

MINISTRY OF EDUCATION AND SCIENCE OF THE RUSSIAN FEDERATION
Federal State State-Financed Educational Institution of High Professional Education
South Ural State University (National Research University)
Faculty of Computational Mathematics and Informatics
Department of System Programming

THESIS IS CHECKED

Reviewer

 A.S. Staroverov

“08” urok 2016

ACCEPTED FOR THE DEFENSE

Head of the department, Dr. Sci., Prof.

 L.B. Sokolinsky

“13” 06 2016

**DEVELOPMENT OF A COMPUTER-AIDED DOCUMENT
MANAGEMENT SYSTEM FOR EDUCATIONAL PROCESS
AT THE TECHNICAL COLLEGE OF BAGHDAD CITY**

GRADUATE QUALIFICATION WORK
SUSU-02.04.02.2016.115-052.GQW

Supervisor

Cand.Sci, Assoc. Prof.

 E.V. Ivanova

Author,

the student of the group VMI-216

 Arcelan S. Al-Shammari

Normative control

 O.N. Ivanova

“08” urok 2016

Chelyabinsk-2016

MINISTRY OF EDUCATION AND SCIENCE OF THE RUSSIAN FEDERATION
Federal State State-Financed Educational Institution of High Professional Education
South Ural State University (National Research University)
Faculty of Computational Mathematics and Informatics
Department of System Programming

APPROVED

Head of the department,
Dr. Sci., Prof.


L.B. Sokolinsky

“09” 02 2016

TASK

of the master graduate qualification work

for the student of the group VMI-216

Arcelan Sabri Al-Shammari

in master direction 020402

“Fundamental Informatics and Information Technologies”

(Master program “Database Technologies”)

- 1. The topic** (approved by the order of the rector from 15.04.2016 No. 661)
Development of a computer-aided document management system for educational process at the Technical college of Baghdad city.
- 2. The deadline for the completion of the work:** 01.06.2016.
- 3. The source data for the work**
 - 3.1. Gilmore W. J. Beginning PHP and MySQL: From Novice to Professional, 4th Edition, 2010. 787 p.
 - 3.2. Bakken S. S., Aulbach A., Schmid E., etc. PHP Manual. PHP Documentation Group, 2003. 4073 p.
- 4. The list of the development issues**
 - 4.1. To make analysis of the subject area.
 - 4.2. To study the tools of web application developing.
 - 4.3. To realize and test the web application for educational process at the Technical College of Baghdad city.
- 5. Issuance date of the task:** 09.02.2016.

Supervisor

Cand.Sci, Assoc. Prof.



E.V. Ivanova

The task is taken to perform



Arcelan S. Al-Shammari

Student: Arcelan S. Al-Shammari, VMI-216

Supervisor: Cand.Sci, Assoc. Prof. E.V. Ivanova

Topic: Development of a computer-aided document management system for educational process at the Technical college of Baghdad city

**The calendar plan
of the execution of master graduate qualifying work (GQW)**

No	Phase	Duration	Deadline	Report	Actual date of execution	Supervisor's signature
1.	Introduction and literature review	1 month	February, 25 th	1. Task of the master graduate qualification work 2. Text of Introduction 3. References	Feb, 25 th	EU -
2.	Development of the model, design of the system	1 month	March, 15 th	1. Text of chapter 1 (theoretical part).	March, 15 th	EU -
3.	Implementation of a system	1 month	April, 15 th	1. Software system 2. Text of chapter 2 (implementation part).	April 15 th	EU -
4.	Testing and debugging of the system, experiments	2 weeks	May, 1 st	1. Set of tests 2. Text of chapter 3 (experimental part).	May, 1 st	EU -
5.	Full text	2 weeks	May, 15 th	1. Full text of GQW	May, 15 th	EU -
6.	Validation of the text by supervisor	1 week	May, 22 nd	1. Electronic version of the GQW text checked by the supervisor	May, 22 th	EU -
7.	Normative control	3 days	May, 25 th	1. Twisted text of GQW signed by student, supervisor and normative controller		
8.	Proposal defense	1 week	May, 25 th - June, 1 st	1. Twisted text of GQW signed by student, supervisor and normative controller for the signature of the Head of the Department Head about accepting for the defense 2. A signed review of the supervisor 3. A review of the reviewer, signed and notarized at his place of work 4. Implementation act (if exists) 5. Presentation of the report in PowerPoint		

Table of contents

ACKNOWLEDGEMENTS	4
INTRODUCTION.....	5
1. THE ANALYSIS OF THE SUBJECT AREA	8
1.1.The problem statement.....	8
1.2.Comparative analysis of the existing analogical sites	8
1.3.The used development tools.....	10
2. DEVELOPMENT OF A SYSTEM	11
2.1.Design of system	11
2.1.1. Functional requirements.....	11
2.1.2. Use case diagram	12
2.1.3. Development of the interface.....	13
2.1.4. ER-diagram	17
2.1.5. Database schema.....	17
2.2.Realization of system	17
2.2.1. Realization of the database	17
2.2.2. Realization application.....	22
3. TESTING OF THE SYSTEM	24
3.1.Functionality Testing	24
3.2.Interface testing	25
3.3.Compatibility testing.....	37
3.4.Security testing.....	37
CONCLUSION	38
LITERATURE	40
APPENDICES.....	43
Appendix 1	43
Appendix 2	44

ACKNOWLEDGEMENTS

At first, I would like to thank our God to pass this opportunity.

Special thanks to my supervisor Cand.Sci, E.V. Ivanova for big helpful in supervise, support, discussions, especially concerning MySQL, PHP and its associated programming systems.

Also, my grateful sincere thanks to my big family mother and father, small family my wife and daughters, to Dr. Ahmed W. and all friend of Iraq, Марина Щепунова in Russia for their help and support.

Finally, very grateful and extend my sincere thanks to all staff working in the Department of System Programming at Faculty of Computational Mathematics and Informatics for all great information that learn and teach it to my.

It is my pleasure to acknowledge them all here.

INTRODUCTION

Actuality

Information and Communications Technology (ICT) has provided all the modern methods in the practical aspects of management (organization) in all fields of work that contribute to facilitate completion.

Of these fields is to manage the affairs of the students and organization of the school curriculum, which facilitate scientific level to follow them by the teacher as well as senior management (college) Secretarial.

Aimed at universities around the world to raise the rankings of its universities, often need these universities to review the scientific level of the students and the academic level of the teachers as well as some other university administration and regulatory aspects, all these objects need to review the reports and statistics about it then be analyze and study those results to find out all weak points to be addressed, addition to identifying the strengths points for the purpose of development it to achieve the goals of the university.

There are many methods and techniques that help in the organization of the school curriculum for students and knowing the scientific and academic levels, one of these techniques using websites applications to build programs that help effectively to achieve the goals of the university.

Each college or scientific department need to know the extent of the commitment of the students attended lectures and commitment to perform daily tests and seasonal examinations.

In general, the student feeling that there is a vocal point to views and watching his level of scientific performance, that drive him to provide what is the best for the sake of improvement his attitude and commitment to performance his duties.

Therefore, we decided to develop a special site for teachers and students of the Technical College of Baghdad city, based on modern information technologies.

Research goals and objectives

The goal of the work is the development of a computer-aided document management system for educational process at the Technical college of Baghdad city.

For the reaching this object we must solve the following objectives:

- 1) analysis of subject area;
- 2) study the tools of web application developing;
- 3) design of web-application;
- 4) realize and test of web-application.

Practical significance

This project is useful for the scientific Secretary, teachers and students in the Technical college of Baghdad city. This project can be useful because it included many features to assist the scientific Secretary in a department or college who manage and follow-up scientific procedures between teacher and students, addition the possibility preparation for a summary of profile to teachers and student that are using this system:

- 1) saving the time and efforts during working at website;
- 2) secure access for the private data about the users, including the identification of privacy working at the web;
- 3) ensuring data integrity in different groups of students;
- 4) preview and print a reports about teachers and students;
- 5) unlimited to the number of the users.

Structure of the thesis

A thesis consists of three chapters, introduction, conclusion and literature list.

In a first chapter, the analysis of the subject area, included problem statement, comparative analysis of the existing analogical sites that support and hosting web-application at in the sectors of e-learning and education, describe the tools of web-application developing.

In a second chapter, there is a description design and realization web application and database. This chapter included functional requirements, use case diagram, interfaces, ER-diagram, database schema and realization of SQL-query and interfaces.

In a third chapter, it is appointed for testing of the system.

The thesis has 3 chapters; 44 pages; the literature list contains 26 resources.

1. THE ANALYSIS OF THE SUBJECT AREA

1.1. The problem statement

This system is giving the senior management of the college (scientific secretarial) the ability to organization of students situation and follow up their condition, where the student is away from the scientific secretary or teacher with respect to inquiries about his situation by use of his own page on this system, which contains all the details of his situation (degrees "Marks", and the situation of the daily attendance).

All the student information (ID, name, age, gender contact the group or class) is entered by the scientific secretary, in addition to the introduction of all the special teacher (ID, name, degree, title, department, college) and more other details .

The teacher can the possibility of introducing information (Add, Modify) own examinations degrees and the situation of the daily attendance of the lecture to each student.

Detailed reports on each student, detailed reports of each teacher, the status report (special student self).

