

## Modeling of the electronic index with UML diagrams as a component of e-learning



Computer Science

**Keywords:** e-learning, electronic index, actors, subjects, students, UML diagrams.

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### Abstract

E-learning is developed fast due to internet. E-learning is the delivery of learning content via all electronic media, including Internet, satellite broadcasting, interactive TV, etc. The use of the classic index in different worlds universities has been replaced with an electronic index. This has meant that all writing evidence that have been taken so far should be replaced with the so-called electronic archive. Thousands of wood materials like papers and books will be saved through the electronic index. The electronic index should resolve the issue of signatures, mainly to be implemented the digital signature that will confirm authorship of the professor and will not allow falsification. The administration work would be facilitated.

### Introduction

E-learning is developed fast due to internet. The internet and the WWW provided us with easy access to information and knowledge. E-learning is mostly associated with activities involving computers and interactive networks simultaneously. In essence, it is a computer based educational tool or system that enables you to learn anywhere and at any time. E-learning is the delivery of learning content via all electronic media, including Internet, Intranet, satellite broadcasting, interactive TV, CD-Rom and audio/video tapes. The use of Internet technologies to deliver a broad array of solutions that enhance knowledge and performance. (Rosenberg, 2011)

The use of the classic index in different worlds universities has been replaced with an electronic index. This has meant that all writing evidence that have been taken so far should be replaced with the so-called electronic archive. In this way the administrative work has been simplified and the possibility of manipulation is reduced. The modeling of our electronic index is performed with the Unified Modeling Language - UML, and data are stored and manipulated in a database created in SQL Server.

### Materials and methods

#### Feasibility study

The application will contain information about the name of the course, the name of the professor who teaches a course, the number of hours, the signature of attending lectures in which the student has participated, the final grade it is scored and finally remarks by the professor. In this application we think to be put in operation in college because it facilitates the administrative tasks.

#### Type of users

Users of the electronic index will be:

1. Administrators - whose job is to make the registration of students by adding data, deleting or renewal of those data about students. For example: if a student has a university degree, the administrator has an obligation to tell him if there is a lack of documentation, if there is no lack of it he should prepare the diploma and other information that you should send it to the archives to be saved. The administrator also will perform most of the work to mark the subjects, establishing the schedule of professors, writing the ECTS for each subject, etc.
2. Students - makes a request to the administrator to become part of an electronic with his personal data, or any other document with data for which need to make a request for example request that he is a student

of that faculty, application for certificate of grades, students will have his personal account to have online view on his index, but without permission to make changes in certain areas.

3. Professor - The role of the professor will be, marking the grades and identification of the presence of the students, also for each hour he will write the date, time, subject and other relevant information, the professor will have space for the entry of each exam, and to make different averages.

**Results**

Creating of Use Case Diagram through UML language. The use case diagram's we created for specific duties of each actor. Starting from the administrator we describe his role and interactions that he makes with the actors professor and student. The main duties of our model are distributed to the administrator. Firstly he get signed onto the system then checks the status of the student's index, then he perform the services he wants. So it checks whether the student has made the payment of the semester, and continues with his registration.

The student then gives the data and the necessary documents for registration in the relevant University. Then the student is given a list of elective courses that he must choose which will be pursued during the academic year. Professor set the lectures schedule and exercises he will take. After the registration the administrator also can give him a proof that he is a student, as well as the grading certificate. Professor holds the exams, marks the grades in the electronic index, while the administrator certifies grades and complete the reports.

