

Python summer training - Project 2022-2021



Examination Management System

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Abstract

Today information technology is used in many aspects in our life. We can benefit from using it in education process. The most critical part in education is the evaluation process. Traditional methods in evaluation have many disadvantages and time consuming. Computerized examination system will help to solve many aspects of traditional evaluation way which depend on paper and make a chance for human mistakes. Examination management system will provide a good computerized environment for both examiners and students to keep all their rights with doing all their responsibilities. In this system the correction of the exam will be done after the student finish the exam without any delay which saves time and effort.



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1- Introduction

In education, the concept of E-Learning (Electronic Learning) has grown rapidly. Organizations around the world are trying to move from a paper-based environment to a paperless environment. Traditional examination systems pen and paper are used which require more effort on the part of students and instructors. Computerized examination system are considered an important source for university and institutes exams. There are many benefits for adopting computerized examination management system. Examination management system saves time especially in case of huge number of students and provide a digital accurate evaluation free of human mistakes. The purpose of examination management systems is to take exams in an efficient manner and save time consuming in checking, marking, return back the paper. It facilitates to access the examination information to students. It also provides all necessary information that the examiner need about the students and their degrees. Examination management system provide a good computerized environment to keep many questions in a good format to use them in exams. Examination management system provide a timely exams with many restrictions to discipline the examination manner. It's a good computerized environment that help students in exams to enter their questions accurately and provide more than one way to check their answers then it show them the correct answer and their descriptive degrees to be informed with all their work.



2- Project overview

- * Project name: Examination management system
- * Current problem: Traditional assessment of students based upon papers can cause many problems to them and it's also time consuming in correcting phase and let human mistakes done by examiners. It also doesn't provide a good environment to students and let cheats done which damage the educational process. So a computerized examination system is a good solution to overcome many problems and evaluate students in a good way with warranty of getting all their deserved marks.

2.1- Project description

Computerized examination system depends on three types of users to make its functionality in a good way. Examination management system provide an automatic way to evaluate students to make the evaluation process free of human mistakes. It's also provide a good environment to examiners to easily manage their exams and maintains confidentiality of exams. It also provide a good computerized environment to students to enter the exams in a valid date and time and answer questions smoothly then review their questions and finally see the correction of exam questions to know their mistakes. This system can be installed in examination centers, colleges, schools and courses centers.

Now each module in the examination management system will be explained in more details.



- Login module:

This module will be at the beginning of the system. It will ask users to enter their email and password. Firstly it will check the email it's valid or not then the system will use the user email to identify his role if the user is an existing member the system will be available to user for using it upon its role but if it isn't an existing member the system will show an error message to ask the user to enter a valid email and password. To identify users and use of the system the login module do this based on the database which has all data needed from a previous time.

- Admin module:

Admin will use his id to use the system with help of his national number. At admin module there will be four frames to ease its use and make its functionality in a good ways. First frame will show the admin personal information like his name, gender, address and phone number. The second frame will help the admin in managing departments data so he has the ability to insert, update, delete and show all data in this field. The third frame will be used in managing examiners information to make them use the system smoothly. Admin can choose to show examiners from a particular department only also all examiners displayed are sorted upon their names. The last frame in admin module will help them to easily manage students information and has many capabilities to make them use the system easily.

- Examiner module:

Examiners will use their id and their national number to use the system. This module also contains four frames to ease the use of the system and make it clear. Like admin module the first frame will display the personal information of the examiner. The second one



helps examiners to manage exams information like name, beginning date, beginning time, finish date, finish time and the total degree of the exam. Many tools and techniques used in this frame to decrease number of mistakes done by human like entering an invalid dates and times so a calendar and a digital clock widgets and algorithms used here to handle this area to be free of mistakes. The third frame used to manage questions of exams easily the examiner select an exam from his exams then its questions will be displayed in a table then he can manage all exam questions. This system can dealing with multiple choice and true, false questions only. The system also can inform the examiner about sum of degrees of put questions. The last frame in this module easily show examiner exams and the students from his department to put exams to them and see their degrees and statuses is the exam is done or not. Another advantage added to this system examiners can download students degrees on their computer in form of excel sheet in the selected folder to use it easily in any other needed tasks.

