



UNIVERSITY OF AGDER

<A semantic web approach for dealing with university courses>

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Abstract

Semantic web gives intelligence and meaning to the web. Ontology is primary and most important part of semantic web because it focuses on relationship rather than information. Semantics in Educational knowledge domain is very emerging. Some of the work is already done [1][2] but there is still a lot more to be done.

This Master thesis gives solution for developing of ontology in the field of educational domain i.e. University. We discussed the framework of engineering ontology by the use of Protégé which is very user friendly and easy to handle tool.

The thesis describes the implementation of ontology and Querying of ontology to extract the information to make it utilizable for semantic applications to handle. We used protégé 4.2 throught about the report for development of ontology.

Preface

I would like to thank for the guidance of my supervisor Jan Pettersen Nytnun who helped me a lot Throughout the semester and provided constant assistance. Secondly I would like to thank my family who have supported and encouraged me throughout this project without their support I might not be able to achieve this much. Thank you

Grimstad, June 2013

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1. Introduction

The Semantic Web is a network or mesh of information connected in such a way that its easily executable by machines, on a large scale globally. We can also define it as being a proficient way of showing data on the World Wide Web or as a worldwide connected database.

The current web is the collection of documents and computers are phrasing around these documents. The end users search for documents by asking the questions from search engines. The computer understand the HTML code literally word by word by reading single words and show the results regarding to it. But it cannot understand the meaning behind those documents which the users parsing around.

Let take a simple example of a phrase "I Love Photography". The search engines understand it as a combination of words. But if we change the syntax of the words then the computer don't really understand, e.g. the language is changed to Chinese or Norwegian "Jeg elsker fotografering". In semantic web technology the computer will understand the meaning behind the phrases that the user likes to know about photography and the equipments of photography and all the things related to photography. The semantics are always the same regardless of change in syntax e.g. if "I love Photography" is written as "I ♥ Photography"

When the World Wide Web was proposed by Tim Berners Lee a decade ago it was envisioned not only as a medium for human communication but also for machine communication. The second half of that hope is as yet unrealized, with the frustrating result that vast amounts of data available to the human enquirer cannot practically be analyzed and combined by machine. In modern era people have less time about the common things like appointment with the doctor, the time and place of appointment and booking of appointment. These are the kind of stuff which machine can do it for humans

This report will explain the basic knowledge of the semantic web technologies and explanation of basic layers which is to the date a great challenge also further on will discuss the ontology development and tools which are used throughout the project.

The Semantic Web was thought up by Tim Berners-Lee, inventor of the WWW, URIs, HTTP, and HTML. There is a dedicated team of people at the World Wide Web consortium (W3C) working to improve, extend and standardize the system, and many languages, publications, tools and have already been developed. However, Semantic Web technologies are still very much in their infancies, and although the future of the project in general appears to be bright, there seems to be little consensus about the likely direction and characteristics of the early Semantic Web [8]

2. Theoretical Background

Tim Berners Lee when at the first come up with the idea of web 2.0 his vision was not only for human-human communications but also for machine interaction. The contents on web currently are majorly for humans. Let's take an example there is a lot of information on web about

- Weather
- Airline schedule
- Sports Stats
- TV and Movies Guidelines

These information is easily available on the web and can be seen but it's very difficult to use these contents or make it customizable on own website or any other application. To explain it better let's take the case of online calendars it's very easy to see data but very difficult to pull out information and utilize it on other websites or any portable device. Though Google has done a lot more work on that task to create API with the help of which one can easily pull out information and utilize it anywhere. And that's because of using OWL, RDF, SPARQL and many other new languages. With the help of these new languages the concept of web is change and it's all in the new dimensions of search contents and explaining the web contents e.g. Ontologies can define more briefly than the HTML etc. The Semantic web is new idea and research going on currently and the purpose behind this idea is to introduce artificial intelligence to the internet where searches are not based just on the phrase match but the meaning behind that searches.

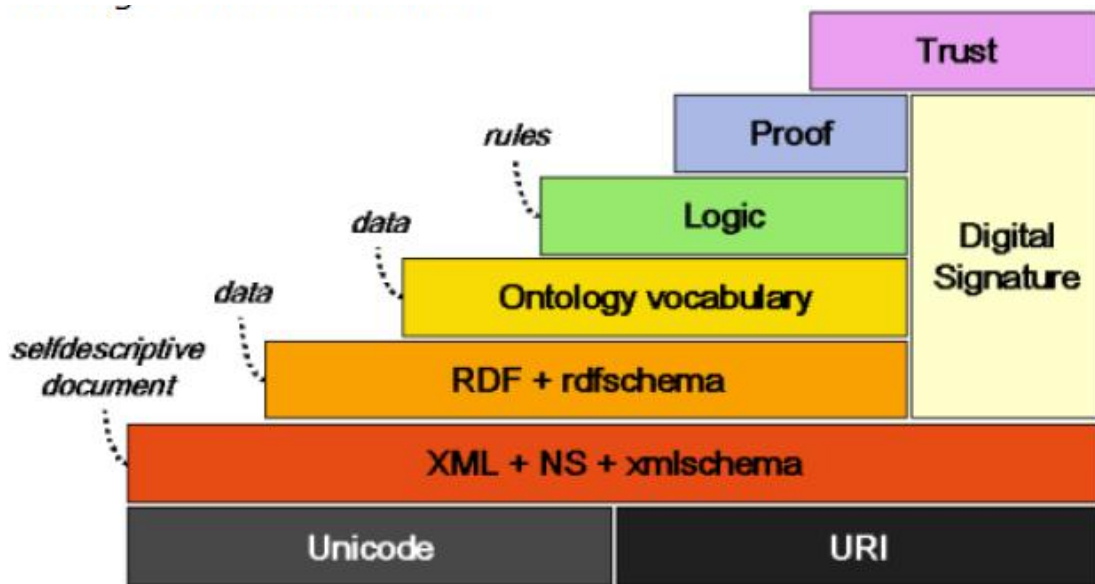
Many organizations are attempting to make the Web computer-friendly via Web services, but current web several limitations:

- *A Web service knows only about itself — not about its users, clients, or customers.*
- *Web services are not designed to use and reconcile ontologies among each other or with their clients.*
- *Web services are passive until invoked; they can't provide alerts or updates when new information becomes available.*
- *Web services do not cooperate with each other or self-organize, although they can be composed by external systems.[9]*

Tim Berners Lee has divided the semantic web into layers which are

- Unicode and URI layer
- XML and XML schema layer
- RDF layer

- Ontology
- Logic
- Proof
- Trust



Semantic Web Layers
 Courtesy: Semantic Web Activity

Figure 1 Semantic web Layers [10]

URI

A URI is uniform resource identifier and it is used for the identification purposes of the web contents. Every web content has its own URI address which is in the form of the characters or strings and it helps in recognizing the contents.

Uniform Resource Identifiers is simply used for identifying the resource in semantic web URI plays an important role. The contents on the web have a unique identity URI and it's just same as the social security number (SSN). URI consists of combination of characters and symbols. As URI is Uniform Resource Identifier so it can be characterized as

Uniform

Uniformity delivers numerous assistances: it lets diverse kinds of resource identifiers to be used in the identical context, even also when the type of method used to access those resources may contrast and the other one is that it lets uniform semantic clarification of mutual syntactic agreements across dissimilar kinds of resource identifiers, also it lets introduction of new kinds of resource identifiers Deprived of interfering with the way that current identifiers are used; and,

it lets the identifiers to be reused in numerous diverse contexts, therefore authorizing new applications or protocols to influence a big, and diversely used combination of resource identifiers

Resource

A resource must have an identity and it can be anything. Familiar examples contain an image, document, a service, and a group of other resources. Not all resources are network "retrievable"; e.g., human beings, corporations, and bound books in a library can also be considered resources

A URI can be further classified as a locator, a name, or both.

The term "Uniform Resource Locator" (URL) is the form of URI which identify contents and locates for example the social security number will be my URI while my home address will be my URL, so rather than searching the content by name or any other means it identifies it by location.

The term "Uniform Resource Name" (URN) refers to the subset of URI that are required to remain globally unique and persistent even when the resource ceases to exist or becomes unavailable.

A URN differs from a URL in that its primary purpose is persistent labeling of a resource with an identifier. That identifier is drawn from one of a set of defined namespaces, each of which has its own set name structure and assignment procedures

A URI parser of URI syntax is able to parse URL and URN both references as a URI, we have to determine the scheme, after than parsing can be performed as URI components. In other words, the URI syntax is a superset of the syntax of all URI schemes [11]

Example URI

The following examples illustrate URI that are in common use.

ftp://ftp.is.co.za/rfc/rfc1808.txt

-- ftp scheme for File Transfer Protocol services

gopher://spinaltap.micro.umn.edu/00/Weather/California/Los%20Angeles

-- gopher scheme for Gopher and Gopher+ Protocol services

http://www.math.uio.no/faq/compression-faq/part1.html

-- http scheme for Hypertext Transfer Protocol services

mailto:mduerst@ifi.unizh.ch

-- mail to scheme for electronic mail addresses

news:comp.infosystems.www.servers.unix

-- News scheme for USENET news groups and articles

telnet://melvy1.ucop.edu/

-- Telnet scheme for interactive services via the TELNET Protocol[12]

XML

XML is a machine language which is abbreviated as Extensible mark-up language and it is used for documents like HTML etc.

XML is currently a very popular and effective way of exchanging information. XML languages conform to a well defined syntax that is compatible with many parsers which are widely available. XML provides a proficient solution to the syntax problem for data sharing.

XML consists of tags which the user can create and use it for structure of the program and it's different from HTML tags.

XML can identify the type of documents, elements, attributes of those elements and the connection or relationship of those elements and documents.

XML and HTML have quite a lot of differences. HTML is purely used to display or design the web pages. The function of HTML is different from XML. HTML cannot save data while XML is used to store data in the document. So XML has no concern over the design and layout of web content.

XML can also be used as a good communication tool. If there are group of users using same tags in an application to express data then these users can robustly communicate so due to that reason XML is known as easier platform of exchanging information between entities.

Background of XML:

Browsers compatibility in the past has been a great challenged. The document created by the user has a lot of issues with the other browsers for example the user created a document in Internet explorer then the document tested on opera will have different look. WWW (World Wide Web) has now extended the limits of using just few tags of HTML.

W3C is also known as World Wide Web consortium is the platform which has been working to promote standards in technology for decades.

With the help of XML the user can create self created new tags, new elements in no time. Most of the browsers now a day's support XML.

How XML does look:

Let's look at some examples of XML text:

```
<?xml version="1.0"?>
<Gift>
<to>Peter</to>
<from>Frank</from>
<wordings>Happy Birthday!</wordings>
<body>Have a Great day</body>
</Gift>
```

At the start of the line there is declaration of the XML and its version. It is necessary to include that part in the XML code. Also we have to note down that there is no closing tag for the declaration line. So we have to keep in mind that declaration doesn't need closing tag.

RDF

Resource Description Framework, this is the basic framework that the rest of the Semantic Web is based on. On the Semantic Web, information is represented as a set of declarations called *statements* made up of three parts: subject, predicate, and object. Because of these three parts, statements are also sometimes referred to as *triples*. The three elements of a statement have meanings that are similar to their meanings in normal English grammar. The subject of a statement is the thing that statement describes, and the predicate describes a relationship between the subject and the object. Let's take an example from the book Semantic web Programming page 69[5]

Andrew knows Matt.

Andrew's surname is Perez-Lopez.

Matt knows John.

Ryan works with John.

RDF representation will be like the figure given below.

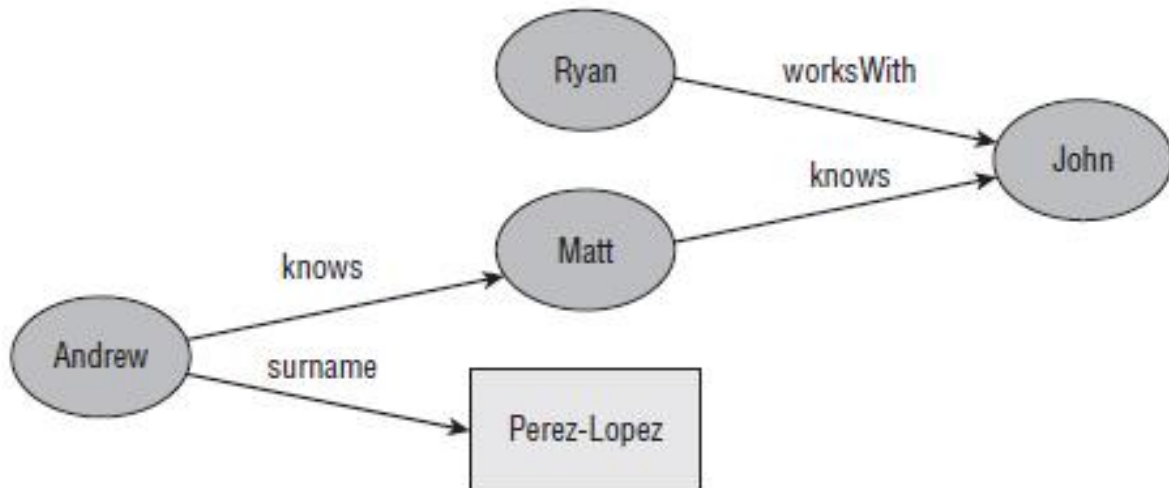


Figure 2 RDF representation Semantic web Programming page69 [5]

In the Figure 2 we can see that two objects are linked with each other with the predicate. In first case Ryan is linked with John with a predicate "worksWith" because they are colleagues while Matt is linked with John by predicate "knows".

Any connection between a document and the thing(s) in the world it describes is made only by the person who reads the document. There could be a link from a document about Einstein to a document about Oslo-Norway, but there is no conception of an entity that is Einstein or linking it to the thing that is Oslo-Norway. In the Semantic Web we refer to the things in the world as resources, a resource can be anything that someone might want to talk about. Einstein, Oslo, "the value of X", and "all the companies in Grimstad" are all examples of things someone might talk about and that can be resources in the Semantic Web. In any case, resource is the word used in the Semantic Web standards. In fact, the name of the base technology in the Semantic Web (RDF) uses this word in an essential way. Let's take an example [5]

Sample Triples

Subject	Predicate	Object
Einstein	Died	1955
Einstein	Field is	Physics
Einstein	won	Nobel Prize

RDF schema:

RDFS is the schema language for RDF. RDF Schema extends RDF by introducing a set of distinguished resources into the language. This is related to the way in which a traditional programming language can be extended by defining new language-defined keywords. But there is an important difference: XML parsers can automatically determine whether a particular XML document conforms to a given schema.

Other schema languages help us to interpret particular data. For example, a database schema provides header and key information for tables in a relational database. There is neither anything in the table itself to indicate the meaning

Ontology

Ontology describes the concepts in the domain and also the relationships that hold between those concepts. Different ontology languages provide different facilities. The most recent development in standard ontology languages is OWL from the World Wide Web Consortium (W3C). There are several definitions of ontology each and one differ from each other. Another definition can be "ontology is a formal explicit description of concepts in a domain of discourse. Classes which are sometimes called concepts, properties of these classes are call slots or roles, while restrictions on slots are called facets. When ontology is together with the instances it creates knowledge base.

Ontology is truly based on the representation of classes. So we can say that classes gives concept to ontology.

Since the beginning of the 1990s ontology became an admired research topic investigated by quite a few AI research communities including knowledge engineering, natural language processing, and knowledge representation. More recently, the notion of ontology is also becoming extensive in the fields like intelligent information integration, cooperative information systems, information retrieval, electronic commerce, and knowledge management.

In computer science and information science, ontology is a formal representation of the knowledge by a set of concepts within a domain and the relationships between those concepts. It is used to reason about the properties of that domain, and may be used to describe the Domain.

Overview of Existing Ontologies:

Ontology is the main term of semantic web. The main purpose of ontology is to capture the domain knowledge in such a way that it is easily understandable by machines. The ontologies in educational system are very emerging these days. One of the survey is carried out by Sir Jorge Cardoso has shown that most of the ontologies are created in the field of education which is 31% then after education its Computer software (28.50%), Government(17%), Business(15.5%), Life sciences(13%) as shown in figure below

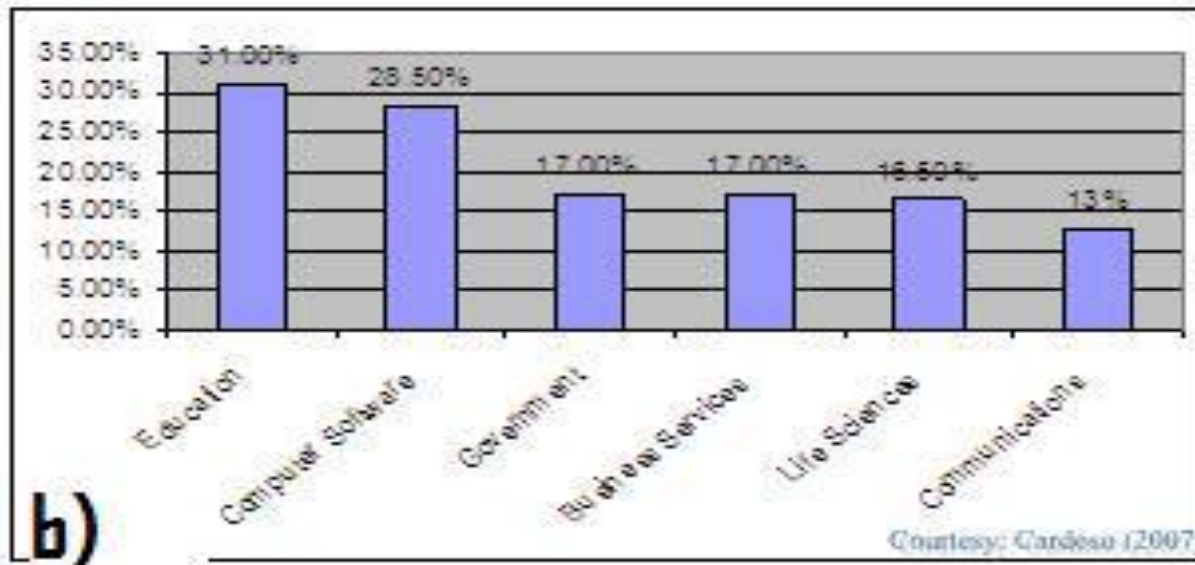


Figure 3 Development of ontologies in different domains [13]

In the survey it was also mentioned that mostly the tool is used is called Protégé which is 68.2% as shown in figure

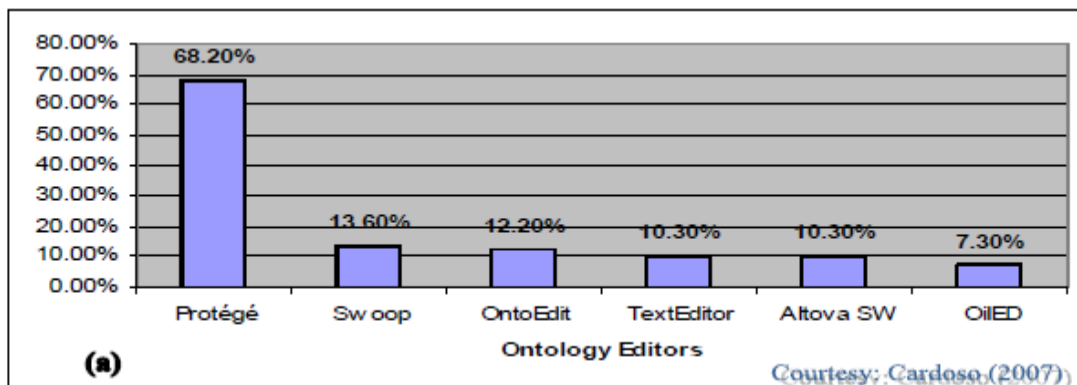


Figure 4 Ontology Editors used by respondents [13]

In the domain of Educational system the ontology delivers the information of how the classes are related to each other. When it comes to the concept of "Education" then ontology is created on the basis of University. Different group of developers create their own ontology. But if we compare those ontologies some concepts will be always missing also there will be some classes and relationship missing. Because every developers has different requirements.

For example there are two ontologies one is related to examination system and the other is related to details of professors only then there will be a lot of difference in the classes and the relationship. There might be lack of information about the student's date of birth, student ID etc in ontology about the details of professor because it's irrelevant for the ontology to add information about the student despite adding information and relationships of the professor.

There are some ontologies related to University in education domain such as develop-ing university ontology, by Sanjay Malik[1]Which focus on the university employee detail only based on date of joining , name, address etc. and ontology based on course, Ling Zeng[3][4], et al. 2009 [2]which focus on particular course to reuse of course for teaching purpose.

Components of Ontology

Most ontology describes individuals (instances), classes (concepts), attributes, and relations.

Common components of ontologies include:

- *Individuals*: Instances or objects (the basic or "ground level" objects)
- *Classes*: Sets, collections, concepts, classes in programming, types of objects, or kinds of things.
- *Attributes*: Aspects, properties, features, characteristics, or parameters that objects (and classes) can have
- *Relations*: Ways in which classes and individuals can be related to one another
- *Function terms*: Complex structures formed from certain relations that can be used in place of an individual term in a statement
- *Restrictions*: Formally stated descriptions of what must be true in order for some assertion to be accepted as input
- *Rules*: Statements in the form of an if-then (antecedent-consequent) sentence that describe the logical inferences that can be drawn from an assertion in a particular form
- *Axioms*: Assertions (including rules) in a logical form that together comprise the overall theory that the ontology describes in its domain of application
- *Events*: The changing of attributes or relations [14]

Ontology Languages

An ontology language is a formal language used to encode the ontology. The advantage of formal languages is the reasoning mechanism which appears in every phase of conception, use and maintenance of ontology. There are a number of such languages for ontologies, both proprietary and standards based, which are as follows:

1. *DAML+OIL*

DAML stands for DARPA Agent Markup Language. DARPA in turn stands for Defense Advanced Research Projects Agency and is the central research and development organization for the Department of Defense. OIL stands for Ontology Inference Layer or Ontology Interchange Language.

2. *SWRL*

Semantic Web Rule Language (SWRL) is a proposal for a semantic Web rules-language, combining sublanguages of the OWL, Web Ontology Language (OWL DL and LITE) with those of the Rule Markup Language

(Unary/binary datalog). SWRL adds rules to OWL+DL. The reason is that these rules provide more expressive power to description logic. SWRL plays an important role in ontology for the semantic Web.

3. *Web Ontology Language*

The Web Ontology Language (OWL) is a family of knowledge representation languages for authoring ontologies. The languages are characterized by formal semantics and RDF/XML-based serializations for the semantic Web. It has classes, sub-classes, properties, sub properties, property restrictions, and both class and property individuals.

The semantic Web relies heavily on the formal ontologies that construction underlying data for the purpose of comprehensive and transportable machine understanding. Therefore, the success of the semantic

Web depends strongly on the production of the ontology which requires fast and easy engineering of ontology and avoidance of a knowledge acquisition bottleneck [6]

Logic

In this layer logics are added to the semantic content. For example we say that

Male is parent.

Peter is Male

Then *Peter is Parent*

We cite another example that is widely used in AI textbooks. It involves birds. We will state the knowledge base easily:

- Birds fly ($\forall x: \text{bird}(x) \text{ fly}(x)$)
- Penguins are birds ($\forall x: \text{penguin}(x) \text{ bird}(x)$)
- Joe is a penguin ($\text{penguin}(\text{Joe})$)

We can deduce now, that Joe is a bird and hence can fly. But there's one more rule that, for the sake of accuracy, could be added to the domain representation.

- Penguins don't fly ($\forall x: \text{penguin}(x) \neg \text{fly}(x)$) [15]

This statement causes an inconsistency in the knowledge base. If we follow the path

Joe is a penguin, penguins are birds, birds fly, then Joe flies. If we follow the path Joe is a penguin, penguins don't fly, then Joe doesn't. The addition of a rule made the knowledge base inconsistent, even though it was a sensible rule to add. And locally, the knowledge base was also correct before this rule was added. It was just missing some information and it still is missing information. Complete formalized knowledge of a domain is an illusion.

Proof

After building a system that has some logic and semantic then this layer helps to prove things. While it's very difficult to create proofs rather than checking proofs. Here is an example from an internet

Example: Corporate sales records show that Jane has sold 55 widgets and 66 sprockets. The inventory system states that widgets and sprockets are both different company products. The built-in math rules state that $55 + 66 = 121$ and that 121 is more than 100. And, as we know, someone who sells more than 100 products is a member of the Super Salesman club. The computer puts all these logical rules together into a proof that Jane is a Super Salesman [16]

Trust

Without trust semantic web is ineffectual. There should be trust factor involved that how trustworthy the source is. A system which is called digital signatures it is based on mathematic and cryptography. It provides proofs written by the people. Certain person wrote (or agrees with) a document or statement. So it digitally signs all of my RDF statements. That way, you can be sure that I wrote them (or at least vouch for their authenticity). Now, you simply tell your program whose signatures to trust and who's not to. Each can set their own levels or trust (or paranoia) the computer can decide how much of what it reads to believe [17]

3. Problem statement

Motivation

Being an ontology developer there are a lot of factors which you have to keep in mind. Designing ontology is the creation process of a lot of classes and relationship so the user must have deep knowledge about the domain. Two ontologies of the same domain might differ because of the requirement of the queries by creator from ontology. So the understanding of domain might have affect on design of ontology.

Problem or Goal

The Goal of this report is to implement an ontology and to show how it can be made and what will be the steps that would be required to follow. The problem is that user must have brief knowledge about the domain of the ontology because the better the knowledge is the better the ontology will be.

Key assumptions and limitations

Limitation of the scope of ontology is that

"The ontology should not contain all the possible information about the domain: you do not need to specialize (or generalize) more than you need for your application (at most one extra level each way)."

We have to limit the scope of ontology for specific application. For example if we are making ontology of laptops we do not need to add what's the color to brand is or what does the logo is made of [18]

Prior work in the field

To be more efficient ontologist you have to study more about the domain of ontology and the related ontologies. The more you study ontologies related to your domain the more proficient and effective your ontology will be regarding to the queries which we want to ask from ontology. Because there might be several ontologies in educational domain but if the ontology is focused on the storing data of professors then the other educational domain based ontologies might not answer the queries about the data of Professors. so if the ontology is not that much effective then answers which it will provide for the questions by the users will also not be effective.

Method

The most recent development in standard ontology languages is

OWL from the World Wide Web Consortium. OWL is meant to be simplest and easiest language for the beginners. There are a lot of languages but we picked up OWL for its simplicity. It has a richer set of operators - e.g. and, or and negation. It is based on a different logical model which makes it possible for concepts to be defined as well as described.

Complex concepts can therefore be built up in definitions out of simpler concepts.

Solution approach or Implementation

The solution which is provided in this report is to implement ontology and to show its basic steps which should be taken before programming ontology and during Programming ontology. After selecting domain the tool which is preferred is protégé. It supports OWL and is a good tool to start-up with. The tool is furthermore discussed in the solution.

4. Solution

Creating Ontology and then a good quality Ontology that is Well-structured and free from contradictions, isn't easy. The designer of the ontology requires the ability to conceptualize and articulate ideas and a skill for modeling abstractions. The solution for making ontology is by using some software as respect to the type of ontology the user wants to create. There are more than 185 tools for editing, making and mapping of ontology but we will discuss some of the good rating tools which can do the job better than the rest of the tools.

Fundamental steps which are key in the development of an ontology using a tool are [19]:

- **Obtain domain knowledge:** *A deep insight into and a thorough knowledge of the respective domain is prerequisite to construction of any domain ontology.*
- **Identify the key concepts:** *Concepts that represent the domain are identified and hence implemented by means of classes.*
- **Build the taxonomy:** *the class hierarchy is created by creating the classes and their respective subclasses, and instances of classes.*
- **Identify relationships between classes:** *Properties are used to represent relationship between classes.*
- **Consistency checking:** *the constructed domain ontology must be checked for consistency using reasoners.*
- **Implementation of ontology:** *involves deployment of ontology to enable machine-to-machine communication.*

An Ontology building methodology may have the following layers [20]

- *Top layer: building process compliance with software development process.*
- *Middle layer: Generic constraints and guidelines to specify major steps.*
- *Bottom layer: Most fine grain guidelines such as those for class identification process etc.*

1. Protégé:

Protégé is free ontology editor which is created by Stanford University. It is very popular tool for editing and creating ontology. It supports Frame based ontology design and OWL ontology. The plus point for protégé is that It has several plug-ins which is very handy and useful. Due to its plug-ins it is used a lot all over the world.

2. Web protégé:

Web protégé is also a product of Stanford centre but it is used for developing web ontology. Its user interface is just as same as Protégé so it's online version of protégé.

3. NeOn Toolkit:

NeOn is an ontology engineering tool. Just like Protégé it has plug-ins but which are lesser in amount as protégé. Basically this tool is used for making weighty projects for example Ontology mapping and integration, multi-modular ontologies etc

4. SWOOP

It is a small but very simple tool for developing ontology. Due to its simplicity it is majorly used by beginners for developing ontology.

5. Neologism

This tool is used for online vocabulary editor.

6. TopBraid Composer

This tool is used for Semantic web editor.

7. Vitro

Semantic web editor

8. Knoodl

9. Ontofly

10. Altova OWL editor

11. PoolParty

12. IBM Integrated Ontology Development ToolKit

The list goes on.

The tool we have used in this project is called Protégé and there are a lot of reasons for using the protégé and those are

- **User Friendly user interface**

The interface for protégé is very simple for starters in ontology engineering. The workspace can be modified for more simplicity and rapid work.

- **Scalability**

In Protégé user can develop from small ontology to heavy weight ontology containing several thousands of classes.

- **Plug-in Architecture**

The plug-in architecture in Protégé is very good plus point for protégé which differentiate it from other tools. The plug-ins are used for several purpose. The plug-ins can be used for visualizing the ontology. For example the OWLviz and OntoGraf are the type of plug-ins which helps in visualizing the created ontology. In **Figure5** and **Figure6** we can see the visualization.

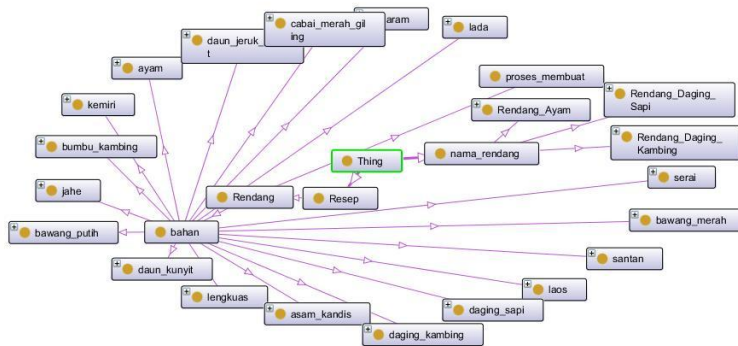


Figure 5 Onto Graf visualization



Figure 6 OWLviz visualization

Not only visualization but there are more plug-ins which works very differently. There are some more useful plug-in listed below

- DL Query
- Ontology Differences
- OWL Code Generation

And many more.

Design Specification:

The design specification of ontology consists of Classes, Object properties, Data properties, individuals, Restrictions, which will be discussed in the detail in this chapter. So this chapter is divided into following parts

1. Classes and class hierarchy
2. Object properties of ontology
3. Data properties of ontology
4. The axioms of ontology
5. The reasoning of ontology
6. Result and Analysis

Classes and Class hierarchy:

The classes in ontology play a vital role. The classes and class hierarchy in this ontology can be seen in the **Figure7**. The number of classes may not be as much as compared to existing educational knowledge based ontologies. And that's because the construction of ontology depends on the developer that how much the developer want to extend. The classes in project are shown in Figure below

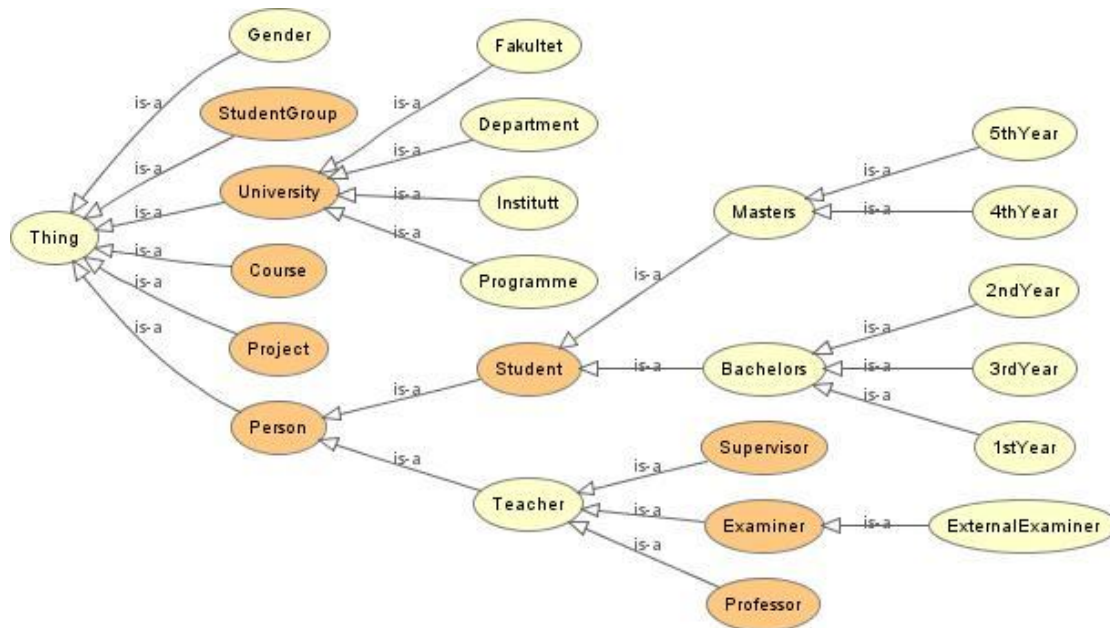


Figure 7 OWLviz Representation of Class Hierarchy using Protégé

Each class and its usage will be discussed in this section.