1.2. Comparative analysis of the existing analogical sites

The main points in raising the scientific level of the students is to focus on two important points are:

1) follow-up situations students and scientific levels by scientific secretarial college in addition to organizing all that is linked between the teacher and the student;

2) follow-up to the student to the same his situations, this gives the student a sense that his follow-up by scientific secretaries in college and not only from the teacher.

It is clear that this method is very effective in achieving the goal of our project. For example, we were taken two samples to the website for support and hosting websites application at in the sectors of e-learning and education that which use open source Learning Management System (LMS) as platforms [12].

1. Modular Object-Oriented Dynamic Learning Environment (Moodle)

[11]. System Moodle has following basic functions:

- visually attractive interface;
- very fast and modern as it is Ajax enabled;
- unicode, LDAP and SCORM supporting;
- multilingual;
- advanced security characteristics;
- allows to create courses and fill them content and tests.

2. .LRN (pronounced "dot learn") [13]. System .LRN has following basic functions:

- visually attractive interface;
- homework drop box;
- Sharable Content Object Reference Model (SCORM)* display;
- student tracking data can be exported;
- different roles are supported for .LRN Classes, such as students, professors and administrative staff;
- .LRN has been internationalized to support multiple languages, dialects and time zones.

Its main flaw that it has a very diverse interface with many inconsistencies, users spends time learning new skills, not learning how to use the platform.

In addition, there is an important point that is privacy and those systems that operate in the platforms and environments open source incompatible with the concept of privacy and especially that this project is a special one technical colleges in Iraq, the security situation critical in it, that's a major reason for us to design and build our application.

It is necessary to develop special website for Development of a web-application for managing teachers and students, to achieve the objective of the project.

* (**SCORM**) is a collection of standards and specifications for web-based electronic education-9
al technology (also called e-learning).

1.3. The used development tools

The database is built by using DBMS (MySQL) and programming language PHP.

We select a PHP for several reasons: able optimize our code better, simple to installation, it is free, use scripts that easier to read and update, easy to learn that make to saving the time and effort [3], Serialization, Generating Unique ID's and provides a lot of the standard functionality [14].

As for the use of DBMS (MySQL) to build its own database system, MySQL is a relational database-management system designed for use in client/server architectures. MySQL can also be used as an embedded database library [6].

it has been for various reasons: Scalability and Flexibility, High Performance and Availability, Robust Transactional Support, Web and Data Warehouse Strengths, Strong Data Protection, Comprehensive Application Development, Management Ease, Open Source Freedom and Lowest Total Cost of Ownership [15].

PHP has supported MySQL and that made of the strong bonds between these two technologies, by use both technologies give us highest ability by merge all functions and features to be get a final result : security enhancements, advanced connection options, offer the ability to extend for new version (Object oriented, Prepared statements, Transactional support, Enhanced debugging capabilities, Master/slave support) [4].

2. DEVELOPMENT OF A SYSTEM

2.1. Design of system

2.1.1. Functional requirements

The system can be manage and follow-up of Students Affairs (undergraduate and postgraduate) and scientific levels. A database of system containing information about Students, Teachers, Groups, Department, Scientific Secretary, Faculty.

System has three type of users:

- *Scientific Secretary* – enter teachers, students, subjects, get reports about every teacher, student.
- *Teachers* – enter marks, get reports about his every student.
- *Student* – get reports about himself.

This system must contain the following basic functions:

- 1) user's authorization ;
- 2) connect to the database;
- 3) organize of users data;
- 4) calculate final marks for students;
- 5) generate detail reports about students;
- 6) generate reports about the teacher.

The requirement “user's authorization” means to have an opportunity for users to login and logout the site. It is a special type of protection from the unauthorized access.

System has to works through the website application page that which enables useful by users, the requirement “Connect to the database” means to establish the connection to MySQL database, which is saved on the server.

The application implements the following technical requirements:

- 1) operating system: different versions of Windows, Linux;
- 2) browser: Google Chrome, Internet Explorer, Mozilla Fireworks;
- 3) Server: PHP version 5.1.6 or newer, MySQL (5.1.40 +), phpMyAdmin (version: 3.2.3).

2.1.2. Use case diagram

At a first step before construction of any software needs a make a plan, it was necessary to develop a plan of action, in order that the work is correct and free of problems and programmatic iterations. For this reason, we use the Unified Modeling Language (UML) [1]. To represent the system functionality and the requirements of the system from the user's perspective we use the use case model [2]. Use case model is a sequence of steps describing an interaction between a user and a system. Use cases describe the way the user will interact with the system and how the system will respond him.

The use-case description needs to be sufficiently detailed so that all stakeholders understand what the system will do to provide the value required of it.

This means that users, customers, developers, and testers all need to agree not only on what the system will do, but also on how they will measure whether it has done the things it needs to do [10].

The result of developing our use case model is shown at the fig. 1.

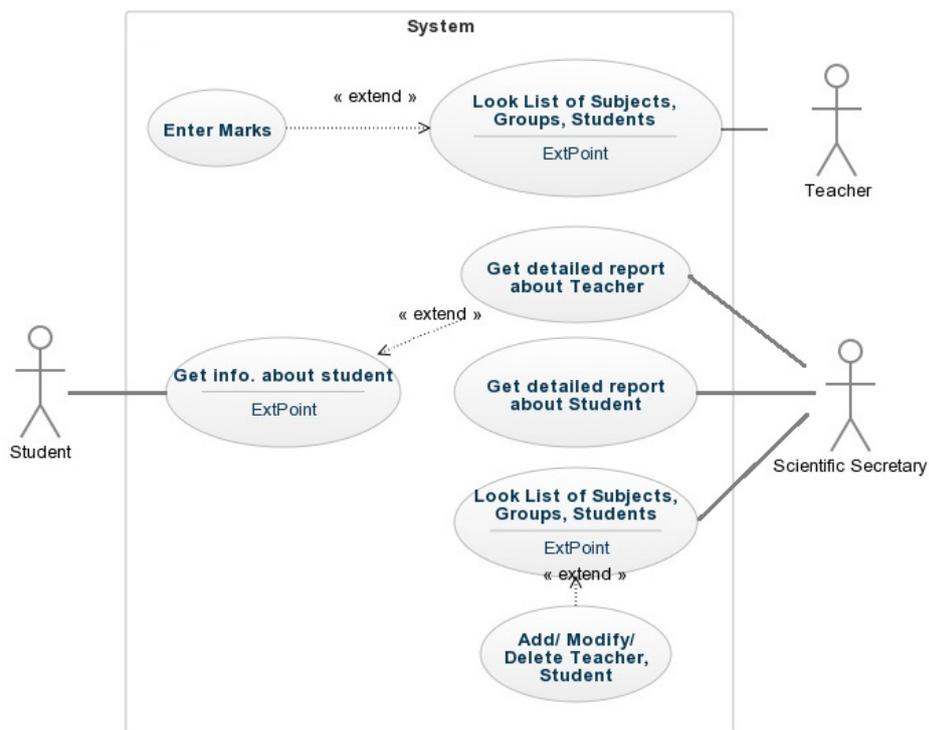


Fig. 1. Use case model

There are some use cases, which include extension points according to the permissions of actors in the model. For example, the teacher can work with lectures in full functionality: add, remove and update it. The student must be input his full information records first to which belongs to the lecture and can Preview his situation only.

2.1.3. Development of the interface

Based on the planned use case model, as described in fig.1, we will offer which screen views will be available to the user.

The integration between systems is generally higher when using application programming interfaces (API). Via an API a program offers a set of functions that can be used by other programs or subroutines. They include database access client/server, and peer-to-peer interaction, transaction processing, etc. [8].

For realize that we were designed several user interface to make our system more interactive, effective and usefully for all system users [20].

Interfaces for Scientific Secretary

Interfaces were development for Scientific Secretary. It presentation as fig. 2-8.