Student module:

Students will use their id and national numbers to use the system. This module contains two frames. Like previous modules the first frame will show student personal information. The second frame will show student exams with their information like dates, times, degrees and status of each exam. The status will show if the exam is done or not. The student can choose an exam from this field only valid exams will be opened to him and move the student to exam modules. After doing the exam the student will be returned in this page and see his degree and he cannot open the same exam again.



Exam modules:

The first exam module will be opened to the students who choosing a valid exam upon examiner rules. It will show exam questions randomly so questions order will be different from student to another to prevent cheating. This module will provide next and back on questions to ease the examination mechanism. After doing the exam in the first module the second module will be opened. This module show all questions with student answers to provide another way of reviewing an exam if there is any problem with any question easily the student can choose it and a third module will be opened to edit the answer. After this process the second module will be opened again for doing its task. After reviewing all questions student can submit the exam. After submitting the exam the fourth module will be opened and it will show student total degree and the correct answer of each question compared to the student answer. After checking all degrees and answers students can easily return back to the student module.



2.2- Project scope

Project includes

Project documentation.

Login module which specify the using of the system according to the user and his responsibilities.

Admin module which used by the system admin for entering some necessary data for easing the use of the system.

Examiner module which provide a good computerized environment for dealing with exams and students data.

Student module which represent the main page of the student.

Exam modules which used by the student in doing exams it provide a good environment to them to reach the maximum benefit.

2.3- Assumptions

Assumptions

There should be a good network infrastructure to run the system smoothly without problems so devices like switches should be used and connect them to other end devices using cables.

There must be a good servers for running the system and storing data efficiently.

The system should have storage devices for backup and data recovery like DAS (Directed attached storage) and NAS (Network attached storage).

The system and its database can be integrated with some office programs and make additional tasks with it.

2.4- Constraints

Constraints

This system is real time transaction so it requires access to online database.

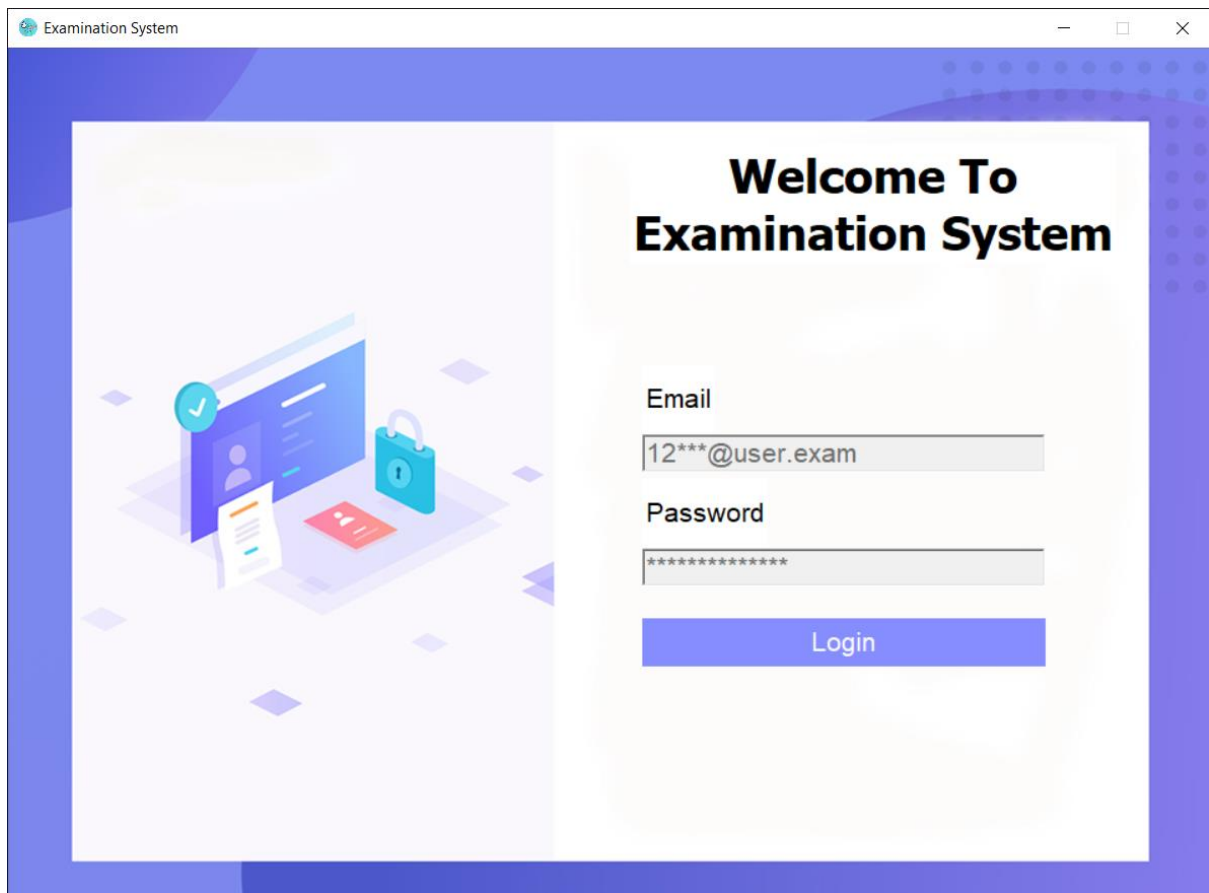
Failure rate must be low and if failure occurs recovery must be quick and accurate.