Course

Course is the subclass of thing. In this class all the courses which are offered by the institution in the specific year are mentioned. The course will have Course name and Course code which will be discussed onwards in Axiom Section. The course will also have information about the year in which the course has been offered. The Course will also have information about the professor who will be teaching the specific course in specific year. Also the course class will have information about the students taking the course.

- **Gender**

This class will have information about the Gender of Person. It can be male or female. With the help of this class the gender can be discriminated of the person. Gender is class but not property and that is because in protégé there are two kinds of properties data type and object type. It is not data property and object property in protégé has domain and range to make a relationship between two classes which here does not solve the problem so we take it as a class. Though adding the information of gender can be made through object properties i.e hasGender Male. It will be discussed later in the Object properties section.

- **University**

University is super class of classes includes Department, Institute, faculty and programme. The University will contain information about these classes relevant to the University of agder. The subclasses are discussed below

- **Department**

Department is the subclass of university which will contain information about the departments which the university will compose. Also the Department will have information about the programme.

- **Fakultet**

The Fakultet is subclass of University. Fakultet will contain information about all the faculties of university. The faculties will be composed of some departments. So the Faculty lies above in the hierarchy of institution but in Protégé all of these classes lie under the university.

- **Institutt**

Institute contains all the information about the institutes of UIA. The institutt will also contain information about the location and all useful information which are linked to it. For example the phone number location etc

- **Programme**

Programme contains information about the study and study direction. It contains the entire programmes which are offered by institution. These programmes will have further details about the relationship with departments and basic information about the programme. i.e. Credit hours, Department etc

- **Person**

The Class of person contains all the personals and the students engaged with the institution in anyways. This class will have all the information about the people for example Age, date of birth, Personal number, student number etc. This class will be the super class of following classes.

- **Student**

In this class Student of all levels will be mentioned alongside the information about their student ID, programme registered in, Department etc. The student is then further divided into subclasses as follow

- *Bachelors*

In this Class the Bachelor students of 1st, 2nd and 3rd year will be registered. This class contains all the information about the Department, faculty, Courses the student will take and the programme. These classes have 3 more subclasses named 1st year, 2nd year and 3rd year. if there is a student of 3rd year taking courses of 1st year due to some reasons, in that case the level of the student will remain same because the level of the student is calculated by the year of admission.

- *Masters*

In this Class the Master students of 4th and 5th year will be registered. This class contains information about the Master thesis, Department, faculty, and many more information. This class will have 2 more subclasses named 4th and 5th year.

- **Teacher**

This class contains all the information about the Teachers. This class will also have information about the regarding department of teacher and the course which will be responsibility of teacher. This class will further have 3 subclasses which are Examiner, Professor and Supervisor.

- *Examiner*

Examiner is kind of teacher which will be involved in the project at the end of project. Examiner will be involved in the grading of project at the end of project. Examiner may or may not be part of organization that why there is subclass of Examiner which is External examiner. External examiner will not belong to the Institution. This class will contain information about the Examiner of Student Group and the Examiner of Project.

- *Professor*

In this class all the organizational personnel which belongs to institution and teacher of come course will lie in this class. Professor can also be supervisor. In this class there will be information about the department, faculty and all the personal information of professor.

- *Supervisor*

Supervisor is a class which is almost equivalent to the professor but slightly changes. A professor will teaches some of the course while the supervisor it's not compulsory to teach the course. It can be PHD student or a professor. This class will have all the personal information and professional information about the person. The supervisor will also be responsible for grading the projects and the groups.

- **Project**

This is one of important class on this ontology. This class consists of projects. The project is related to the course. Not all the courses have projects. In this class there will be information about examiners, students and the supervisors. The project will have information about the student who is taking the specific project and the supervisor and also about the grade which the student will get at the end.

- **Student Group**

Student Group is the type of class in which the student makes the group for 2, 3 or more for a single project. In this class there will be information about the Group number, Group grade, group project, Group supervisor and the member students.

Object properties of ontology

Object properties links two individuals with each other. The object properties have their range and domain. In this project there are several object properties used. Some of them are inverse of each other. The object properties which are used in this project are mentioned in the figure below. The properties will be discussed individually.

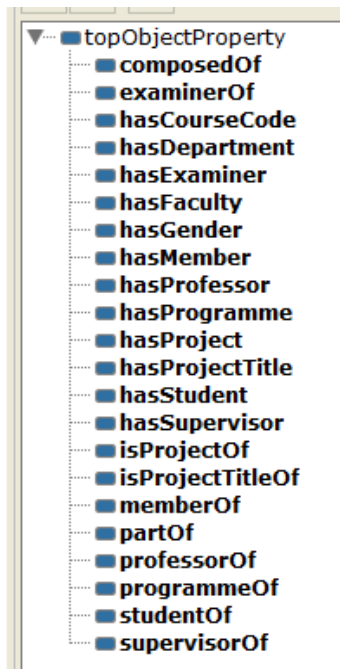


Figure 8 Object Properties

- **composedOf**

Composedof is object property for individuals of class University. This object property is used to relate the individuals of subclasses of University to the individuals of University itself. The domain of this object property is University. As in the Figure 9 we can see Engineering and science is faculty and it composes the Department of Engineering and sciences, Department of Mathematical sciences, Department of Natural sciences and Department of information and communication sciences. Same with the case of UIA which is individual of University and it composes all the departments, faculties, institutes and programmes.

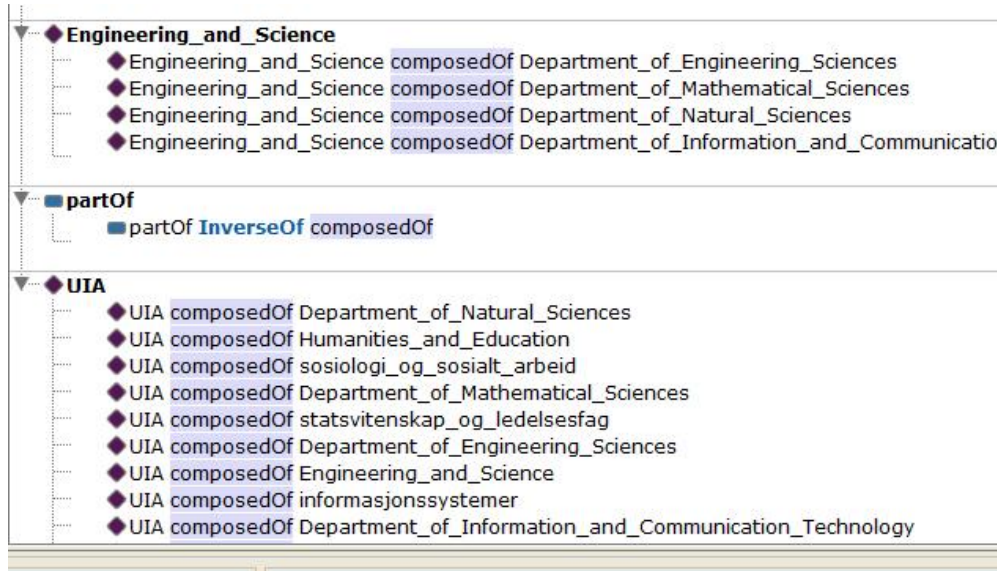


Figure 9 Usage of composedOf Object Property

- **partOf**

It is the inverse of ComposedOf. This property relates the individuals of subclasses of University to the individuals of class University itself. As it's the inverse of composedOf so the domain and the ranges are inverted as well.

- **examinerOf**

This property relates the Class Examiner to the individuals of StudentGroup and Project. The Domain of this object property is class "Examiner" while the range is "StudentGroup" and "Project". This means that the examinerOf relates these classes with each other.

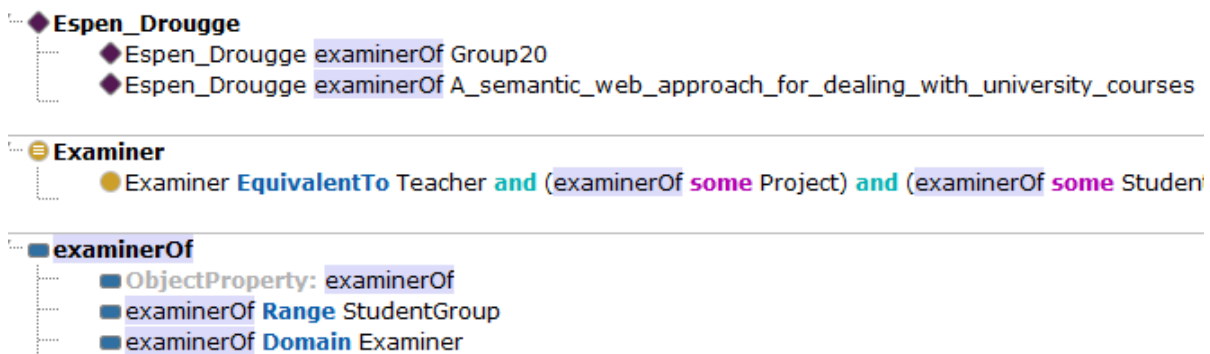


Figure 10 Usage of examinerOf Object Property

- **hasExaminer**

This Object property is inverse of examinerOf. In the previous object property we have mentioned the domain as class "Examiner" so in this case it became range of the property. And the domain of this object property became class "studentGroup" and "Project".

- **hasCourseCode**

This object property is used to allocate the course code to the course. The domain of this object property is Course. The usage of this property is shown in below



Figure 11 Usage of CourseCode Object Property

- **hasDepartment**

This object property relates the individual of class "Person" to "Department". The domain of this object property is "Person" and the range is "Department". This object property is used to add the name of department into information of person.

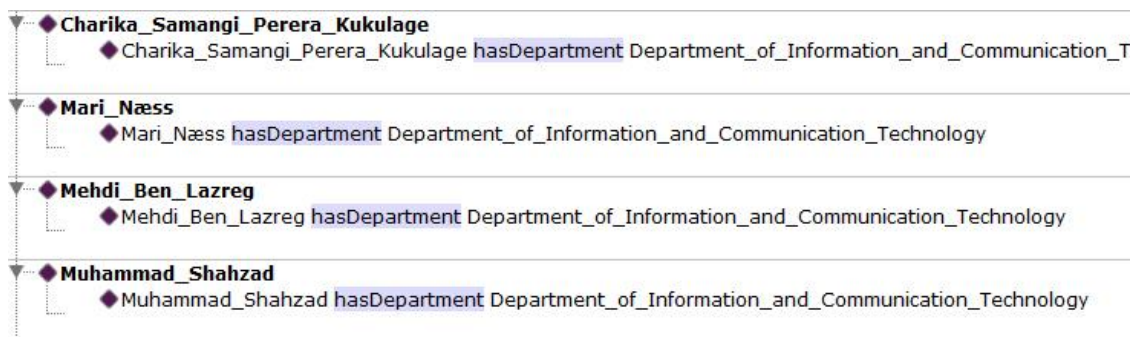


Figure 12 Usage of hasDepartment Object Property

- **hasFaculty**

In this object property the domain is "Person" while the range is "Faculty". This object property adds information of faculty into information of person. The usage of this object property is given below



Figure 13 Usage of hasFaculty Object Property

- **hasGender**

This object property is used to add information about the gender.

- **memberOf and hasMember**

These object properties are inverse of each other and they are used to link the individuals of class "Student" and "StudentGroup". The domain of property memberOf is Student and range is StudentGroup. As the property hasMember is inverse so the domain and range is also inverted. These properties add information of student group into record of student. The usage can be seen in the figure below



Figure 14 Usage of memberOf and hasMember Object Properties

- **hasProfessor and professorOf**

These object properties are inverse of each other. These Properties link the individuals of class "Professor" and "Course". The domain of hasProfessor is "Course" and range "Professor" and the domain and range is inverted for property professorOf. This object property is used to add information about the professor in the course or vice versa. The usage of this property in our ontology can be seen in the figure below

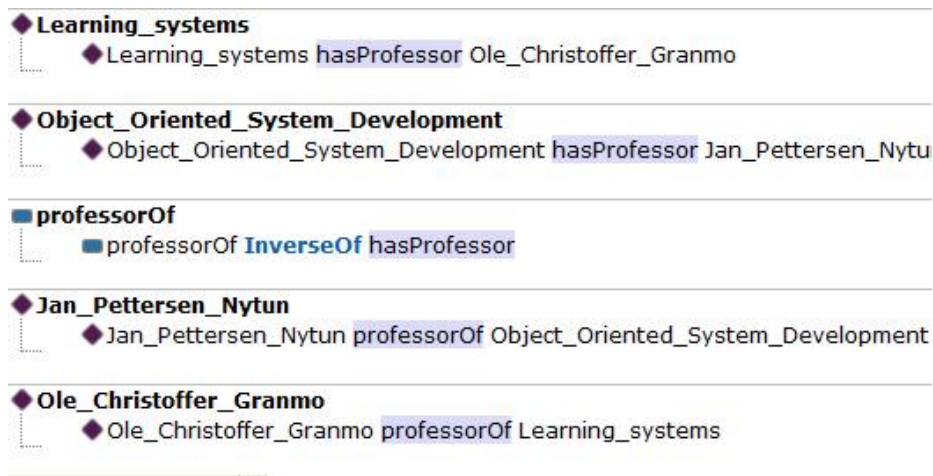


Figure 15 Usage of hasProfessor and professorOf Object Properties

- **hasProgramme and programmeOf**

These Object properties are used to add information of programme into class department. These properties link the individuals of class "Department" and "Programme". The domain of hasProgramme is "Department" and range "programme" and the domain range is inverted for programmeOf.

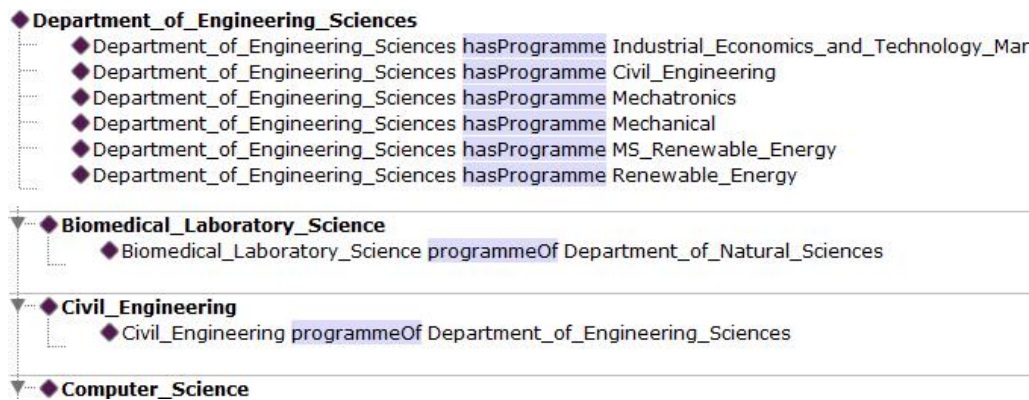


Figure 16 Usage of hasProgramme and programmeOf Object Properties

- **hasProject and isProjectOf**

The domain of object property hasProject is "Student" and "Course". And the range is "Project". The same but inverted classes are domain and range of isProjectOf. These properties are used to for adding information about the relevant project which the student has taken in the particular semester.

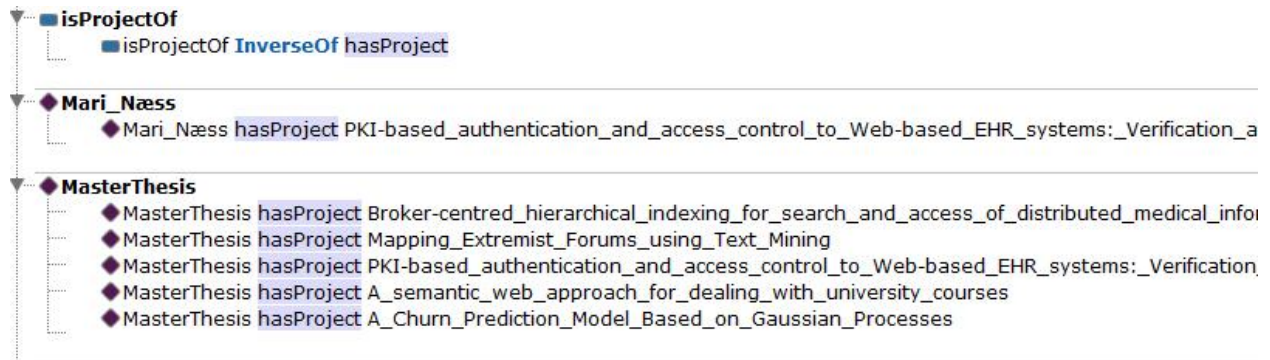


Figure 17 Usage of hasProject and isProjectOf Object Properties

- **hasProjectTitle and isProjectTitleOf**

These properties are used to link the individuals of class "StudentGroup" and "Project". The domain of hasProjectTitle is "StudentGroup" and range "Project". The usage of this object property can be shown in the figure

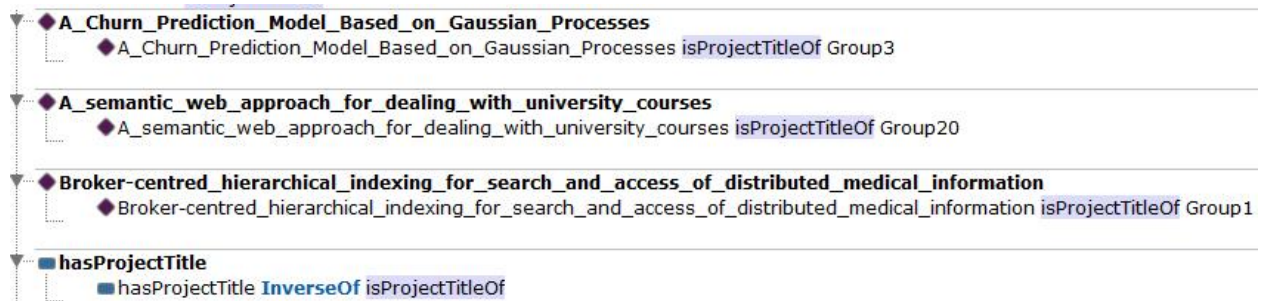


Figure 18 Usage of hasProjectTitle and isProjectTitleOf Object Properties

- **hasStudent and studentOf**

These Object properties relate "Course", "Programme" and "Student". The Domain of hasStudent is "Programme" and "Course" while the range is "Student" and inverse for 'studentOf'. The main task of this property is to add information of the Courses and Programme which the student is studying currently. The usage can be seen in figure below

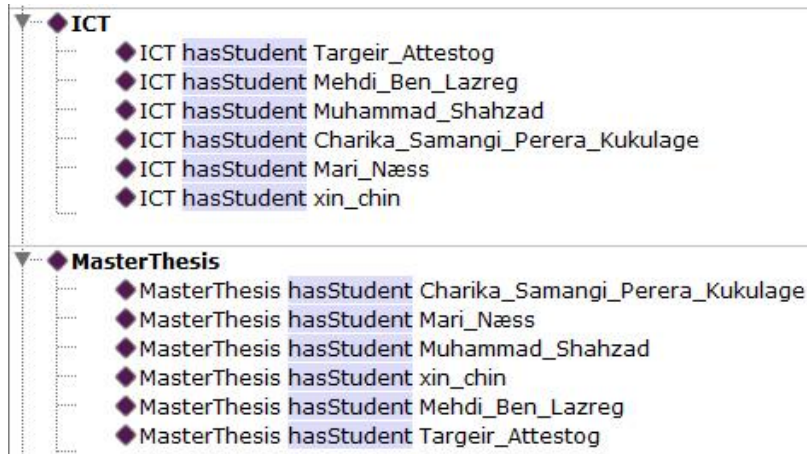


Figure 19 Usage of hasStudent and studentOf Object Properties

- **hasSupervisor and supervisorOf**

The Domain of 'hasSupervisor' is "Project" and "studentGroup" while the range is "Supervisor". While for the 'supervisorOf' the domain and range get inverted.



Figure 20 Usage of hasSupervisor and supervisorOf Object Properties

Data type Properties

In previous section we have seen that in object properties the individuals has been linked but in this section the individual are linked with the data literals. In ontology Data type properties plays a vital role. Object properties are used for relationship between two classes while data type properties are used to save some data value of any format for example adding the property Age, Email address, Phone# etc. In this project there are several data type properties used which will be discussed in this section.

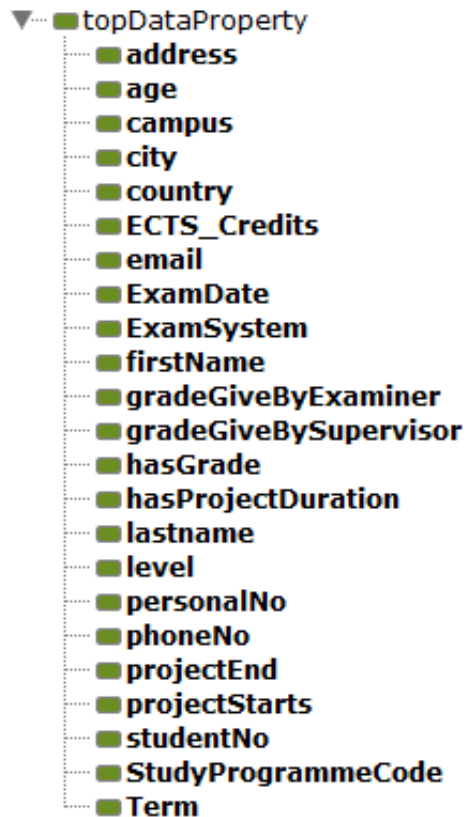


Figure 21 List of data type Properties

- *Address*

This Data type property is used for adding information of address. The address can be of the student, Campus, Institution or any other individual. The address has to be type of 'string'. Which that means in ontology the information about the address can sorted out as string and any queries related to address can be mentioned as a 'string' in DL query or SPARQL query.

- *Age*

Age is data type property which is used for adding information about the age of person. The age format is simple its type is of integer 'int'.

- *Campus*

This data type property is used for adding information about the campus. Since the University of Agder have two campuses one in Kristiansand and another in Grimstad so it's really important to add information about the campus. This datatype property in used by individuals of many classes like for example Institution, Student, Teacher, Department and many other classes.

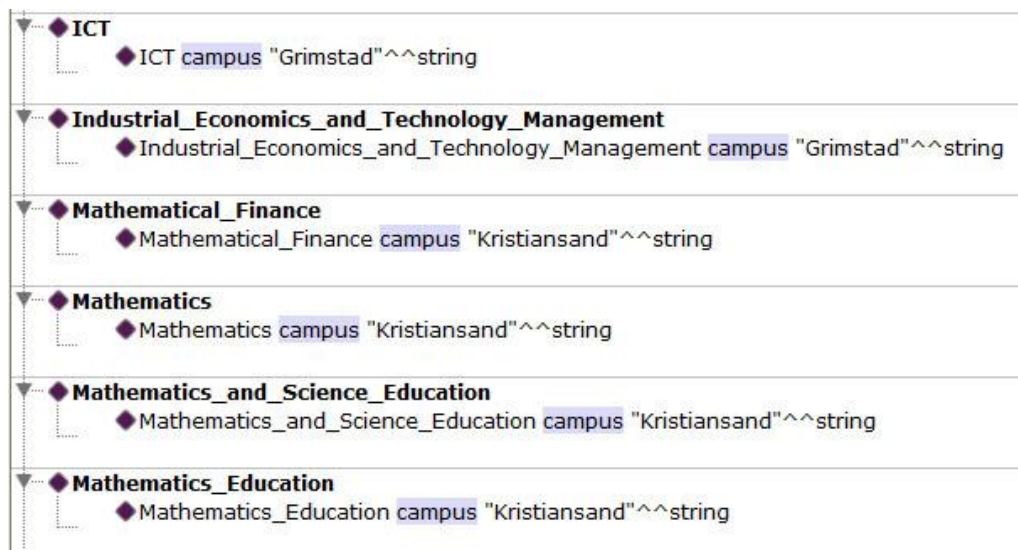


Figure 22 Usage of campus Data type property

- *City*

This data type property is used to add information about the city where the individual is located. This can be very useful if searching for particular individual and will be utilized. The Data type of this property is 'string' as we know that the city name is just in the form of letters.

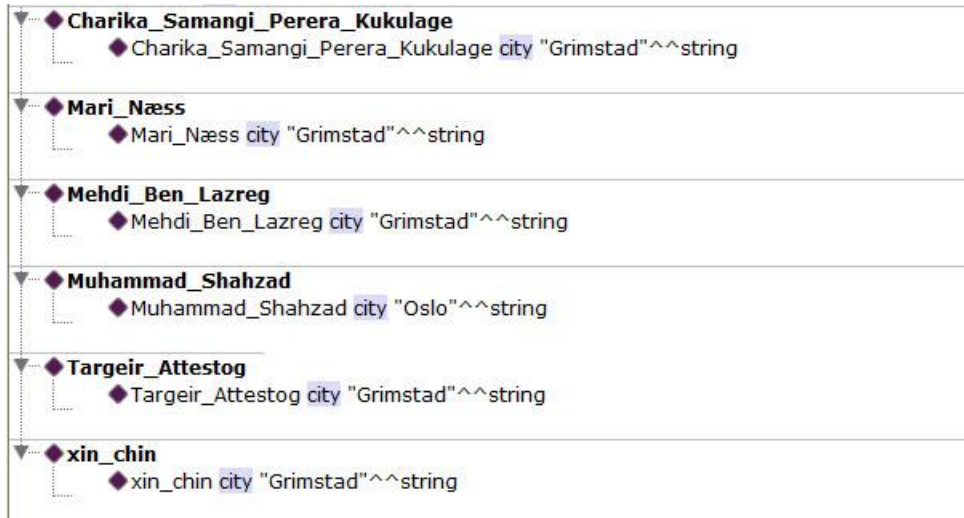


Figure 23 Usage of city Data type property

- *Country*

This Datatype property is used for information of Country into individuals. Most likely the Class "Person" are supposed to use this data type property because of many programmes in which there are many international students admitted so in that case it's very useful. It may also play an important role in searching an individual.



Figure 24 Usage of country Data type property

- *ECTS Credits*

This Datatype property plays a very important role in addition of information about any "Course" "Programme" or "Project". ECTS credits are total number of credit hours of any subject in

semester or the total number of credits the student will be taught in the whole period of the programme. The data type of this property is 'int' because the credits are only mentioned by integers. The usage of this property can be seen in the figure

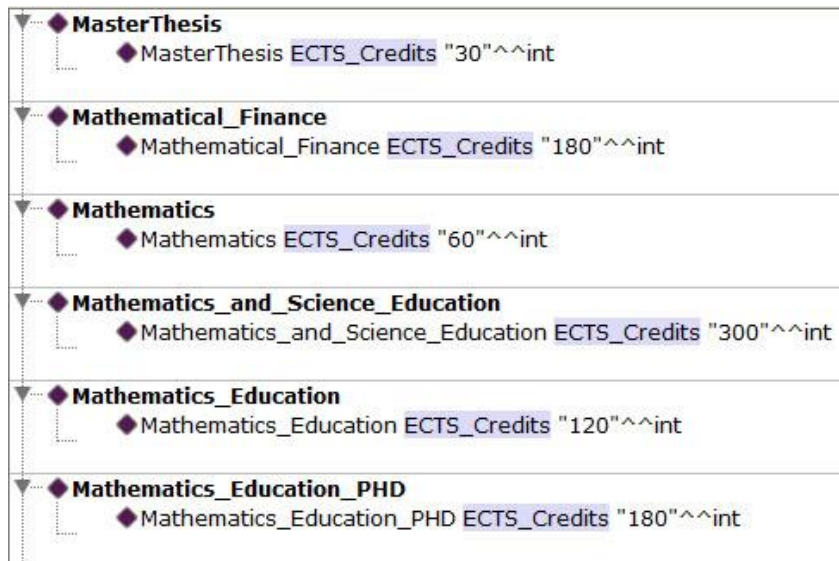


Figure 25 Usage of ECTS_Credits Data type property

- *Email*

This data type property is used to storing email of individuals. The data type of this property is 'string'. This property is very useful for sending information on email. The email can be of any individual of class for example "Person" or "Department" etc. The usage can be seen in the figure

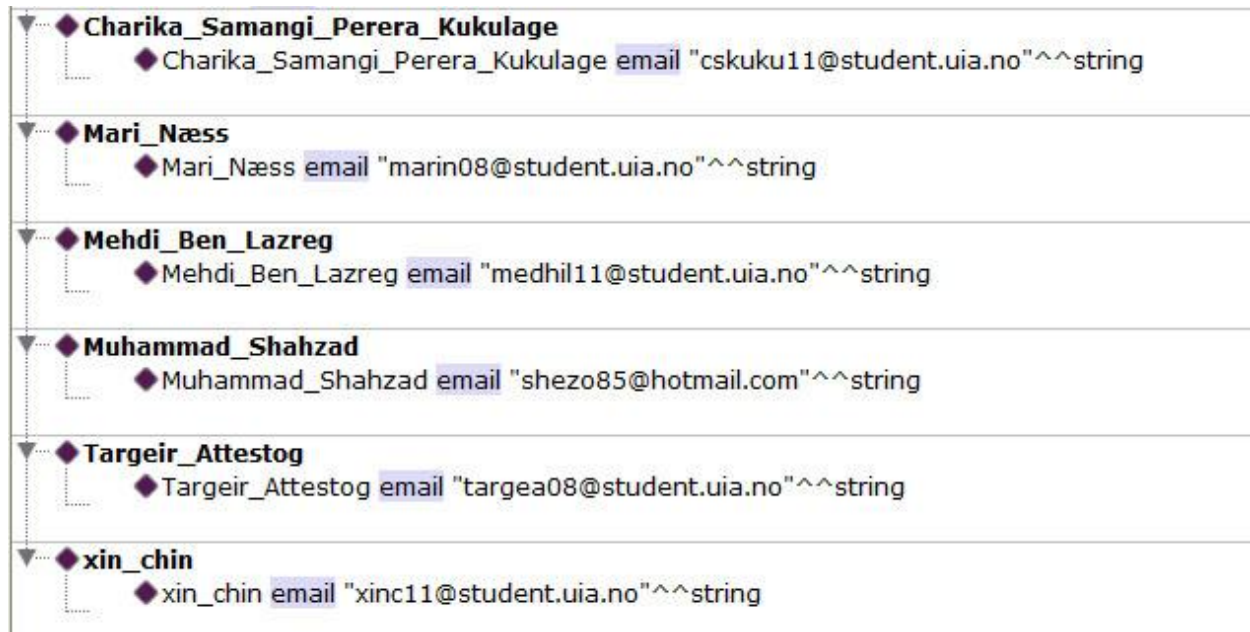


Figure 26 Usage of email Data type property

- *Exam Date*

The property is mainly used for Class "Course". So the Domain of this data type property is class "Course". This property adds information about the date of examination of particular course. Since student is admitted into the course the exam date will change after each semester. The data type of this property is 'datetime'. This data type property is used in our ontology which is shown in the figure

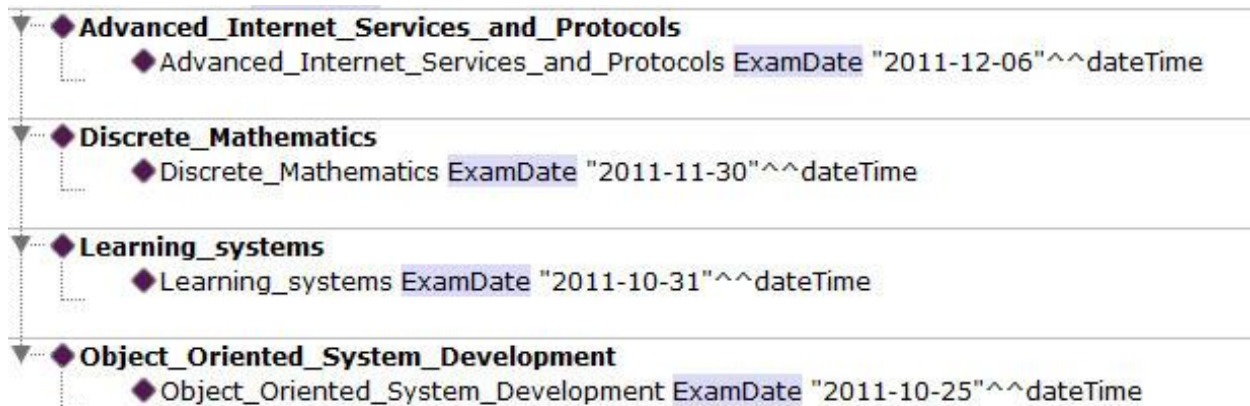


Figure 27 Usage of ExamDate Data type property

- *Exam System*

Exam system property is used to add information about the type of exam which the specific course will have. Since there are many type of examination in university of Agder for example some courses have written examination only while some courses have written as well as assignments submission also while some courses have just submission of reports. The data type of this property is 'string' and the usage of this property is shown in the figure below.

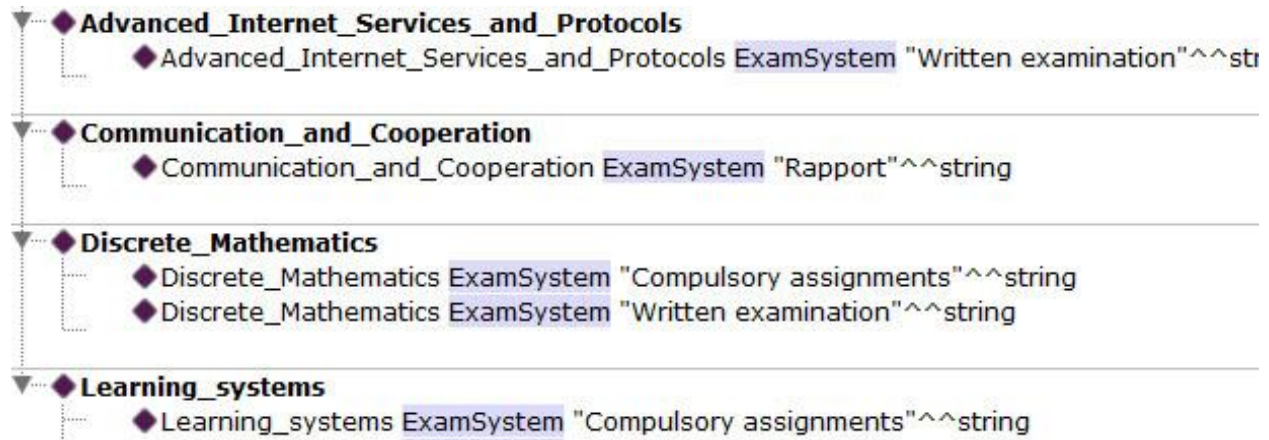


Figure 28 Usage of ExamSystem Data type property

- *First Name*

This data type property is used for adding information about the first name of an individual. The data type of this property is 'string'. This property can be useful for sorting and searching of individuals.