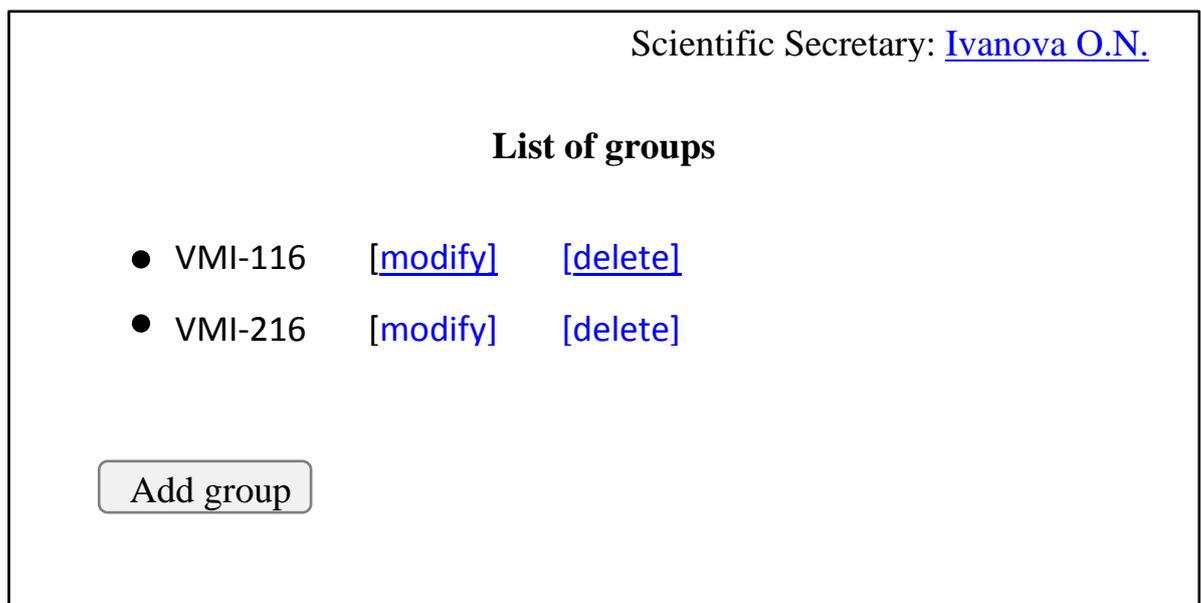


Fig. 2. Page for list of groups

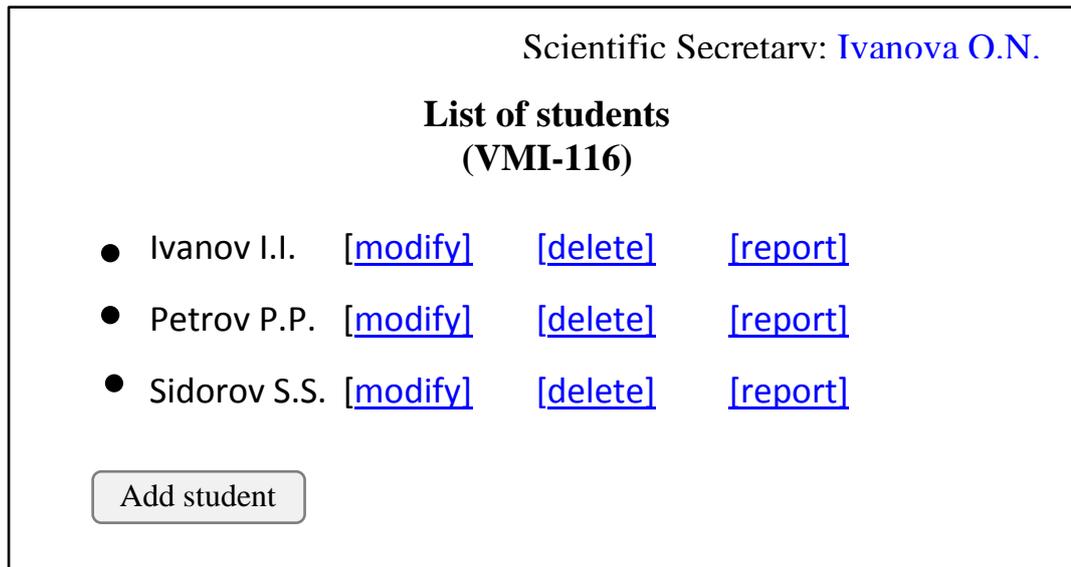


Fig. 3. Page for list of students

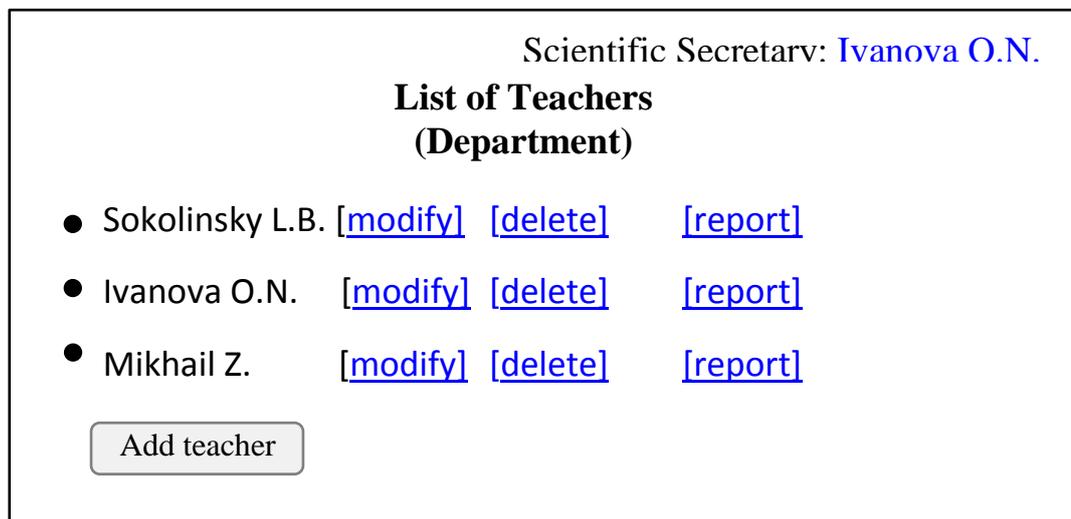


Fig. 4. Page for list of teachers

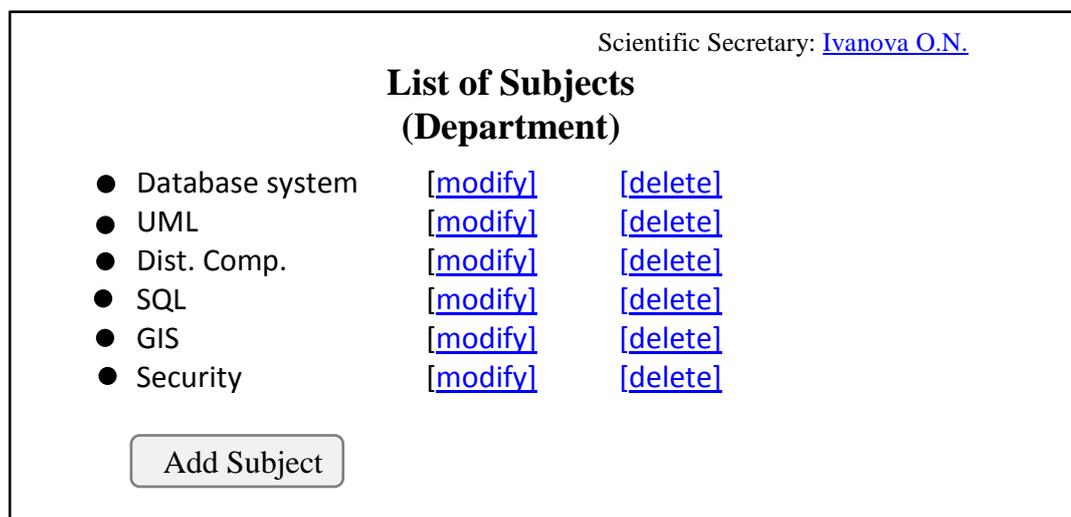


Fig. 5. Page for list of subjects

Add a new Student

Student Name

Student Age

Student Sex Male Female

Student Address

Student E-mail

Student Phone

Login

Password

Fig. 6. Page for add new student

“Detailed report”

Student: [Ivanov I.I.](#)

Age: 22

Sex: F

Stage: 4th

Group: VMI-116

Start of academic year:

#	Subject	Oct.	Nov.	Dec.	...	(May)
1	Database Management System	100	77	67		83
2	UML	85	82	79		84
3	Networks	81	90	84		83
4	-----					

Fig. 7. Page for report about student

Scientific Secretary: [Ivanova O.N.](#)

“Detailed report for Teacher [Sokolinsky L.B](#)”

#	Subject	Hours	Group	Stage
1	Database Management System	54	VMI-116	2
2	Implementation Data Mining	18		3
3	-----			

Print

Fig. 8. Page for report about teacher

Interfaces for Teacher

Interfaces were development for Teacher, It presentation as fig. 9-11.

Teacher: [Sokolinsky L.B](#)

List of Subjects

#	Group	Stage	Title	Hours	Students list
1	VMI-301	3	Database Management System	54	-----
2			Data Mining	18	

Fig. 9. Page for list of subjects for teacher

Teacher: [Udina A.A.](#)

**List of groups for
“Database Management System”**

- [VMI-116](#)

Fig. 10. Page for list of Groups

Teacher: [Udina A.A.](#)

**“Database Management System” lessons
For Subject (Database Management System) &
Group (VMI-116)**

Marks				
#	Student Name	Date	Marks	Type of Mark
1	Ivanov I.I.		77	practical works
2	Petrov P.P.		82	attendance
3	Sidorov S.S.		90	quiz
4	-----			

#	Student	Oct.	Nov.	Dec.	...	Final (May)
1	Ivanov I.I.	100	36	67		83
2	Petrov P.P.					
3	Sidorov S.S.					

Fig. 11. Page for list of Students Situation "Marks"

Interfaces for Student

Interfaces were development for Student, It presentation as fig. 12.

Marks						
						Student: Ivanov I.I (VMI-116) Sign out
#	Subject	Oct.	Nov.	Dec.	...	(May)
1	Database Management System	100	77	67		83
2	UML	85	82	79		84
3	Networks	81	90	84		83
4	-----					

Fig. 12. Page for Student

2.1.4. ER-diagram

The ER model is one of the best-known tools for logical database design, within the database community it is considered to be a very natural and easy-to-understand way of conceptualizing the structure of a database [7]. In our system, the ER-diagram designed as in fig. 13. [Appendix 1].

2.1.5. Database schema

On base ER-diagram was development the database schema, which is shown in fig. 14. [Appendix 2], this schema shows number of tables, its structures and explain relations between tables of our database.