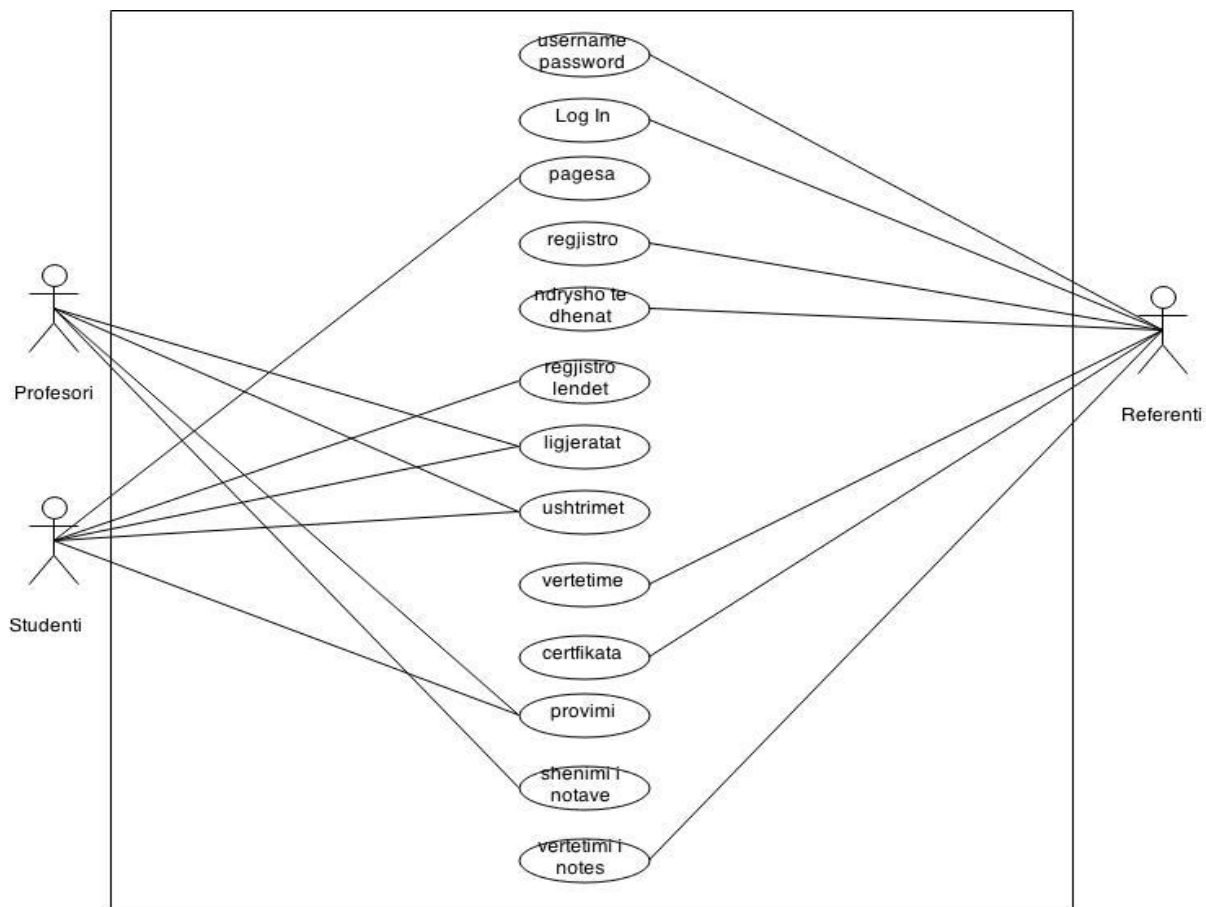


Fig.1 Activity Diagrams shows the activities of the actors with the step-by-step system

Activity Diagrams show activities of the actors which are connected and carried out with the step-by-step system. In the beginning we provided the payment of the semester, and the eventual change of student data. Then the student determines which subjects will follow. Professor lectures and holds evidence of the regularity of the student, which then determines which students can take the exam. Administrator after the payment may submit to the student the grades certificate, and confirms received grades.