- *Last Name*

This data type property is used for adding information about the last name of an individual. The data type of this property is 'string'. This property can be useful for sorting and searching of individuals.

- *Has projectDuration*

Has project Duration is data type of 'int'. It is usually counted as number of months the project will have. Some projects are for single semester so the total time the student will get is more likely 3 months while some project are meant for two semester so the number of months the student get are 6 months. The domain of this data type property is class "Project". The usage of this property can be seen in the figure.

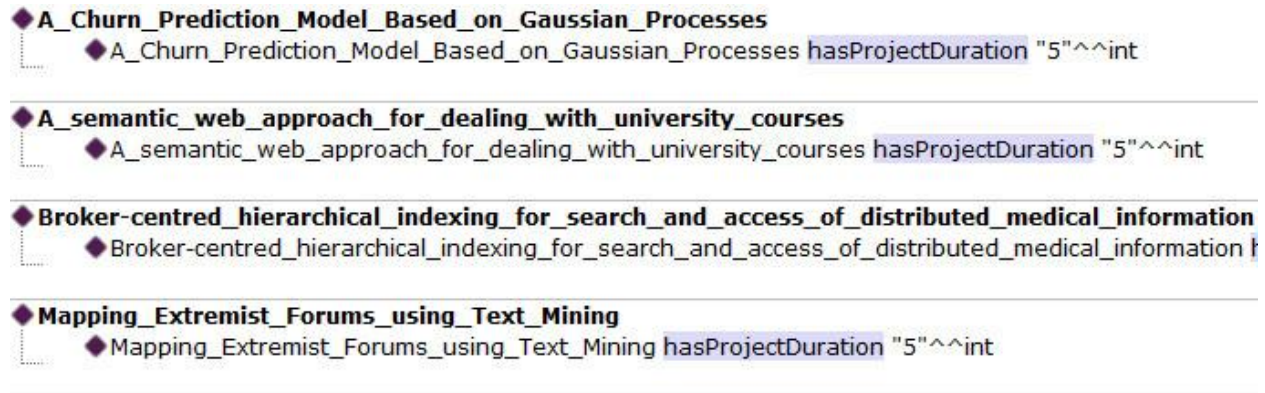


Figure 29 Usage of hasProjectDuration Data type property

- *Level*

This data type property is used for adding level into programme. Some programmes are Master level while some of the programmes are of Bachelor and PHD level. The data type of this property is 'string'. The usage of this property can be seen in the figure below.

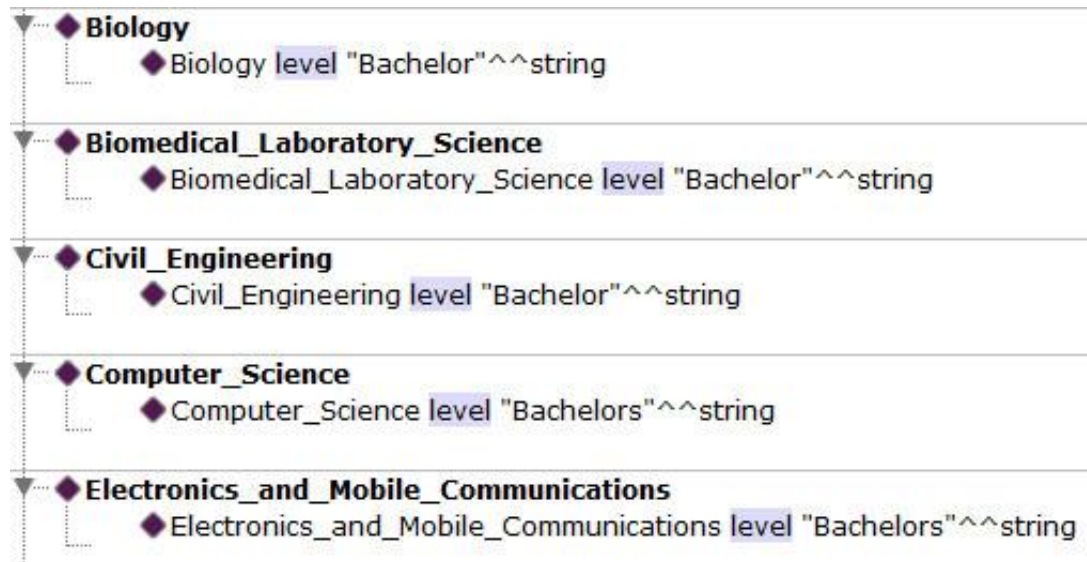


Figure 30 Usage of Level Data type property

- *Personal number*

This data type property is mainly used to storing the personal number of an individual. This looks more private thing for a person so this data type should be for the record of the institution rather than showing to everyone.

- *Phone number*

This data type property is used to add information about the phone number of an individual. It is sometimes very important regarding the searching about particular Department of any official. The data type of this proper is 'string'. The usage of this property in our ontology is mentioned in the figure below



Figure 31 Usage of phoneNo Data type property

- *Project End*

This object property is used to add information about the ending date of the project. With the help of this property the students and teachers will be able to know about the time to start work on the project and the end date. The data type of this property is 'Datetime'



Figure 32 Usage of projectEnd Data type property

- *Project Start*

The data type of this property is 'Datetime'. This object property is used to add information about the starting date of the project. With the help of this property the students and teachers will be able to know about the time to start work on the project and the end date.



Figure 33 Usage of projectStarts Data type property

- *Student Number*

Student ID number is the number which the institution has given it to every student. The data type property is used to add information about the student ID into individuals of class "Student" the domain of this data type property is "Student". The data type of this property is 'int' since the student ID only contains integers. The usage of this id is given below in the figure

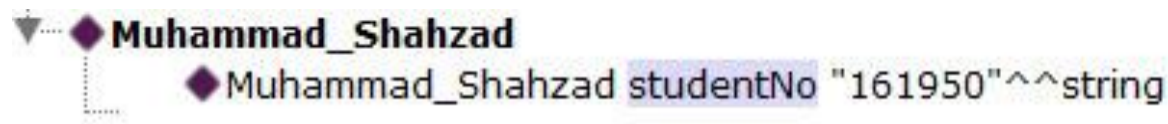


Figure 34 Usage of studentNo Data type property

- *Study Programme Code*

The Study programme Code is data type properties which have code for each and every study programme. The data type of this property is 'string' and it is because the code contains characters and the numbers. The usage of this property is shown in the figure below.

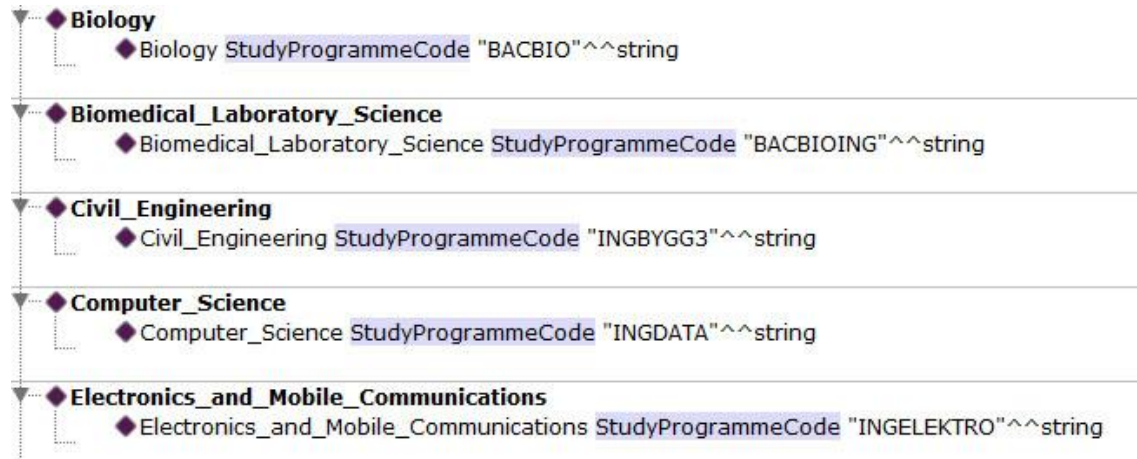


Figure 35 Usage of StudyProgrammeCode Data type property

- *Term*

The data type Term is used for saving information about the term in which the specific course is offered. Since the content and criteria of each course is changed every year so it's important to store the information about the term in which the course is offered. The data type of this property is 'string'. The usage of this property in this ontology is mentioned below



Figure 36 Usage of Term Data type property

- *hasGrade*

This property is used to add the information about the grades into the individuals of class Course, StudentGroup, Project and Student. The domain of this property is "StudentGroup", "Project", "Course", and "student". The type of this data type property is string. The main role of this data type property is to add the result. The usage of this property can be seen in the figure

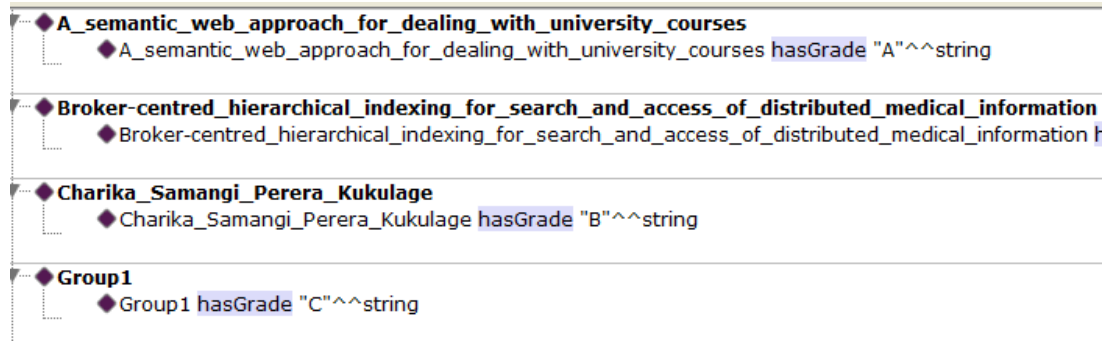


Figure 37 Usage of hasGrade Data type property

- *gradeGiveByExaminer*

This property is used to add the information about the grades into the individuals of class StudentGroup, Project and Student. The domain of this property is "StudentGroup", "Project", "Examiner" and "Student". The type of this data type property is string. The main role of this data type property is to add the result of the supervisor to the project/group. The usage of this property can be seen in the figure

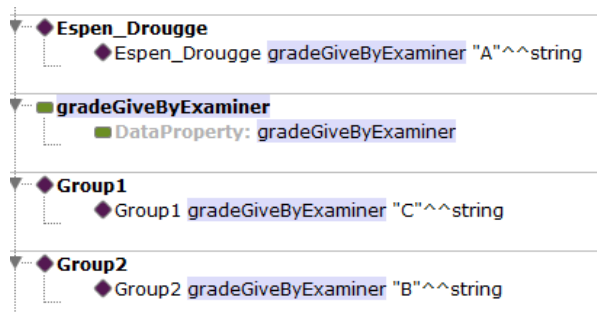


Figure 38 Usage of gradeGiveByExaminer Data type property

- *gradeGiveBySupervisor*

This property is used to add the grades into the individuals of class StudentGroup, Project and Student. The domain of this property is "StudentGroup", "Project", "Supervisor" and "Student". The type of this data type property is string. The main role of this data type property is to add the result of the supervisor to the project/group. The usage of this property can be seen in the figure

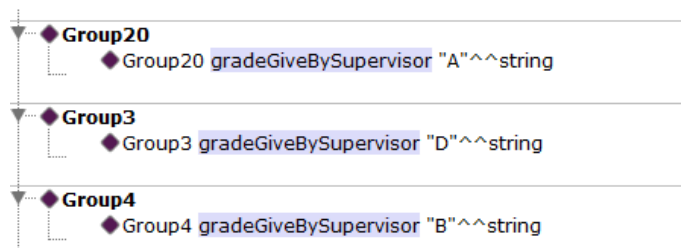


Figure 39 Usage of gradeGiveBySupervisor Data type property

The axioms of ontology

The axiom of the ontology is divided into two parts.

1. Axioms for classes
2. Axioms of instances

Axioms for Classes

Axioms are used to show the relationship between classes, properties and individuals. In this part of the report all the relationships the classes have will be shown.

Course

There are two restrictions which are linked with this class. One is linked through the object property 'hasProfessor' and another is linked through object property 'hasStudent'. Since we know that the course must have students which are enrolled with it and another is some professor who will teach the course.

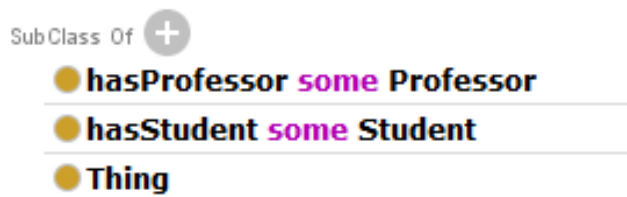


Figure 40 Axiom of Class Course

Student

In this class there are three restrictions which are linked with this class. Firstly the 'Department' class is linked by the object property 'hasDepartment'. So this means that the student must have a department. Then after 'fakultet' class is linked by 'hasfaculty' object property which means that the student must have a faculty. There also a kind of students which study "interfakulær", in that case the faculty of the student has to be updated after each term so the information about the faculty is updated after each term. There can be more than one faculties added for a student of such kind. And at the last there is restriction of class 'Course' which is linked by 'studentOf' property which means that the student must be studying some course under the institution.

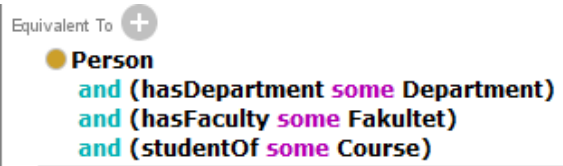


Figure 41 Axiom of Class Student

University

There are two restrictions which are linked with this class. One is that it must have Departments. So object property 'hasDepartment' is linked by class 'Department'. While the second one is that university must have a faculty. So that restriction is added by linking the class 'Fakultet' by object property 'hasFaculty'.

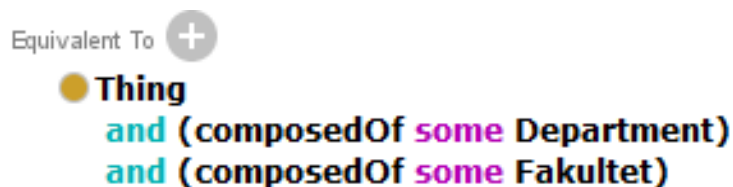


Figure 42 Axiom of Class University

Examiner

In this class there are two restrictions involved. The first one is that the person should be examiner of some project. For this restriction the object property 'examinerOf' is linked with the class 'Project' and added in the subclass of Examiner class. The second restriction which is that the examiner will also must have a group. Here the group will have a name and consist of either 2 or more student. But it can also contain a single student. This restriction is added by adding object property 'examinerOf' linking it with the class 'StudentGroup'. The restriction is shown in the figure below

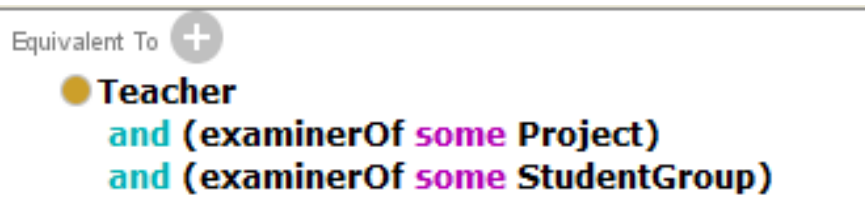


Figure 43 Axiom of Class Examiner

Professor

Professor is the subclass of "Teacher" in this class there are three restrictions that are related to the class professor. The first one is that the professor must be the part of intuition so the

professor will obviously will have a department. So the object property hasDepartment is linked with class department through some restriction. The second restriction is that professor will also have faculty. That means that the professor must have faculty. So in that case the object property hasFaculty is linked with the class fakultet by some restriction. The last restriction for the class Professor is that it will have be linked with some course by means of object property. So the professor must be teacher of some course. The object property professorOf is linked with class "Course" with some restriction.

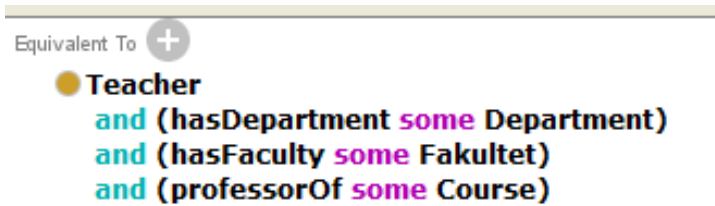


Figure 44 Axiom of Class Professor

Supervisor

Supervisor is the subclass of "Teacher" in this class there are three restrictions that are related to the class professor. Firstly Supervisor must be the part of institution so the supervisor will obviously will have a department. So the object property hasDepartment is linked with class department through some restriction. The second restriction is that Supervisor will also have faculty. So in that case the object property hasFaculty is linked with the class fakultet by some restriction. The last restriction for the class Supervisor is that it will have be linked with some project by means of object property. So the Supervisor must take some project. The object property supervisorOf is linked with class "Project" with some restriction.

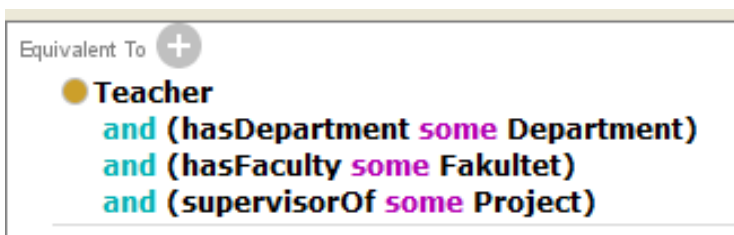


Figure 45 Axiom of Class Supervisor

Project

In this class there are three restrictions which define this class. The first is that the project must have examiner though the role of examiner will be at the end of the project but there will be examiner. The object property hasExaminer is linked with class 'Examiner' by use of some restriction. Second restriction for class Project is that it must have students which will be enrolled for some project. Each project can either have one or group of students. For this

restriction to add the object property 'hasStudent' is linked with class 'student'. The last restriction is that the project must have supervisor which will supervise and help the student from start till the end. This restriction is added by object property hasSupervisor linking it with the supervisor.

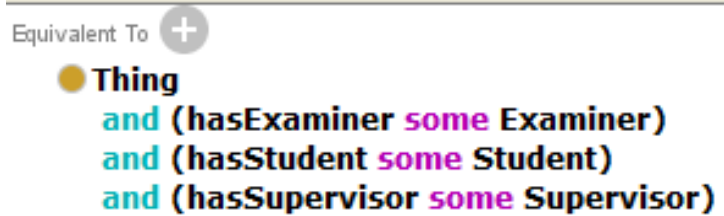


Figure 46 Axiom of Class Project

StudentGroup

Student Group is the class for group of student which takes the project together. In this class there are four restrictions which will help in defining the class StudentGroup. The first restriction is that for every group its necessary to have an examiner though the examiner should not be linked with the group all the time the examiner will be needed at the end of project but still it's necessary to have an examiner so for this restriction we add the object property 'hasExaminer' linking with class 'Examiner' by some restriction. The second restriction for this class is that for every student group its necessary to have some member or members. These members will be students. So for this restriction we add the object property 'hasMember' linking with the class 'Student' by some restriction. And the last restriction for the class 'StudentGroup' is that every group must have supervisor from start till the end of the project. For this restriction we add the object property 'hasSupervisor' linking with class 'Supervisor' by some restriction.

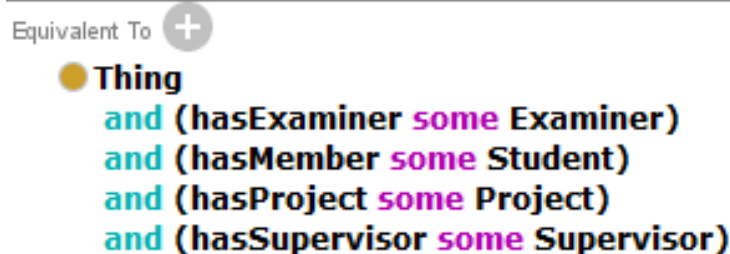


Figure 47 Axiom of Class StudentGroup

Axioms for Instances

The axioms of instances are the object properties and data type properties related to every individual. In this project we have added few individuals which will be discussed in this section.

Instances of Course

The Course is the class where there will be individuals which are courses. As the class 'Course' is defined earlier in the report the individual have the same properties which the class course has. The total number of instances for this class is nine. But we will define one or two of them briefly the rest of individuals will have the properties but the values will be changed. The total number of individual for this class are listed in the figure below

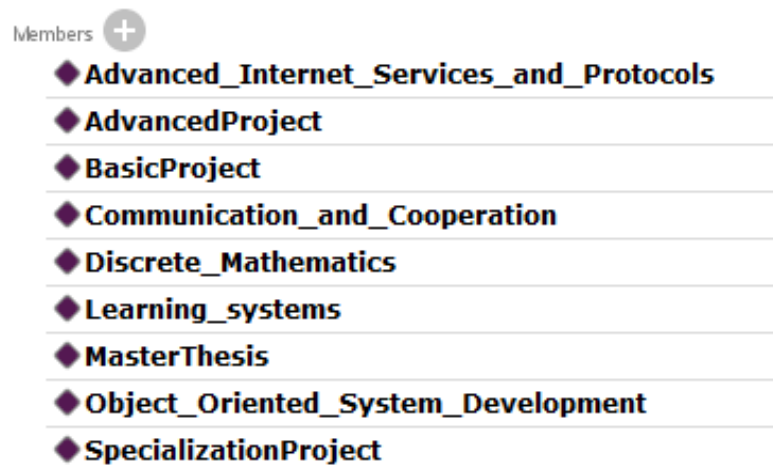


Figure 48

Master Thesis

It is instance of class 'Course'. There are object properties and the data properties which define this instance. Master Thesis has three types of object properties asserted. First one is that it has the students since there are more than one students linked with this course so all the students are link by adding individuals 'Muhammad Shahzad' 'Mari_Næss' 'Charika_Samangi_Perera_Kukulage' 'xin_chin' 'Mehdi_Ben_Lazreg' 'Targeir_Attestog' and linking it with the object property 'hasStudent'.

Second object property asserted is about this individual is that it must have course code which plays very important role. The information about course code is added by object property 'hasCourseCode' linking the individual which in this case is 'IKT590'. So every course must have information about its course code.

The third object property for this individual is that it must have projects. In the master thesis each and every student has the responsibility to deliver the report and presentation. The

individuals 'Broker centered hierarchical indexing for search and access of distributed medical information' 'Mapping_Extremist_Forums_using_Text_Mining' 'A_semantic_web_approach_for_dealing_with_university_courses' 'PKI-based_authentication_and_access_control_to_Web-based_EHR_systems:_Verification_and_evaluation_of_different_deployment_solutions' 'A_Churn_Prediction_Model_Based_on_Gaussian_Processes' are linked with the object property 'hasProject'.

About the Datatype properties asserted to this individual are two. The datatype properties added to this individual is ECTS_Credits which adds the number of credit hours of the individual of course. The datatype of this property is 'int' for this course the value is '30'. Second datatype property asserted to this individual is 'Term' which has the datatype of 'string' the main task of this property is to add information of the term into the course in which it is offered because every year the criteria and contents of the course changes in this case he value of term is 'spring 2013'.

















Object property assertions 	
	hasStudent Mari_Næss
	hasStudent Charika_Samangi_Perera_Kukulage
	hasProject Broker-centred_hierarchical_indexing_for_search_and_access_of_distributed_medical_information
	hasCourseCode IKT590
	hasProject Mapping_Extremist_Forums_using_Text_Mining
	hasStudent Muhammad_Shahzad
	hasStudent xin_chin
	hasProject A_semantic_web_approach_for_dealing_with_university_courses
	hasProject PKI-based_authentication_and_access_control_to_Web-based_EHR_systems:_Verification_and_evaluation_of_different_deployment_solutions
	hasStudent Mehdi_Ben_Lazreg
	hasStudent Targeir_Attestog
	hasProject A_Churn_Prediction_Model_Based_on_Gaussian_Processes
Data property assertions 	
	ECTS_Credits "30"^^int
	Term "Spring 2013"^^string

Figure 49 List of Properties which defines instance of Course

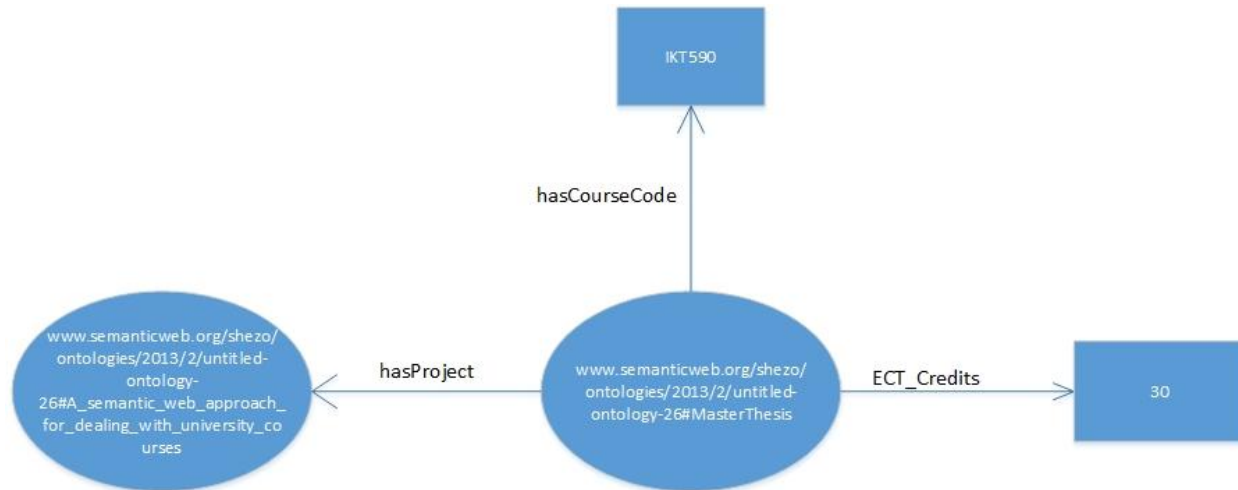


Figure 50 RDF statement graph of Master thesis linking with some properties

Instances of Student

As the institute contains thousands of students but we have added few of the existing student of the 5th year of ICT just for testing purposes but by the prototype the data can be entered into ontology. The restrictions and the properties will be same to define for each and every student of the institution. In this section one or two individuals will be discussed to get knowledge about the individuals in this project. The total number of students added to this ontology is given below



Figure 51 Instances of Student

Muhammad Shahzad

This is instance of class "5thYear". There are object properties and the data properties which define this instance. It has six types of object properties asserted. First of all is that it is member

of some group. As there are projects in every term so the student should be part of group which will contain two or more student. The group can also contain one student as well. In this case 'Muhammad Shahzad' has object property asserted that its 'memberOf' individual group 'Group20'.

Second type of object property asserted about this individual is that it must be student of some programme in this case the student 'Muhammad Shahzad' is 'studentOf' programme 'ICT'.

Also for individual of class 'Student' it be student of some Courses so for this individual there are few courses which the student is affiliated with. The information of courses are added by linking the object property 'studentOf' with individuals of class 'Course'. This case we have add courses 'IKT508' 'IKT420' 'IKT411' 'MasterThesis' 'Advanced_Internet_Services_and_Protocols' 'Discrete_Mathematics'

The third type of object properties asserted for this individual is that it must have projects. As the student of Masters there are projects in every term so in this case the project the individual 'Muhammad Shahzad' has 'A_semantic_web_approach_for_dealing_with_university_courses'.

The other types of object properties linked this individual are 'hasGender' 'hasFaculty' 'hasDepartment'. These object properties are related to the individual of the classes 'Gender' 'Fakultet' 'Department' respectively. The value for the there properties are shown in the figure below.

There are eight type of Data type properties asserted to this individual. The data type property added to this individual is 'studentNo' which is the number of student for identity and this ID is unique for every student. The data type of this property is 'string' for this course the value is '161950'. Another data type property asserted to this individual is 'email' which has the data type of 'string' the main task of this restriction is to add information of the email in this case he value of email is 'shezo85@hotmail.com'. The data type property asserted to this individual is 'Age' which has the datatype of 'int' here the value of age is '24'.

The 'firstName' and 'lastname' datatype properties add the information of the full name of student. The same as the case for properties 'city', 'country' and 'phoneNo'. The values of these properties are mentioned below in the figure

Object property assertions +

- **memberOf** Group20
- **studentOf** ICT
- **studentOf** Discrete_Mathematics
- **hasDepartment** Department_of_Information_and_Communication_Technology
- **studentOf** IKT508
- **studentOf** IKT420
- **studentOf** IKT411
- **hasFaculty** Engineering_and_Science
- **studentOf** MasterThesis
- **hasGender** male
- **hasProject** A_semantic_web_approach_for_dealing_with_university_courses
- **studentOf** Advanced_Internet_Services_and_Protocols

Data property assertions +

- **studentNo** "161950"^^string
- **email** "shezo85@hotmail.com"^^string
- **age** "24"^^int
- **firstName** "Muhammad"^^string
- **city** "Oslo"^^string
- **lastname** "Shahzad"^^string
- **country** "Pakistan"^^string
- **phoneNo** "41345351"^^int

Figure 52 List of Properties which defines instance of Student

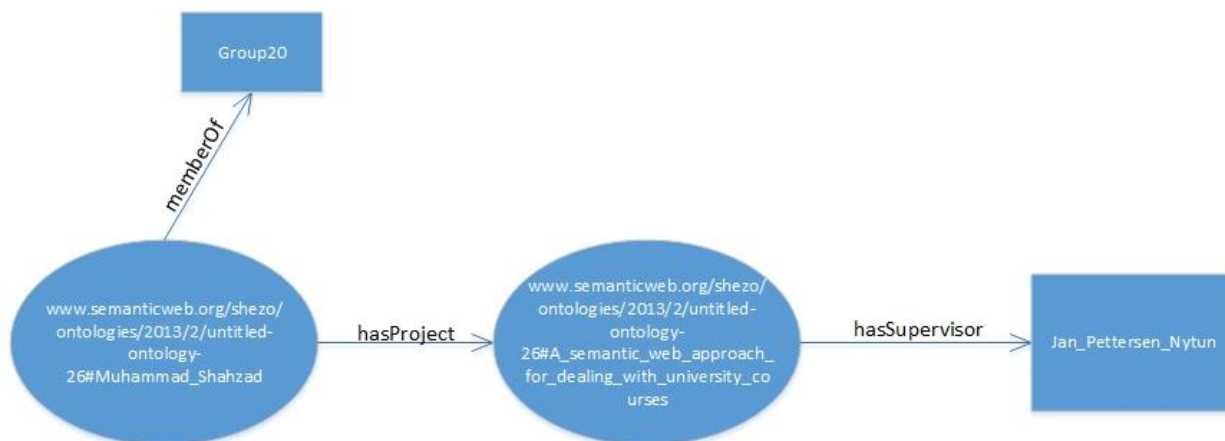


Figure 53 RDF statement graph of Master thesis linking with some properties

Instances of Teacher

The institute contain hundreds of teachers but we have added some of the existing teachers to overview the restrictions and the properties will be same to define each and every Teacher of the institution. In this section one or two individuals will be discussed to get knowledge about the individuals in this project. There are three subclasses of 'Teacher' one is 'Professor' other one is 'Examiner' and last one 'Supervisor'. The total number of Teachers added to this ontology is given below

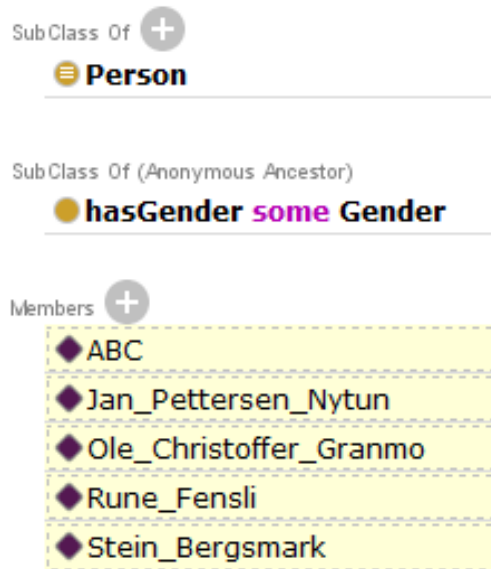


Figure 54 List of Individuals of Teacher

Jan Pettersen Nytun

It is the individual of the class 'Professor' 'Supervisor' as the individual is the teacher of some course as well as the supervisor of some project. There are 5 types of object properties and four types of datatype properties asserted into this individual. Due to lack of personal information about this specific individual many of the datatype properties are not used but in real life usage each and every property will be used.

The object property 'supervisorOf' is asserted into the individual by linking it with the individual 'Group20'. That's means that this individual is the supervisor of Group20. Same as goes for the same object property linking with another individual of the class 'Project' which in this case is 'A_semantic_web_approach_for_dealing_with_university_courses'. That means that this individual is the supervisor of this Project.

The object property 'professorOf' is asserted into the individual by linking it with the individual 'Object_Oriented_System_Development'. That's means that this individual is Professor of the course named Object Oriented System Development.