Turnaround time from transaction input to the production output must be a few seconds or less.

Every transaction must be processed in the same way regardless of user or time.

3- Project modules

3.1- Login module



The screenshot shows a web application window titled "Examination System". The interface has a blue header and a white main content area. On the left, there is a 3D illustration of a laptop, a document, and a padlock. On the right, the text "Welcome To Examination System" is displayed in bold. Below this, there are two input fields: "Email" with the value "12***@user.exam" and "Password" with masked characters "*****". A blue "Login" button is positioned below the password field.

The first module facing the user and it requests his email and password. Email extension will be different here upon the user.

Id number + "@student.exam" if the user is student.

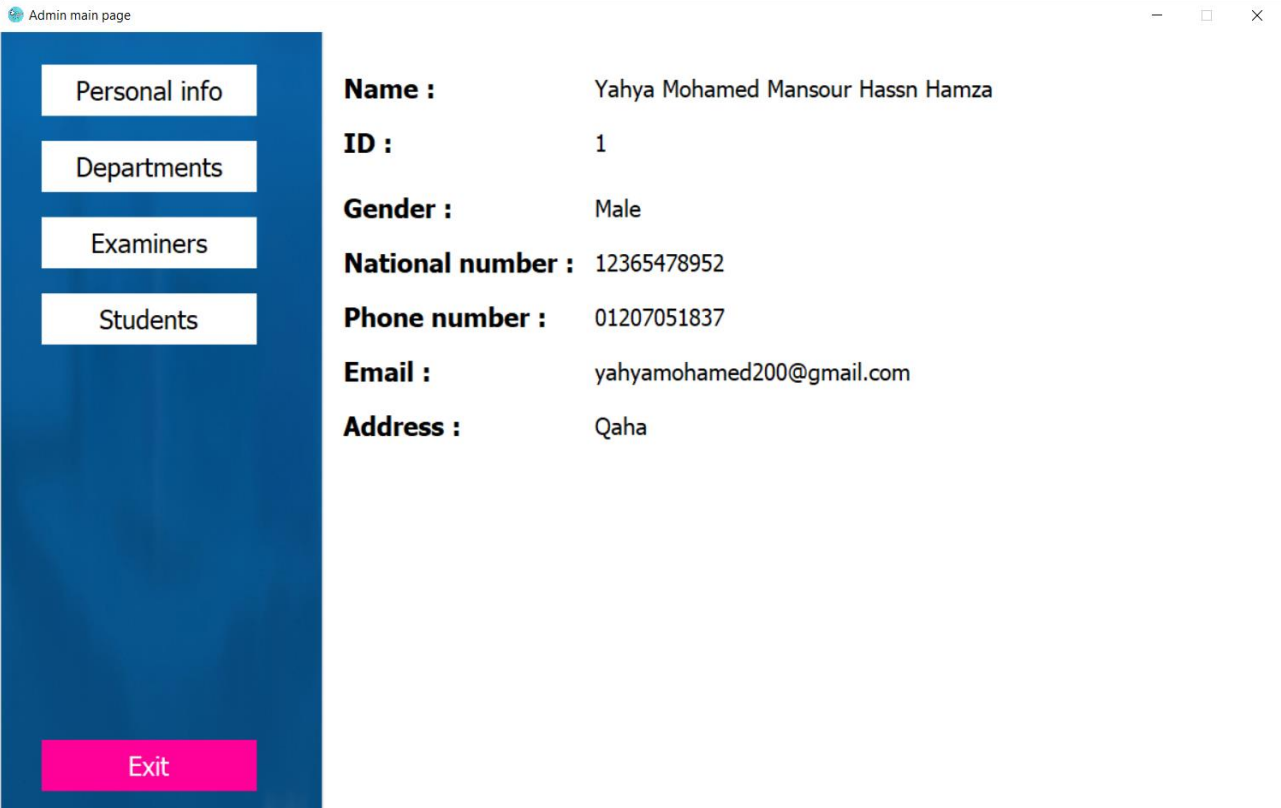
Id number + "@examiner.exam" if the user is examiner.

Id number + "@admin.exam" if the user is admin.

The password here will be the national number of the user.

3.2- Admin module

1) Personal information frame



The screenshot shows a web application window titled "Admin main page". On the left is a dark blue sidebar with four white buttons: "Personal info", "Departments", "Examiners", and "Students". At the bottom of the sidebar is a pink "Exit" button. The main content area displays the personal information of an admin user in a list format:

Name :	Yahya Mohamed Mansour Hassn Hamza
ID :	1
Gender :	Male
National number :	12365478952
Phone number :	01207051837
Email :	yahyamohamed200@gmail.com