2.2. Realization of system

2.2.1. Realization of the database

To build databases of information needed by software systems important issue to facilitate dealing with information on those systems which regulate and facilitate access to information, and that the management of these database be through a special systems (database management systems DBMS) are interconnected with each other by special relations assists in reaching to required information.

A Database Management System (DBMS) consists of software that organizes the storage of data.

A database is an integrated collection of logically related records or files consolidated into a common pool that provides data for one or more multiple users [5].

A DBMS controls the creation, maintenance, and use of the database storage structures of organizations and of their end users.

It allows organizations to place control of organization wide database development in the hands of Database Administrators (DBAs) and other specialists [5].

In large systems, a DBMS allows users and other software to store and retrieve data in structured way.

Today, hundreds of gigabytes of data fit on a single disk, and it is quite feasible to run a DBMS on a personal computer, Thus, database systems based on the relational model have become available for even very small machines, and they are beginning to appear as a common tool for computer applications, much as spreadsheets and word processors did before them [9].

In this project, our DBMS is MySQL, it is software Open Source means that it is possible for anyone to use and modify the software. Anybody can download the MySQL software from the Internet and use it without paying anything [16].

And we used phpMyAdmin, it is a web application written in PHP; it contains (like most web applications) XHTML, CSS, and JavaScript client code. This application provides a complete web interface for administering MySQL databases, and is widely recognized as the leading application in this field [19].

The protocol used to communicate between PHP and MySQL allows a compressed mode. Using this mode provides better efficiency, to take advantage of this mode.

For that we established and created the following tables of the database it consists of 11 tables as shown in the fig. 15.

Table	Action	Records	Type	Collation	Size	Overhead
<input type="checkbox"/> Department	[Icons]	2	MyISAM	cp1251_general_ci	2.1 KiB	-
<input type="checkbox"/> dep_techers	[Icons]	7	MyISAM	cp1251_general_ci	1.1 KiB	-
<input type="checkbox"/> Faculty	[Icons]	1	MyISAM	cp1251_general_ci	2.1 KiB	-
<input type="checkbox"/> Groups	[Icons]	5	MyISAM	cp1251_general_ci	2.6 KiB	412 B
<input type="checkbox"/> progress	[Icons]	20	MyISAM	cp1251_general_ci	1.4 KiB	-
<input type="checkbox"/> ScienSecretry	[Icons]	2	MyISAM	cp1251_general_ci	2.1 KiB	-
<input type="checkbox"/> student	[Icons]	16	MyISAM	cp1251_general_ci	602.6 KiB	22.0 KiB
<input type="checkbox"/> Subject	[Icons]	17	MyISAM	cp1251_general_ci	2.7 KiB	-
<input type="checkbox"/> sub_group	[Icons]	1	MyISAM	cp1251_general_ci	1.0 KiB	-
<input type="checkbox"/> sub_teacher	[Icons]	8	MyISAM	cp1251_general_ci	1.1 KiB	-
<input type="checkbox"/> teacher	[Icons]	7	MyISAM	cp1251_general_ci	2.6 KiB	56 B
11 table(s)	Sum	86	MyISAM	cp1251_general_ci	621.3 KiB	22.5 KiB

Fig. 15. Structure of the database "Student_DB_Sys"

- table of *Faculty* contains information about the id and name of faculty as a head of hierarchical structure of the system as in the fig. 16;

```
CREATE TABLE Faculty (
    id INT PRIMARY KEY,
    name CHAR(50)
);
```

Fig. 16. Structure of the "Faculty" table

- table for *Department* contains information about the id, name of department, id_ss for connect with *ScienSecretry* table and id_f for connect with *Faculty* table as in the fig. 17;

```
CREATE TABLE Department (
    id INT PRIMARY KEY,
    name CHAR(50),
    id_ss INT REFERENCES ScienSecretry (id),
    id_f INT REFERENCES Faculty(id)
);
```

Fig. 17. Create table Department

- table of *ScienSecretry* contains information about the id, name, login, password for Scientific Secretary who work with this system as an administrator and id connect with *Department* table as primary Key;

This table saves the collection of username and password for Scientific Secretary additional to other information; it consists of 5 fields as in the fig. 18.

```

CREATE TABLE ScienSecretry (
  id INT PRIMARY KEY,
  name CHAR(50) ,
  login VARCHAR(20) ,
  password VARCHAR(20)
);

```

Fig. 18. Structure of the "ScienSecretry" table

- table of *teacher* contains information about the id, teachername, scientificdegree, address, login, password for Teacher's who work with system, it consists of 6 fields as in the fig. 19;

```

CREATE TABLE Teacher (
  id INT PRIMARY KEY,
  teachername VARCHAR (30),
  scientificdegree VARCHAR (20),
  address VARCHAR (30),
  login VARCHAR(20),
  password VARCHAR(20)
)

```

Fig. 19. Structure of the "teacher" table

- table of *Subject* contains information about the id, subjectname, heuresSubject, describsubject, for subject that give from teacher's, it consists of 4 fields as in the fig. 20;

```

CREATE TABLE Subject (
  id INT PRIMARY KEY,
  subjectname VARCHAR (20),
  heuresSubject INT( 3 ),
  descriplecture TEXT ,
)

```

Fig. 20. Structure of the "Subject" table

- table of *Groups* contains information about the id, speciality, stage, name, for groups of students, it consists of 5 fields as in the fig. 21;

```

CREATE TABLE Groups (
  id INT PRIMARY KEY,
  Speciality CHAR (20),
  Stage INT (2),
  name VARCHAR (10),
  id_dep INT(11) NOT NULL REFERENCES department (id)
)

```

Fig. 21. Structure of the "Groups" table

- table of *student* contains information about the id, studentname, age, sex, address, e-mail, phone, photo, login, password for students and id_groups for connect with *Groups* table, it consists of 11 fields as in the fig. 22;

```
CREATE TABLE Student (
  id INT PRIMARY KEY,
  studentname VARCHAR (30),
  age INT (2),
  sex CHAR (1),
  address VARCHAR (30),
  id_group INT (11) NOT NULL REFERENCES Groups(id),
  e-mail VARCHAR (20),
  phone VARCHAR (50),
  photo BLOB,
  login VARCHAR(20),
  password VARCHAR(20) )
```

Fig. 22. Structure of the "student" table

- table of *dep_teachers* contains information about the id_dep for connect with *Department* table and id_teacher for connect with *Department* table, it consists of 2 fields as in the fig. 23;

```
CREATE TABLE dep_techers (
  id_dep INT(11) NOT NULL REFERENCES Department(id),
  id_teacher INT(11) NOT NULL REFERENCES Teacher (id)
)
```

Fig. 23. Structure of the "dep_teachers" table

- table of *sub_teachers* contains information about the id_subject for connect with *Subject* table and id_teacher for connect with *teacher* table, it consists of 2 fields as in the fig. 24;

```
CREATE TABLE sub_teacher (
  id_subject INT( 11 ) NOT NULL REFERENCES Subject(id),
  id_teacher INT( 11 ) NOT NULL REFERENCES Teacher (id)
)
```

Fig. 24. Structure of the "sub_teachers" table

- table of *sub_group* contains information about the id_sub for connect with *Subject* table and id_group for connect with *Groups* table, it consists of 2 fields as in the fig. 25;

```
CREATE TABLE sub_group (
  id_sub INT( 11 ) NOT NULL REFERENCES Subject(id),
  id_group INT( 11 ) NOT NULL REFERENCES Groups (id)
)
```

Fig. 25. Structure of the "sub_group" table

- table of *progress* contains information about the id_student for connect with *student* table, id_subject for connect with *Subject* table and details about marks (date, mark, type_mark) that student get it during a study year, type_mark refer to type of marks (state exam, attendance, practical works and quiz), it consists of 5 fields as in the fig. 26;

```
CREATE TABLE progress (
    id_student INT( 11 ) NOT NULL REFERENCES student,
    id_subject INT( 11 ) NOT NULL REFERENCES Subject,
    date date,
    marks int(2),
    type_mark int(2)
)
```

Fig. 26. Structure of the "progress" table

2.2.2. Realization application

For realization of page for list of groups (fig. 2, fig. 10) use following query:

```
SELECT *
FROM groups
WHERE id_dep = $_SESSION['id_dep'];
```

For realization of page for list of students (fig. 3) use following query:

```
SELECT *
FROM student
WHERE id_groups = $_SESSION['id_groups'];
```

For realization of page for list of students (fig. 3) use following query:

```
SELECT student.id AS STID, studentname, age, sex, address,
id_groups, 'e-mail', phone, photo, login, name
FROM student, Groups
WHERE student.id_groups=$_GET['ids'] AND
Groups.id=student.id_groups;
```

For realization of page for list of teachers (fig. 4) use following query:

```
SELECT *
FROM teacher
WHERE id = $_SESSION['id_teacher'];
```

For realization of page for list of subjects (fig. 5) use following queries:

```
SELECT *
FROM subject
WHERE id = $_SESSION['id_subject'];
```

```
SELECT *
```

```

FROM subject,teacher,sub_teacher
WHERE subject.id=sub_teacher.id_subject AND
      (teacher.id=sub_teacher.id_teacher );