The object property 'gradeGiven' is asserted into the individual by linking it with the individual 'A' of the class 'Result'. That's means that this individual has Given the following Grade to its project which in this ontology is 'A'.

The object property 'hasFaculty' and 'hasDepartment' is also asserted into the individual by linking it with the individual 'Engineering_and_Science' of class 'Fakultet' and 'Department_of_Information_and_Communication_Technology' of class 'Department' respectively.

The object property 'hasGender' is asserted into the individual by linking it with the individual 'Male' of class 'Gender'.

The datatype properties 'Address' 'email' 'phoneNo' 'country' are few amongst the datatype properties which should be asserted for teachers. About rest of few due to lack of information aren't used here. The datatype property 'address' has type 'string' with the value 'A3054 (Jon Lilletunsvei 9, Grimstad)'. . The datatype property 'email' has type 'string' with the value 'jan.p.nytun@uia.no'. The rest of datatype properties are explained in the figure below

Object property assertions +	
■	supervisorOf Group20
■	hasFaculty Engineering_and_Science
■	professorOf Object_Oriented_System_Development
■	supervisorOf A_semantic_web_approach_for_dealing_with_university_courses
■	hasGender male
■	hasDepartment Department_of_Information_and_Communication_Technology
■	gradeGiven A
Data property assertions +	
■	address "A3054 (Jon Lilletunsvei 9, Grimstad)"^^string
■	email "jan.p.nytun@uia.no"^^string
■	phoneNo "0047 37233146"^^int
■	country "Norway"^^string

Figure 55 List of properties defining Jan_Petersen_Nytun

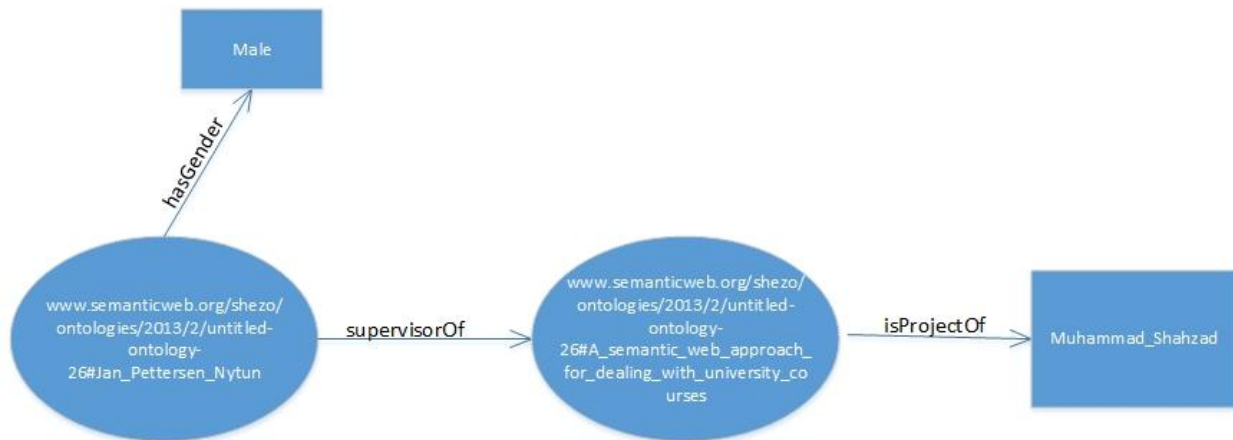


Figure 56 RDF statement graph of Jan_Perttersen_nytun linking with some properties

Instances of Project

The class project has instances which follows the restriction added to the class projects. There might me many projects existing in the UIA record but in this ontology there are some projects added in the class of 'MasterThesis'. In this section one of the individual of class 'Project' will be discussed in the detail which will be almost same in property wise. The total number of individuals of the class 'Project' shown below

members +

- ◆ **A_Churn_Prediction_Model_Based_on_Gaussian_Processes**
- ◆ **A_semantic_web_approach_for_dealing_with_university_courses**
- ◆ **Broker-centred_hierarchical_indexing_for_search_and_access_of_distributed_medical_information**
- ◆ **Mapping_Extremist_Forums_using_Text_Mining**
- ◆ **PKI-based_authentication_and_access_control_to_Web-based_EHR_systems:_Verification_and_evaluation_of_different_deployment_solutions**

Figure 57 Instances of Project

A semantic web approach for dealing with university courses

This is the individual of the class 'Project' so this individual must follow the restrictions added to the class Project. This individual contains 5 types of the object properties and three type of datatype properties.

The object property 'isProjectOf' is added by linking it with the individual of the class 'Course' which here it is 'MasterThesis'. This relation adds the information of the Course into the project.

The object property 'hasExaminer' is added by linking it with the individual of the class 'Examiner' which here it is 'Espen Drougge'. Every project has its supervisor and examiner and this property adds information of the examiner to the project.

Object property 'isProjectTitleOf' adds the information of the Group number into the projects. Every Group has its project title. This object property linked with the individual of class 'StudentGroup' which in this case is 'Group20'

There is also object property 'hasSupervisor' which adds the information of the supervisor to this individual of project.

Also there are information of the individual of class student which has taken this specific project which in this case is 'Muhammad_shahzad'. The object property 'getGrade' adds the information of the grade given to this project by the institution after evaluating everything. Here the value is 'A'.

There are three type of data type properties related to this individual which are 'hasProjectDuration' 'projectStarts' 'projectEnd'. The data type property 'hasProjectDuration' shows the total number months the project will take to get completed from start to end. The data type of this property is 'int'. 'projectStarts' and 'projectEnd' have the data type of 'datetime' the main use of this property is to add the information about the start date and end date of the project so that the student should be aware of the dates from the start and plan the things according to it.

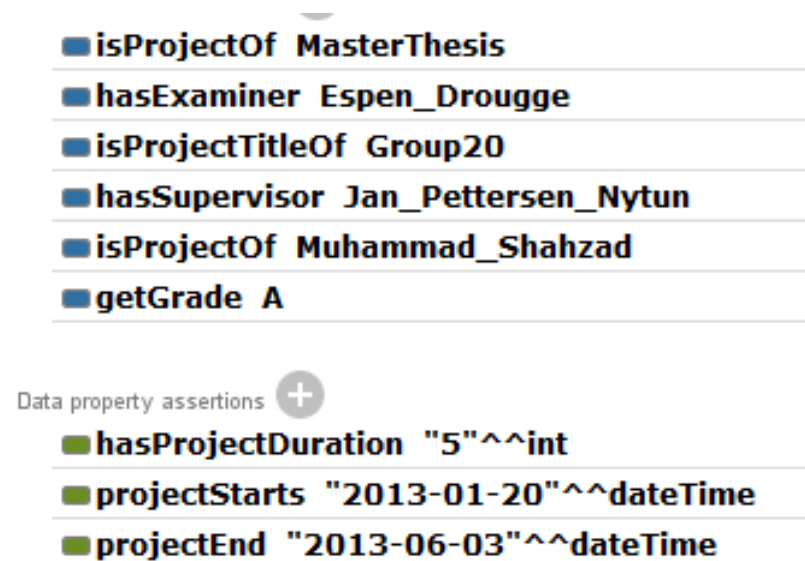


Figure 58

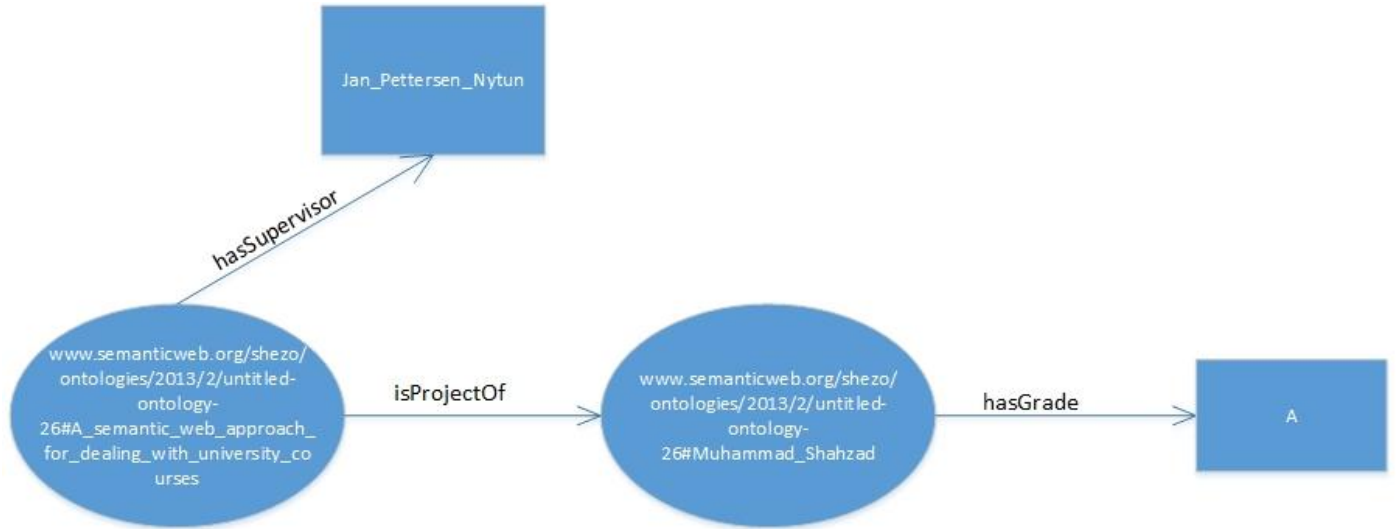


Figure 59 RDF statement graph of Project linking with some properties

5. Result and Analysis

In this part of the report we have discussed the Results and Analysis about ontology. Here the classes will be visualized by the help of the plugin tool called OWLViz.

The orange color represents the defined classes in the figure while the yellow colored classes define the primitive classes. In this section we will visualize

- Student Based
- Teacher Based
- University Based

Student Based Visualization

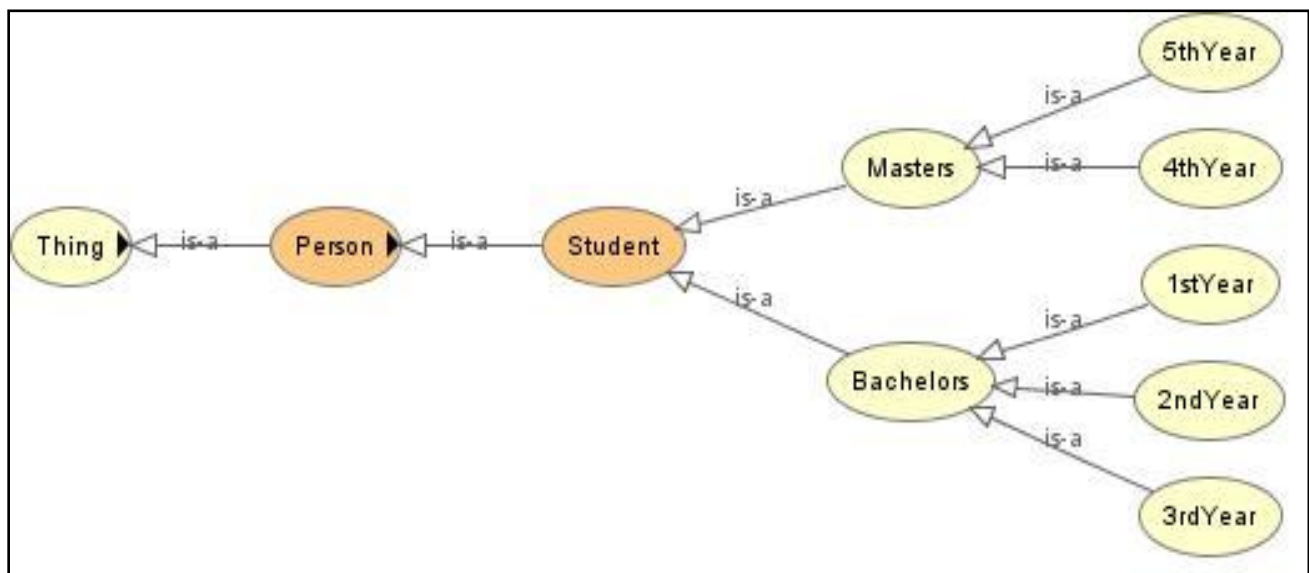


Figure 60 Student Based Visualization using OWLViz

Teacher Based

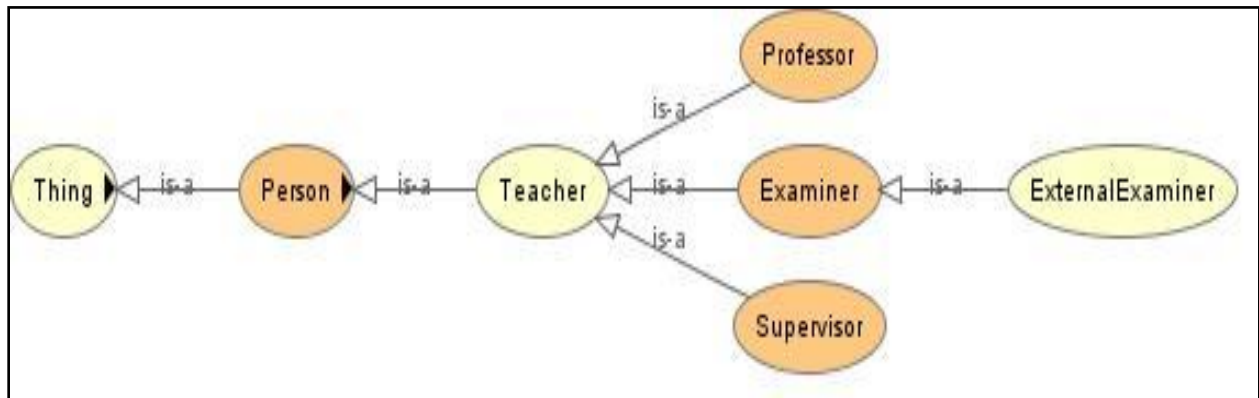


Figure 61 Teacher Based using OWLviz

University Based

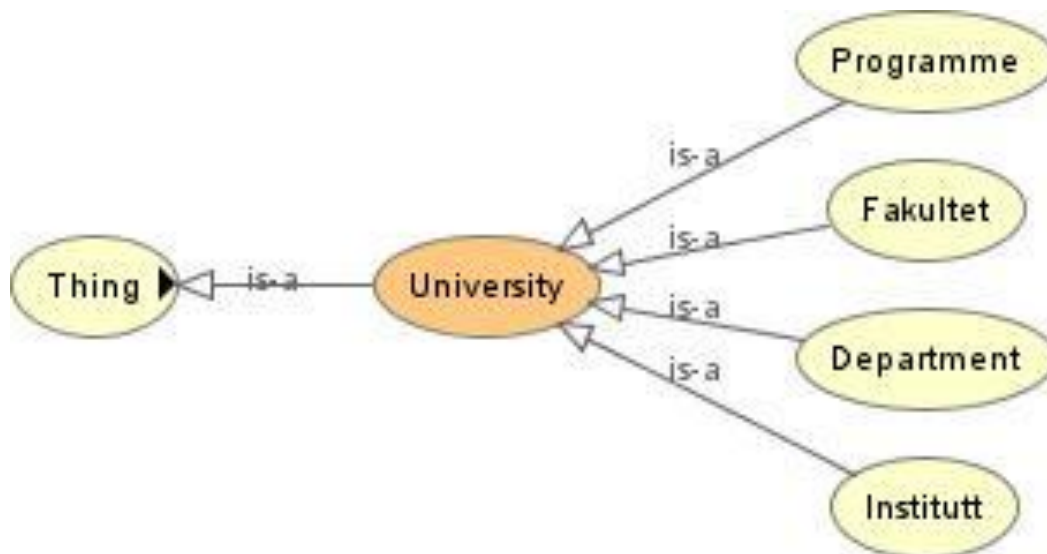


Figure 62 University Based using OWLviz

Query retrieval process

Queries has a very important role in ontology. Ontologies are mostly constructed on the base of queries. By this we mean that the ontology developer keep the queries in mind before working on ontology e.g. What kind of question will it answer or how much knowledge will be needed. Queries are most like testing the ontology to know how well the ontology is answering to the question asked by the user. In protégé there are two types of Query systems.

- SPARQL Query
- DL Query

SPARQL queries are most advanced form of queries in which the user has to code about its findings. Note that SPARQL is both a query language *and* a protocol. Most people focus on the query language since it defines the syntax in which to frame queries. The protocol is used to describe how a SPARQL client (such as one accessible via a web browser) talks to a SPARQL endpoint/processor (such as <http://dbpedia.org/sparql>) both in an abstract sense and using a concrete implementation based on WSDL 2.0. (Semantic web programming Book)

DL Queries: The DL Query tab provides a powerful and easy-to-use feature for searching a classified ontology. It is a standard Protégé 4 plugin, available both as a tab and also as a view widget that can be positioned into any other tab. The query language (*class expression*) supported by the plugin is based on the Manchester OWL syntax, a user-friendly syntax for OWL DL that is fundamentally based on collecting all information about a particular class, property, or individual into a single construct, called a frame [21]

To use the DL queries in Protégé we first have to start the reasoner. Because the queries are not applied on the inconsistent ontologies. So first we have to make sure there is no contradictions in the ontology then we can apply queries. In the queries tab you have to make sure that our syntax is correct and the DL queries are Capital case sensitive so before applying queries we have to keep these things in the mind. There are some of the queries which are applied for this project.

Queries about Results

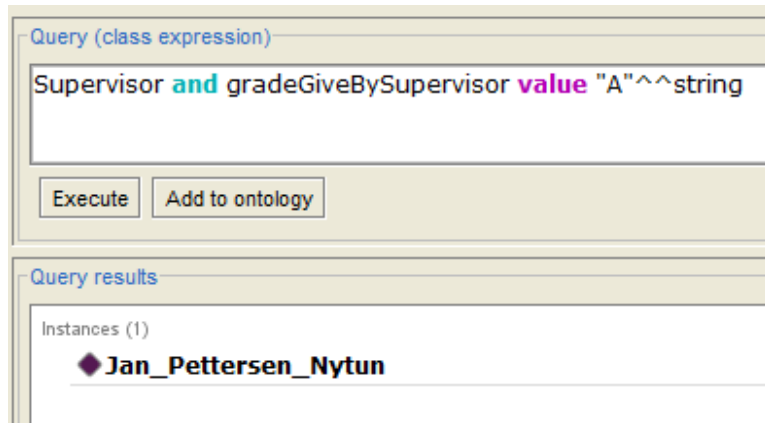


Figure 63 Query about Results

In this query it has been asked to show the Individuals of Supervisor those who gave "A" grade to the group or project. The first part of the Query is the in which we want to search which in this case is "Supervisor" then there is Data property "gradeGiveBySupervisor" whose value is "A" and its type is string. In the figure it has been showed that "Jan_Pettersen_Nythun" is the only supervisor which has given the A grade. If there was more than one A grade by different supervisor then it would have showed the other individual also.

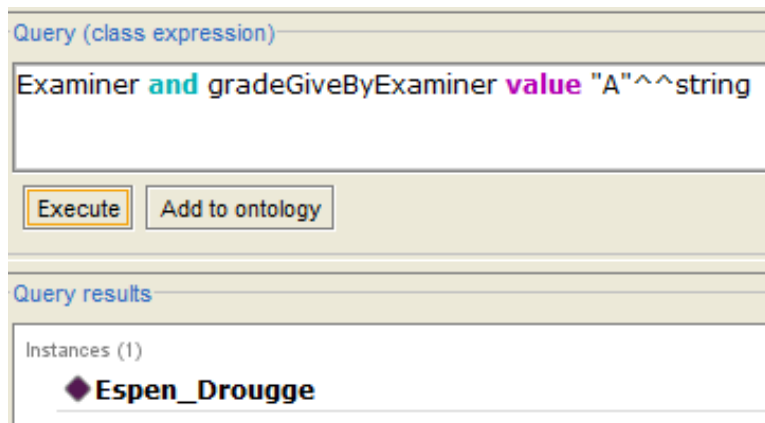


Figure 64 Query about Result by Examiner

This one is another query which little change of Examiner despite of Supervisor. And the Query will show in the result the individuals which has given A grade.

Query (class expression)

Project and hasGrade value "B"^^string

Execute Add to ontology

Query results

Instances (4)

- ◆ **PKI-based_authentication_and_access_control_to_Web-based_EHR_systems:_Verification_and_evaluation_of_different_deployment_solutions**
- ◆ **Group2**
- ◆ **Group4**
- ◆ **Mapping_Extremist_Forum_using_Text_Mining**

Figure 65 Query about Project Grade

In this Query it has been asked that to show the project which has grades valued B. The class project is at the start of query to show the projects only. And its shown in the figure the results we get are individuals Group 2, Group 4 and the two projects as shown in the figures are those which has grade A. If we want to know the all those students, projects, groups which got A grade then we can change the query as shown in figure below

Query (class expression)

hasGrade value "B"^^string

Execute Add to ontology

Query results

Instances (6)

- ◆ **PKI-based_authentication_and_access_control_to_Web-based_EHR_systems:_Verification_and_evaluation_of_different_deployment_solutions**
- ◆ **Group2**
- ◆ **Charika_Samangi_Perera_Kukulage**
- ◆ **Group4**
- ◆ **Mapping_Extremist_Forum_using_Text_Mining**
- ◆ **Targeir_Attestog**

Figure 66

Other queries

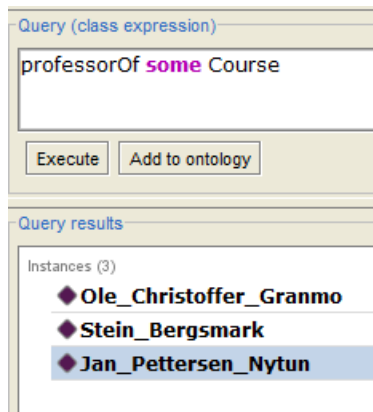


Figure 67

In the Query above it has been asked to show those individuals which are professor of some courses and in the results we can see the individual which are Professors of some courses.

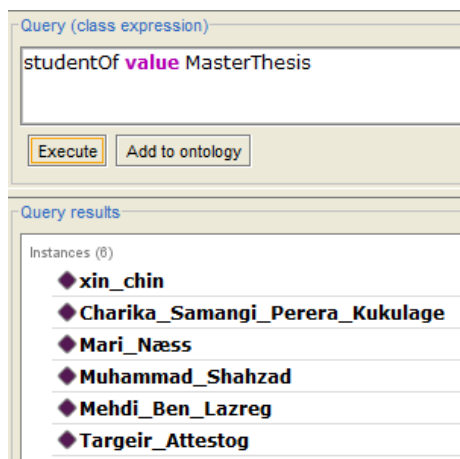


Figure 68

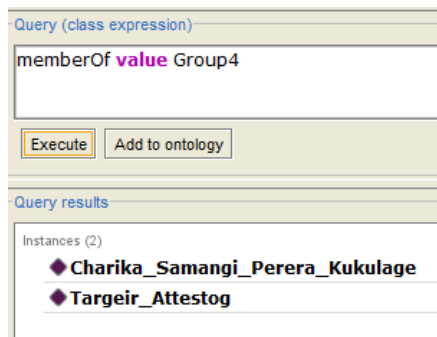


Figure 69

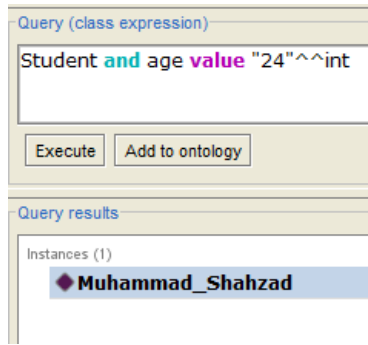


Figure 70

6. Semantic Web Application for Ontology

In the solution the ontology is defined and developed but now the big question arises that how it will be used. So in this section of the project a semantic web application is proposed that how the ontology will be useful in real life in the form of application.

The previous section provided the solid exposure of forming ontology of semantic data. While this section provides the semantic programming of application. Semantic web is all about the handling of the data. For building application a framework is defiantly needed. In this case we have to process semantic data so the framework which can be used are shown in the figure below

FRAMEWORK	LANGUAGE/INTERFACE	SEMANTIC LEVEL
Jena	Java	RDF to OWL 2
Sesame	Java & RESTful web service	RDF
OWL API	Java	OWL 2
RAP–RDF API	PHP	RDF
Redland	C, Python, Ruby, Perl, & PHP	RDF
LinqToRDF	.NET	RDF

Figure 71 Taken from Book Semantic web Programming [5]

The application will have four different users

- Student
- Professor
- Supervisor
- Examiner

Student

As a student the use case of the application will be as shown in the figure. At the very first the student has to authorize himself/herself the authorization will be on the email and the password given by the administration. Once the student is authorized and signed in into application then the student will be able to view the profile. In profile there will be all the information about the student, Courses and semester information.

The student will be able to search for the any course with the help predefined DL integrated into application. For example we add query which will be integrated through Protégé software. The student has to search the code through the course code.

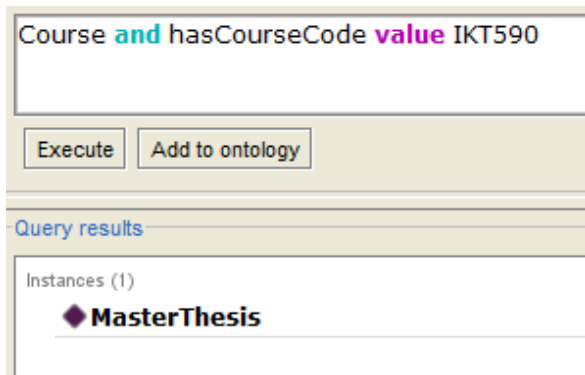


Figure 72

The student will also be able to check the grade. The grade may be three kinds of

- Grade given by Supervisor
- Grade given by Examiner
- And overall Grade

The queries about the results are mentioned in the Queries section.

The student will also be able to add and drop courses by the help of this application. In the protégé you can simple add/drop course just by the removing/adding the property e.g. "studentOf IKT413" or "studentOf Masterthesis".

The student will also be to change personal information. The Personal information consists of following Data Properties

- Address
- Age
- Country
- City
- Email
- First name
- Last name
- Phone number

The student will also be able to add project through protégé. The list of Project title will be displayed by Supervisor and the student will have to add the title into profile.

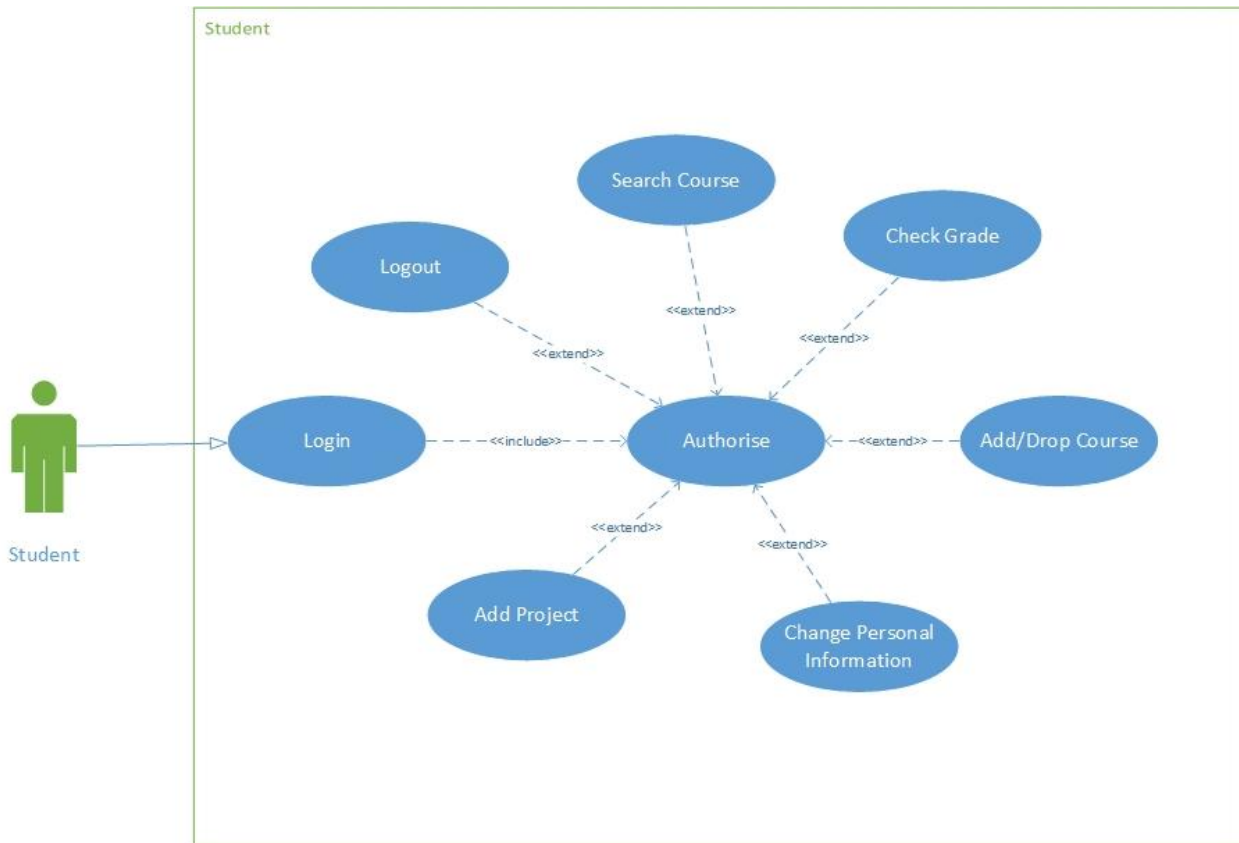


Figure 73 Use Case for Student

Supervisor

After the authentication of the supervisor the supervisor can logout also or change the information.

The supervisor can Add project and Project titles and the student will be then after able to add these title into their profile. The Project will be supervised through the whole semester.

Supervisor can also change the personal information Address, Phone number etc

After the projects are registered by the number of students the teacher will be able to add group which will contain one or more students. It Depends on the number of students registered into project.

The supervisor will be able to add the grade to the Project/Group as shown in the query below the results will be then after displayed.

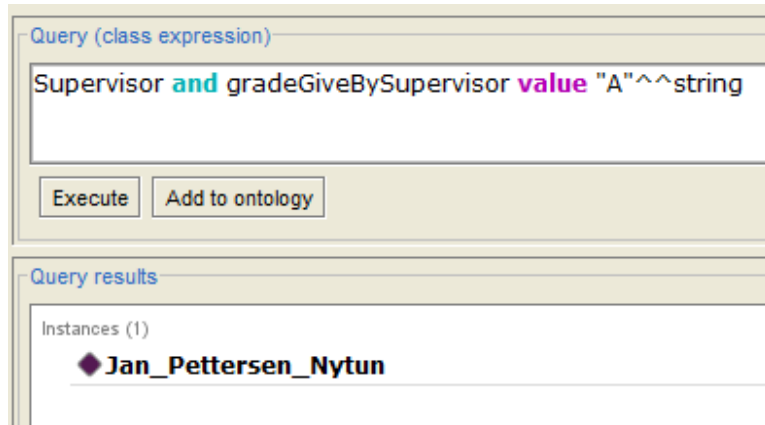


Figure 74

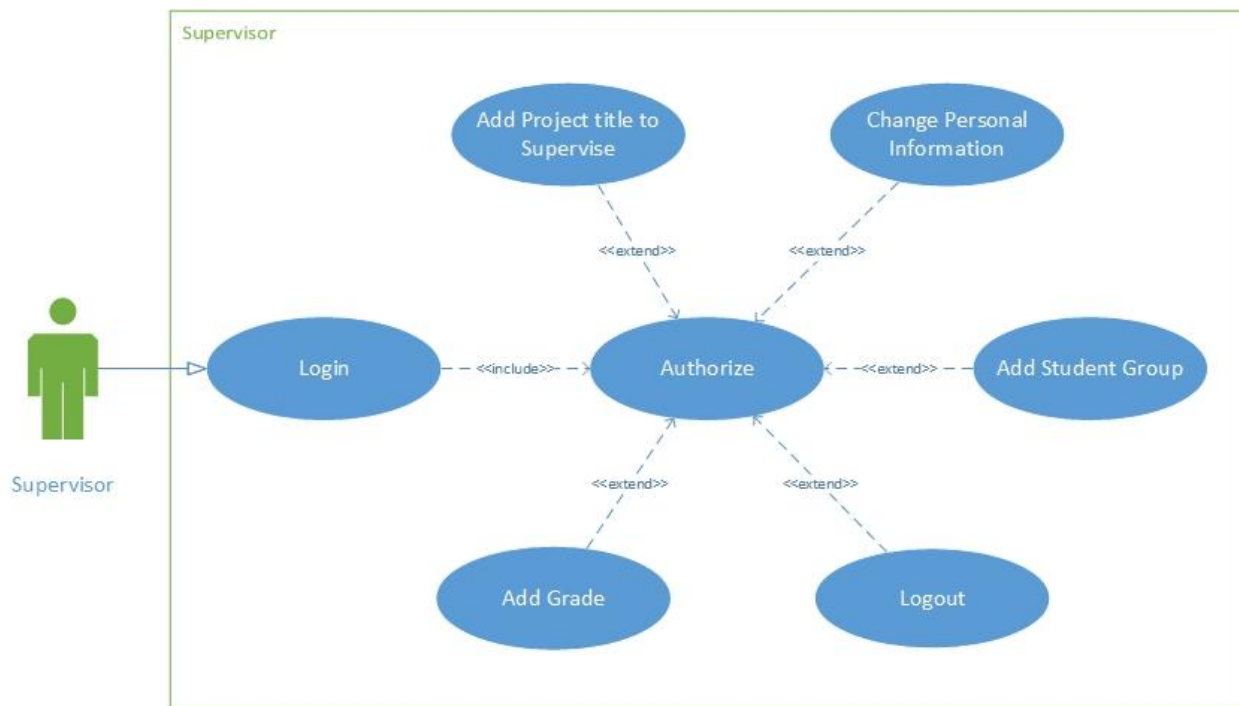


Figure 75 Use case for Supervisor

Examiner

The Examiner can do almost same tasks as supervisor but few features are missing. The Examiner can add Grade to Project/Group. The examiner can also add personal information about the University which he/she belong, Phone number, Identification number etc The examiner can add Project titles or Group which has to be examine by the particular examiner.