Address :	Qaha

This part of the admin module displays all admin personal information upon the admin id. For moving to any other frame admin only should choose the frame name from the buttons listed on the left on the window.

2) Departments frame

Department ID	Department name
1	BFCAI 3rd year 2nd semester
4	Benha faculty of law 1st year 2nd semester
5	Faculty of arts 4th year 2nd semester
7	BFCAI IS 3rd year 2nd semester DSS

Department ID : 4

Department name : Benha faculty of law 1st year 2nd semester

Exit **Insert** **Update** **Delete**

At this frame the admin can manage all departments' data to use them in another frames in examiners and students data. Managing data here means that he can insert, update, delete and show them.

3) Examiners frame

ID	Name	National num	Gender
2	Abdallah Alghamry	29809218800855	Male
1	Ahmed Shalaby	28710559310045	Male
3	Yahya Mohamed Mansour Hassan H	65478912354777	Male
4	Yousef Ali	45789412532	Male

Examiner id : 3
Examiner name : Yahya Mohamed Mansour Hassan Hamza
Department : Benha faculty of law 1st year 2nd semester
Email : yahyamohamed2000@gmail.com
Phone num : 1207051837
National num : 65478912354777
Gender : ☒ Male ☐ Female

At this frame all examiners data are managed by the admin (insert, update and delete). Departments are assigned here to examiners. All records shown here are ordered upon the examiners departments and their names. If the admin chooses any department from the combo box only members from this department will be shown in the table ordered upon their names to ease the use of the system when dealing with much data.