```

For realization of pages for report about teacher and list of subjects for teacher (fig. 8, fig. 9) use following query:

```

SELECT DISTINCT a1.id_subject, a1.subjectname, a1.month, mark
FROM
  (
    SELECT id_subject, Extract(month from date) as month,
          SUM(marks) as mark
    FROM progress
    WHERE id_student=$_GET['ids'] AND
          (date>='$academicYear-09-01') AND
          (date<='($academicYear+1)-06-30')
    GROUP BY id_subject, month
  ) as a0
RIGHT JOIN
  (
    SELECT id_subject, subjectname, month
    FROM Subject, (
      SELECT id_subject
      FROM progress
      WHERE id_student=$_GET['ids']
      GROUP BY id_subject
    )
    as base, months
    WHERE base.id_subject=Subject.id
  ) as a1
ON (a0.id_subject=a1.id_subject) and (a0.month=a1.month)
ORDER BY a1.id_subject, a1.month;

```

For realization of pages for report about student and list of marks for student (fig. 7, fig. 12) use following query:

```

SELECT *
FROM Subject ,Groups ,teacher, sub_teacher, sub_group
WHERE (sub_group.id_sub=Subject.id) AND
      (groups.id=sub_group.id_group) AND
      (Subject.id=sub_teacher.id_subject) AND
      (teacher.id=sub_teacher.id_teacher)AND
      teacher.id=$_GET ['ids'];

```

3. TESTING OF THE SYSTEM

Web application testing, a software testing technique exclusively adopted to test the applications that are hosted on web in which the application interfaces and other functionalities are tested, the test procedure consist several stages (Functionality Testing, Interface testing, Compatibility testing and Security testing) [26].

3.1. Functionality Testing

Table 1. The general testing of the site:

No.	Function	Expected result	Obtained result	Conclusion
1.	To show the main page	Any visitor can watch this	Only users of system can login to next page by using owns username and password.	The function works
2.	At page of "Scientific Secretary" interface	Just Scientific Secretary can see this page and see list of (groups, Teachers and Subject)	Only Scientific Secretary can login to this page.	The function works
3.	At page of "List of groups"	The Scientific Secretary can see all groups of student with options (Add, Modify, Delete and list of student of group)	The Scientific Secretary can see all groups of student with options (Add, Modify, Delete and list of student of group)	The function works
4.	At page of "Add Group"	The Scientific Secretary can add new group to system	The Scientific Secretary can add new group to system	The function works
5.	At page of "Modify Group"	The Scientific Secretary can modify on group information	The Scientific Secretary can modify on group information	The function works
6.	At page of "Delete Group"	The Scientific Secretary can delete any group but must be empty from student	The Scientific Secretary can delete any group but must be empty from student	The function works
7.	At page of "List of Students Group"	The Scientific Secretary can see all student with a same group include details about them and can make (Add, Modify, Delete and report)	The Scientific Secretary can see all student with a same group include details about them and can make (Add, Modify, Delete and report)	The function works

Continuation of the table 1.

No.	Function	Expected result	Obtained result	Conclusion
8.	At page of "Student report"	The Scientific Secretary can preview a report about each student with his marks)	The Scientific Secretary can preview a report about each student with his marks)	The function works
9.	At page of "List of Teacher"	The Scientific Secretary can see list of teachers that work with a same department and can make (Add, Modify, Delete, see report and print it)	The Scientific Secretary can see list of teachers that work with a same department and can make (Add, Modify, Delete and report)	The function works
10.	At page of "List of Subjects"	The Scientific Secretary can see list of subjects that teach by teachers and can make (Add, Modify, Delete)	The Scientific Secretary can see list of subjects that teach by teachers and can make (Add, Modify, Delete)	The function works
11.	At page of "Teacher" interface	Just Teacher can see this page and see list of (groups , subjects and list of student) that teach by him.	Only Teacher can login to this page and see list of (groups , subjects and list of student) that teach by him.	The function works
12.	At page of "List of Students "	The Teacher can see list of student with a same group and enter a status (state exam, attendance, practical works and quiz) for them.	The Teacher can see list of student with a same group and enter a status (state exam, attendance, practical works and quiz) for them.	The function works
13.	report and print it)	Just Student can see this page and see report for his status with details and print report)	Only Student can see this page and see report for his status with details and print report)	The function works

3.2. Interface testing

When visitor(user) enter to main webpage for our system can see three functions;("Login", "PassWord", "dropdown list" include three types of authorize to login to system (Scientific Secartary, Teacher, Student), as shown in Fig. 27.



Fig. 27. The Main Page

The user can not enter to next website without username and password that register for it by Scientific Secartary as Adminstrator, all policies and authorization gave from Scientific Secretary to user's.

After login each user have own interface, can use it with his authority that mean system have three types of interface; First interfase for Scientific Secartary, it has all options can system perform inside it (add, delete, modify, reviw/print repoerts, addition to that give a username and password to each user con not every one enter to system without it) for Teachers, Subjects and Student, as shown in fig. 28.

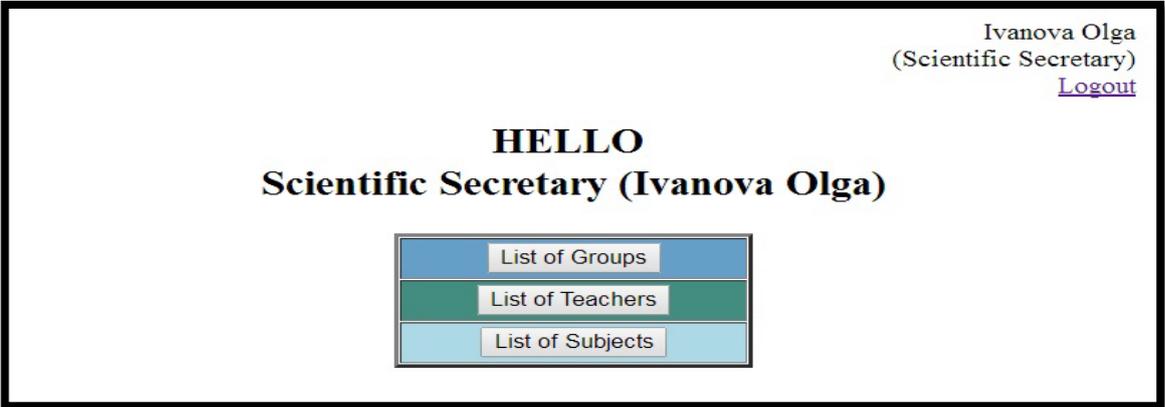


Fig. 28. Interface webpage for Scientific Secartary

Second interface for Teacher, every teacher can see all information about groups which teach it (name of group, stage, subjects, hours of subject that take during course and list of students), as shown in fig. 29.

Here we must refer to "ID's" for groups, teachers, subjects and students generated in the DBMS automatically when add any new item to database.

Leonid Sokolinsky
(Teacher)
[Logout](#)

Groups and Subjects Teacher (Leonid Sokolinsky)

[Print this page](#)

No.	Name of Group	Stage	Subject	Hours	List of Students
1	VMI-104	1	Database system impl	77	List of Students
2	VMI-201	2	Database system impl	77	List of Students
3	VMI-201	2	Distributed Object T	74	List of Students
4	VMI-102	6	Distributed Object T	74	List of Students
5	VMI-301	7	Markup Languages 2	95	List of Students

Fig. 29. Interface webpage for Teacher

Third interface for Student, each student can only review his situation (marks and attendance status), in mark field is a gathering process for all type of marks (state exam, attendance, practical works and quiz) which student get it through courses and can student also print his report for this interface, as shown in fig. 30.

**Welcome
Student (Dania A. Al-Shammari)**

Dania A. Al-Shammari
(Student)
[Logout](#)

Group (VMI-301) , Stage (7) , Academic year (2015)

[Print this page](#)

No.	Name of Subject	Marks									
		Sept	Oct	Nov	Dec.	Jan	Feb	Mar	Apr	May	Jun
1	Database system imp	153	66	88	66	95	0	0	0	165	0
2	Distributed Object T	95	99	65	55	87	0	0	0	98	0
3	Object-oriented CASE	87	68	76	78	87	0	0	0	95	0
4	ANSYS1	87	87	87	183	86	0	0	0	92	0
5	Fundamentals of Mult	86	98	89	97	0	0	0	0	90	0
6	Information Security	0	0	87	96	0	0	0	0	87	0

Fig. 30. Interface webpage for Student

In Scientific Secretary interface which were reviewed previously in fig. 28., Scientific Secretary work as administrator inside a system, it can make several procedure by usage many webpages as will as explain and shown as follow;

List of Groups, this webpage consist whole informations about all groups that study in Scientific Secretary department (ID's, Speciality, Stage, Name of Group, Department, Action, List of Students) , as shown in fig. 31.

ID	Speciality	Stage	Name of Group	Action		List of Students
2	FFI	4	VMI-102	Modify	Delete	List of Students
3	FFI	2	VMI-201	Modify	Delete	List of Students
4	DB	7	VMI-301	Modify	Delete	List of Students
1	FFI	2	VMI-101	Modify	Delete	List of Students
20	AI	4	VMI-102	Modify	Delete	List of Students

Fig. 31. The page for List of Groups

In this page can add new group, include information about specialization, stage number, academic year, name a new group as shown in fig. 32.

Fig. 32. The page for List of Groups

Also by "Action" can make a modify all information to any group as in fig. 33.