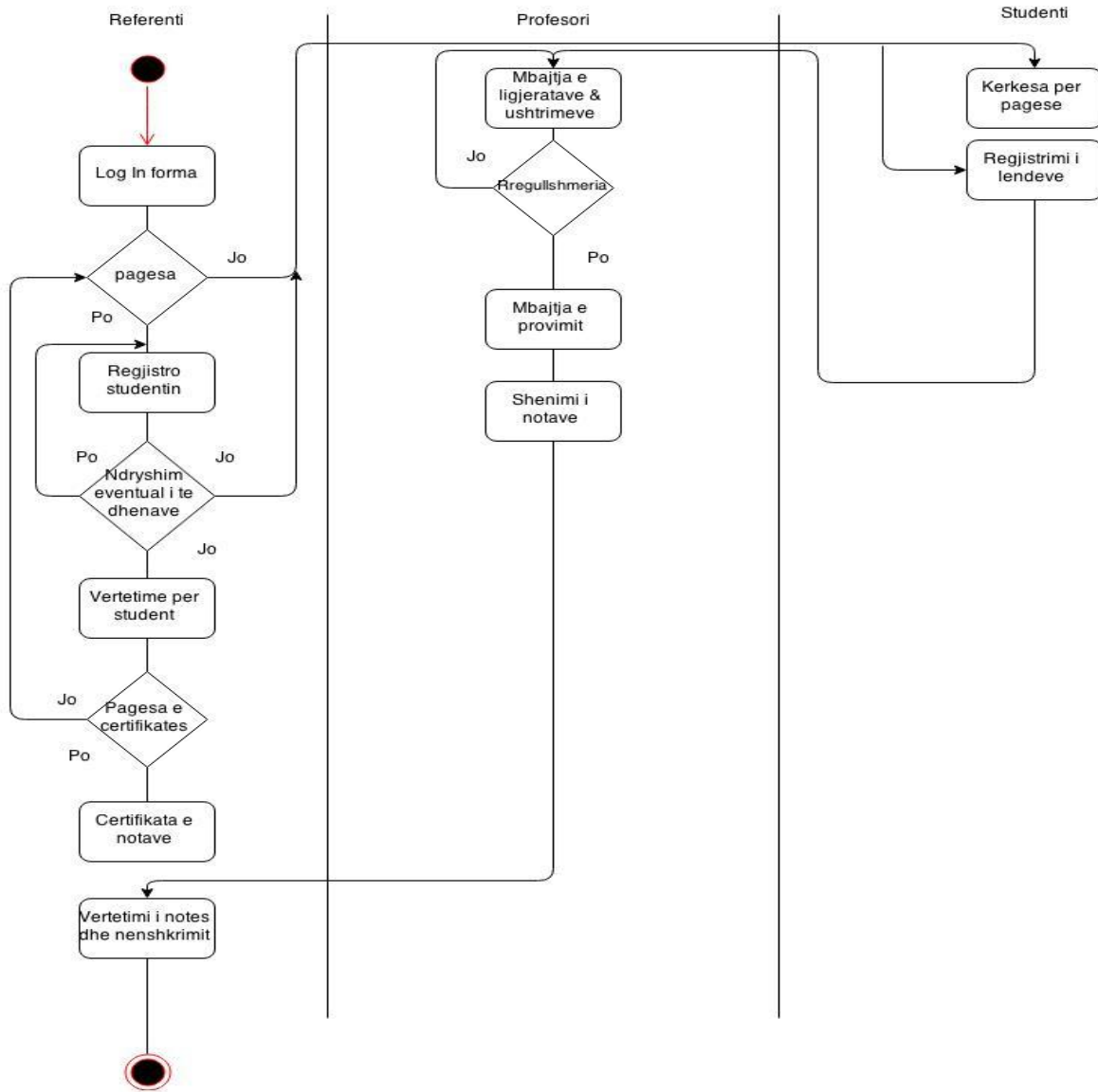


Fig.2 Class diagram describes the features of each actor and their participating attributes.

The purpose of the class diagram is to describe the features of each actor who appears as a model in this class with their participating attributes. Class diagrams are interconnected with links: Administrator is associated with many students and professors.