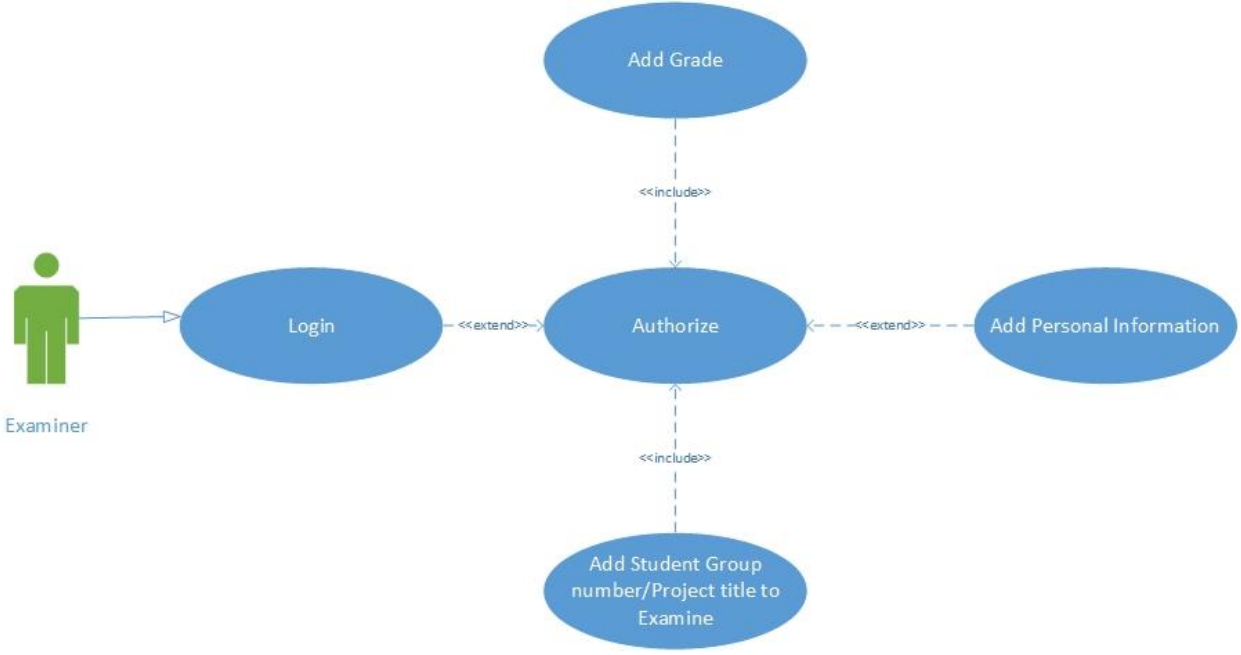


Figure 76 Use case of Examiner

Professor

The use case of the professor is given in the figure

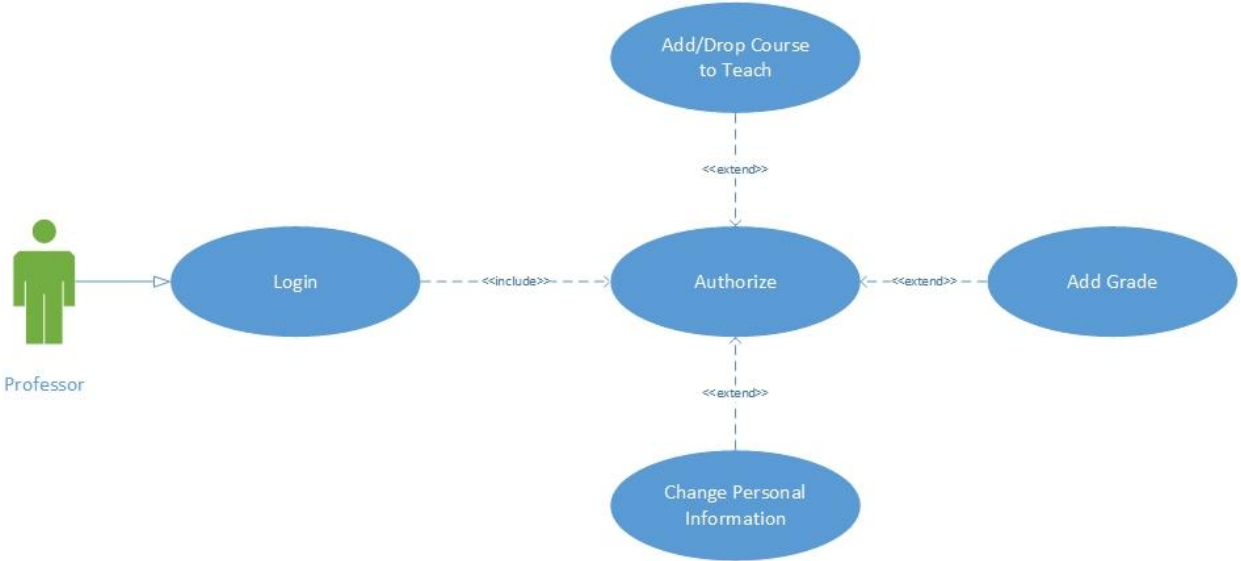


Figure 77 Use Case for Professor

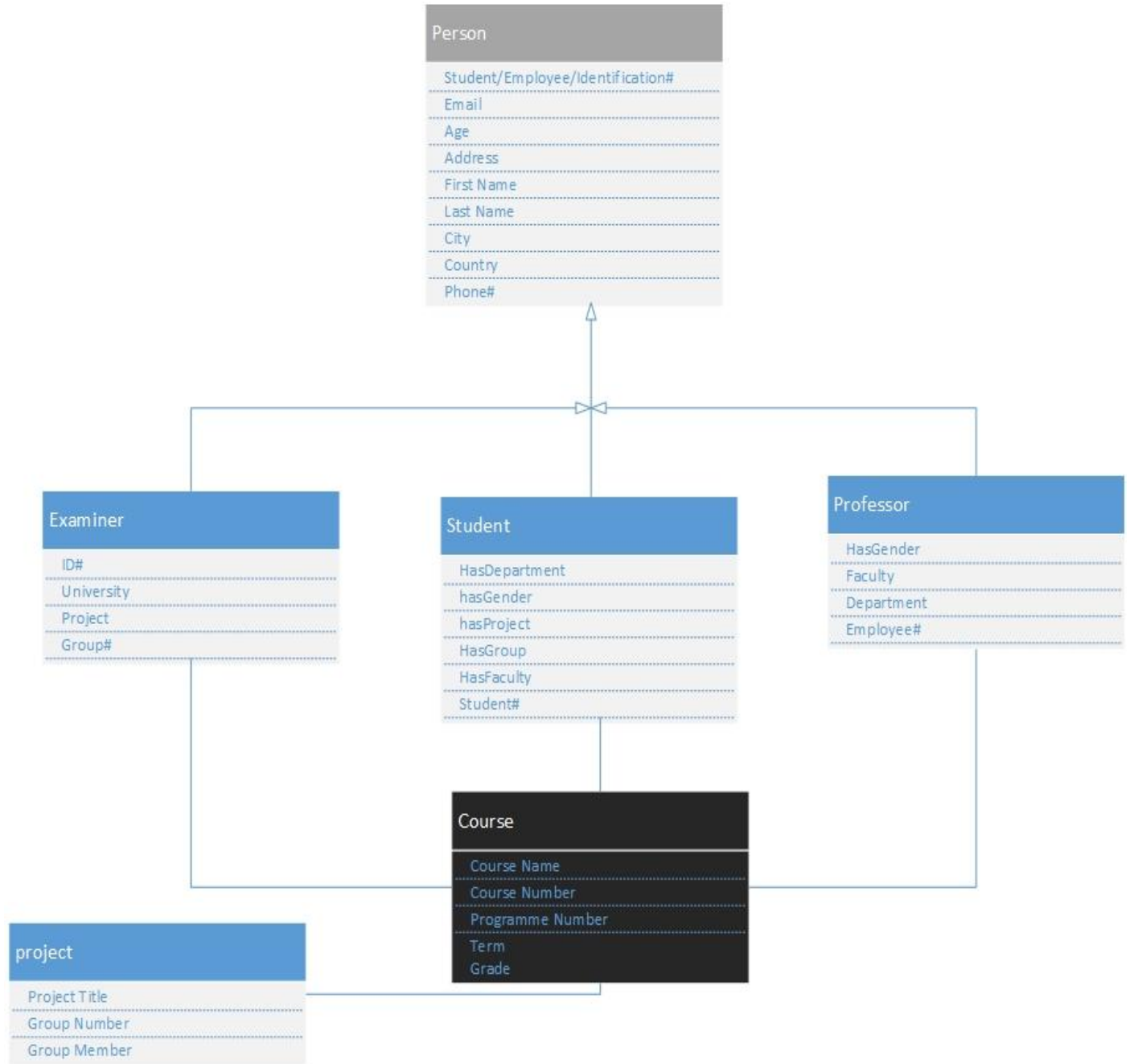


Figure 78 Class Diagram for the Proposed Semantic Application

7. Discussion

The main task in this project was to create ontology for Educational domain in particular University. The proposed ontology is based on the gathered information. Ontology is meant for handling of project courses and adding information about the students, the staff i.e. Supervisor, Professor and Examiner and the relationship among them.

The results came up in the form of ontology after implementing all the relationships and the restrictions on classes. The Ontology which is capable of storing information about all the courses and the projects which are registered by the student. The ontology also stores information about Age of the student, StudentID number, Address, Study year, faculty, Department, the course which the student will study and the projects which student has been registered in the semester. The ontology also stores information of the staff members like Supervisor, Professor and Examiner. The information which the ontology stores about staff members are Department, faculty, Courses which the professor teach and the Projects which the supervisor will have in supervision. The ontology also stores information about courses e.g. The students which has registered the course, Information about the course code, Information about the project which is affiliated with the course, the number of ECTS credits the course has, Term in which the course is offered and the Exam system of the course that if the course will have written exam or report submission.

The ontology also has information about the programmes which the institution offers like the study programme code, level of the programme as if it is bachelor level or Master, the campus in which the programme is offered, the number of ECTS credits it has, also it stores the information about the students which study the following programme and the information about the department to which the programme belong. The project information are also defined in the ontology e.g. Project duration is the number of months which the project will to complete from start to end, The start and end date of the project is also defined in the ontology, the grade which the project received at the end, it also stores information about the supervisor examiner and the student affiliated with the project.

The alternatives to create ontologies are to use other software instead of Protégé. Protégé is simple and easy to get used to it by its simple user interface. There are some other tools like SWOOP, Web protégé, onto edit which work slightly different. The Web Protégé is more similar to the protégé environment but it is used for web applications. So this ontology can also be made for web also for the broader usage of ontology.

The Solution which is proposed in this project solves the problems related to student, courses, grades, teachers and institution. It may not be the complete solution in all aspects and may not contain information about all fields inside the organization for example the ontology may not

contain detailed information about the administration staff and its relationships. This ontology is mainly focused on the relationship of Student, Teacher, Courses, Projects and Grades. This solution provides us detailed information about the student and its relationship with all the fields inside an organization like Programme, Projects, teachers, Grades etc. The solution also provides information about querying a semantic ontology to show information which is already stored in ontology e.g. list of the student studying a specific course.

There is a lot of work in the future in the domain of educational knowledge based ontologies for example I can be building a semantic application in Java using Jena library to use the ontology and more programming. As in this project the concept of the application has been planted.

8. Conclusion

Some work has been done on defining a semantic web for higher education, e.g., [1], [2]. More specialized studies in regard to university courses have also been performed, e.g., [3], [4]. But the problem was there was no such relevant work to Project courses and its relationship with the students, supervisor and examiner and also the relationship of a professor with course. In this project it is to investigate and give an overview of at least some existing relevant approaches. In the solution of this project ontology is proposed based on the gathered information. The ontology is meant for handling of project courses (i.e., courses where the students work in groups solving selected problems) as they appear at the ICT institute (UIA). An application based on semantic web technology is proposed at the end to demonstrate the use of the ontology. The kind of use of this application in question includes storing information about students, supervisors, grades, etc. Also queries about this information are included which help in extracting information from ontology, e.g., queries that can say something about grades given by some supervisor compared to another.

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Appendices

Appendix A Complete RDF Code

```
<?xml version="1.0"?>
```

```
<!DOCTYPE rdf:RDF [
```

```
  <!ENTITY owl "http://www.w3.org/2002/07/owl#" >
```

```
  <!ENTITY xsd "http://www.w3.org/2001/XMLSchema#" >
```

```
  <!ENTITY rdfs "http://www.w3.org/2000/01/rdf-schema#" >
```

```
  <!ENTITY ace_lexicon "http://attempto.ifi.uzh.ch/ace_lexicon#" >
```

```
  <!ENTITY rdf "http://www.w3.org/1999/02/22-rdf-syntax-ns#" >
```

```
  <!ENTITY untitled-ontology-26 "http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#" >
```



```
<rdf:RDF xmlns="http://www.w3.org/2002/07/owl#"
```

```
  xml:base="http://www.w3.org/2002/07/owl"
```

```
  xmlns:untitled-ontology-26="http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#"
```

```
  xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
```

```
  xmlns:owl="http://www.w3.org/2002/07/owl#"
```

```
  xmlns:xsd="http://www.w3.org/2001/XMLSchema#"
```

```
  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
```

```
  xmlns:ace_lexicon="http://attempto.ifi.uzh.ch/ace_lexicon#">
```

```
<Ontology rdf:about="http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26"/>
```

```
<!--  
////////////////////////////////////  
//  
// Annotation properties  
//  
////////////////////////////////////  
-->
```

```
<!-- http://attempto.ifi.uzh.ch/ace_lexicon#CN_pl -->  
  
<AnnotationProperty rdf:about="&ace_lexicon;CN_pl"/>
```

```
<!-- http://attempto.ifi.uzh.ch/ace_lexicon#CN_sg -->  
  
<AnnotationProperty rdf:about="&ace_lexicon;CN_sg"/>
```

```
<!-- http://attempto.ifi.uzh.ch/ace_lexicon#PN_sg -->  
  
<AnnotationProperty rdf:about="&ace_lexicon;PN_sg"/>
```



```
<!-- http://attempto.ifi.uzh.ch/ace_lexicon#TV_pl -->
```

```
<AnnotationProperty rdf:about="&ace_lexicon;TV_pl"/>
```

```
<!-- http://attempto.ifi.uzh.ch/ace_lexicon#TV_sg -->
```

```
<AnnotationProperty rdf:about="&ace_lexicon;TV_sg"/>
```

```
<!-- http://attempto.ifi.uzh.ch/ace_lexicon#TV_vbg -->
```

```
<AnnotationProperty rdf:about="&ace_lexicon;TV_vbg"/>
```

```
<!-- http://www.w3.org/2000/01/rdf-schema#comment -->
```

```
<rdf:Description rdf:about="&rdfs;comment">
```

```
  <rdfs:comment>University Projects system ontology</rdfs:comment>
```

```
</rdf:Description>
```

```

<!--
////////////////////////////////////
//
// Object Properties
//
////////////////////////////////////
-->

```

```

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#composedOf -->

```

```

<ObjectProperty rdf:about="&untitled-ontology-26;composedOf">
  <ace_lexicon:TV_pl>composedOf</ace_lexicon:TV_pl>
  <ace_lexicon:TV_vbg>composedOfed</ace_lexicon:TV_vbg>
  <ace_lexicon:TV_sg>composedOfs</ace_lexicon:TV_sg>
  <rdfs:domain rdf:resource="&untitled-ontology-26;University"/>
</ObjectProperty>

```

```

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#examinerOf -->

```

```

<ObjectProperty rdf:about="&untitled-ontology-26;examinerOf">

```

```

<rdf:type rdf:resource="&owl;AsymmetricProperty"/>
<ace_lexicon:TV_pl>examinerOf</ace_lexicon:TV_pl>
<ace_lexicon:TV_vbg>examinerOfed</ace_lexicon:TV_vbg>
<ace_lexicon:TV_sg>examinerOfs</ace_lexicon:TV_sg>
<rdfs:domain rdf:resource="&untitled-ontology-26;Examiner"/>
<rdfs:range rdf:resource="&untitled-ontology-26;Project"/>
<rdfs:range rdf:resource="&untitled-ontology-26;StudentGroup"/>
<inverseOf rdf:resource="&untitled-ontology-26;hasExaminer"/>
</ObjectProperty>

```

```

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#hasCourseCode -->

```

```

<ObjectProperty rdf:about="&untitled-ontology-26;hasCourseCode">
  <rdf:type rdf:resource="&owl;AsymmetricProperty"/>
  <ace_lexicon:TV_vbg>hasCourseCoded</ace_lexicon:TV_vbg>
  <ace_lexicon:TV_sg>hasCourseCodes</ace_lexicon:TV_sg>
  <ace_lexicon:TV_pl>hasCourseCode</ace_lexicon:TV_pl>
  <rdfs:domain rdf:resource="&untitled-ontology-26;Course"/>
</ObjectProperty>

```

```

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#hasDepartment -->

```

```

<ObjectProperty rdf:about="&untitled-ontology-26;hasDepartment">

```

```
<rdf:type rdf:resource="&owl;AsymmetricProperty"/>
<ace_lexicon:TV_vbg>hasDepartmented </ace_lexicon:TV_vbg>
<ace_lexicon:TV_sg>hasDepartments </ace_lexicon:TV_sg>
<ace_lexicon:TV_pl>hasDepartment </ace_lexicon:TV_pl>
<rdfs:range rdf:resource="&untitled-ontology-26;Department"/>
<rdfs:domain rdf:resource="&untitled-ontology-26;Person"/>
</ObjectProperty>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#hasExaminer -->
```

```
<ObjectProperty rdf:about="&untitled-ontology-26;hasExaminer">
  <rdf:type rdf:resource="&owl;FunctionalProperty"/>
  <ace_lexicon:TV_pl>hasExaminer </ace_lexicon:TV_pl>
  <ace_lexicon:TV_sg>hasExaminers </ace_lexicon:TV_sg>
  <ace_lexicon:TV_vbg>hasExamined </ace_lexicon:TV_vbg>
  <rdfs:range rdf:resource="&untitled-ontology-26;Examiner"/>
  <rdfs:domain rdf:resource="&untitled-ontology-26;Project"/>
  <rdfs:domain rdf:resource="&untitled-ontology-26;StudentGroup"/>
</ObjectProperty>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#hasFaculty -->
```

```
<ObjectProperty rdf:about="&untitled-ontology-26;hasFaculty">
```

```
<rdf:type rdf:resource="&owl;AsymmetricProperty"/>
<ace_lexicon:TV_vbg>hasFacultied</ace_lexicon:TV_vbg>
<ace_lexicon:TV_pl>hasFaculty</ace_lexicon:TV_pl>
<ace_lexicon:TV_sg>hasFaculties</ace_lexicon:TV_sg>
<rdfs:range rdf:resource="&untitled-ontology-26;Fakultet"/>
<rdfs:domain rdf:resource="&untitled-ontology-26;Person"/>
</ObjectProperty>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#hasGender -->
```

```
<ObjectProperty rdf:about="&untitled-ontology-26;hasGender">
  <rdf:type rdf:resource="&owl;AsymmetricProperty"/>
  <ace_lexicon:TV_sg>hasGenders</ace_lexicon:TV_sg>
  <ace_lexicon:TV_vbg>hasGendered</ace_lexicon:TV_vbg>
  <ace_lexicon:TV_pl>hasGender</ace_lexicon:TV_pl>
  <rdfs:range rdf:resource="&untitled-ontology-26;Gender"/>
  <rdfs:domain rdf:resource="&untitled-ontology-26;Person"/>
</ObjectProperty>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#hasMember -->
```

```
<ObjectProperty rdf:about="&untitled-ontology-26;hasMember">
  <rdf:type rdf:resource="&owl;AsymmetricProperty"/>
```

```
<ace_lexicon:TV_pl>hasMember</ace_lexicon:TV_pl>
<ace_lexicon:TV_vbg>hasMembered</ace_lexicon:TV_vbg>
<ace_lexicon:TV_sg>hasMembers</ace_lexicon:TV_sg>
<rdfs:range rdf:resource="&untitled-ontology-26;Student"/>
<rdfs:domain rdf:resource="&untitled-ontology-26;StudentGroup"/>
</ObjectProperty>

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#hasProfessor -->

<ObjectProperty rdf:about="&untitled-ontology-26;hasProfessor">
  <rdf:type rdf:resource="&owl;AsymmetricProperty"/>
  <ace_lexicon:TV_vbg>hasProfessored</ace_lexicon:TV_vbg>
  <ace_lexicon:TV_sg>hasProfessors</ace_lexicon:TV_sg>
  <ace_lexicon:TV_pl>hasProfessor</ace_lexicon:TV_pl>
  <rdfs:domain rdf:resource="&untitled-ontology-26;Course"/>
  <rdfs:range rdf:resource="&untitled-ontology-26;Professor"/>
</ObjectProperty>

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#hasProgramme -->

<ObjectProperty rdf:about="&untitled-ontology-26;hasProgramme">
  <rdf:type rdf:resource="&owl;AsymmetricProperty"/>
  <ace_lexicon:TV_pl>hasProgramme</ace_lexicon:TV_pl>
```

```
<ace_lexicon:TV_vbg>hasProgrammed</ace_lexicon:TV_vbg>
<ace_lexicon:TV_sg>hasProgrammes</ace_lexicon:TV_sg>
<rdfs:range rdf:resource="&untitled-ontology-26;Department"/>
<rdfs:domain rdf:resource="&untitled-ontology-26;Programme"/>
</ObjectProperty>

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#hasProject -->

<ObjectProperty rdf:about="&untitled-ontology-26;hasProject">
  <rdf:type rdf:resource="&owl;TransitiveProperty"/>
  <ace_lexicon:TV_sg>hasProjects</ace_lexicon:TV_sg>
  <ace_lexicon:TV_vbg>hasProjected</ace_lexicon:TV_vbg>
  <ace_lexicon:TV_pl>hasProject</ace_lexicon:TV_pl>
  <rdfs:domain rdf:resource="&untitled-ontology-26;Course"/>
  <rdfs:range rdf:resource="&untitled-ontology-26;Project"/>
  <rdfs:domain rdf:resource="&untitled-ontology-26;Student"/>
</ObjectProperty>

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#hasProjectTitle -->

<ObjectProperty rdf:about="&untitled-ontology-26;hasProjectTitle">
  <rdf:type rdf:resource="&owl;TransitiveProperty"/>
  <ace_lexicon:TV_vbg>hasProjectTitled</ace_lexicon:TV_vbg>
```

```
<ace_lexicon:TV_sg>hasProjectTitles</ace_lexicon:TV_sg>
<ace_lexicon:TV_pl>hasProjectTitle</ace_lexicon:TV_pl>
<rdfs:range rdf:resource="&untitled-ontology-26;Project"/>
<rdfs:domain rdf:resource="&untitled-ontology-26;StudentGroup"/>
<inverseOf rdf:resource="&untitled-ontology-26;isProjectTitleOf"/>
</ObjectProperty>

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#hasStudent -->

<ObjectProperty rdf:about="&untitled-ontology-26;hasStudent">
  <rdf:type rdf:resource="&owl;TransitiveProperty"/>
  <ace_lexicon:TV_vbg>hasStudented</ace_lexicon:TV_vbg>
  <ace_lexicon:TV_sg>hasStudents</ace_lexicon:TV_sg>
  <ace_lexicon:TV_pl>hasStudent</ace_lexicon:TV_pl>
  <rdfs:domain rdf:resource="&untitled-ontology-26;Course"/>
  <rdfs:domain rdf:resource="&untitled-ontology-26;Programme"/>
  <rdfs:range rdf:resource="&untitled-ontology-26;Student"/>
</ObjectProperty>

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#hasSupervisor -->

<ObjectProperty rdf:about="&untitled-ontology-26;hasSupervisor">
  <rdf:type rdf:resource="&owl;TransitiveProperty"/>
```



```

<ace_lexicon:TV_pl>hasSupervisor</ace_lexicon:TV_pl>
<ace_lexicon:TV_vbg>hasSupervised</ace_lexicon:TV_vbg>
<ace_lexicon:TV_sg>hasSupervisors</ace_lexicon:TV_sg>
<rdfs:domain rdf:resource="&untitled-ontology-26;Project"/>
<rdfs:domain rdf:resource="&untitled-ontology-26;StudentGroup"/>
<rdfs:range rdf:resource="&untitled-ontology-26;Supervisor"/>
</ObjectProperty>

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#isProjectOf -->

<ObjectProperty rdf:about="&untitled-ontology-26;isProjectOf">
  <rdf:type rdf:resource="&owl;TransitiveProperty"/>
  <ace_lexicon:TV_sg>isProjectOfs</ace_lexicon:TV_sg>
  <ace_lexicon:TV_vbg>isProjectOfed</ace_lexicon:TV_vbg>
  <ace_lexicon:TV_pl>isProjectOf</ace_lexicon:TV_pl>
  <rdfs:range rdf:resource="&untitled-ontology-26;Course"/>
  <rdfs:domain rdf:resource="&untitled-ontology-26;Project"/>
  <rdfs:range rdf:resource="&untitled-ontology-26;Student"/>
  <inverseOf rdf:resource="&untitled-ontology-26;hasProject"/>
</ObjectProperty>

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#isProjectTitleOf -->

```

```
<ObjectProperty rdf:about="&untitled-ontology-26;isProjectTitleOf">
  <rdf:type rdf:resource="&owl;TransitiveProperty"/>
  <ace_lexicon:TV_sg>isProjectTitleOfs</ace_lexicon:TV_sg>
  <ace_lexicon:TV_pl>isProjectTitleOf</ace_lexicon:TV_pl>
  <ace_lexicon:TV_vbg>isProjectTitleOfed</ace_lexicon:TV_vbg>
  <rdfs:domain rdf:resource="&untitled-ontology-26;Project"/>
  <rdfs:range rdf:resource="&untitled-ontology-26;StudentGroup"/>
</ObjectProperty>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#memberOf -->
```

```
<ObjectProperty rdf:about="&untitled-ontology-26;memberOf">
  <rdf:type rdf:resource="&owl;AsymmetricProperty"/>
  <ace_lexicon:TV_vbg>memberOfed</ace_lexicon:TV_vbg>
  <ace_lexicon:TV_sg>memberOfs</ace_lexicon:TV_sg>
  <ace_lexicon:TV_pl>memberOf</ace_lexicon:TV_pl>
  <rdfs:domain rdf:resource="&untitled-ontology-26;Student"/>
  <rdfs:range rdf:resource="&untitled-ontology-26;StudentGroup"/>
  <inverseOf rdf:resource="&untitled-ontology-26;hasMember"/>
</ObjectProperty>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#partOf -->
```

```
<ObjectProperty rdf:about="&untitled-ontology-26;partOf">
  <rdf:type rdf:resource="&owl;TransitiveProperty"/>
  <ace_lexicon:TV_pl>partOf</ace_lexicon:TV_pl>
  <ace_lexicon:TV_vbg>partOfed</ace_lexicon:TV_vbg>
  <ace_lexicon:TV_sg>partOfs</ace_lexicon:TV_sg>
  <rdfs:range rdf:resource="&untitled-ontology-26;University"/>
  <inverseOf rdf:resource="&untitled-ontology-26;composedOf"/>
</ObjectProperty>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#professorOf -->
```

```
<ObjectProperty rdf:about="&untitled-ontology-26;professorOf">
  <rdf:type rdf:resource="&owl;AsymmetricProperty"/>
  <ace_lexicon:TV_pl>professorOf</ace_lexicon:TV_pl>
  <ace_lexicon:TV_sg>professorOfs</ace_lexicon:TV_sg>
  <ace_lexicon:TV_vbg>professorOfed</ace_lexicon:TV_vbg>
  <rdfs:range rdf:resource="&untitled-ontology-26;Course"/>
  <rdfs:domain rdf:resource="&untitled-ontology-26;Professor"/>
  <inverseOf rdf:resource="&untitled-ontology-26;hasProfessor"/>
</ObjectProperty>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#programmeOf -->
```

```

<ObjectProperty rdf:about="&untitled-ontology-26;programmeOf" >
  <rdf:type rdf:resource="&owl;AsymmetricProperty"/>
  <ace_lexicon:TV_sg>programmeOfs</ace_lexicon:TV_sg>
  <ace_lexicon:TV_vbg>programmeOfed</ace_lexicon:TV_vbg>
  <ace_lexicon:TV_pl>programmeOf</ace_lexicon:TV_pl>
  <rdfs:domain rdf:resource="&untitled-ontology-26;Department"/>
  <rdfs:range rdf:resource="&untitled-ontology-26;Programme"/>
  <inverseOf rdf:resource="&untitled-ontology-26;hasProgramme"/>
</ObjectProperty>

```

```

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#studentOf -->

```

```

<ObjectProperty rdf:about="&untitled-ontology-26;studentOf" >
  <rdf:type rdf:resource="&owl;TransitiveProperty"/>
  <ace_lexicon:TV_pl>studentOf</ace_lexicon:TV_pl>
  <ace_lexicon:TV_sg>studentOfs</ace_lexicon:TV_sg>
  <ace_lexicon:TV_vbg>studentOfed</ace_lexicon:TV_vbg>
  <rdfs:range rdf:resource="&untitled-ontology-26;Course"/>
  <rdfs:range rdf:resource="&untitled-ontology-26;Programme"/>
  <rdfs:domain rdf:resource="&untitled-ontology-26;Student"/>
  <inverseOf rdf:resource="&untitled-ontology-26;hasStudent"/>
</ObjectProperty>

```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#supervisorOf -->
```

```
<ObjectProperty rdf:about="&untitled-ontology-26;supervisorOf">
  <rdf:type rdf:resource="&owl;TransitiveProperty"/>
  <ace_lexicon:TV_vbg>supervisorOfed</ace_lexicon:TV_vbg>
  <ace_lexicon:TV_sg>supervisorOfs</ace_lexicon:TV_sg>
  <ace_lexicon:TV_pl>supervisorOf</ace_lexicon:TV_pl>
  <rdfs:range rdf:resource="&untitled-ontology-26;Project"/>
  <rdfs:range rdf:resource="&untitled-ontology-26;StudentGroup"/>
  <rdfs:domain rdf:resource="&untitled-ontology-26;Supervisor"/>
  <inverseOf rdf:resource="&untitled-ontology-26;hasSupervisor"/>
</ObjectProperty>
```

```
<!--
////////////////////////////////////
//
// Data properties
//
////////////////////////////////////
-->
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#ECTS_Credits -->
```

```
<DatatypeProperty rdf:about="&untitled-ontology-26;ECTS_Credits">
  <ace_lexicon:TV_vbg>ECTS_Creditsed</ace_lexicon:TV_vbg>
  <ace_lexicon:TV_sg>ECTS_Creditses</ace_lexicon:TV_sg>
  <ace_lexicon:TV_pl>ECTS_Credits</ace_lexicon:TV_pl>
  <rdfs:domain rdf:resource="&untitled-ontology-26;Course"/>
  <rdfs:domain rdf:resource="&untitled-ontology-26;Programme"/>
  <rdfs:range rdf:resource="&xsd:int"/>
</DatatypeProperty>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#ExamDate -->
```

```
<DatatypeProperty rdf:about="&untitled-ontology-26;ExamDate">
  <ace_lexicon:TV_vbg>ExamDated</ace_lexicon:TV_vbg>
  <ace_lexicon:TV_sg>ExamDates</ace_lexicon:TV_sg>
  <ace_lexicon:TV_pl>ExamDate</ace_lexicon:TV_pl>
  <rdfs:domain rdf:resource="&untitled-ontology-26;Course"/>
  <rdfs:range rdf:resource="&xsd:date"/>
</DatatypeProperty>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#ExamSystem -->
```

```
<DatatypeProperty rdf:about="&untitled-ontology-26;ExamSystem">
```

```

<ace_lexicon:TV_sg>ExamSystems</ace_lexicon:TV_sg>
<ace_lexicon:TV_pl>ExamSystem</ace_lexicon:TV_pl>
<ace_lexicon:TV_vbg>ExamSystemed</ace_lexicon:TV_vbg>
<rdfs:domain rdf:resource="&untitled-ontology-26;Course"/>
<rdfs:range rdf:resource="&xsd:string"/>
</DatatypeProperty>

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#StudyProgrammeCode -->

<DatatypeProperty rdf:about="&untitled-ontology-26;StudyProgrammeCode">
  <ace_lexicon:TV_vbg>StudyProgrammeCoded</ace_lexicon:TV_vbg>
  <ace_lexicon:TV_sg>StudyProgrammeCodes</ace_lexicon:TV_sg>
  <ace_lexicon:TV_pl>StudyProgrammeCode</ace_lexicon:TV_pl>
  <rdfs:domain rdf:resource="&untitled-ontology-26;Programme"/>
  <rdfs:range rdf:resource="&xsd:string"/>
</DatatypeProperty>

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Term -->

<DatatypeProperty rdf:about="&untitled-ontology-26;Term">
  <ace_lexicon:TV_pl>Term</ace_lexicon:TV_pl>
  <ace_lexicon:TV_vbg>Termed</ace_lexicon:TV_vbg>
  <ace_lexicon:TV_sg>Terms</ace_lexicon:TV_sg>

```

```
<rdfs:domain rdf:resource="&untitled-ontology-26;Course"/>
<rdfs:range rdf:resource="&xsd:string"/>
</DatatypeProperty>

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#address -->

<DatatypeProperty rdf:about="&untitled-ontology-26;address">
  <ace_lexicon:TV_vbg>addressed</ace_lexicon:TV_vbg>
  <ace_lexicon:TV_sg>addresses</ace_lexicon:TV_sg>
  <ace_lexicon:TV_pl>address</ace_lexicon:TV_pl>
  <rdfs:domain rdf:resource="&untitled-ontology-26;Person"/>
  <rdfs:domain rdf:resource="&untitled-ontology-26;University"/>
  <rdfs:range rdf:resource="&xsd:string"/>
</DatatypeProperty>