4) Students frame

ID	Name	National num	Gender
1	yousef elbaroudy	3020310880085	Male
3	Ali osama abdein	32145789541	Male
2	Huda Moharm	1214584522	Female
4	Ahmed	45875155	Male

Student id : 3
Student name :
Department :
Email :
Phone num :
National num :
Gender : ☒ Male ☐ Female

At this frame all students data are managed by the admin (insert, update and delete). Departments are assigned here to students. All records shown here are ordered upon the students departments and their names. If the admin chooses any department from the combo box only members from this department will be shown in the table ordered upon their names only to ease the use of the system when dealing with much data.

3.3- Examiner module

1) Personal information frame



The screenshot shows a web application window titled "Examiner main page". On the left is a dark blue sidebar with four white buttons: "Personal info", "Exams", "Questions", and "Students exams". At the bottom of the sidebar is a pink "Exit" button. The main content area displays the following information:

Name :	Abdallah Alghamry
ID :	2
Gender :	Male
National number :	29809218800855
Phone number :	01004048215
Email :	abdallah_alghamry@fci.bu.edu.eg
Department :	BFCAI 3rd year 2nd semester

This part of the examiner module displays all examiner personal information upon the examiner id. For moving to any other frame examiner only should choose the frame name from the buttons listed on the left on the window.

2) Exams frame

Examiner main page

Personal info

Exams

Questions

Students exams

Exit

Exam id	Exam name	Beginning date	Beginning time
2	Computer Architecture Quiz	08/12/22	04:00
3	System analysis and design quiz	08/11/22	23:59

Exam id : 2

Exam name : Computer Architecture Quiz

Calendar to set dates: **Beginning time :** **End time :** **Total degree :**

July 2002

Mon	Tue	Wed	Thu	Fri	Sat	Sun
27	1	2	3	4	5	6
28	8	9	10	11	12	13
29	15	16	17	18	19	20
30	22	23	24	25	26	27
31	29	30	31	1	2	3
32	5	6	7	8	9	10

4 : 0 23 : 0 10.0

Set beginning date 08/12/22

Set end date 08/13/22

Insert Update Delete

At this frame the examiner can manage exams information. To enter the dates of the exam examiner should use the calendar to put valid dates then press "Set beginning date" or "Set end date" to set the dates of the exam. With the help of digital clock examiner can enter exams beginning and end times. Then the total degree of the exam. If there is any problem with entered data the system will ask the examiner to enter a valid data.

3) Questions frame

Examiner main page

Personal info

Exams

Questions

Students exams

Exit

ID	Question	1st answer	2nd answer
1	What is the type of the "ADD" instruc	R-Type	I-Type
2	How many flip-flop is there in 4-bit r	1	2
3	if the shift amount = 4 to the left, wh	8	16
4	the following opcode "000010" stanc	BEQ	ADD
5	MIPS consider as CISC instruction se	True	False
6	The output depends on the current s	Moore Style	Mealy Stly
7	The decimal number 2022 is express	0111111000000000	0010000000100010
8	To expand a 2-bit parallel adder to a	Use two 2-bit adders and connect th	Use two 2-bit adders with no interco
9	How many wordlines are there in 4-t	4	12
10	Which is a good conductor for GND	P-mos	N-mos

Question id : 2 Degree : 1.0

How many flip-flop is there in 4-bit register ? question*

1 2 3 4

☐ 1st ☐ 2nd ☐ 3rd ☒ 4th

The answer is: 4

The Exam : Computer Architecture Quiz

Get sum of question degrees

Insert Update Delete

Firstly the table in this frame will be empty. After selecting an exam from the combo box only questions in this exams will be displayed on the table. Now the examiner can put questions to the exam and identify the correct answer of each one and its degree. The examiner can know the sum of degrees of the questions to be informed how many questions left to complete the exam total degree.