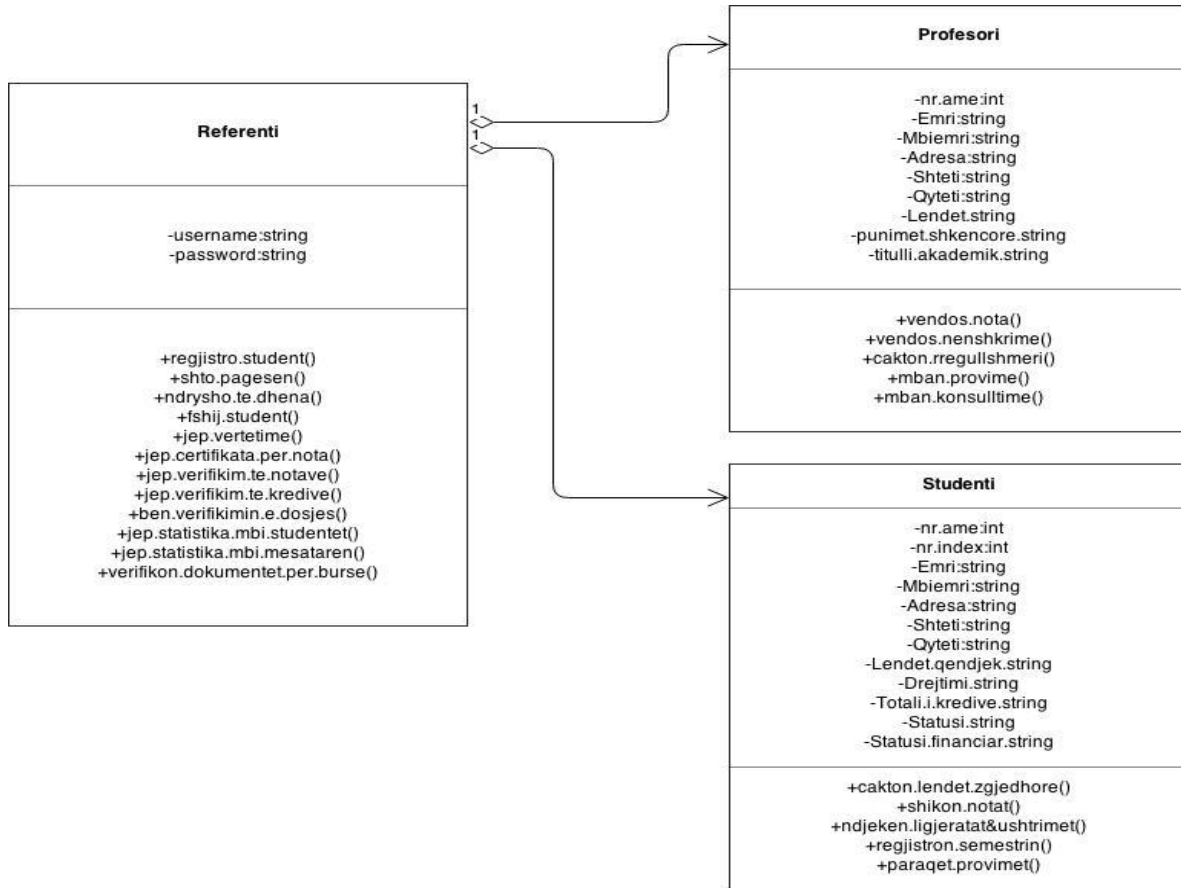


Fig.3 Class diagram presents actor data and their functions.

The main element of the class diagram is the icon that represents the class. The class icon is a diagram which the actor presents data and functions that it performs. In the first part we have the status or his profession. In his part are given the main data, while in the third we have duties that he may perform. The class diagram allows us to see the way of connection and shared functions among different entities.