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#age -->

<DatatypeProperty rdf:about="&untitled-ontology-26;age">
  <ace_lexicon:TV_pl>age</ace_lexicon:TV_pl>
  <ace_lexicon:TV_sg>ages</ace_lexicon:TV_sg>
  <ace_lexicon:TV_vbg>aged</ace_lexicon:TV_vbg>
  <rdfs:domain rdf:resource="&untitled-ontology-26;Person"/>
  <rdfs:range rdf:resource="&xsd:int"/>
```



```
</DatatypeProperty>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#campus -->
```

```
<DatatypeProperty rdf:about="&untitled-ontology-26;campus">
```

```
  <ace_lexicon:TV_pl>campus</ace_lexicon:TV_pl>
```

```
  <ace_lexicon:TV_sg>campuses</ace_lexicon:TV_sg>
```

```
  <ace_lexicon:TV_vbg>campused</ace_lexicon:TV_vbg>
```

```
  <rdfs:domain rdf:resource="&untitled-ontology-26;University"/>
```

```
  <rdfs:range rdf:resource="&xsd:string"/>
```

```
</DatatypeProperty>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#city -->
```

```
<DatatypeProperty rdf:about="&untitled-ontology-26;city">
```

```
  <ace_lexicon:TV_sg>cities</ace_lexicon:TV_sg>
```

```
  <ace_lexicon:TV_vbg>cityed</ace_lexicon:TV_vbg>
```

```
  <ace_lexicon:TV_pl>city</ace_lexicon:TV_pl>
```

```
  <rdfs:domain rdf:resource="&untitled-ontology-26;Person"/>
```

```
  <rdfs:range rdf:resource="&xsd:string"/>
```

```
</DatatypeProperty>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#country -->
```

```
<DatatypeProperty rdf:about="&untitled-ontology-26;country">
```

```
  <ace_lexicon:TV_pl>country</ace_lexicon:TV_pl>
```

```
  <ace_lexicon:TV_sg>countries</ace_lexicon:TV_sg>
```

```
  <ace_lexicon:TV_vbg>countried</ace_lexicon:TV_vbg>
```

```
  <rdfs:domain rdf:resource="&untitled-ontology-26;Person"/>
```

```
  <rdfs:range rdf:resource="&xsd:string"/>
```

```
</DatatypeProperty>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#email -->
```

```
<DatatypeProperty rdf:about="&untitled-ontology-26;email">
```

```
  <ace_lexicon:TV_sg>emails</ace_lexicon:TV_sg>
```

```
  <ace_lexicon:TV_vbg>emailed</ace_lexicon:TV_vbg>
```

```
  <ace_lexicon:TV_pl>email</ace_lexicon:TV_pl>
```

```
  <rdfs:domain rdf:resource="&untitled-ontology-26;Person"/>
```

```
  <rdfs:range rdf:resource="&xsd:string"/>
```

```
</DatatypeProperty>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#firstName -->
```

```
<DatatypeProperty rdf:about="&untitled-ontology-26;firstName">
  <ace_lexicon:TV_sg>firstNames</ace_lexicon:TV_sg>
  <ace_lexicon:TV_pl>firstName</ace_lexicon:TV_pl>
  <ace_lexicon:TV_vbg>firstNamed</ace_lexicon:TV_vbg>
  <rdfs:domain rdf:resource="&untitled-ontology-26;Person"/>
  <rdfs:range rdf:resource="&xsd:string"/>
</DatatypeProperty>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#gradeGiveByExaminer -->
```

```
<DatatypeProperty rdf:about="&untitled-ontology-26;gradeGiveByExaminer">
  <ace_lexicon:TV_sg>gradeGiveByExaminers</ace_lexicon:TV_sg>
  <ace_lexicon:TV_vbg>gradeGiveByExaminered</ace_lexicon:TV_vbg>
  <ace_lexicon:TV_pl>gradeGiveByExaminer</ace_lexicon:TV_pl>
</DatatypeProperty>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#gradeGiveBySupervisor -->
```

```
<DatatypeProperty rdf:about="&untitled-ontology-26;gradeGiveBySupervisor">
  <ace_lexicon:TV_vbg>gradeGiveBySupervised</ace_lexicon:TV_vbg>
  <ace_lexicon:TV_sg>gradeGiveBySupervisors</ace_lexicon:TV_sg>
  <ace_lexicon:TV_pl>gradeGiveBySupervisor</ace_lexicon:TV_pl>
</DatatypeProperty>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#hasGrade -->
```

```
<DatatypeProperty rdf:about="&untitled-ontology-26;hasGrade">
```

```
  <ace_lexicon:TV_sg>hasGrades</ace_lexicon:TV_sg>
```

```
  <ace_lexicon:TV_vbg>hasGraded</ace_lexicon:TV_vbg>
```

```
  <ace_lexicon:TV_pl>hasGrade</ace_lexicon:TV_pl>
```

```
  <rdfs:domain rdf:resource="&untitled-ontology-26;Course"/>
```

```
  <rdfs:domain rdf:resource="&untitled-ontology-26;Project"/>
```

```
  <rdfs:domain rdf:resource="&untitled-ontology-26;Student"/>
```

```
  <rdfs:domain rdf:resource="&untitled-ontology-26;StudentGroup"/>
```

```
  <rdfs:range rdf:resource="&xsd:string"/>
```

```
  <rdfs:subPropertyOf rdf:resource="&owl;topDataProperty"/>
```

```
</DatatypeProperty>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#hasProjectDuration -->
```

```
<DatatypeProperty rdf:about="&untitled-ontology-26;hasProjectDuration">
```

```
  <rdfs:comment>This property is counted in the Months</rdfs:comment>
```

```
  <ace_lexicon:TV_vbg>hasProjectDurationed</ace_lexicon:TV_vbg>
```

```
  <ace_lexicon:TV_pl>hasProjectDuration</ace_lexicon:TV_pl>
```

```
  <ace_lexicon:TV_sg>hasProjectDurations</ace_lexicon:TV_sg>
```

```
  <rdfs:domain rdf:resource="&untitled-ontology-26;Project"/>
```

```
<rdfs:range rdf:resource="&xsd:int"/>
</DatatypeProperty>

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#lastname -->

<DatatypeProperty rdf:about="&untitled-ontology-26;lastname">
  <ace_lexicon:TV_vbg>lastnamed</ace_lexicon:TV_vbg>
  <ace_lexicon:TV_sg>lastnames</ace_lexicon:TV_sg>
  <ace_lexicon:TV_pl>lastname</ace_lexicon:TV_pl>
  <rdfs:domain rdf:resource="&untitled-ontology-26;Person"/>
  <rdfs:range rdf:resource="&xsd:string"/>
</DatatypeProperty>

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#level -->

<DatatypeProperty rdf:about="&untitled-ontology-26;level">
  <ace_lexicon:TV_pl>level</ace_lexicon:TV_pl>
  <ace_lexicon:TV_vbg>levelled</ace_lexicon:TV_vbg>
  <ace_lexicon:TV_sg>levels</ace_lexicon:TV_sg>
  <rdfs:domain rdf:resource="&untitled-ontology-26;Programme"/>
  <rdfs:range rdf:resource="&xsd:string"/>
</DatatypeProperty>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#personalNo -->
```

```
<DatatypeProperty rdf:about="&untitled-ontology-26;personalNo">
```

```
  <ace_lexicon:TV_vbg>personalNoed</ace_lexicon:TV_vbg>
```

```
  <ace_lexicon:TV_pl>personalNo</ace_lexicon:TV_pl>
```

```
  <ace_lexicon:TV_sg>personalNoes</ace_lexicon:TV_sg>
```

```
  <rdfs:domain rdf:resource="&untitled-ontology-26;Person"/>
```

```
  <rdfs:range rdf:resource="&xsd:int"/>
```

```
</DatatypeProperty>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#phoneNo -->
```

```
<DatatypeProperty rdf:about="&untitled-ontology-26;phoneNo">
```

```
  <ace_lexicon:TV_sg>phoneNoes</ace_lexicon:TV_sg>
```

```
  <ace_lexicon:TV_vbg>phoneNoed</ace_lexicon:TV_vbg>
```

```
  <ace_lexicon:TV_pl>phoneNo</ace_lexicon:TV_pl>
```

```
  <rdfs:domain rdf:resource="&untitled-ontology-26;Person"/>
```

```
  <rdfs:domain rdf:resource="&untitled-ontology-26;University"/>
```

```
  <rdfs:range rdf:resource="&xsd:int"/>
```

```
</DatatypeProperty>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#projectEnd -->
```

```
<DatatypeProperty rdf:about="&untitled-ontology-26;projectEnd">
```

```
  <ace_lexicon:TV_vbg>projectEnded</ace_lexicon:TV_vbg>
```

```
  <ace_lexicon:TV_sg>projectEnds</ace_lexicon:TV_sg>
```

```
  <ace_lexicon:TV_pl>projectEnd</ace_lexicon:TV_pl>
```

```
  <rdfs:domain rdf:resource="&untitled-ontology-26;Project"/>
```

```
  <rdfs:range rdf:resource="&xsd;dateTime"/>
```

```
</DatatypeProperty>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#projectStarts -->
```

```
<DatatypeProperty rdf:about="&untitled-ontology-26;projectStarts">
```

```
  <ace_lexicon:TV_pl>projectStarts</ace_lexicon:TV_pl>
```

```
  <ace_lexicon:TV_sg>projectStartses</ace_lexicon:TV_sg>
```

```
  <ace_lexicon:TV_vbg>projectStartsed</ace_lexicon:TV_vbg>
```

```
  <rdfs:domain rdf:resource="&untitled-ontology-26;Project"/>
```

```
  <rdfs:range rdf:resource="&xsd;dateTime"/>
```

```
</DatatypeProperty>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#studentNo -->
```

```
<DatatypeProperty rdf:about="&untitled-ontology-26;studentNo">
```

```

<ace_lexicon:TV_pl>studentNo</ace_lexicon:TV_pl>
<ace_lexicon:TV_sg>studentNoes</ace_lexicon:TV_sg>
<ace_lexicon:TV_vbg>studentNoed</ace_lexicon:TV_vbg>
<rdfs:domain rdf:resource="&untitled-ontology-26;Student"/>
<rdfs:range rdf:resource="&xsd:string"/>
</DatatypeProperty>

<!--
////////////////////////////////////
//
// Classes
//
////////////////////////////////////
-->

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#1stYear -->

<Class rdf:about="&untitled-ontology-26;1stYear">
  <rdfs:subClassOf rdf:resource="&untitled-ontology-26;Bachelors"/>
  <ace_lexicon:CN_pl>1stYears</ace_lexicon:CN_pl>
  <ace_lexicon:CN_sg>1stYear</ace_lexicon:CN_sg>
</Class>

```



```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#2ndYear -->
```

```
<Class rdf:about="&untitled-ontology-26;2ndYear">
```

```
  <rdfs:subClassOf rdf:resource="&untitled-ontology-26;Bachelors"/>
```

```
  <ace_lexicon:CN_pl>2ndYears</ace_lexicon:CN_pl>
```

```
  <ace_lexicon:CN_sg>2ndYear</ace_lexicon:CN_sg>
```

```
</Class>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#3rdYear -->
```

```
<Class rdf:about="&untitled-ontology-26;3rdYear">
```

```
  <rdfs:subClassOf rdf:resource="&untitled-ontology-26;Bachelors"/>
```

```
  <ace_lexicon:CN_pl>3rdYears</ace_lexicon:CN_pl>
```

```
  <ace_lexicon:CN_sg>3rdYear</ace_lexicon:CN_sg>
```

```
</Class>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#4thYear -->
```

```
<Class rdf:about="&untitled-ontology-26;4thYear">
```

```
  <rdfs:subClassOf rdf:resource="&untitled-ontology-26;Masters"/>
```

```
<disjointWith rdf:resource="&untitled-ontology-26;5thYear"/>

<ace_lexicon:CN_sg>4thYear</ace_lexicon:CN_sg>

<ace_lexicon:CN_pl>4thYears</ace_lexicon:CN_pl>

</Class>

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#5thYear -->

<Class rdf:about="&untitled-ontology-26;5thYear">

  <rdfs:subClassOf rdf:resource="&untitled-ontology-26;Masters"/>

  <ace_lexicon:CN_sg>5thYear</ace_lexicon:CN_sg>

  <ace_lexicon:CN_pl>5thYears</ace_lexicon:CN_pl>

</Class>

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Bachelors -->

<Class rdf:about="&untitled-ontology-26;Bachelors">

  <rdfs:subClassOf rdf:resource="&untitled-ontology-26;Student"/>

  <disjointWith rdf:resource="&untitled-ontology-26;Masters"/>

  <ace_lexicon:CN_sg>Bachelors</ace_lexicon:CN_sg>

  <ace_lexicon:CN_pl>Bachelorses</ace_lexicon:CN_pl>

</Class>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Course -->
```

```
<Class rdf:about="&untitled-ontology-26;Course">
```

```
<equivalentClass>
```

```
<Class>
```

```
<intersectionOf rdf:parseType="Collection">
```

```
<rdf:Description rdf:about="&owl;Thing"/>
```

```
<Restriction>
```

```
<onProperty rdf:resource="&untitled-ontology-26;hasProfessor"/>
```

```
<someValuesFrom rdf:resource="&untitled-ontology-26;Professor"/>
```

```
</Restriction>
```

```
<Restriction>
```

```
<onProperty rdf:resource="&untitled-ontology-26;hasStudent"/>
```

```
<someValuesFrom rdf:resource="&untitled-ontology-26;Student"/>
```

```
</Restriction>
```

```
</intersectionOf>
```

```
</Class>
```

```
</equivalentClass>
```

```
<ace_lexicon:CN_pl>Courses</ace_lexicon:CN_pl>
```

```
<ace_lexicon:CN_sg>Course</ace_lexicon:CN_sg>
```

```
</Class>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Department -->
```

```

<Class rdf:about="&untitled-ontology-26;Department">
  <rdfs:subClassOf rdf:resource="&untitled-ontology-26;University"/>
  <ace_lexicon:CN_pl>Departments</ace_lexicon:CN_pl>
  <ace_lexicon:CN_sg>Department</ace_lexicon:CN_sg>
</Class>

```

```

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Examiner -->

```

```

<Class rdf:about="&untitled-ontology-26;Examiner">
  <equivalentClass>
    <Class>
      <intersectionOf rdf:parseType="Collection">
        <rdf:Description rdf:about="&untitled-ontology-26;Teacher"/>
        <Restriction>
          <onProperty rdf:resource="&untitled-ontology-26;examinerOf"/>
          <someValuesFrom rdf:resource="&untitled-ontology-26;Project"/>
        </Restriction>
        <Restriction>
          <onProperty rdf:resource="&untitled-ontology-26;examinerOf"/>
          <someValuesFrom rdf:resource="&untitled-ontology-26;StudentGroup"/>
        </Restriction>
      </intersectionOf>
    </Class>
  </equivalentClass>
  <disjointWith rdf:resource="&untitled-ontology-26;Professor"/>

```

```
<disjointWith rdf:resource="&untitled-ontology-26;Supervisor"/>
<ace_lexicon:CN_sg>Examiner</ace_lexicon:CN_sg>
<ace_lexicon:CN_pl>Examiners</ace_lexicon:CN_pl>
</Class>

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#ExternalExaminer -->

<Class rdf:about="&untitled-ontology-26;ExternalExaminer">
  <rdfs:subClassOf rdf:resource="&untitled-ontology-26;Examiner"/>
  <ace_lexicon:CN_pl>ExternalExaminers</ace_lexicon:CN_pl>
  <ace_lexicon:CN_sg>ExternalExaminer</ace_lexicon:CN_sg>
</Class>

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Fakultet -->

<Class rdf:about="&untitled-ontology-26;Fakultet">
  <rdfs:subClassOf rdf:resource="&untitled-ontology-26;University"/>
  <ace_lexicon:CN_sg>Fakultet</ace_lexicon:CN_sg>
  <ace_lexicon:CN_pl>Fakultets</ace_lexicon:CN_pl>
</Class>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Gender -->
```

```
<Class rdf:about="&untitled-ontology-26;Gender">
```

```
  <rdfs:subClassOf rdf:resource="&owl;Thing"/>
```

```
  <ace_lexicon:CN_pl>Genders</ace_lexicon:CN_pl>
```

```
  <ace_lexicon:CN_sg>Gender</ace_lexicon:CN_sg>
```

```
</Class>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Institut -->
```

```
<Class rdf:about="&untitled-ontology-26;Institut">
```

```
  <rdfs:subClassOf rdf:resource="&untitled-ontology-26;University"/>
```

```
  <ace_lexicon:CN_sg>Institut</ace_lexicon:CN_sg>
```

```
  <ace_lexicon:CN_pl>Institutts</ace_lexicon:CN_pl>
```

```
</Class>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Masters -->
```

```
<Class rdf:about="&untitled-ontology-26;Masters">
```

```
  <rdfs:subClassOf rdf:resource="&untitled-ontology-26;Student"/>
```

```
  <ace_lexicon:CN_pl>Masterses</ace_lexicon:CN_pl>
```

```
  <ace_lexicon:CN_sg>Masters</ace_lexicon:CN_sg>
```

```
</Class>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Person -->
```

```
<Class rdf:about="&untitled-ontology-26;Person">
```

```
  <equivalentClass>
```

```
    <Restriction>
```

```
      <onProperty rdf:resource="&untitled-ontology-26;hasGender"/>
```

```
      <someValuesFrom rdf:resource="&untitled-ontology-26;Gender"/>
```

```
    </Restriction>
```

```
  </equivalentClass>
```

```
  <ace_lexicon:CN_sg>Person</ace_lexicon:CN_sg>
```

```
  <ace_lexicon:CN_pl>Persons</ace_lexicon:CN_pl>
```

```
</Class>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Professor -->
```

```
<Class rdf:about="&untitled-ontology-26;Professor">
```

```
  <equivalentClass>
```

```
    <Class>
```

```
      <intersectionOf rdf:parseType="Collection">
```

```
        <rdf:Description rdf:about="&untitled-ontology-26;Teacher"/>
```

```
      <Restriction>
```

```
        <onProperty rdf:resource="&untitled-ontology-26;hasDepartment"/>
```

```

    <someValuesFrom rdf:resource="&untitled-ontology-26;Department"/>
  </Restriction>
  <Restriction>
    <onProperty rdf:resource="&untitled-ontology-26;hasFaculty"/>
    <someValuesFrom rdf:resource="&untitled-ontology-26;Fakultet"/>
  </Restriction>
  <Restriction>
    <onProperty rdf:resource="&untitled-ontology-26;professorOf"/>
    <someValuesFrom rdf:resource="&untitled-ontology-26;Course"/>
  </Restriction>
</intersectionOf>
</Class>
</equivalentClass>
<ace_lexicon:CN_pl>Professors</ace_lexicon:CN_pl>
<ace_lexicon:CN_sg>Professor</ace_lexicon:CN_sg>
</Class>

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Programme -->

<Class rdf:about="&untitled-ontology-26;Programme">
  <rdfs:subClassOf rdf:resource="&untitled-ontology-26;University"/>
  <ace_lexicon:CN_sg>Programme</ace_lexicon:CN_sg>
  <ace_lexicon:CN_pl>Programmes</ace_lexicon:CN_pl>
</Class>

```



```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Project -->
```

```
<Class rdf:about="&untitled-ontology-26;Project">
```

```
<equivalentClass>
```

```
<Class>
```

```
<intersectionOf rdf:parseType="Collection">
```

```
<rdf:Description rdf:about="&owl;Thing"/>
```

```
<Restriction>
```

```
<onProperty rdf:resource="&untitled-ontology-26;hasExaminer"/>
```

```
<someValuesFrom rdf:resource="&untitled-ontology-26;Examiner"/>
```

```
</Restriction>
```

```
<Restriction>
```

```
<onProperty rdf:resource="&untitled-ontology-26;hasStudent"/>
```

```
<someValuesFrom rdf:resource="&untitled-ontology-26;Student"/>
```

```
</Restriction>
```

```
<Restriction>
```

```
<onProperty rdf:resource="&untitled-ontology-26;hasSupervisor"/>
```

```
<someValuesFrom rdf:resource="&untitled-ontology-26;Supervisor"/>
```

```
</Restriction>
```

```
</intersectionOf>
```

```
</Class>
```

```
</equivalentClass>
```

```
<ace_lexicon:CN_pl>Projects</ace_lexicon:CN_pl>
```

```
<ace_lexicon:CN_sg>Project</ace_lexicon:CN_sg>
```

```
</Class>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Student -->
```

```
<Class rdf:about="&untitled-ontology-26;Student">
```

```
  <equivalentClass>
```

```
    <Class>
```

```
      <intersectionOf rdf:parseType="Collection">
```

```
        <rdf:Description rdf:about="&untitled-ontology-26;Person"/>
```

```
        <Restriction>
```

```
          <onProperty rdf:resource="&untitled-ontology-26;hasDepartment"/>
```

```
          <someValuesFrom rdf:resource="&untitled-ontology-26;Department"/>
```

```
        </Restriction>
```

```
        <Restriction>
```

```
          <onProperty rdf:resource="&untitled-ontology-26;hasFaculty"/>
```

```
          <someValuesFrom rdf:resource="&untitled-ontology-26;Fakultet"/>
```

```
        </Restriction>
```

```
        <Restriction>
```

```
          <onProperty rdf:resource="&untitled-ontology-26;studentOf"/>
```

```
          <someValuesFrom rdf:resource="&untitled-ontology-26;Course"/>
```

```
        </Restriction>
```

```
      </intersectionOf>
```

```
    </Class>
```

```
  </equivalentClass>
```

```
  <disjointWith rdf:resource="&untitled-ontology-26;Teacher"/>
```

```
<ace_lexicon:CN_pl>Students</ace_lexicon:CN_pl>
```

```
<ace_lexicon:CN_sg>Student</ace_lexicon:CN_sg>
</Class>

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#StudentGroup -->

<Class rdf:about="&untitled-ontology-26;StudentGroup">
  <equivalentClass>
    <Class>
      <intersectionOf rdf:parseType="Collection">
        <rdf:Description rdf:about="&owl;Thing"/>
        <Restriction>
          <onProperty rdf:resource="&untitled-ontology-26;hasExaminer"/>
          <someValuesFrom rdf:resource="&untitled-ontology-26;Examiner"/>
        </Restriction>
        <Restriction>
          <onProperty rdf:resource="&untitled-ontology-26;hasMember"/>
          <someValuesFrom rdf:resource="&untitled-ontology-26;Student"/>
        </Restriction>
        <Restriction>
          <onProperty rdf:resource="&untitled-ontology-26;hasProject"/>
          <someValuesFrom rdf:resource="&untitled-ontology-26;Project"/>
        </Restriction>
        <Restriction>
          <onProperty rdf:resource="&untitled-ontology-26;hasSupervisor"/>
          <someValuesFrom rdf:resource="&untitled-ontology-26;Supervisor"/>
        </Restriction>
      </intersectionOf>
    </Class>
  </equivalentClass>
</Class>
```

```

    </Restriction>
  </intersectionOf>
</Class>
</equivalentClass>
<ace_lexicon:CN_pl>StudentGroups</ace_lexicon:CN_pl>
<ace_lexicon:CN_sg>StudentGroup</ace_lexicon:CN_sg>
</Class>

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Supervisor -->

<Class rdf:about="&untitled-ontology-26;Supervisor">
  <equivalentClass>
    <Class>
      <intersectionOf rdf:parseType="Collection">
        <rdf:Description rdf:about="&untitled-ontology-26;Teacher"/>
        <Restriction>
          <onProperty rdf:resource="&untitled-ontology-26;hasDepartment"/>
          <someValuesFrom rdf:resource="&untitled-ontology-26;Department"/>
        </Restriction>
        <Restriction>
          <onProperty rdf:resource="&untitled-ontology-26;hasFaculty"/>
          <someValuesFrom rdf:resource="&untitled-ontology-26;Fakultet"/>
        </Restriction>
        <Restriction>
          <onProperty rdf:resource="&untitled-ontology-26;supervisorOf"/>

```

```
<someValuesFrom rdf:resource="&untitled-ontology-26;Project"/>
</Restriction>
</intersectionOf>
</Class>
</equivalentClass>
<rdfs:subClassOf rdf:resource="&untitled-ontology-26;Teacher"/>
<ace_lexicon:CN_sg>Supervisor</ace_lexicon:CN_sg>
<ace_lexicon:CN_pl>Supervisors</ace_lexicon:CN_pl>
</Class>

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Teacher -->

<Class rdf:about="&untitled-ontology-26;Teacher">
  <rdfs:subClassOf rdf:resource="&untitled-ontology-26;Person"/>
  <ace_lexicon:CN_sg>Teacher</ace_lexicon:CN_sg>
  <ace_lexicon:CN_pl>Teachers</ace_lexicon:CN_pl>
</Class>

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#University -->

<Class rdf:about="&untitled-ontology-26;University">
  <equivalentClass>
    <Class>
```

```

<intersectionOf rdf:parseType="Collection">
  <rdf:Description rdf:about="&owl;Thing"/>
  <Restriction>
    <onProperty rdf:resource="&untitled-ontology-26;composedOf"/>
    <someValuesFrom rdf:resource="&untitled-ontology-26;Department"/>
  </Restriction>
  <Restriction>
    <onProperty rdf:resource="&untitled-ontology-26;composedOf"/>
    <someValuesFrom rdf:resource="&untitled-ontology-26;Fakultet"/>
  </Restriction>
</intersectionOf>
</Class>
</equivalentClass>
<ace_lexicon:CN_sg>University</ace_lexicon:CN_sg>
<ace_lexicon:CN_pl>Universities</ace_lexicon:CN_pl>
</Class>

```

```

<!--
////////////////////////////////////
//
// Individuals
//
////////////////////////////////////
-->

```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#A -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;A">
```

```
  <ace_lexicon:PN_sg>A</ace_lexicon:PN_sg>
```

```
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#A_Churn_Prediction_Model_Based_on_Gaussian_Processes -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;A_Churn_Prediction_Model_Based_on_Gaussian_Processes">
```

```
  <rdf:type rdf:resource="&untitled-ontology-26;Project"/>
```

```
  <untitled-ontology-26:projectStarts rdf:datatype="&xsd;dateTime">2013-01-20</untitled-ontology-26:projectStarts>
```

```
  <untitled-ontology-26:projectEnd rdf:datatype="&xsd;dateTime">2013-06-03</untitled-ontology-26:projectEnd>
```

```
  <untitled-ontology-26:hasProjectDuration rdf:datatype="&xsd;int">5</untitled-ontology-26:hasProjectDuration>
```

```
  <untitled-ontology-26:hasGrade rdf:datatype="&xsd:string">D</untitled-ontology-26:hasGrade>
```

```
  <untitled-ontology-26:gradeGiveByExaminer rdf:datatype="&xsd:string">D</untitled-ontology-26:gradeGiveByExaminer>
```

```
  <untitled-ontology-26:gradeGiveBySupervisor rdf:datatype="&xsd:string">D</untitled-ontology-26:gradeGiveBySupervisor>
```

```
  <ace_lexicon:PN_sg>A_Churn_Prediction_Model_Based_on_Gaussian_Processes</ace_lexicon:PN_sg>
```

```
  <untitled-ontology-26:isProjectTitleOf rdf:resource="&untitled-ontology-26;Group3"/>
```

```
  <untitled-ontology-26:isProjectOf rdf:resource="&untitled-ontology-26;MasterThesis"/>
```

```

<untitled-ontology-26:isProjectOf rdf:resource="&untitled-ontology-26;Mehdi_Ben_Lazreg"/>
<untitled-ontology-26:hasSupervisor rdf:resource="&untitled-ontology-26;Ole_Christoffer_Granmo"/>
</NamedIndividual>

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-
26#A_semantic_web_approach_for_dealing_with_university_courses -->

<NamedIndividual rdf:about="&untitled-ontology-
26;A_semantic_web_approach_for_dealing_with_university_courses">

  <rdf:type rdf:resource="&untitled-ontology-26;Project"/>

  <untitled-ontology-26:projectStarts rdf:datatype="&xsd;dateTime">2013-01-20</untitled-ontology-
26:projectStarts>

  <untitled-ontology-26:projectEnd rdf:datatype="&xsd;dateTime">2013-06-03</untitled-ontology-
26:projectEnd>

  <untitled-ontology-26:hasProjectDuration rdf:datatype="&xsd;int">5</untitled-ontology-
26:hasProjectDuration>

  <untitled-ontology-26:hasGrade rdf:datatype="&xsd:string">A</untitled-ontology-26:hasGrade>

  <ace_lexicon:PN_sg>A_semantic_web_approach_for_dealing_with_university_courses</ace_lexicon:PN_sg>

  <untitled-ontology-26:hasExaminer rdf:resource="&untitled-ontology-26;Espen_Drougge"/>

  <untitled-ontology-26:isProjectTitleOf rdf:resource="&untitled-ontology-26;Group20"/>

  <untitled-ontology-26:hasSupervisor rdf:resource="&untitled-ontology-26;Jan_Pettersen_Nytun"/>

  <untitled-ontology-26:isProjectOf rdf:resource="&untitled-ontology-26;MasterThesis"/>

  <untitled-ontology-26:isProjectOf rdf:resource="&untitled-ontology-26;Muhammad_Shahzad"/>
</NamedIndividual>

```



```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#AdvancedProject -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;AdvancedProject">
  <rdf:type rdf:resource="&untitled-ontology-26;Course"/>
  <untitled-ontology-26:ECTS_Credits rdf:datatype="&xsd:int">10</untitled-ontology-26:ECTS_Credits>
  <untitled-ontology-26:Term rdf:datatype="&xsd:string">Spring 2012</untitled-ontology-26:Term>
  <ace_lexicon:PN_sg>AdvancedProject</ace_lexicon:PN_sg>
  <untitled-ontology-26:hasCourseCode rdf:resource="&untitled-ontology-26;IKT411"/>
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Advanced_Internet_Services_and_Protocols -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;Advanced_Internet_Services_and_Protocols">
  <rdf:type rdf:resource="&untitled-ontology-26;Course"/>
  <untitled-ontology-26:ExamDate rdf:datatype="&xsd;dateTime">2011-12-06</untitled-ontology-26:ExamDate>
  <untitled-ontology-26:ECTS_Credits rdf:datatype="&xsd:int">5</untitled-ontology-26:ECTS_Credits>
  <untitled-ontology-26:Term rdf:datatype="&xsd:string">Autumn 2011</untitled-ontology-26:Term>
  <untitled-ontology-26:ExamSystem rdf:datatype="&xsd:string">Written examination</untitled-ontology-26:ExamSystem>
  <ace_lexicon:PN_sg>Advanced_Internet_Services_and_Protocols</ace_lexicon:PN_sg>
  <untitled-ontology-26:hasCourseCode rdf:resource="&untitled-ontology-26;IKT421"/>
  <untitled-ontology-26:hasStudent rdf:resource="&untitled-ontology-26;Muhammad_Shahzad"/>
  <untitled-ontology-26:hasProfessor rdf:resource="&untitled-ontology-26;Stein_Bergsmark"/>
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#B -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;B">
```

```
  <ace_lexicon:PN_sg>B</ace_lexicon:PN_sg>
```

```
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#BasicProject -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;BasicProject">
```

```
  <rdf:type rdf:resource="&untitled-ontology-26;Course"/>
```

```
  <untitled-ontology-26:ECTS_Credits rdf:datatype="&xsd:int">5</untitled-ontology-26:ECTS_Credits>
```

```
  <untitled-ontology-26:Term rdf:datatype="&xsd:string">Autumn 2011</untitled-ontology-26:Term>
```

```
  <ace_lexicon:PN_sg>BasicProject</ace_lexicon:PN_sg>
```

```
  <untitled-ontology-26:hasCourseCode rdf:resource="&untitled-ontology-26;IKT420"/>
```

```
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Biology -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;Biology">
```

```
  <rdf:type rdf:resource="&untitled-ontology-26;Programme"/>
```

```
  <untitled-ontology-26:ECTS_Credits rdf:datatype="&xsd:int">180</untitled-ontology-26:ECTS_Credits>
```

```

<untitled-ontology-26:StudyProgrammeCode rdf:datatype="&xsd:string">BACBIO</untitled-ontology-
26:StudyProgrammeCode>

<untitled-ontology-26:level rdf:datatype="&xsd:string">Bachelor</untitled-ontology-26:level>

<untitled-ontology-26:campus rdf:datatype="&xsd:string">Kristiansand</untitled-ontology-26:campus>

<ace_lexicon:PN_sg>Biology</ace_lexicon:PN_sg>

<untitled-ontology-26:programmeOf rdf:resource="&untitled-ontology-26;Department_of_Natural_Sciences"/>

</NamedIndividual>

```

```

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Biomedical_Laboratory_Science -
-->

```

```

<NamedIndividual rdf:about="&untitled-ontology-26;Biomedical_Laboratory_Science">

<rdf:type rdf:resource="&untitled-ontology-26;Programme"/>

<untitled-ontology-26:ECTS_Credits rdf:datatype="&xsd:int">180</untitled-ontology-26:ECTS_Credits>

<untitled-ontology-26:StudyProgrammeCode rdf:datatype="&xsd:string">BACBIOING</untitled-ontology-
26:StudyProgrammeCode>

<untitled-ontology-26:level rdf:datatype="&xsd:string">Bachelor</untitled-ontology-26:level>

<untitled-ontology-26:campus rdf:datatype="&xsd:string">Kristiansand</untitled-ontology-26:campus>

<ace_lexicon:PN_sg>Biomedical_Laboratory_Science</ace_lexicon:PN_sg>

<untitled-ontology-26:programmeOf rdf:resource="&untitled-ontology-26;Department_of_Natural_Sciences"/>

</NamedIndividual>

```

```

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Broker-
centred_hierarchical_indexing_for_search_and_access_of_distributed_medical_information -->