4) Students exams frame

Examiner main page

Exam id	Exam name	Student id	Student name
3	System analysis and design quiz	1	yousef elbaroudy

Students

Student id	Student name
1	yousef elbaroudy

Exams

System analysis and design quiz

Get degrees in excel sheet

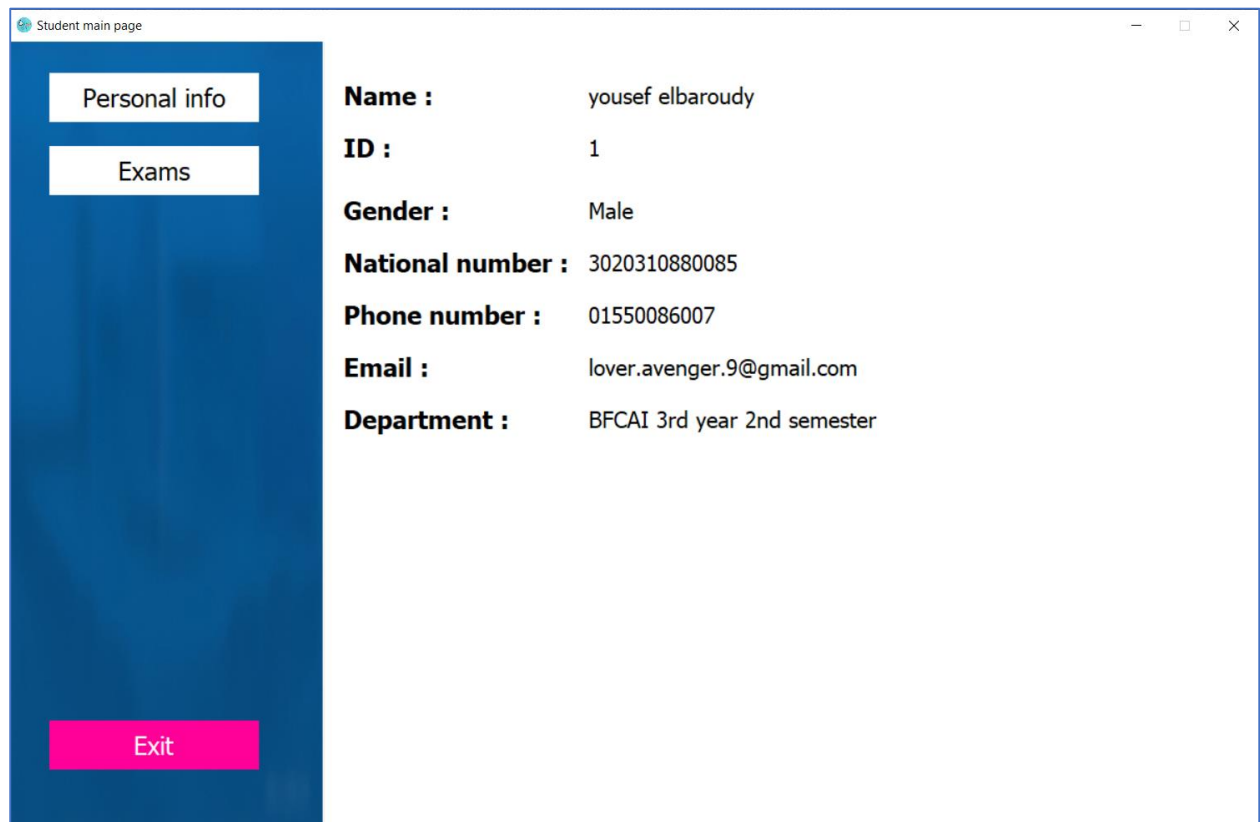
Student id:

Insert Delete

Firstly the table which identify students' degrees in this frame will be empty. After selecting an exam from the combo box the degrees of the students with their names will be displayed on the table ordered upon their names if there is any student doesn't do the exam his name will be displayed at the end of the table. If the examiner wants the degrees of particular exam they can download it in excel sheet form after choosing a particular folder.