Fig. 33. The page for Modify Group

In case "Delete" a groupe, there is a messege show as a webpage refer to can not delete group if it have student, as shown in fig. 34.

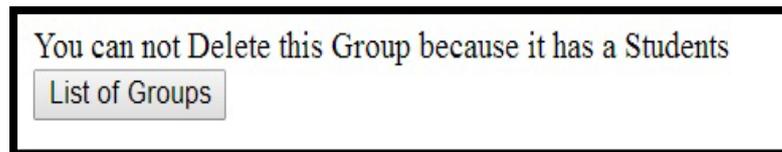


Fig. 34. The page interrupt messege for Delete Group

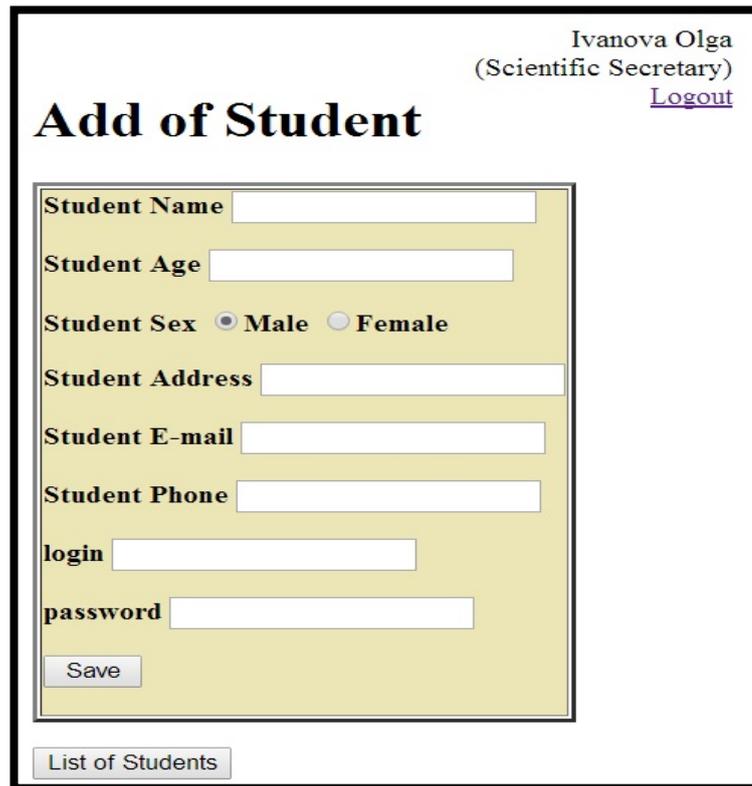
"List of Students", it is a hyperlink to list of students for group with all information about evryone with this group, by this webpage can see name of group, stage, academic year and all detils on student (name, age, gender, address, e-mail, phone no., photo, username and password"hidden", as shown in fig. 35.

ID	Name of Student	Age	Gender	Address	Group	E-mail	Phone No.	Photo	Username	Action	Report
93	Dania A. Al-Shammari	21	F	Sony Krivoy 79	VMI-301	e-mail	9876544		dan112233	Modify Add/Modify photo Delete	Report
92	Ali S. Salih	42	M	fghdfhd	VMI-301	e-mail	+964 780 1 633		ivanovaon	Modify Add/Modify photo Delete	Report

Fig. 35. The page for List of Students

Through this page, Scientific Secretary can do several procedures (add new student to this group, modify, delete, review report) for them.

"Add Student", this is a page for adding a new student to this group. It consists of fields to enter all information about the student. In this page, Scientific Secretary gives every student a username and password to make him enter the system, as in fig. 36.



Ivanova Olga
(Scientific Secretary)
[Logout](#)

Add of Student

Student Name

Student Age

Student Sex Male Female

Student Address

Student E-mail

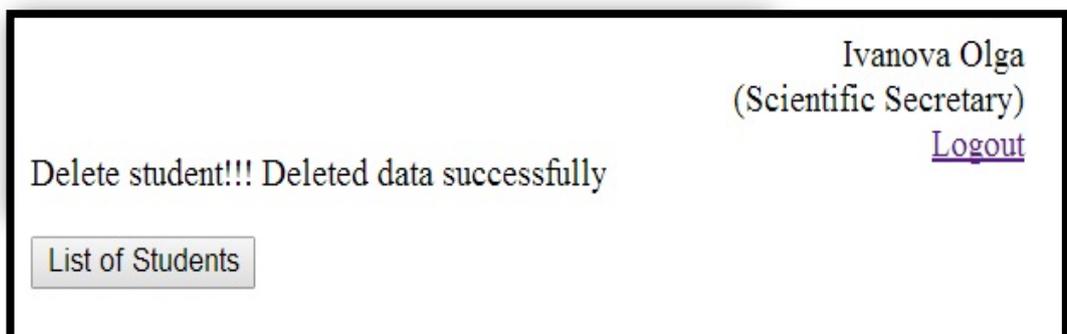
Student Phone

login

password

Fig. 36. The page for Add Student

In case of "Delete", there is a message as a webpage referring to delete a student from the group, as shown in fig. 37.



Ivanova Olga
(Scientific Secretary)
[Logout](#)

Delete student!!! Deleted data successfully

Fig. 37. The page for message of Delete Student

"Modify", this is page for modify for existing student in a group it is consist a same fields which entered in student file, as in fig. 38.

Fig. 38. The page for Modify Student

"Report",it is page to show report for student with all detiles (name, age, gender, group and date of start academic year, also this page include reuslt of marks to each subject that student toke it, as shown in fig. 39.

No.	Name of Subject	Marks									
		Sept	Oct	Nov	Dec.	Jan	Feb	Mar	Apr	May	Jun
1	Database system imp	153	66	88	66	95	0	0	0	165	0
2	Distributed Object T	95	99	65	55	87	0	0	0	98	0
3	Object-oriented CASE	87	68	76	78	87	0	0	0	95	0
4	ANSYS1	87	87	87	183	86	0	0	0	92	0
5	Fundamentals of Mult	86	98	89	97	0	0	0	0	90	0
6	Information Security	0	0	87	96	0	0	0	0	87	0

Fig. 39. The page for Student Report

List of Teachers, this webpage consist whole informations about all Teachers (ID, name, scientific degree, address, login, password) whom those teach in department, Scientific Secretary can make (add, modify, delete and reviw report for teachers), in this page Scientific Secretary give a username and password to evry teacher to enter to this system, as shown in fig. 40.

ID	Name of Teacher	Scientific Degree	Address	Login	Password	Action	Report
1	Leonid Sokolinsky	Professor	Lenin, 767	Leonidsok	lep1234	Modify Delete Report	
2	Radchenko Gleb Q	Associate Professor	Lenin Ave., 76	Radchenko	rg123455	Modify Delete Report	
3	Ivanova Olga	Associate Professor	Pre. Lenin 76	ivaolg	ivaolg123	Modify Delete Report	
4	Ivanova Elena	Senior lecturer	Pre. Lenin 76	elenuva	elena123	Modify Delete Report	
5	Dolganin Natalia	Docent	Sony Krinoy	dolnata	nata1234	Modify Delete Report	
6	Mezhenin M.G.a	Teacher	SUSU, IUI	mezmg	Mez2233	Modify Delete Report	
16	Ivanova Elena	Senior lecturer	Pre. Lenin 76	elenuva	elena123	Modify Delete Report	

Fig. 40. The page for List of Teachers

"Add Teacher",it is page to add a new teacher to department, include (name, scientific degree, address, login, password), As for the "ID" for teacher the DBMS generat id number automaticly for each teacher add to system, as shown in fig. 41.

Fig. 41. The page for Add Teacher

"Modify",it is page to modify existing teacher in a department, it is consist a same fields which entered in teacher file, as in fig. 42.

Fig. 42. The page for Modify Teacher

"Report",it is page to show report for student with all detiles (name, subjects, hours (that take through the course), group and stage of group), also can print this report from this page, as in fig. 43.

No.	Subjects	Hours	Groups	Stage
1	Distributed Object T	174	VMI-301	7

Fig. 43. The page for Report of Teacher

In case of "Delete", there is appear messege as a webpage refer to delete teacher from list of teachers, as shown in fig. 44.

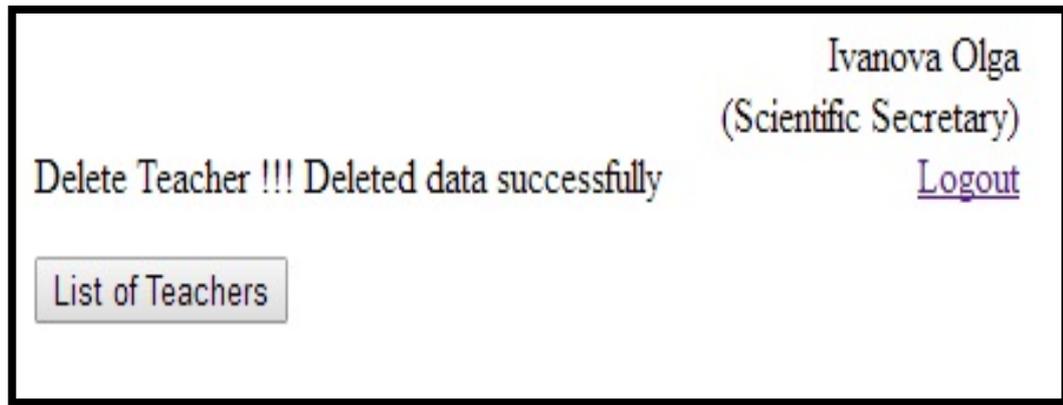


Fig. 44. The page for message of Delete Teacher

List of Subjects, this webpage consist whole informations about all subjects that study it by student in one academic year (ID, name of subject, hours number, description to subject, teacher of subject, action), Scientific Secretary can make (add, modify, delete and print report for subjects, as shown in fig. 45).