```

```

<NamedIndividual rdf:about="&untitled-ontology-26;Broker-
centred_hierarchical_indexing_for_search_and_access_of_distributed_medical_information">

  <rdf:type rdf:resource="&untitled-ontology-26;Project"/>

  <untitled-ontology-26:projectStarts rdf:datatype="&xsd;dateTime">2013-01-20</untitled-ontology-
26:projectStarts>

  <untitled-ontology-26:projectEnd rdf:datatype="&xsd;dateTime">2013-06-03</untitled-ontology-
26:projectEnd>

  <untitled-ontology-26:hasProjectDuration rdf:datatype="&xsd;int">5</untitled-ontology-
26:hasProjectDuration>

  <untitled-ontology-26:hasGrade rdf:datatype="&xsd:string">C</untitled-ontology-26:hasGrade>

  <untitled-ontology-26:gradeGiveBySupervisor rdf:datatype="&xsd:string">C</untitled-ontology-
26:gradeGiveBySupervisor>

  <untitled-ontology-26:gradeGiveByExaminer rdf:datatype="&xsd:string">D</untitled-ontology-
26:gradeGiveByExaminer>

  <ace_lexicon:PN_sg>Broker-
centred_hierarchical_indexing_for_search_and_access_of_distributed_medical_information</ace_lexicon:PN_sg>

  <untitled-ontology-26:isProjectTitleOf rdf:resource="&untitled-ontology-26;Group1"/>

  <untitled-ontology-26:isProjectOf rdf:resource="&untitled-ontology-26;MasterThesis"/>

  <untitled-ontology-26:hasSupervisor rdf:resource="&untitled-ontology-26;Rune_Fensli"/>

  <untitled-ontology-26:isProjectOf rdf:resource="&untitled-ontology-26;xin_chin"/>

</NamedIndividual>

```

```

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-
26#Charika_Samangi_Perera_Kukulage -->

```

```

<NamedIndividual rdf:about="&untitled-ontology-26;Charika_Samangi_Perera_Kukulage">

  <rdf:type rdf:resource="&untitled-ontology-26;5thYear"/>

  <untitled-ontology-26:hasGrade rdf:datatype="&xsd:string">B</untitled-ontology-26:hasGrade>

```

```

<untitled-ontology-26:city rdf:datatype="&xsd:string">Grimstad</untitled-ontology-26:city>
<untitled-ontology-26:country rdf:datatype="&xsd:string">Srilanka</untitled-ontology-26:country>
<untitled-ontology-26:email rdf:datatype="&xsd:string">cskuku11@student.uia.no</untitled-ontology-26:email>
<ace_lexicon:PN_sg>Charika_Samangi_Perera_Kukulage</ace_lexicon:PN_sg>
<untitled-ontology-26:hasDepartment rdf:resource="&untitled-ontology-26;Department_of_Information_and_Communication_Technology"/>
<untitled-ontology-26:hasFaculty rdf:resource="&untitled-ontology-26;Engineering_and_Science"/>
<untitled-ontology-26:memberOf rdf:resource="&untitled-ontology-26;Group4"/>
<untitled-ontology-26:studentOf rdf:resource="&untitled-ontology-26;ICT"/>
<untitled-ontology-26:studentOf rdf:resource="&untitled-ontology-26;IKT590"/>
<untitled-ontology-26:hasProject rdf:resource="&untitled-ontology-26;Mapping_Extremist_Forums_using_Text_Mining"/>
<untitled-ontology-26:studentOf rdf:resource="&untitled-ontology-26;MasterThesis"/>
<untitled-ontology-26:hasGender rdf:resource="&untitled-ontology-26;female"/>
</NamedIndividual>

```

```

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Civil_Engineering -->

```

```

<NamedIndividual rdf:about="&untitled-ontology-26;Civil_Engineering">
  <rdf:type rdf:resource="&untitled-ontology-26;Programme"/>
  <untitled-ontology-26:ECTS_Credits rdf:datatype="&xsd:int">180</untitled-ontology-26:ECTS_Credits>
  <untitled-ontology-26:level rdf:datatype="&xsd:string">Bachelor</untitled-ontology-26:level>
  <untitled-ontology-26:campus rdf:datatype="&xsd:string">Grimstad</untitled-ontology-26:campus>
  <untitled-ontology-26:StudyProgrammeCode rdf:datatype="&xsd:string">INGBYGG3</untitled-ontology-26:StudyProgrammeCode>
  <ace_lexicon:PN_sg>Civil_Engineering</ace_lexicon:PN_sg>

```

```
<untitled-ontology-26:programmeOf rdf:resource="&untitled-ontology-26;Department_of_Engineering_Sciences"/>
```

```
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Communication_and_Cooperation -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;Communication_and_Cooperation">
```

```
<rdf:type rdf:resource="&untitled-ontology-26;Course"/>
```

```
<untitled-ontology-26:ECTS_Credits rdf:datatype="&xsd:int">5</untitled-ontology-26:ECTS_Credits>
```

```
<untitled-ontology-26:Term rdf:datatype="&xsd:string">Autumn 2011</untitled-ontology-26:Term>
```

```
<untitled-ontology-26:ExamSystem rdf:datatype="&xsd:string">Rapport</untitled-ontology-26:ExamSystem>
```

```
<ace_lexicon:PN_sg>Communication_and_Cooperation</ace_lexicon:PN_sg>
```

```
<untitled-ontology-26:hasCourseCode rdf:resource="&untitled-ontology-26;ORG432"/>
```

```
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Computer_Science -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;Computer_Science">
```

```
<rdf:type rdf:resource="&untitled-ontology-26;Programme"/>
```

```
<untitled-ontology-26:ECTS_Credits rdf:datatype="&xsd:int">180</untitled-ontology-26:ECTS_Credits>
```

```
<untitled-ontology-26:level rdf:datatype="&xsd:string">Bachelors</untitled-ontology-26:level>
```

```
<untitled-ontology-26:campus rdf:datatype="&xsd:string">Grimstad</untitled-ontology-26:campus>
```

```
<untitled-ontology-26:StudyProgrammeCode rdf:datatype="&xsd:string">INGDATA</untitled-ontology-26:StudyProgrammeCode>
```

```
<ace_lexicon:PN_sg>Computer_Science</ace_lexicon:PN_sg>
```

```
<untitled-ontology-26:programmeOf rdf:resource="&untitled-ontology-26;Department_of_Information_and_Communication_Technology"/>
```

```
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Department_of_Engineering_Sciences -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;Department_of_Engineering_Sciences">
```

```
<rdf:type rdf:resource="&untitled-ontology-26;Department"/>
```

```
<ace_lexicon:PN_sg>Department_of_Engineering_Sciences</ace_lexicon:PN_sg>
```

```
<untitled-ontology-26:hasProgramme rdf:resource="&untitled-ontology-26;Civil_Engineering"/>
```

```
<untitled-ontology-26:partOf rdf:resource="&untitled-ontology-26;Engineering_and_Science"/>
```

```
<untitled-ontology-26:hasProgramme rdf:resource="&untitled-ontology-26;Industrial_Economics_and_Technology_Management"/>
```

```
<untitled-ontology-26:hasProgramme rdf:resource="&untitled-ontology-26;MS_Renewable_Energy"/>
```

```
<untitled-ontology-26:hasProgramme rdf:resource="&untitled-ontology-26;Mechanical"/>
```

```
<untitled-ontology-26:hasProgramme rdf:resource="&untitled-ontology-26;Mechatronics"/>
```

```
<untitled-ontology-26:hasProgramme rdf:resource="&untitled-ontology-26;Renewable_Energy"/>
```

```
<untitled-ontology-26:partOf rdf:resource="&untitled-ontology-26;UIA"/>
```

```
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Department_of_Information_and_Communication_Technology -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;Department_of_Information_and_Communication_Technology">  
  <rdf:type rdf:resource="&untitled-ontology-26;Department"/>  
  <ace_lexicon:PN_sg>Department_of_Information_and_Communication_Technology</ace_lexicon:PN_sg>  
  <untitled-ontology-26:hasProgramme rdf:resource="&untitled-ontology-26;Computer_Science"/>  
  <untitled-ontology-26:hasProgramme rdf:resource="&untitled-ontology-26;Electronics_and_Mobile_Communications"/>  
  <untitled-ontology-26:partOf rdf:resource="&untitled-ontology-26;Engineering_and_Science"/>  
  <untitled-ontology-26:hasProgramme rdf:resource="&untitled-ontology-26;Health_Informatics"/>  
  <untitled-ontology-26:hasProgramme rdf:resource="&untitled-ontology-26;ICT"/>  
  <untitled-ontology-26:hasProgramme rdf:resource="&untitled-ontology-26;Multimedia_Technology_and_Design"/>  
  <untitled-ontology-26:hasProgramme rdf:resource="&untitled-ontology-26;PHD_ICT"/>  
  <untitled-ontology-26:partOf rdf:resource="&untitled-ontology-26;UIA"/>  
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Department_of_Mathematical_Sciences -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;Department_of_Mathematical_Sciences">  
  <rdf:type rdf:resource="&untitled-ontology-26;Department"/>  
  <ace_lexicon:PN_sg>Department_of_Mathematical_Sciences</ace_lexicon:PN_sg>  
  <untitled-ontology-26:partOf rdf:resource="&untitled-ontology-26;Engineering_and_Science"/>  
  <untitled-ontology-26:hasProgramme rdf:resource="&untitled-ontology-26;Mathematical_Finance"/>
```



```

<untitled-ontology-26:hasProgramme rdf:resource="&untitled-ontology-26;Mathematics"/>
<untitled-ontology-26:hasProgramme rdf:resource="&untitled-ontology-26;Mathematics_Education"/>
<untitled-ontology-26:hasProgramme rdf:resource="&untitled-ontology-26;Mathematics_Education_PHD"/>
<untitled-ontology-26:hasProgramme rdf:resource="&untitled-ontology-26;Mathematics_and_Science_Education"/>
<untitled-ontology-26:partOf rdf:resource="&untitled-ontology-26;UIA"/>
</NamedIndividual>

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Department_of_Natural_Sciences -->

<NamedIndividual rdf:about="&untitled-ontology-26;Department_of_Natural_Sciences">
  <rdf:type rdf:resource="&untitled-ontology-26;Department"/>
  <ace_lexicon:PN_sg>Department_of_Natural_Sciences</ace_lexicon:PN_sg>
  <untitled-ontology-26:hasProgramme rdf:resource="&untitled-ontology-26;Biology"/>
  <untitled-ontology-26:hasProgramme rdf:resource="&untitled-ontology-26;Biomedical_Laboratory_Science"/>
  <untitled-ontology-26:partOf rdf:resource="&untitled-ontology-26;Engineering_and_Science"/>
  <untitled-ontology-26:partOf rdf:resource="&untitled-ontology-26;UIA"/>
</NamedIndividual>

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Discrete_Mathematics -->

<NamedIndividual rdf:about="&untitled-ontology-26;Discrete_Mathematics">
  <rdf:type rdf:resource="&untitled-ontology-26;Course"/>

```

```

<untitled-ontology-26:ExamDate rdf:datatype="&xsd;dateTime">2011-11-30</untitled-ontology-26:ExamDate>
<untitled-ontology-26:ECTS_Credits rdf:datatype="&xsd;int">5</untitled-ontology-26:ECTS_Credits>
<untitled-ontology-26:Term rdf:datatype="&xsd;string">Autumn 2011</untitled-ontology-26:Term>
<untitled-ontology-26:ExamSystem rdf:datatype="&xsd;string">Compulsory assignments</untitled-ontology-26:ExamSystem>
<untitled-ontology-26:ExamSystem rdf:datatype="&xsd;string">Written examination</untitled-ontology-26:ExamSystem>
<ace_lexicon:PN_sg>Discrete_Mathematics</ace_lexicon:PN_sg>
<untitled-ontology-26:hasCourseCode rdf:resource="&untitled-ontology-26;MA-418"/>
<untitled-ontology-26:hasStudent rdf:resource="&untitled-ontology-26;Muhammad_Shahzad"/>
</NamedIndividual>

```

```

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Economics_and_Social_Sciences -->

```

```

<NamedIndividual rdf:about="&untitled-ontology-26;Economics_and_Social_Sciences">
  <rdf:type rdf:resource="&untitled-ontology-26;Fakultet"/>
  <ace_lexicon:PN_sg>Economics_and_Social_Sciences</ace_lexicon:PN_sg>
  <untitled-ontology-26:partOf rdf:resource="&untitled-ontology-26;UIA"/>
</NamedIndividual>

```

```

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Electronics_and_Mobile_Communications -->

```

```

<NamedIndividual rdf:about="&untitled-ontology-26;Electronics_and_Mobile_Communications">

```

```

<rdf:type rdf:resource="&untitled-ontology-26;Programme"/>
<untitled-ontology-26:ECTS_Credits rdf:datatype="&xsd:int">180</untitled-ontology-26:ECTS_Credits>
<untitled-ontology-26:level rdf:datatype="&xsd:string">Bachelors</untitled-ontology-26:level>
<untitled-ontology-26:campus rdf:datatype="&xsd:string">Grimstad</untitled-ontology-26:campus>
<untitled-ontology-26:StudyProgrammeCode rdf:datatype="&xsd:string">INGELEKTRO</untitled-ontology-
26:StudyProgrammeCode>
<ace_lexicon:PN_sg>Electronics_and_Mobile_Communications</ace_lexicon:PN_sg>
<untitled-ontology-26:programmeOf rdf:resource="&untitled-ontology-
26;Department_of_Information_and_Communication_Technology"/>
</NamedIndividual>

```

```

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Engineering_and_Science -->

```

```

<NamedIndividual rdf:about="&untitled-ontology-26;Engineering_and_Science">
<rdf:type rdf:resource="&untitled-ontology-26;Fakultet"/>
<ace_lexicon:PN_sg>Engineering_and_Science</ace_lexicon:PN_sg>
<untitled-ontology-26:composedOf rdf:resource="&untitled-ontology-
26;Department_of_Engineering_Sciences"/>
<untitled-ontology-26:composedOf rdf:resource="&untitled-ontology-
26;Department_of_Information_and_Communication_Technology"/>
<untitled-ontology-26:composedOf rdf:resource="&untitled-ontology-
26;Department_of_Mathematical_Sciences"/>
<untitled-ontology-26:composedOf rdf:resource="&untitled-ontology-26;Department_of_Natural_Sciences"/>
<untitled-ontology-26:partOf rdf:resource="&untitled-ontology-26;UIA"/>
</NamedIndividual>

```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Espen_Drougge -->

<NamedIndividual rdf:about="&untitled-ontology-26;Espen_Drougge">
  <rdf:type rdf:resource="&untitled-ontology-26;ExternalExaminer"/>
  <untitled-ontology-26:gradeGiveByExaminer rdf:datatype="&xsd:string">A</untitled-ontology-26:gradeGiveByExaminer>
  <ace_lexicon:PN_sg>Espen_Drougge</ace_lexicon:PN_sg>
  <untitled-ontology-26:examinerOf rdf:resource="&untitled-ontology-26;A_semantic_web_approach_for_dealing_with_university_courses"/>
  <untitled-ontology-26:examinerOf rdf:resource="&untitled-ontology-26;Group20"/>
  <untitled-ontology-26:hasGender rdf:resource="&untitled-ontology-26;male"/>
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Fine_Arts -->

<NamedIndividual rdf:about="&untitled-ontology-26;Fine_Arts">
  <rdf:type rdf:resource="&untitled-ontology-26;Fakultet"/>
  <ace_lexicon:PN_sg>Fine_Arts</ace_lexicon:PN_sg>
  <untitled-ontology-26:partOf rdf:resource="&untitled-ontology-26;UIA"/>
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Group1 -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;Group1">
  <rdf:type rdf:resource="&untitled-ontology-26;StudentGroup"/>
  <untitled-ontology-26:gradeGiveBySupervisor rdf:datatype="&xsd:string">C</untitled-ontology-26:gradeGiveBySupervisor>
  <untitled-ontology-26:hasGrade rdf:datatype="&xsd:string">C</untitled-ontology-26:hasGrade>
  <untitled-ontology-26:gradeGiveByExaminer rdf:datatype="&xsd:string">C</untitled-ontology-26:gradeGiveByExaminer>
  <ace_lexicon:PN_sg>Group1</ace_lexicon:PN_sg>
  <untitled-ontology-26:hasProjectTitle rdf:resource="&untitled-ontology-26;Broker-centred_hierarchical_indexing_for_search_and_access_of_distributed_medical_information"/>
  <untitled-ontology-26:hasSupervisor rdf:resource="&untitled-ontology-26;Rune_Fensli"/>
  <untitled-ontology-26:hasMember rdf:resource="&untitled-ontology-26;xin_chin"/>
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Group10 -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;Group10">
  <ace_lexicon:PN_sg>Group10</ace_lexicon:PN_sg>
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Group2 -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;Group2">
  <rdf:type rdf:resource="&untitled-ontology-26;StudentGroup"/>
```

```

    <untitled-ontology-26:hasGrade rdf:datatype="&xsd:string">B</untitled-ontology-26:hasGrade>

    <untitled-ontology-26:gradeGiveBySupervisor rdf:datatype="&xsd:string">B</untitled-ontology-26:gradeGiveBySupervisor>

    <untitled-ontology-26:gradeGiveByExaminer rdf:datatype="&xsd:string">B</untitled-ontology-26:gradeGiveByExaminer>

    <ace_lexicon:PN_sg>Group2</ace_lexicon:PN_sg>

    <untitled-ontology-26:hasMember rdf:resource="&untitled-ontology-26;Mari_Næss"/>

    <untitled-ontology-26:hasProjectTitle rdf:resource="&untitled-ontology-26;PKI-based_authentication_and_access_control_to_Web-based_EHR_systems:_Verification_and_evaluation_of_different_deployment_solutions"/>

    <untitled-ontology-26:hasSupervisor rdf:resource="&untitled-ontology-26;Rune_Fensli"/>

</NamedIndividual>

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Group20 -->

<NamedIndividual rdf:about="&untitled-ontology-26;Group20">

    <rdf:type rdf:resource="&untitled-ontology-26;StudentGroup"/>

    <untitled-ontology-26:gradeGiveByExaminer rdf:datatype="&xsd:string">A</untitled-ontology-26:gradeGiveByExaminer>

    <untitled-ontology-26:gradeGiveBySupervisor rdf:datatype="&xsd:string">A</untitled-ontology-26:gradeGiveBySupervisor>

    <untitled-ontology-26:hasGrade rdf:datatype="&xsd:string">A</untitled-ontology-26:hasGrade>

    <ace_lexicon:PN_sg>Group20</ace_lexicon:PN_sg>

    <untitled-ontology-26:hasProjectTitle rdf:resource="&untitled-ontology-26;A_semantic_web_approach_for_dealing_with_university_courses"/>

    <untitled-ontology-26:hasExaminer rdf:resource="&untitled-ontology-26;Espen_Drougge"/>

    <untitled-ontology-26:hasSupervisor rdf:resource="&untitled-ontology-26;Jan_Pettersen_Nytun"/>

    <untitled-ontology-26:hasMember rdf:resource="&untitled-ontology-26;Muhammad_Shahzad"/>

```

```
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Group3 -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;Group3">
```

```
<rdf:type rdf:resource="&untitled-ontology-26;StudentGroup"/>
```

```
<untitled-ontology-26:hasGrade rdf:datatype="&xsd:string">D</untitled-ontology-26:hasGrade>
```

```
<untitled-ontology-26:gradeGiveBySupervisor rdf:datatype="&xsd:string">D</untitled-ontology-26:gradeGiveBySupervisor>
```

```
<untitled-ontology-26:gradeGiveByExaminer rdf:datatype="&xsd:string">D</untitled-ontology-26:gradeGiveByExaminer>
```

```
<ace_lexicon:PN_sg>Group3</ace_lexicon:PN_sg>
```

```
<untitled-ontology-26:hasProjectTitle rdf:resource="&untitled-ontology-26;A_Churn_Prediction_Model_Based_on_Gaussian_Processes"/>
```

```
<untitled-ontology-26:hasMember rdf:resource="&untitled-ontology-26;Mehdi_Ben_Lazreg"/>
```

```
<untitled-ontology-26:hasSupervisor rdf:resource="&untitled-ontology-26;Ole_Christoffer_Granmo"/>
```

```
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Group4 -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;Group4">
```

```
<rdf:type rdf:resource="&untitled-ontology-26;StudentGroup"/>
```

```
<untitled-ontology-26:gradeGiveBySupervisor rdf:datatype="&xsd:string">B</untitled-ontology-26:gradeGiveBySupervisor>
```

```
<untitled-ontology-26:gradeGiveByExaminer rdf:datatype="&xsd:string">B</untitled-ontology-26:gradeGiveByExaminer>

<untitled-ontology-26:hasGrade rdf:datatype="&xsd:string">B</untitled-ontology-26:hasGrade>

<ace_lexicon:PN_sg>Group4</ace_lexicon:PN_sg>

<untitled-ontology-26:hasMember rdf:resource="&untitled-ontology-26;Charika_Samangi_Perera_Kukulage"/>

<untitled-ontology-26:hasProjectTitle rdf:resource="&untitled-ontology-26;Mapping_Extremist_Forums_using_Text_Mining"/>

<untitled-ontology-26:hasSupervisor rdf:resource="&untitled-ontology-26;Ole_Christoffer_Granmo"/>

<untitled-ontology-26:hasMember rdf:resource="&untitled-ontology-26;Targeir_Attestog"/>

</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Group5 -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;Group5">

  <ace_lexicon:PN_sg>Group5</ace_lexicon:PN_sg>

</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Group6 -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;Group6">

  <ace_lexicon:PN_sg>Group6</ace_lexicon:PN_sg>

</NamedIndividual>
```



```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Group7 -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;Group7">
```

```
  <ace_lexicon:PN_sg>Group7</ace_lexicon:PN_sg>
```

```
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Group8 -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;Group8">
```

```
  <ace_lexicon:PN_sg>Group8</ace_lexicon:PN_sg>
```

```
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Group9 -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;Group9">
```

```
  <ace_lexicon:PN_sg>Group9</ace_lexicon:PN_sg>
```

```
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Health_Informatics -->
```

```

<NamedIndividual rdf:about="&untitled-ontology-26;Health_Informatics">
  <rdf:type rdf:resource="&untitled-ontology-26;Programme"/>
  <untitled-ontology-26:ECTS_Credits rdf:datatype="&xsd:int">90</untitled-ontology-26:ECTS_Credits>
  <untitled-ontology-26:campus rdf:datatype="&xsd:string">Arendal</untitled-ontology-26:campus>
  <untitled-ontology-26:StudyProgrammeCode rdf:datatype="&xsd:string">HELSOSIT</untitled-ontology-
26:StudyProgrammeCode>
  <untitled-ontology-26:level rdf:datatype="&xsd:string">Master</untitled-ontology-26:level>
  <ace_lexicon:PN_sg>Health_Informatics</ace_lexicon:PN_sg>
  <untitled-ontology-26:programmeOf rdf:resource="&untitled-ontology-
26;Department_of_Information_and_Communication_Technology"/>
</NamedIndividual>

```

```

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Health_and_Sport_Sciences -->

```

```

<NamedIndividual rdf:about="&untitled-ontology-26;Health_and_Sport_Sciences">
  <rdf:type rdf:resource="&untitled-ontology-26;Fakultet"/>
  <ace_lexicon:PN_sg>Health_and_Sport_Sciences</ace_lexicon:PN_sg>
  <untitled-ontology-26:partOf rdf:resource="&untitled-ontology-26;UIA"/>
</NamedIndividual>

```

```

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Humanities_and_Education -->

```

```

<NamedIndividual rdf:about="&untitled-ontology-26;Humanities_and_Education">
  <rdf:type rdf:resource="&untitled-ontology-26;Fakultet"/>

```

```

<ace_lexicon:PN_sg>Humanities_and_Education</ace_lexicon:PN_sg>

<untitled-ontology-26:partOf rdf:resource="&untitled-ontology-26;UIA"/>

</NamedIndividual>

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#ICT -->

<NamedIndividual rdf:about="&untitled-ontology-26;ICT">
  <rdf:type rdf:resource="&untitled-ontology-26;Programme"/>
  <untitled-ontology-26:ECTS_Credits rdf:datatype="&xsd:int">120</untitled-ontology-26:ECTS_Credits>
  <untitled-ontology-26:campus rdf:datatype="&xsd:string">Grimstad</untitled-ontology-26:campus>
  <untitled-ontology-26:StudyProgrammeCode rdf:datatype="&xsd:string">MASTIKT</untitled-ontology-
26:StudyProgrammeCode>
  <untitled-ontology-26:level rdf:datatype="&xsd:string">Master</untitled-ontology-26:level>
  <ace_lexicon:PN_sg>ICT</ace_lexicon:PN_sg>
  <untitled-ontology-26:hasStudent rdf:resource="&untitled-ontology-26;Charika_Samangi_Perera_Kukulage"/>
  <untitled-ontology-26:programmeOf rdf:resource="&untitled-ontology-
26;Department_of_Information_and_Communication_Technology"/>
  <untitled-ontology-26:hasStudent rdf:resource="&untitled-ontology-26;Mari_Næss"/>
  <untitled-ontology-26:hasStudent rdf:resource="&untitled-ontology-26;Mehdi_Ben_Lazreg"/>
  <untitled-ontology-26:hasStudent rdf:resource="&untitled-ontology-26;Muhammad_Shahzad"/>
  <untitled-ontology-26:hasStudent rdf:resource="&untitled-ontology-26;Targeir_Attestog"/>
  <untitled-ontology-26:hasStudent rdf:resource="&untitled-ontology-26;xin_chin"/>
</NamedIndividual>

```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#IKT411 -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;IKT411">
```

```
  <ace_lexicon:PN_sg>IKT411</ace_lexicon:PN_sg>
```

```
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#IKT413 -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;IKT413">
```

```
  <ace_lexicon:PN_sg>IKT413</ace_lexicon:PN_sg>
```

```
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#IKT420 -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;IKT420">
```

```
  <ace_lexicon:PN_sg>IKT420</ace_lexicon:PN_sg>
```

```
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#IKT421 -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;IKT421">
```

```
<ace_lexicon:PN_sg>IKT421</ace_lexicon:PN_sg>
```

```
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#IKT507 -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;IKT507">
```

```
<ace_lexicon:PN_sg>IKT507</ace_lexicon:PN_sg>
```

```
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#IKT508 -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;IKT508">
```

```
<ace_lexicon:PN_sg>IKT508</ace_lexicon:PN_sg>
```

```
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#IKT590 -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;IKT590">
```

```
<ace_lexicon:PN_sg>IKT590</ace_lexicon:PN_sg>
```

```
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Industrial_Economics_and_Technology_Management -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;Industrial_Economics_and_Technology_Management">  
  <rdf:type rdf:resource="&untitled-ontology-26;Programme"/>  
  <untitled-ontology-26:ECTS_Credits rdf:datatype="&xsd:int">300</untitled-ontology-26:ECTS_Credits>  
  <untitled-ontology-26:campus rdf:datatype="&xsd:string">Grimstad</untitled-ontology-26:campus>  
  <untitled-ontology-26:StudyProgrammeCode rdf:datatype="&xsd:string">MASTINDØK5</untitled-ontology-26:StudyProgrammeCode>  
  <untitled-ontology-26:level rdf:datatype="&xsd:string">Master</untitled-ontology-26:level>  
  <ace_lexicon:PN_sg>Industrial_Economics_and_Technology_Management</ace_lexicon:PN_sg>  
  <untitled-ontology-26:programmeOf rdf:resource="&untitled-ontology-26;Department_of_Engineering_Sciences"/>  
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Jan_Pettersen_Nytun -->  
  
<NamedIndividual rdf:about="&untitled-ontology-26;Jan_Pettersen_Nytun">  
  <rdf:type rdf:resource="&untitled-ontology-26;Professor"/>  
  <rdf:type rdf:resource="&untitled-ontology-26;Supervisor"/>  
  <untitled-ontology-26:phoneNo rdf:datatype="&xsd:int">0047 37233146</untitled-ontology-26:phoneNo>  
  <untitled-ontology-26:gradeGiveBySupervisor rdf:datatype="&xsd:string">A</untitled-ontology-26:gradeGiveBySupervisor>  
  <untitled-ontology-26:address rdf:datatype="&xsd:string">A3054 (Jon Lilletunsvei 9, Grimstad)</untitled-ontology-26:address>
```

```

<untitled-ontology-26:country rdf:datatype="&xsd:string">Norway</untitled-ontology-26:country>
<untitled-ontology-26:email rdf:datatype="&xsd:string">jan.p.nytun@uia.no</untitled-ontology-26:email>
<ace_lexicon:PN_sg>Jan_Pettersen_Nytun</ace_lexicon:PN_sg>
<untitled-ontology-26:supervisorOf rdf:resource="&untitled-ontology-26;A_semantic_web_approach_for_dealing_with_university_courses"/>
<untitled-ontology-26:hasDepartment rdf:resource="&untitled-ontology-26;Department_of_Information_and_Communication_Technology"/>
<untitled-ontology-26:hasFaculty rdf:resource="&untitled-ontology-26;Engineering_and_Science"/>
<untitled-ontology-26:supervisorOf rdf:resource="&untitled-ontology-26;Group20"/>
<untitled-ontology-26:professorOf rdf:resource="&untitled-ontology-26;Object_Oriented_System_Development"/>
<untitled-ontology-26:hasGender rdf:resource="&untitled-ontology-26;male"/>
</NamedIndividual>

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Learning_systems -->

<NamedIndividual rdf:about="&untitled-ontology-26;Learning_systems">
  <rdf:type rdf:resource="&untitled-ontology-26;Course"/>
  <untitled-ontology-26:ExamDate rdf:datatype="&xsd:dateTime">2011-10-31</untitled-ontology-26:ExamDate>
  <untitled-ontology-26:ECTS_Credits rdf:datatype="&xsd:int">5</untitled-ontology-26:ECTS_Credits>
  <untitled-ontology-26:Term rdf:datatype="&xsd:string">Autumn 2011</untitled-ontology-26:Term>
  <untitled-ontology-26:ExamSystem rdf:datatype="&xsd:string">Compulsory assignments and Written</untitled-ontology-26:ExamSystem>
  <ace_lexicon:PN_sg>Learning_systems</ace_lexicon:PN_sg>
  <untitled-ontology-26:hasCourseCode rdf:resource="&untitled-ontology-26;IKT507"/>
  <untitled-ontology-26:hasProfessor rdf:resource="&untitled-ontology-26;Ole_Christoffer_Granmo"/>
</NamedIndividual>

```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#MA-418 -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;MA-418">
```

```
  <ace_lexicon:PN_sg>MA-418</ace_lexicon:PN_sg>
```

```
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#MS_Renewable_Energy -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;MS_Renewable_Energy">
```

```
  <rdf:type rdf:resource="&untitled-ontology-26;Programme"/>
```

```
  <untitled-ontology-26:ECTS_Credits rdf:datatype="&xsd:int">120</untitled-ontology-26:ECTS_Credits>
```

```
  <untitled-ontology-26:campus rdf:datatype="&xsd:string">Grimstad</untitled-ontology-26:campus>
```

```
  <untitled-ontology-26:StudyProgrammeCode rdf:datatype="&xsd:string">MASTENE</untitled-ontology-26:StudyProgrammeCode>
```

```
  <untitled-ontology-26:level rdf:datatype="&xsd:string">Master</untitled-ontology-26:level>
```

```
  <ace_lexicon:PN_sg>MS_Renewable_Energy</ace_lexicon:PN_sg>
```

```
  <untitled-ontology-26:programmeOf rdf:resource="&untitled-ontology-26;Department_of_Engineering_Sciences"/>
```

```
</NamedIndividual>
```



```

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-
26#Mapping_Extremist_Forums_using_Text_Mining -->

<NamedIndividual rdf:about="&untitled-ontology-26;Mapping_Extremist_Forums_using_Text_Mining">
  <rdf:type rdf:resource="&untitled-ontology-26;Project"/>
  <untitled-ontology-26:projectStarts rdf:datatype="&xsd;dateTime">2013-01-20</untitled-ontology-
26:projectStarts>
  <untitled-ontology-26:projectEnd rdf:datatype="&xsd;dateTime">2013-06-03</untitled-ontology-
26:projectEnd>
  <untitled-ontology-26:hasProjectDuration rdf:datatype="&xsd;int">5</untitled-ontology-
26:hasProjectDuration>
  <untitled-ontology-26:hasGrade rdf:datatype="&xsd:string">B</untitled-ontology-26:hasGrade>
  <untitled-ontology-26:gradeGiveByExaminer rdf:datatype="&xsd:string">B</untitled-ontology-
26:gradeGiveByExaminer>
  <untitled-ontology-26:gradeGiveBySupervisor rdf:datatype="&xsd:string">B</untitled-ontology-
26:gradeGiveBySupervisor>
  <ace_lexicon:PN_sg>Mapping_Extremist_Forums_using_Text_Mining</ace_lexicon:PN_sg>
  <untitled-ontology-26:isProjectOf rdf:resource="&untitled-ontology-26;Charika_Samangi_Perera_Kukulage"/>
  <untitled-ontology-26:isProjectTitleOf rdf:resource="&untitled-ontology-26;Group4"/>
  <untitled-ontology-26:isProjectOf rdf:resource="&untitled-ontology-26;MasterThesis"/>
  <untitled-ontology-26:isProjectOf rdf:resource="&untitled-ontology-26;Targeir_Attestog"/>
</NamedIndividual>

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Mari_Næss -->

<NamedIndividual rdf:about="&untitled-ontology-26;Mari_Næss">
  <rdf:type rdf:resource="&untitled-ontology-26;5thYear"/>
  <untitled-ontology-26:city rdf:datatype="&xsd:string">Grimstad</untitled-ontology-26:city>

```

```

<untitled-ontology-26:country rdf:datatype="&xsd:string">Norway</untitled-ontology-26:country>

<untitled-ontology-26:email rdf:datatype="&xsd:string">marin08@student.uia.no</untitled-ontology-26:email>

<ace_lexicon:PN_sg>Mari_Næss</ace_lexicon:PN_sg>

<untitled-ontology-26:hasDepartment rdf:resource="&untitled-ontology-26;Department_of_Information_and_Communication_Technology"/>