3.4- Student module

1) Personal information frame

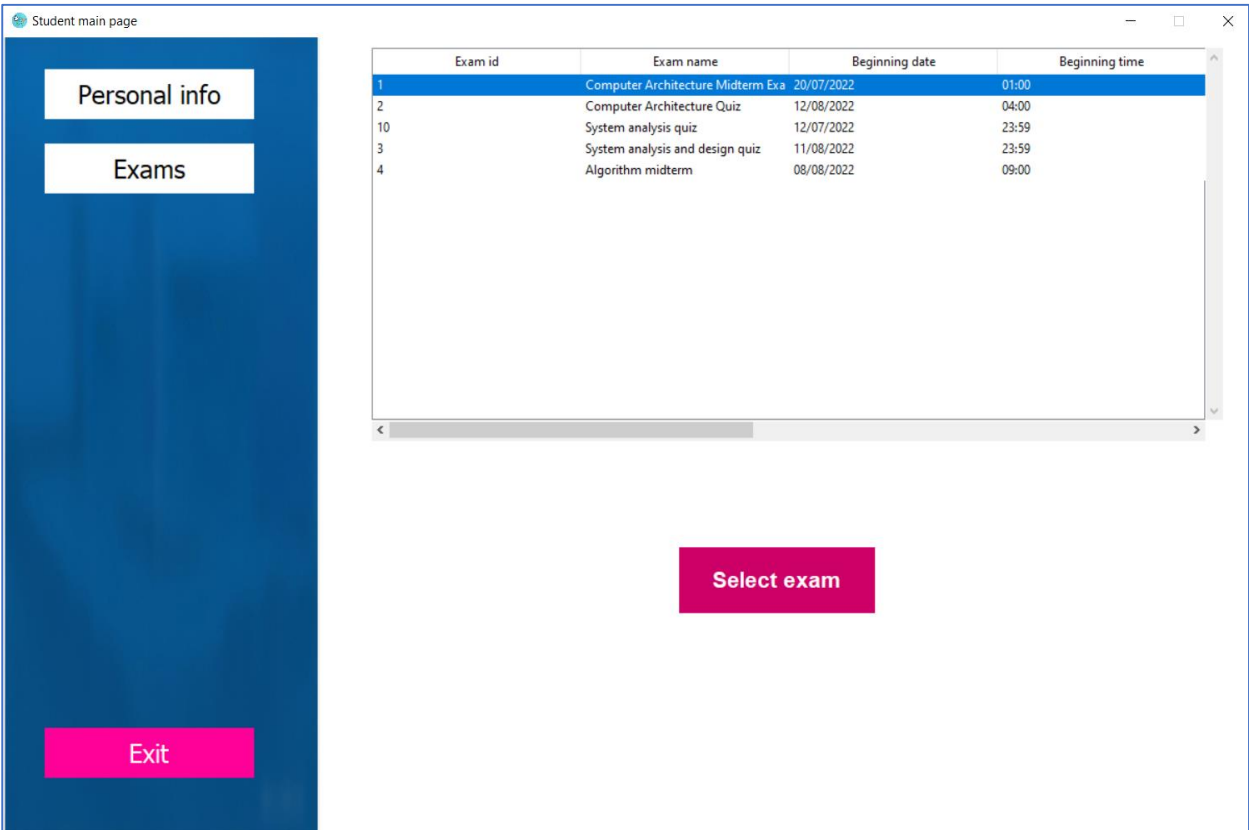


The screenshot shows a web application window titled "Student main page". On the left is a dark blue sidebar with two white buttons: "Personal info" (selected) and "Exams". At the bottom of the sidebar is a pink "Exit" button. The main content area displays the following student information:

Name :	yousef elbaroudy
ID :	1
Gender :	Male
National number :	3020310880085
Phone number :	01550086007
Email :	lover.avenger.9@gmail.com
Department :	BFCAl 3rd year 2nd semester

This part of the student module displays all student personal information upon the student id. For moving to any other frame student only should choose the frame name from the buttons listed on the left on the window.