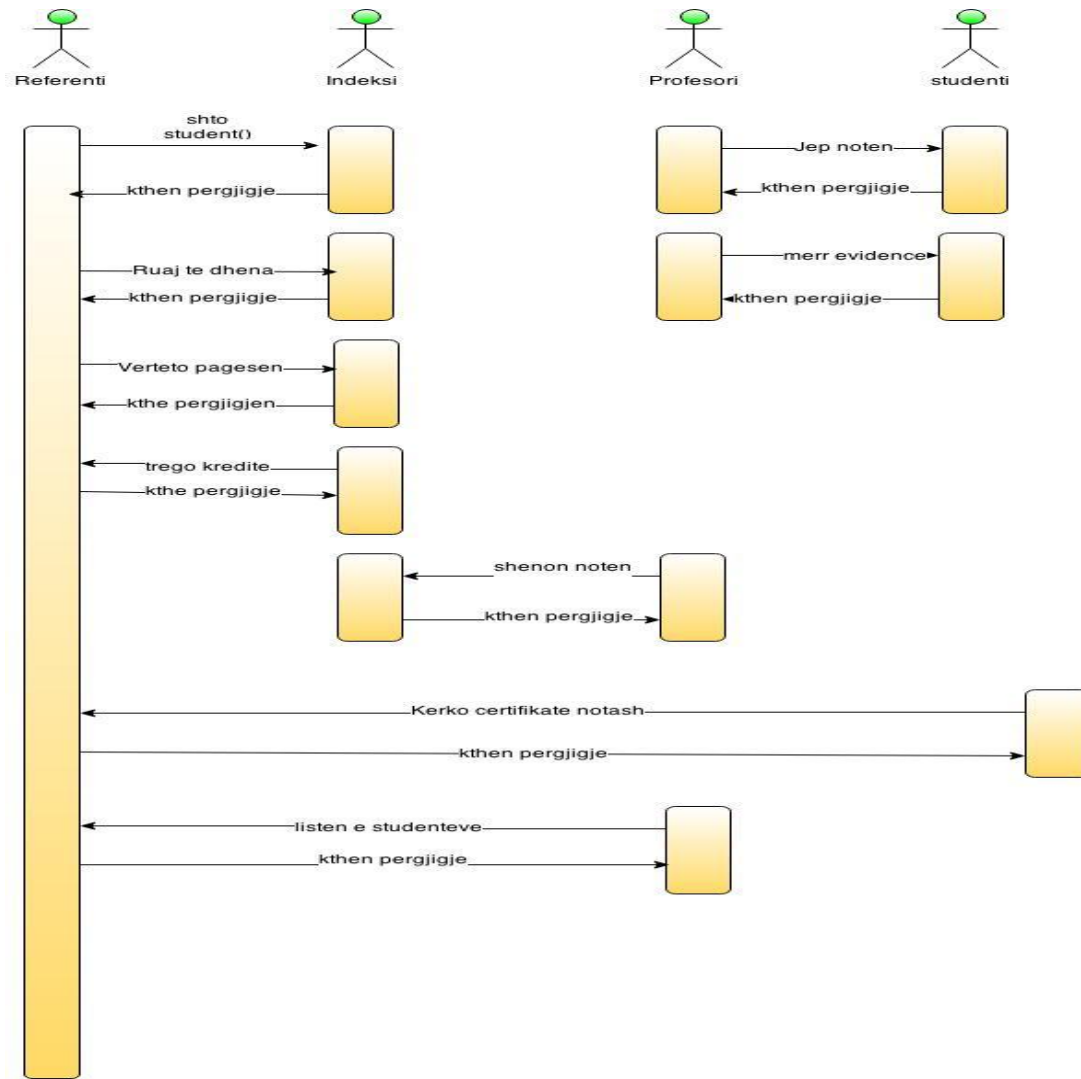


Fig.4 Sequence diagrams represent graphic appearance of the actors and their activity

The sequence diagrams represent us graphics appearance of the actors and their respective activity. Also we have communication between each actor, but here we have them separated and it has been shown for each activity when it should happen. In the form of question-response are appearing the methods of communication among the actors. Also the deployments graphs are presented with the requirements in the respective places of any actor.

## Conclusion

The beginning of the compilation of the program "electronic index" started getting all the information about the operation of the administrations' at the State University of Tetovo<sup>185</sup>. Mainly after the observation made major deficiencies were observed in the old model of the classic indexed and it has been proposed by the students to create an electronic software index that will fulfill all the needs of students, professors and administrators. Main duties and functions of electronic index are:

- Electronic index should resemble the classic one, mainly software design should have similarities with the classic index.
- To be able to change, complement the deletion, mainly electronic index to be more flexible, to be able to increase new fields.
- Resolve the issue of signatures, mainly to be implemented the digital signature that will confirm authorship of the professor and will not allow falsification.
- In addition to the student's profile and the students scores index should have the opportunity to register the presence of the student in school, and during the marking of the grades should appear in this report for each student.
- The scope of the definition of credits to be variable and this area should contains a function that notifies the administrator if the student meets the requirements set for the registration of the next academic year.
- Safety should be maximized, mainly to set clear permissions for each actor, the student should not be able to access to the permissions of professor and administrator have to perform only his specified duties, be carried out occasional backup from the company that creates software .
- Each student have to be notified for the changes to its index via email, mainly to be forwarded the data about his grades and different administrative decisions that are taken for him.
- To have the opportunity to create different reports respectively during specific requirements in databases.

## References

1. Michael Blaha, William Premerlani. Object-Oriented Modeling and Design for Database Applications. Prentice Hall, Upper Saddle River, N.J., 1998.
2. Grady Booch. Object-Oriented Analysis and Design with Applications, 1st ed. Benjamin/Cummings, Redwood City, Calif., 1991.
3. Grady Booch. Object-Oriented Analysis and Design with Applications, 2nd ed. Benjamin/Cummings, Redwood City, Calif., 1994.
4. [Unified Modeling Language User Guide, The \(2ed.\). Addison-Wesley. 2005. p. 496 ISBN 03212](#)
5. ["ISO/IEC 19501:2005 - Information technology - Open Distributed Processing - Unified Modeling Language \(UML\) Version 1.4.2". Iso.org. 2005-04-01. Retrieved 2015-05-07.](#)
6. *Petre, Marian (2013). UML in practice (PDF). 35th International Conference on Software Engineering 18–26 May 2013. pp. 722–731. The majority of those interviewed simply do not use UML, and those who do use it tend to do so selectively and often informally*
7. ["OMG Unified Modeling Language \(OMG UML\), Superstructure. Version 2.4.1". Object Management Group. Retrieved 9 April 2014.](#)
8. Andreas Zender (1997) Advanced Concepts, Life Cycle Models and Tools for Object-Oriented Software Development. p.122

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