ID	Name of Subject	Hours No.	Description	Teacher of Subject	Action
1	Database system imp	76	Development of database management syste	Leonid Sokolinsky	Modify Delete
2	Distributed Object T	174	Distributed Computing	Radchenko Gleb Q	Modify Delete
3	Object-oriented CASE	88	UML	Ivanova Olga	Modify Delete
4	Markup Languages 3	95	Webpage Design	Ivanova Elena	Modify Delete
5	ANSYS1	72	Engineering computer modeling	Dolganin Natalia	Modify Delete
6	Fundamentals of Mult	100	Report on modern multimedia technologies	Mezhenin M.G.a	Modify Delete
4	Database system imp	76	Development of database management syste	Ivanova Elena	Modify Delete

Fig. 45. The page for List of Subjects

"Add Subject",it is page to add a new subject, include (subject name, hours no., subject description, teacher of subject), As for the "ID" for subject the DBMS generat id number automaticly for each subject add to system, as in fig. 46.

Ivanova Olga
(Scientific Secretary)
[Logout](#)

Add of Subject

Subject Name

Hours No.

Subject's Description

Teacher of Subject

Fig. 46. The page for Add Subjects

"Modify", it is a page to modify existing subject, it consists of the same fields which were entered in the subject file, as shown in fig. 47.

Ivanova Olga
(Scientific Secretary)
[Logout](#)

Modify Subject

Name of Subject

Hours No.

Description

Fig. 47. The page for Modify Subjects

In case of "Delete", there is a message as a webpage referring to delete the subject from the subjects list, as shown in fig. 48.

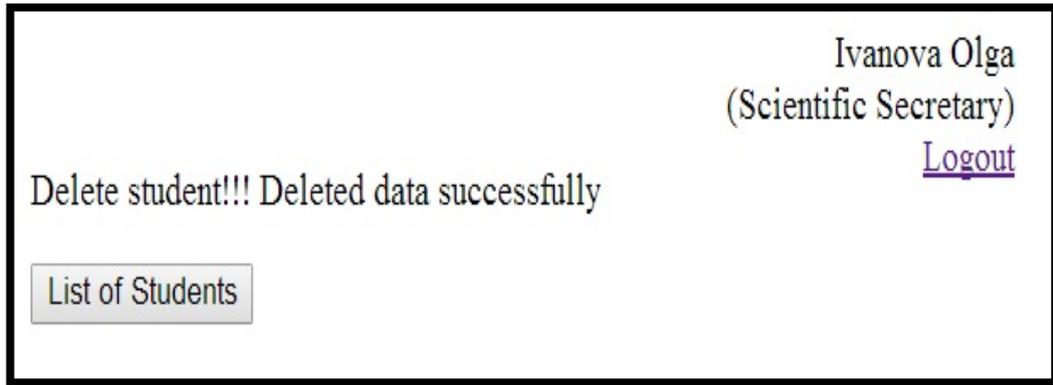


Fig. 48. The page for Delete Subjects

To this point, end of sector of Scientific Secretary work by it interface.

Teacher interface, in this "sector" as we showed up in fig. 29., the teacher can see all groups that he teach it with several details (Name of Group, Stage, Subject, Hours, List of Students), some time one teacher teach same group more than one subject for that the interface consist "subject".

" List of Students", it is hyperlink to webpage include list of students within this group, has ability for teacher to put marks to students dependent on type of mark (Attendance, Quiz, Practical Works, State Exam), as shown in fig. 48.

No.	Name of Student	Marks										Type of Mark
		Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	
93	Dania A. Al-Shammari	153	66	88	66	95	0	0	0	165	0	Attendance

Fig. 49. The page for List of Students for Teacher

All data that put in this page by teacher can view by Scientific Secretary as showed up in fig. 48., also the student can view his own report by using his account in this system by student interface as showed up in fig. 40.

3.3. Compatibility testing

Our system Compatible to usage with several types of browser: Google Chrome (32-bit or newer), Internet Explorer, Mozilla Fireworks (from version 4) and CoolNovo.

3.4. Security testing

In case, there is unauthorize user tried to login to system or any user enter wrong username and password, will show a messege as fig. 50.

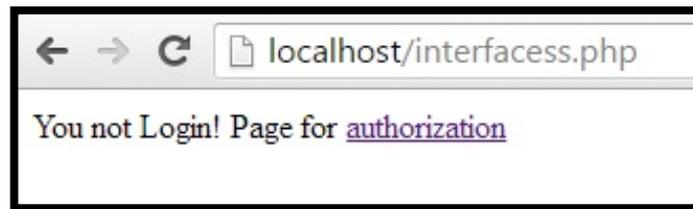


Fig. 50. Unauthorize messege to enter to system

CONCLUSION

The improving operation in the academic level in educational institutions and universities require follow up the case of students and the level of scientific them, that the use of modern techniques for Informatics and Communications (ITC) assists in the automation and organization of work in those institutions and universities reduce the effort and the time for all employees (academic staff and students).

And the use of websites applications and database management systems technologies has become a prime target in the systems of administrative Academy.

Therefore, it is a very important task to develop a special site for development of a computer-aided document management system for educational process based on modern information technologies.

During the period developing of the web site, we solved the following tasks;

- 1) the comparative analysis of the existing sites the website for support and hosting websites application at in the sectors of e-learning and education;
- 2) the modern tools of web sites developing are learned;
- 3) the web site for document management system for educational process at the technical college of Baghdad city is realized and tested.

The perspectives for the developed site are the following:

- 1) ability to register all students, teachers and staff who work in system;
- 2) ability working a system with students not only on one department, but also to other departments of a same faculty. At those points, we can place subject, marks for the definite groups;
- 3) ability to make all procedures add, delete and modify for all information's about users in this system.
- 4) ability to print report for details about status of student, groups and teachers.

The perspectives for the developed application, always we can think of some functions, which we can implement in future for example:

1) the system must show the special message to Scientific secretary if there were threat to enter to system to change the information;

2) the system must have ability for registration by students;

3) the system must send SMS or email notification for student when upgrade his report;

4) the system must provide some statistics for example:

a) to form a report for the numbers of students and academic staff

b) to form a report for the attendance rate of student to lectures monthly;

c) to form a report for the success rates and failure rates.

LITERATURE

1. Cantor M. Object-Oriented Project Management with UML. – USA: John Wiley & Sons, Inc, 1998. – 388 p.
2. Jacobson I. Use Case – Yesterday, Today and Tomorrow // Software & Systems Modeling, 2004. – Vol. 3. – Issue 3. – P. 210-226.
3. Doyle M. Beginning PHP 5.3. –USA: Wiley Publishing, 2010. – 803 p.
4. Gilmore W.J. Beginning PHP and MySQL: From Novice to Professional, 4th ed. – USA: Apress, 2010. – 787 p.
5. Halvorsen H.P. Introduction to Database Systems. – Norway: Telemark University College, 2014. – 40 p.
6. Charles B. Expert MySQL. – USA: Apress, 2013. – 640 p.
7. Sikha Bagui and Richard Earp., Database Design Using Entity-Relationship Diagrams. – USA: Auerbach Publications, 2003. – 321 p.
8. Mauthe A., Thomas P. Professional Content Management Systems: Handling Digital Media Assets. – UK: John Wiley & Sons Ltd, 2004. – 330 p.
9. Molina H.G., Ullman J.D., Widom J. database systems. The Complete Book. 2nd ed. – USA: Pearson Education Inc., 2009. – 1241 p.
10. Bittner K., Use Cases: Just the FAQs (and Answers), Rational Software 2003. – USA: Rational Software, 2003. - 6 p.
11. Website of Modular Object-Oriented Dynamic Learning Environment "moodle" for e-learning websites application. [Electronic resource] URL: <https://moodle.org/> (the date of access: 08.05.2015).
12. Website of E-learning Industry. [Electronic resource] URL: <http://elearningindustry.com/top-open-source-learning-management-systems/> (the date of access: 09.05.2015).
13. Website of .LRN (pronounced "dot learn"). [Electronic resource] URL: <http://www.dotlrn.org/home/> (the date of access: 10.05.2015).