<untitled-ontology-26:hasFaculty rdf:resource="&untitled-ontology-26;Engineering_and_Science"/>

<untitled-ontology-26:memberOf rdf:resource="&untitled-ontology-26;Group2"/>

<untitled-ontology-26:studentOf rdf:resource="&untitled-ontology-26;ICT"/>

<untitled-ontology-26:studentOf rdf:resource="&untitled-ontology-26;IKT590"/>

<untitled-ontology-26:studentOf rdf:resource="&untitled-ontology-26;MasterThesis"/>

<untitled-ontology-26:hasProject rdf:resource="&untitled-ontology-26;PKI-
based_authentication_and_access_control_to_Web-
based_EHR_systems:_Verification_and_evaluation_of_different_deployment_solutions"/>

<untitled-ontology-26:hasGender rdf:resource="&untitled-ontology-26;female"/>

</NamedIndividual>

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#MasterThesis -->

<NamedIndividual rdf:about="&untitled-ontology-26;MasterThesis">

  <rdf:type rdf:resource="&untitled-ontology-26;Course"/>

  <untitled-ontology-26:ECTS_Credits rdf:datatype="&xsd:int">30</untitled-ontology-26:ECTS_Credits>

  <untitled-ontology-26:Term rdf:datatype="&xsd:string">Spring 2013</untitled-ontology-26:Term>

  <ace_lexicon:PN_sg>MasterThesis</ace_lexicon:PN_sg>

  <untitled-ontology-26:hasProject rdf:resource="&untitled-ontology-26;A_Churn_Prediction_Model_Based_on_Gaussian_Processes"/>

  <untitled-ontology-26:hasProject rdf:resource="&untitled-ontology-26;A_semantic_web_approach_for_dealing_with_university_courses"/>

```

```

<untitled-ontology-26:hasProject rdf:resource="&untitled-ontology-26;Broker-
centred_hierarchical_indexing_for_search_and_access_of_distributed_medical_information"/>

<untitled-ontology-26:hasStudent rdf:resource="&untitled-ontology-26;Charika_Samangi_Perera_Kukulage"/>

<untitled-ontology-26:hasCourseCode rdf:resource="&untitled-ontology-26;IKT590"/>

<untitled-ontology-26:hasProject rdf:resource="&untitled-ontology-
26;Mapping_Extremist_Forums_using_Text_Mining"/>

<untitled-ontology-26:hasStudent rdf:resource="&untitled-ontology-26;Mari_Næss"/>

<untitled-ontology-26:hasStudent rdf:resource="&untitled-ontology-26;Mehdi_Ben_Lazreg"/>

<untitled-ontology-26:hasStudent rdf:resource="&untitled-ontology-26;Muhammad_Shahzad"/>

<untitled-ontology-26:hasProject rdf:resource="&untitled-ontology-26;PKI-
based_authentication_and_access_control_to_Web-
based_EHR_systems:_Verification_and_evaluation_of_different_deployment_solutions"/>

<untitled-ontology-26:hasStudent rdf:resource="&untitled-ontology-26;Targeir_Attestog"/>

<untitled-ontology-26:hasStudent rdf:resource="&untitled-ontology-26;xin_chin"/>

</NamedIndividual>

```

```

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Mathematical_Finance -->

```

```

<NamedIndividual rdf:about="&untitled-ontology-26;Mathematical_Finance">

  <rdf:type rdf:resource="&untitled-ontology-26;Programme"/>

  <untitled-ontology-26:ECTS_Credits rdf:datatype="&xsd:int">180</untitled-ontology-26:ECTS_Credits>

  <untitled-ontology-26:StudyProgrammeCode rdf:datatype="&xsd:string">BACMATFIN</untitled-ontology-
26:StudyProgrammeCode>

  <untitled-ontology-26:level rdf:datatype="&xsd:string">Bachelor</untitled-ontology-26:level>

  <untitled-ontology-26:campus rdf:datatype="&xsd:string">Kristiansand</untitled-ontology-26:campus>

  <ace_lexicon:PN_sg>Mathematical_Finance</ace_lexicon:PN_sg>

  <untitled-ontology-26:programmeOf rdf:resource="&untitled-ontology-
26;Department_of_Mathematical_Sciences"/>

```

```
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Mathematics -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;Mathematics">  
  <rdf:type rdf:resource="&untitled-ontology-26;Programme"/>  
  <untitled-ontology-26:ECTS_Credits rdf:datatype="&xsd:int">60</untitled-ontology-26:ECTS_Credits>  
  <untitled-ontology-26:campus rdf:datatype="&xsd:string">Kristiansand</untitled-ontology-26:campus>  
  <untitled-ontology-26:StudyProgrammeCode rdf:datatype="&xsd:string">MAT60</untitled-ontology-26:StudyProgrammeCode>  
  <ace_lexicon:PN_sg>Mathematics</ace_lexicon:PN_sg>  
  <untitled-ontology-26:programmeOf rdf:resource="&untitled-ontology-26;Department_of_Mathematical_Sciences"/>  
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Mathematics_Education -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;Mathematics_Education">  
  <rdf:type rdf:resource="&untitled-ontology-26;Programme"/>  
  <untitled-ontology-26:ECTS_Credits rdf:datatype="&xsd:int">120</untitled-ontology-26:ECTS_Credits>  
  <untitled-ontology-26:campus rdf:datatype="&xsd:string">Kristiansand</untitled-ontology-26:campus>  
  <untitled-ontology-26:StudyProgrammeCode rdf:datatype="&xsd:string">MASTMAT</untitled-ontology-26:StudyProgrammeCode>  
  <untitled-ontology-26:level rdf:datatype="&xsd:string">Master</untitled-ontology-26:level>
```

```
<ace_lexicon:PN_sg>Mathematics_Education</ace_lexicon:PN_sg>
```

```
<untitled-ontology-26:programmeOf rdf:resource="&untitled-ontology-26;Department_of_Mathematical_Sciences"/>
```

```
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Mathematics_Education_PHD -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;Mathematics_Education_PHD">
```

```
<rdf:type rdf:resource="&untitled-ontology-26;Programme"/>
```

```
<untitled-ontology-26:ECTS_Credits rdf:datatype="&xsd:int">180</untitled-ontology-26:ECTS_Credits>
```

```
<untitled-ontology-26:campus rdf:datatype="&xsd:string">Kristiansand</untitled-ontology-26:campus>
```

```
<untitled-ontology-26:StudyProgrammeCode rdf:datatype="&xsd:string">MATDI-DR</untitled-ontology-26:StudyProgrammeCode>
```

```
<untitled-ontology-26:level rdf:datatype="&xsd:string">PHD</untitled-ontology-26:level>
```

```
<ace_lexicon:PN_sg>Mathematics_Education_PHD</ace_lexicon:PN_sg>
```

```
<untitled-ontology-26:programmeOf rdf:resource="&untitled-ontology-26;Department_of_Mathematical_Sciences"/>
```

```
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Mathematics_and_Science_Education -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;Mathematics_and_Science_Education">
```

```
<rdf:type rdf:resource="&untitled-ontology-26;Programme"/>
```

```
<untitled-ontology-26:ECTS_Credits rdf:datatype="&xsd:int">300</untitled-ontology-26:ECTS_Credits>
<untitled-ontology-26:campus rdf:datatype="&xsd:string">Kristiansand</untitled-ontology-26:campus>
<untitled-ontology-26:StudyProgrammeCode rdf:datatype="&xsd:string">MASTREAL5</untitled-ontology-26:StudyProgrammeCode>
<untitled-ontology-26:level rdf:datatype="&xsd:string">Master</untitled-ontology-26:level>
<ace_lexicon:PN_sg>Mathematics_and_Science_Education</ace_lexicon:PN_sg>
<untitled-ontology-26:programmeOf rdf:resource="&untitled-ontology-26:Department_of_Mathematical_Sciences"/>
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Mechanical -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;Mechanical">
<rdf:type rdf:resource="&untitled-ontology-26;Programme"/>
<untitled-ontology-26:ECTS_Credits rdf:datatype="&xsd:int">180</untitled-ontology-26:ECTS_Credits>
<untitled-ontology-26:level rdf:datatype="&xsd:string">Bachelor</untitled-ontology-26:level>
<untitled-ontology-26:campus rdf:datatype="&xsd:string">Grimstad</untitled-ontology-26:campus>
<untitled-ontology-26:StudyProgrammeCode rdf:datatype="&xsd:string">INGFLHU</untitled-ontology-26:StudyProgrammeCode>
<ace_lexicon:PN_sg>Mechanical</ace_lexicon:PN_sg>
<untitled-ontology-26:programmeOf rdf:resource="&untitled-ontology-26:Department_of_Engineering_Sciences"/>
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Mechatronics -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;Mechatronics">
  <rdf:type rdf:resource="&untitled-ontology-26;Programme"/>
  <untitled-ontology-26:ECTS_Credits rdf:datatype="&xsd:int">120</untitled-ontology-26:ECTS_Credits>
  <untitled-ontology-26:campus rdf:datatype="&xsd:string">Grimstad</untitled-ontology-26:campus>
  <untitled-ontology-26:StudyProgrammeCode rdf:datatype="&xsd:string">MASTMEK</untitled-ontology-26:StudyProgrammeCode>
  <untitled-ontology-26:level rdf:datatype="&xsd:string">Master</untitled-ontology-26:level>
  <ace_lexicon:PN_sg>Mechatronics</ace_lexicon:PN_sg>
  <untitled-ontology-26:programmeOf rdf:resource="&untitled-ontology-26;Department_of_Engineering_Sciences"/>
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Mehdi_Ben_Lazreg -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;Mehdi_Ben_Lazreg">
  <rdf:type rdf:resource="&untitled-ontology-26;5thYear"/>
  <untitled-ontology-26:hasGrade rdf:datatype="&xsd:string">D</untitled-ontology-26:hasGrade>
  <untitled-ontology-26:city rdf:datatype="&xsd:string">Grimstad</untitled-ontology-26:city>
  <untitled-ontology-26:country rdf:datatype="&xsd:string">Tunisia</untitled-ontology-26:country>
  <untitled-ontology-26:email rdf:datatype="&xsd:string">medhil11@student.uia.no</untitled-ontology-26:email>
  <ace_lexicon:PN_sg>Mehdi_Ben_Lazreg</ace_lexicon:PN_sg>
  <untitled-ontology-26:hasProject rdf:resource="&untitled-ontology-26;A_Churn_Prediction_Model_Based_on_Gaussian_Processes"/>
  <untitled-ontology-26:hasDepartment rdf:resource="&untitled-ontology-26;Department_of_Information_and_Communication_Technology"/>
```

```

<untitled-ontology-26:hasFaculty rdf:resource="&untitled-ontology-26;Engineering_and_Science"/>
<untitled-ontology-26:memberOf rdf:resource="&untitled-ontology-26;Group3"/>
<untitled-ontology-26:studentOf rdf:resource="&untitled-ontology-26;ICT"/>
<untitled-ontology-26:studentOf rdf:resource="&untitled-ontology-26;IKT590"/>
<untitled-ontology-26:studentOf rdf:resource="&untitled-ontology-26;MasterThesis"/>
<untitled-ontology-26:hasGender rdf:resource="&untitled-ontology-26;male"/>
</NamedIndividual>

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Muhammad_Shahzad -->

<NamedIndividual rdf:about="&untitled-ontology-26;Muhammad_Shahzad">
  <rdf:type rdf:resource="&untitled-ontology-26;5thYear"/>
  <untitled-ontology-26:studentNo rdf:datatype="&xsd:string">161950</untitled-ontology-26:studentNo>
  <untitled-ontology-26:age rdf:datatype="&xsd:int">24
</untitled-ontology-26:age>

  <untitled-ontology-26:phoneNo rdf:datatype="&xsd:int">41345351</untitled-ontology-26:phoneNo>
  <untitled-ontology-26:hasGrade rdf:datatype="&xsd:string">A</untitled-ontology-26:hasGrade>
  <untitled-ontology-26:firstName rdf:datatype="&xsd:string">Muhammad</untitled-ontology-26:firstName>
  <untitled-ontology-26:city rdf:datatype="&xsd:string">Oslo</untitled-ontology-26:city>
  <untitled-ontology-26:country rdf:datatype="&xsd:string">Pakistan</untitled-ontology-26:country>
  <untitled-ontology-26:lastname rdf:datatype="&xsd:string">Shahzad</untitled-ontology-26:lastname>
  <untitled-ontology-26:email rdf:datatype="&xsd:string">shezo85@hotmail.com</untitled-ontology-26:email>
  <ace_lexicon:PN_sg>Muhammad_Shahzad</ace_lexicon:PN_sg>

  <untitled-ontology-26:hasProject rdf:resource="&untitled-ontology-
26;A_semantic_web_approach_for_dealing_with_university_courses"/>

```



```

    <untitled-ontology-26:studentOf rdf:resource="&untitled-ontology-
26;Advanced_Internet_Services_and_Protocols"/>

    <untitled-ontology-26:hasDepartment rdf:resource="&untitled-ontology-
26;Department_of_Information_and_Communication_Technology"/>

    <untitled-ontology-26:studentOf rdf:resource="&untitled-ontology-26;Discrete_Mathematics"/>

    <untitled-ontology-26:hasFaculty rdf:resource="&untitled-ontology-26;Engineering_and_Science"/>

    <untitled-ontology-26:memberOf rdf:resource="&untitled-ontology-26;Group20"/>

    <untitled-ontology-26:studentOf rdf:resource="&untitled-ontology-26;ICT"/>

    <untitled-ontology-26:studentOf rdf:resource="&untitled-ontology-26;IKT411"/>

    <untitled-ontology-26:studentOf rdf:resource="&untitled-ontology-26;IKT420"/>

    <untitled-ontology-26:studentOf rdf:resource="&untitled-ontology-26;IKT508"/>

    <untitled-ontology-26:studentOf rdf:resource="&untitled-ontology-26;MasterThesis"/>

    <untitled-ontology-26:hasGender rdf:resource="&untitled-ontology-26;male"/>

</NamedIndividual>

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-
26#Multimedia_Technology_and_Design -->

<NamedIndividual rdf:about="&untitled-ontology-26;Multimedia_Technology_and_Design">

    <rdf:type rdf:resource="&untitled-ontology-26;Programme"/>

    <untitled-ontology-26:ECTS_Credits rdf:datatype="&xsd:int">180</untitled-ontology-26:ECTS_Credits>

    <untitled-ontology-26:StudyProgrammeCode rdf:datatype="&xsd:string">BACMMTEK</untitled-ontology-
26:StudyProgrammeCode>

    <untitled-ontology-26:level rdf:datatype="&xsd:string">Bachelors</untitled-ontology-26:level>

    <untitled-ontology-26:campus rdf:datatype="&xsd:string">Grimstad</untitled-ontology-26:campus>

    <ace_lexicon:PN_sg>Multimedia_Technology_and_Design</ace_lexicon:PN_sg>

```

```
<untitled-ontology-26:programmeOf rdf:resource="&untitled-ontology-26;Department_of_Information_and_Communication_Technology"/>
```

```
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#ORG432 -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;ORG432">
```

```
<ace_lexicon:PN_sg>ORG432</ace_lexicon:PN_sg>
```

```
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Object_Oriented_System_Development -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;Object_Oriented_System_Development">
```

```
<rdf:type rdf:resource="&untitled-ontology-26;Course"/>
```

```
<untitled-ontology-26:ExamDate rdf:datatype="&xsd;dateTime">2011-10-25</untitled-ontology-26:ExamDate>
```

```
<untitled-ontology-26:ECTS_Credits rdf:datatype="&xsd;int">5</untitled-ontology-26:ECTS_Credits>
```

```
<untitled-ontology-26:Term rdf:datatype="&xsd:string">Autumn 2011</untitled-ontology-26:Term>
```

```
<ace_lexicon:PN_sg>Object_Oriented_System_Development</ace_lexicon:PN_sg>
```

```
<untitled-ontology-26:hasCourseCode rdf:resource="&untitled-ontology-26;IKT413"/>
```

```
<untitled-ontology-26:hasProfessor rdf:resource="&untitled-ontology-26;Jan_Pettersen_Nytun"/>
```

```
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Ole_Christoffer_Granmo -->

<NamedIndividual rdf:about="&untitled-ontology-26;Ole_Christoffer_Granmo">
  <rdf:type rdf:resource="&untitled-ontology-26;Professor"/>
  <ace_lexicon:PN_sg>Ole_Christoffer_Granmo</ace_lexicon:PN_sg>
  <untitled-ontology-26:supervisorOf rdf:resource="&untitled-ontology-26;A_Churn_Prediction_Model_Based_on_Gaussian_Processes"/>
  <untitled-ontology-26:hasDepartment rdf:resource="&untitled-ontology-26;Department_of_Information_and_Communication_Technology"/>
  <untitled-ontology-26:hasFaculty rdf:resource="&untitled-ontology-26;Engineering_and_Science"/>
  <untitled-ontology-26:supervisorOf rdf:resource="&untitled-ontology-26;Group3"/>
  <untitled-ontology-26:supervisorOf rdf:resource="&untitled-ontology-26;Group4"/>
  <untitled-ontology-26:professorOf rdf:resource="&untitled-ontology-26;Learning_systems"/>
  <untitled-ontology-26:supervisorOf rdf:resource="&untitled-ontology-26;Mapping_Extremist_Forums_using_Text_Mining"/>
  <untitled-ontology-26:hasGender rdf:resource="&untitled-ontology-26;male"/>
</NamedIndividual>

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#PHD_ICT -->

<NamedIndividual rdf:about="&untitled-ontology-26;PHD_ICT">
  <rdf:type rdf:resource="&untitled-ontology-26;Programme"/>
  <untitled-ontology-26:ECTS_Credits rdf:datatype="&xsd:int">180</untitled-ontology-26:ECTS_Credits>
  <untitled-ontology-26:campus rdf:datatype="&xsd:string">Grimstad</untitled-ontology-26:campus>
  <untitled-ontology-26:level rdf:datatype="&xsd:string">PHD</untitled-ontology-26:level>
```

```

<ace_lexicon:PN_sg>PHD_ICT</ace_lexicon:PN_sg>

<untitled-ontology-26:programmeOf rdf:resource="&untitled-ontology-
26;Department_of_Information_and_Communication_Technology"/>

</NamedIndividual>

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#PKI-
based_authentication_and_access_control_to_Web-
based_EHR_systems:_Verification_and_evaluation_of_different_deployment_solutions -->

<NamedIndividual rdf:about="&untitled-ontology-26;PKI-based_authentication_and_access_control_to_Web-
based_EHR_systems:_Verification_and_evaluation_of_different_deployment_solutions">

  <rdf:type rdf:resource="&untitled-ontology-26;Project"/>

  <untitled-ontology-26:projectStarts rdf:datatype="&xsd;dateTime">2013-01-20</untitled-ontology-
26:projectStarts>

  <untitled-ontology-26:projectEnd rdf:datatype="&xsd;dateTime">2013-06-03</untitled-ontology-
26:projectEnd>

  <untitled-ontology-26:hasProjectDuration rdf:datatype="&xsd;int">5</untitled-ontology-
26:hasProjectDuration>

  <untitled-ontology-26:gradeGiveBySupervisor rdf:datatype="&xsd;string">B</untitled-ontology-
26:gradeGiveBySupervisor>

  <untitled-ontology-26:hasGrade rdf:datatype="&xsd;string">B</untitled-ontology-26:hasGrade>

  <untitled-ontology-26:gradeGiveByExaminer rdf:datatype="&xsd;string">B</untitled-ontology-
26:gradeGiveByExaminer>

  <ace_lexicon:PN_sg>PKI-based_authentication_and_access_control_to_Web-
based_EHR_systems:_Verification_and_evaluation_of_different_deployment_solutions</ace_lexicon:PN_sg>

  <untitled-ontology-26:isProjectTitleOf rdf:resource="&untitled-ontology-26;Group2"/>

  <untitled-ontology-26:isProjectOf rdf:resource="&untitled-ontology-26;Mari_Næss"/>

  <untitled-ontology-26:isProjectOf rdf:resource="&untitled-ontology-26;MasterThesis"/>

</NamedIndividual>

```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Renewable_Energy -->

<NamedIndividual rdf:about="&untitled-ontology-26;Renewable_Energy">
  <rdf:type rdf:resource="&untitled-ontology-26;Programme"/>
  <untitled-ontology-26:ECTS_Credits rdf:datatype="&xsd:int">180</untitled-ontology-26:ECTS_Credits>
  <untitled-ontology-26:level rdf:datatype="&xsd:string">Bachelors</untitled-ontology-26:level>
  <untitled-ontology-26:campus rdf:datatype="&xsd:string">Grimstad</untitled-ontology-26:campus>
  <untitled-ontology-26:StudyProgrammeCode rdf:datatype="&xsd:string">INGENE</untitled-ontology-26:StudyProgrammeCode>
  <ace_lexicon:PN_sg>Renewable_Energy</ace_lexicon:PN_sg>
  <untitled-ontology-26:programmeOf rdf:resource="&untitled-ontology-26;Department_of_Engineering_Sciences"/>
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Rune_Fensli -->

<NamedIndividual rdf:about="&untitled-ontology-26;Rune_Fensli">
  <rdf:type rdf:resource="&untitled-ontology-26;Supervisor"/>
  <ace_lexicon:PN_sg>Rune_Fensli</ace_lexicon:PN_sg>
  <untitled-ontology-26:supervisorOf rdf:resource="&untitled-ontology-26;Broker-centred_hierarchical_indexing_for_search_and_access_of_distributed_medical_information"/>
  <untitled-ontology-26:supervisorOf rdf:resource="&untitled-ontology-26;Group1"/>
  <untitled-ontology-26:supervisorOf rdf:resource="&untitled-ontology-26;Group2"/>
```

```
<untitled-ontology-26:supervisorOf rdf:resource="&untitled-ontology-26;PKI-
based_authentication_and_access_control_to_Web-
based_EHR_systems:_Verification_and_evaluation_of_different_deployment_solutions"/>
```

```
<untitled-ontology-26:hasGender rdf:resource="&untitled-ontology-26;male"/>
```

```
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#SpecializationProject -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;SpecializationProject">
```

```
<rdf:type rdf:resource="&untitled-ontology-26;Course"/>
```

```
<untitled-ontology-26:ECTS_Credits rdf:datatype="&xsd:int">10</untitled-ontology-26:ECTS_Credits>
```

```
<untitled-ontology-26:Term rdf:datatype="&xsd:string">Autumn 2012</untitled-ontology-26:Term>
```

```
<ace_lexicon:PN_sg>SpecializationProject</ace_lexicon:PN_sg>
```

```
<untitled-ontology-26:hasCourseCode rdf:resource="&untitled-ontology-26;IKT508"/>
```

```
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Stein_Bergsmark -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;Stein_Bergsmark">
```

```
<rdf:type rdf:resource="&untitled-ontology-26;Professor"/>
```

```
<ace_lexicon:PN_sg>Stein_Bergsmark</ace_lexicon:PN_sg>
```

```
<untitled-ontology-26:professorOf rdf:resource="&untitled-ontology-
26;Advanced_Internet_Services_and_Protocols"/>
```

```
<untitled-ontology-26:hasDepartment rdf:resource="&untitled-ontology-
26;Department_of_Information_and_Communication_Technology"/>
```

```

<untitled-ontology-26:hasFaculty rdf:resource="&untitled-ontology-26;Engineering_and_Science"/>
<untitled-ontology-26:professorOf rdf:resource="&untitled-ontology-26;IKT421"/>
<untitled-ontology-26:hasGender rdf:resource="&untitled-ontology-26;male"/>
</NamedIndividual>

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#Targeir_Attestog -->

<NamedIndividual rdf:about="&untitled-ontology-26;Targeir_Attestog">
  <rdf:type rdf:resource="&untitled-ontology-26;5thYear"/>
  <untitled-ontology-26:hasGrade rdf:datatype="&xsd:string">B</untitled-ontology-26:hasGrade>
  <untitled-ontology-26:city rdf:datatype="&xsd:string">Grimstad</untitled-ontology-26:city>
  <untitled-ontology-26:country rdf:datatype="&xsd:string">Norway</untitled-ontology-26:country>
  <untitled-ontology-26:email rdf:datatype="&xsd:string">targea08@student.uia.no</untitled-ontology-
26:email>
  <ace_lexicon:PN_sg>Targeir_Attestog</ace_lexicon:PN_sg>
  <untitled-ontology-26:hasDepartment rdf:resource="&untitled-ontology-
26;Department_of_Information_and_Communication_Technology"/>
  <untitled-ontology-26:hasFaculty rdf:resource="&untitled-ontology-26;Engineering_and_Science"/>
  <untitled-ontology-26:memberOf rdf:resource="&untitled-ontology-26;Group4"/>
  <untitled-ontology-26:studentOf rdf:resource="&untitled-ontology-26;ICT"/>
  <untitled-ontology-26:studentOf rdf:resource="&untitled-ontology-26;IKT590"/>
  <untitled-ontology-26:hasProject rdf:resource="&untitled-ontology-
26;Mapping_Extremist_Forums_using_Text_Mining"/>
  <untitled-ontology-26:studentOf rdf:resource="&untitled-ontology-26;MasterThesis"/>
  <untitled-ontology-26:hasGender rdf:resource="&untitled-ontology-26;male"/>
</NamedIndividual>

```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#UIA -->

<NamedIndividual rdf:about="&untitled-ontology-26;UIA">
  <rdf:type rdf:resource="&untitled-ontology-26;University"/>
  <ace_lexicon:PN_sg>UIA</ace_lexicon:PN_sg>
  <untitled-ontology-26:composedOf rdf:resource="&untitled-ontology-26;Department_of_Engineering_Sciences"/>
  <untitled-ontology-26:composedOf rdf:resource="&untitled-ontology-26;Department_of_Information_and_Communication_Technology"/>
  <untitled-ontology-26:composedOf rdf:resource="&untitled-ontology-26;Department_of_Mathematical_Sciences"/>
  <untitled-ontology-26:composedOf rdf:resource="&untitled-ontology-26;Department_of_Natural_Sciences"/>
  <untitled-ontology-26:composedOf rdf:resource="&untitled-ontology-26;Economics_and_Social_Sciences"/>
  <untitled-ontology-26:composedOf rdf:resource="&untitled-ontology-26;Engineering_and_Science"/>
  <untitled-ontology-26:composedOf rdf:resource="&untitled-ontology-26;Fine_Arts"/>
  <untitled-ontology-26:composedOf rdf:resource="&untitled-ontology-26;Health_and_Sport_Sciences"/>
  <untitled-ontology-26:composedOf rdf:resource="&untitled-ontology-26;Humanities_and_Education"/>
  <untitled-ontology-26:composedOf rdf:resource="&untitled-ontology-26;arbeidsliv_og_innovasjon"/>
  <untitled-ontology-26:composedOf rdf:resource="&untitled-ontology-26;informasjonssystemer"/>
  <untitled-ontology-26:composedOf rdf:resource="&untitled-ontology-26;sosiologi_og_sosialt_arbeid"/>
  <untitled-ontology-26:composedOf rdf:resource="&untitled-ontology-26;statsvitenskap_og_ledelsesfag"/>
  <untitled-ontology-26:composedOf rdf:resource="&untitled-ontology-26;økonomi"/>
</NamedIndividual>
```



```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#arbeidsliv_og_innovasjon -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;arbeidsliv_og_innovasjon">  
  <rdf:type rdf:resource="&untitled-ontology-26;Institutt"/>  
  <untitled-ontology-26:phoneNo rdf:datatype="&xsd:int">3723 3152</untitled-ontology-26:phoneNo>  
  <untitled-ontology-26:address rdf:datatype="&xsd:string">Jon Lilletuns vei 9, Grimstad</untitled-ontology-26:address>  
  <ace_lexicon:PN_sg>arbeidsliv_og_innovasjon</ace_lexicon:PN_sg>  
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#famale -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;famale">  
  <rdf:type rdf:resource="&untitled-ontology-26;Gender"/>  
  <ace_lexicon:PN_sg>famale</ace_lexicon:PN_sg>  
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#informasjonssystemer -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;informasjonssystemer">  
  <rdf:type rdf:resource="&untitled-ontology-26;Institutt"/>  
  <untitled-ontology-26:address rdf:datatype="&xsd:string">1. etasje Gimlemoen 25 H, Kristiansand</untitled-ontology-26:address>
```

```
<untitled-ontology-26:phoneNo rdf:datatype="&xsd:int">3814 1504</untitled-ontology-26:phoneNo>
```

```
<ace_lexicon:PN_sg>informasjonssystemer</ace_lexicon:PN_sg>
```

```
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#male -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;male">
```

```
<rdf:type rdf:resource="&untitled-ontology-26;Gender"/>
```

```
<ace_lexicon:PN_sg>male</ace_lexicon:PN_sg>
```

```
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#sosiologi_og_sosialt_arbeid -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;sosiologi_og_sosialt_arbeid">
```

```
<rdf:type rdf:resource="&untitled-ontology-26;Institutt"/>
```

```
<untitled-ontology-26:phoneNo rdf:datatype="&xsd:int">3814 2382</untitled-ontology-26:phoneNo>
```

```
<untitled-ontology-26:address rdf:datatype="&xsd:string">Underetasje Gimlemoen 25 H,  
Kristiansand</untitled-ontology-26:address>
```

```
<ace_lexicon:PN_sg>sosiologi_og_sosialt_arbeid</ace_lexicon:PN_sg>
```

```
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#statsvitenskap_og_ledelsesfag -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;statsvitenskap_og_ledelsesfag">  
  <rdf:type rdf:resource="&untitled-ontology-26;Institutt"/>  
  <untitled-ontology-26:phoneNo rdf:datatype="&xsd:int">3814 1630</untitled-ontology-26:phoneNo>  
  <untitled-ontology-26:address rdf:datatype="&xsd:string">Underetasje Gimlemoen 25 H,  
Kristiansand</untitled-ontology-26:address>  
  <ace_lexicon:PN_sg>statsvitenskap_og_ledelsesfag</ace_lexicon:PN_sg>  
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#utviklingsstudier -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;utviklingsstudier">  
  <rdf:type rdf:resource="&untitled-ontology-26;Institutt"/>  
  <untitled-ontology-26:address rdf:datatype="&xsd:string">2. etasje Gimlemoen 25 H, Kristiansand</untitled-  
ontology-26:address>  
  <untitled-ontology-26:phoneNo rdf:datatype="&xsd:int">3814 1620</untitled-ontology-26:phoneNo>  
  <ace_lexicon:PN_sg>utviklingsstudier</ace_lexicon:PN_sg>  
</NamedIndividual>
```

```
<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#xin_chin -->
```

```
<NamedIndividual rdf:about="&untitled-ontology-26;xin_chin">
```

```
<rdf:type rdf:resource="&untitled-ontology-26;5thYear"/>
<untitled-ontology-26:hasGrade rdf:datatype="&xsd:string">C</untitled-ontology-26:hasGrade>
<untitled-ontology-26:country rdf:datatype="&xsd:string">China</untitled-ontology-26:country>
<untitled-ontology-26:city rdf:datatype="&xsd:string">Grimstad</untitled-ontology-26:city>
<untitled-ontology-26:email rdf:datatype="&xsd:string">xinc11@student.uia.no</untitled-ontology-26:email>
<ace_lexicon:PN_sg>xin_chin</ace_lexicon:PN_sg>
<untitled-ontology-26:hasProject rdf:resource="&untitled-ontology-26;Broker-
centred_hierarchical_indexing_for_search_and_access_of_distributed_medical_information"/>
<untitled-ontology-26:hasDepartment rdf:resource="&untitled-ontology-
26;Department_of_Information_and_Communication_Technology"/>
<untitled-ontology-26:hasFaculty rdf:resource="&untitled-ontology-26;Engineering_and_Science"/>
<untitled-ontology-26:memberOf rdf:resource="&untitled-ontology-26;Group1"/>
<untitled-ontology-26:studentOf rdf:resource="&untitled-ontology-26;ICT"/>
<untitled-ontology-26:studentOf rdf:resource="&untitled-ontology-26;IKT590"/>
<untitled-ontology-26:studentOf rdf:resource="&untitled-ontology-26;Learning_systems"/>
<untitled-ontology-26:studentOf rdf:resource="&untitled-ontology-26;MasterThesis"/>
<untitled-ontology-26:hasGender rdf:resource="&untitled-ontology-26;famale"/>
</NamedIndividual>

<!-- http://www.semanticweb.org/shezo/ontologies/2013/2/untitled-ontology-26#økonomi -->

<NamedIndividual rdf:about="&untitled-ontology-26;økonomi">
  <rdf:type rdf:resource="&untitled-ontology-26;Institutt"/>
  <untitled-ontology-26:phoneNo rdf:datatype="&xsd:int">3814 1507</untitled-ontology-26:phoneNo>
  <untitled-ontology-26:address rdf:datatype="&xsd:string">Bygg 50/51 Gimlemoen 50, Kristiansand</untitled-
ontology-26:address>
```

```
<ace_lexicon:PN_sg>økonomi</ace_lexicon:PN_sg>
</NamedIndividual>

<!--
////////////////////////////////////
//
// General axioms
//
////////////////////////////////////
-->

<rdf:Description>
  <rdf:type rdf:resource="&owl;AllDisjointClasses"/>
  <members rdf:parseType="Collection">
    <rdf:Description rdf:about="&untitled-ontology-26;Department"/>
    <rdf:Description rdf:about="&untitled-ontology-26;Fakultet"/>
    <rdf:Description rdf:about="&untitled-ontology-26;Institutt"/>
  </members>
</rdf:Description>

<rdf:Description>
  <rdf:type rdf:resource="&owl;AllDisjointClasses"/>
  <members rdf:parseType="Collection">
    <rdf:Description rdf:about="&untitled-ontology-26;1stYear"/>
    <rdf:Description rdf:about="&untitled-ontology-26;2ndYear"/>
    <rdf:Description rdf:about="&untitled-ontology-26;3rdYear"/>
  </members>
</rdf:Description>
```

</members>

</rdf:Description>

</rdf:RDF>

<!-- Generated by the OWL API (version 3.4.2) <http://owlapi.sourceforge.net> -->