14. Website of Tutsplus. [Electronic resource] URL:
<http://code.tutsplus.com/tutorials/9-useful-php-functions-and-features-you-need-to-know--net-11304> (the date of access: 10.05.2015).
15. Website of MySQL. [Electronic resource] URL:
<https://www.mysql.com/why-mysql/topreasons.html> (the date of access: 10.05.2015).
16. Official site of MySQL Server. [Electronic Resource] URL:
<http://dev.mysql.com/doc/refman/4.1/en/what-is-mysql.html> (the date of access: 15.05.2015).
17. MySQL 5.7 Reference Manual. [Electronic Resource] URL:
<http://downloads.mysql.com/docs/refman-5.7-en.pdf> (the date of access: 15.05.2015).
18. PHP Manual. [Electronic Resource] URL:
http://www.dcc.fc.up.pt/~pbrandao/aulas/0203/bdm/docs/php_manual_en.pdf
(the date of access: 15.05.2015).
19. Mastering phpMyAdmin 3.4 for Effective MySQL Management [Electronic Resource] URL:
<http://webwalkway.com/manuals/Mastering%20phpMyAdmin%203.4%20for%20Effective%20MySQL%20Management.pdf> (the date of access: 15.05.2015).
20. The Ergonomics of Computer Interfaces. [Electronic Resource] URL
<http://oai.cwi.nl/oai/asset/5346/05346D.pdf> (the date of access: 05.01.2015).
21. Website of w3schools .URL: <http://www.w3schools.com/php/> (the date of access: 05.01.2016).
22. Website of PHP. [Electronic resource] URL: <http://php.net/> (the date of access: 10.02.2016).
23. Website of FormGet. [Electronic resource] URL:
<http://www.formget.com/> (the date of access: 03.03.2016).
24. Website of PHPRO. [Electronic resource] URL:
<http://www.phpro.org/> (the date of access: 03.03.2016).

25. Website of WDG (Web Design Group). [Electronic resource] URL:
<http://forums.htmlhelp.com/> (the date of access: 03.03.2016).

26. Website of Tutorials point. [Electronic resource] URL:
http://www.tutorialspoint.com/software_testing_dictionary/web_application_testing.htm (the date of access: 06.04.2016).

APPENDICES

Appendix 1

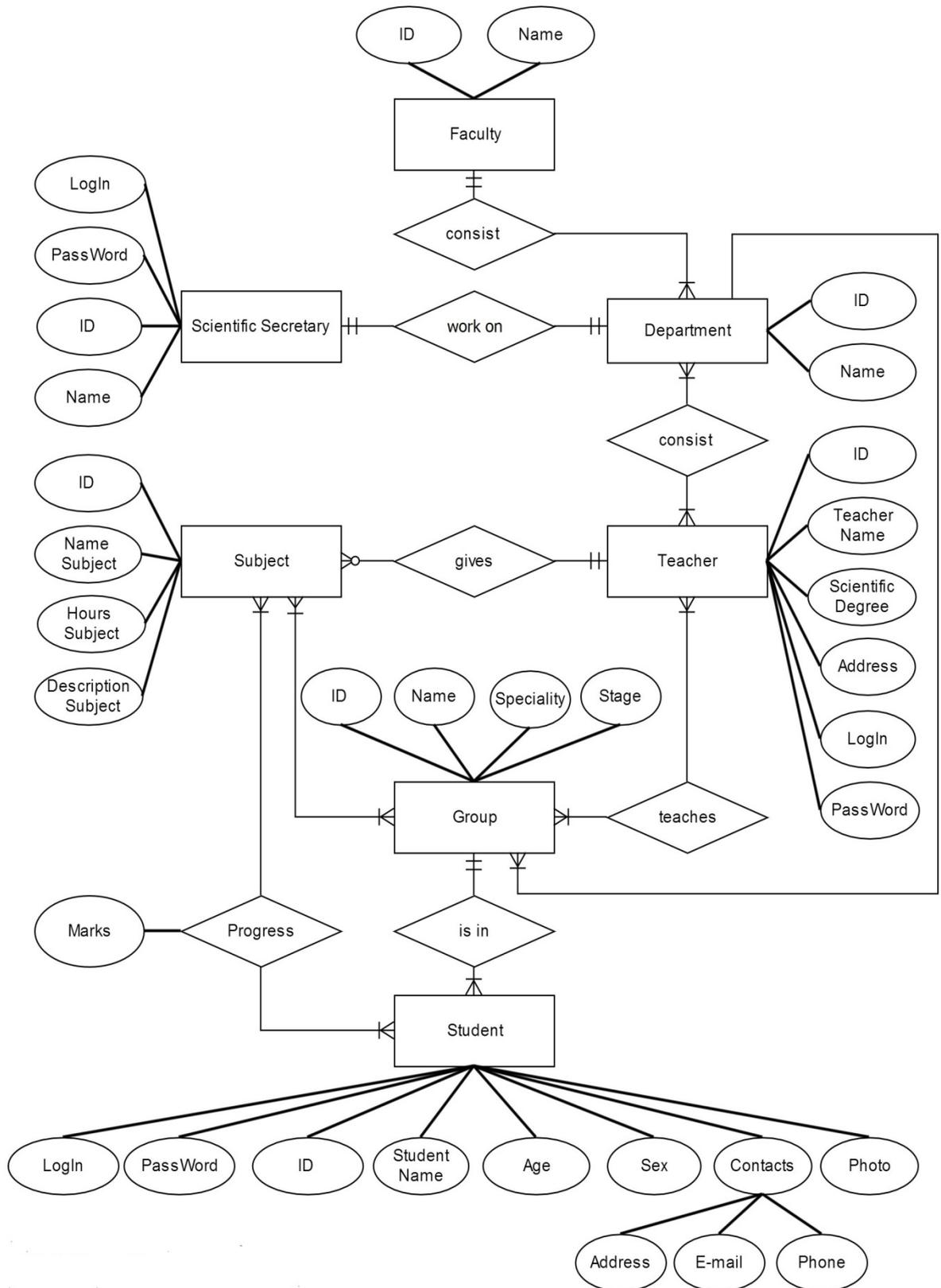


Fig. 13. ER-diagram

Appendix 2

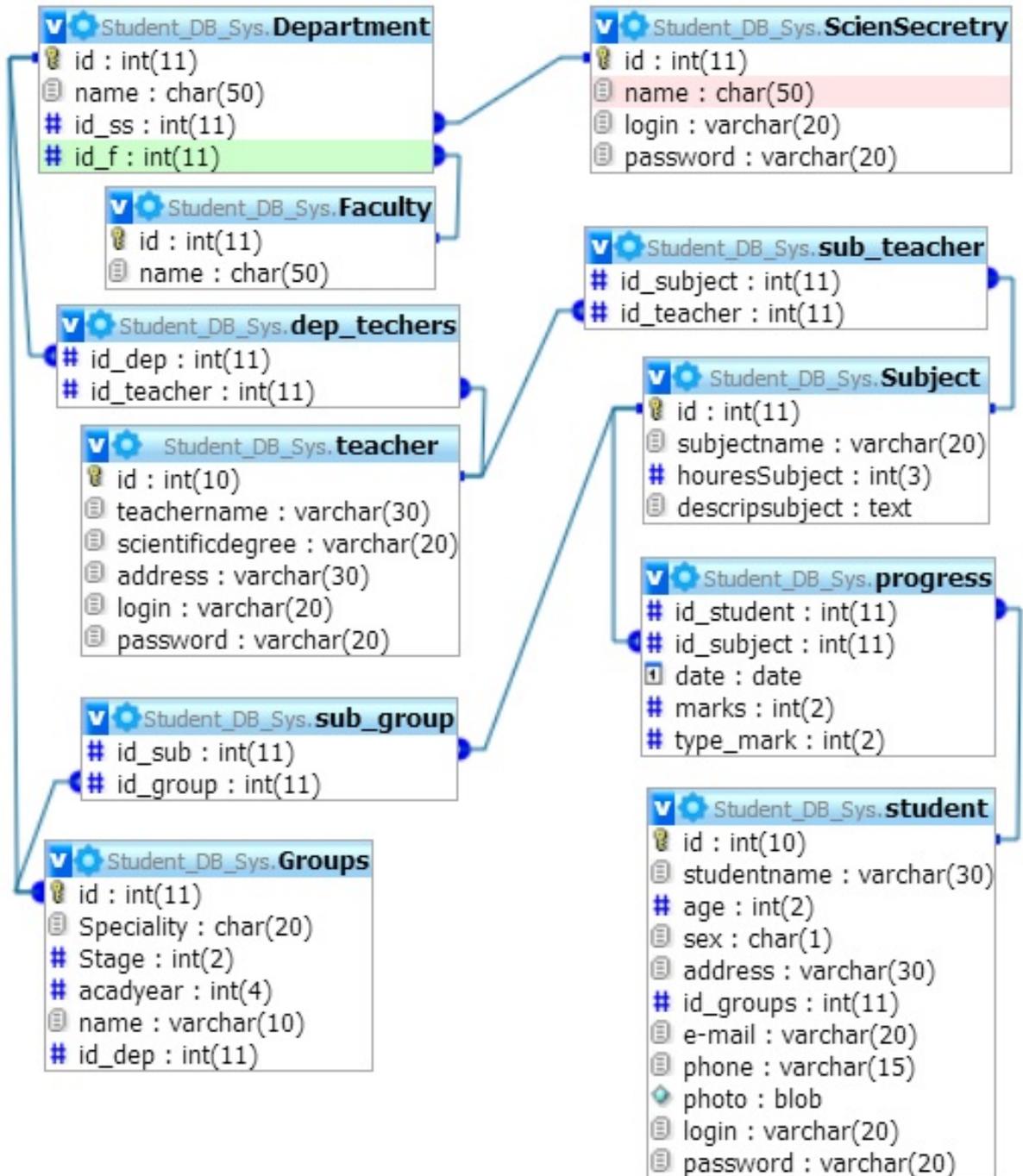


Fig. 14. Database schema