2) Exams frame



The screenshot shows the 'Student main page' interface. On the left is a dark blue sidebar with two white buttons: 'Personal info' and 'Exams'. At the bottom of the sidebar is a pink 'Exit' button. The main area displays a table of exams with the following data:

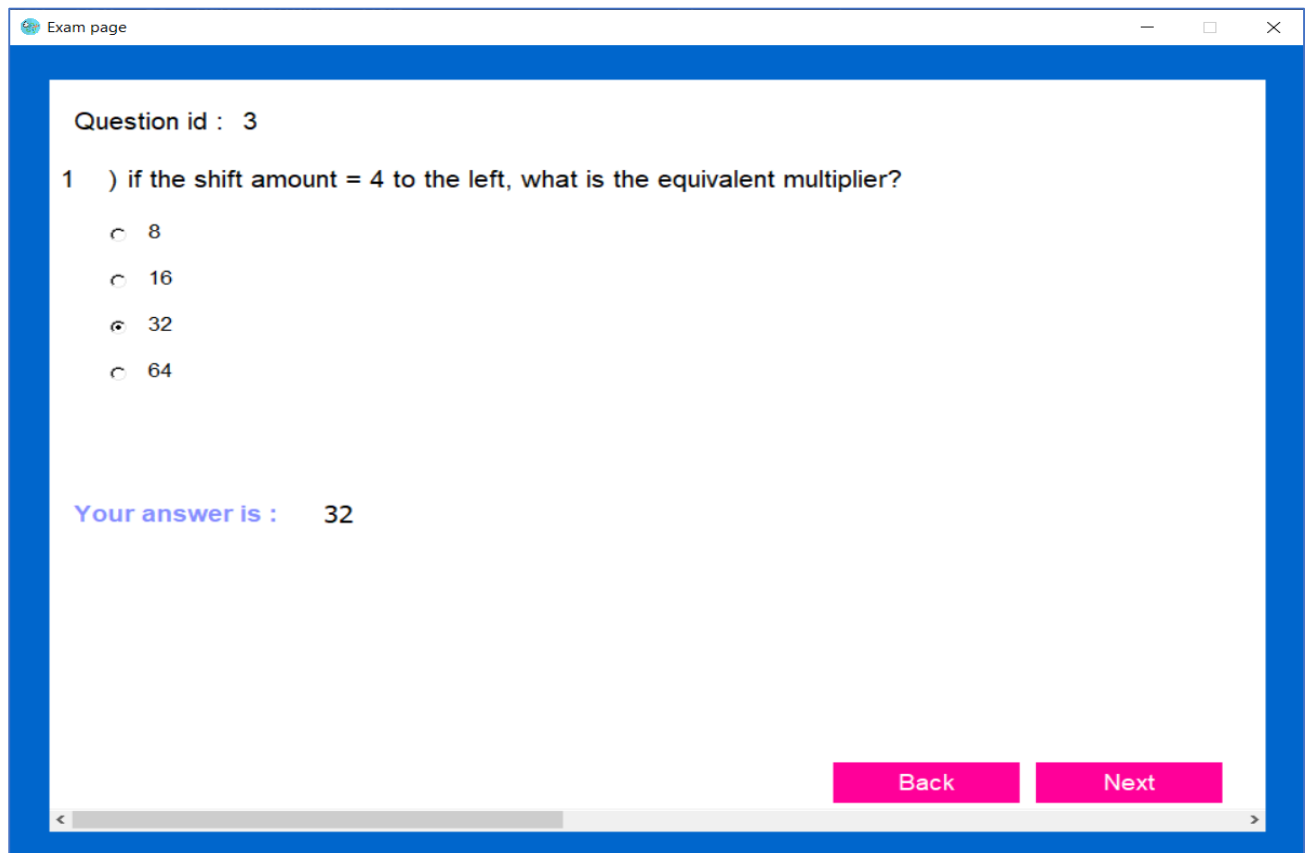
Exam id	Exam name	Beginning date	Beginning time
1	Computer Architecture Midterm Exa	20/07/2022	01:00
2	Computer Architecture Quiz	12/08/2022	04:00
10	System analysis quiz	12/07/2022	23:59
3	System analysis and design quiz	11/08/2022	23:59
4	Algorithm midterm	08/08/2022	09:00

Below the table is a pink 'Select exam' button.

This part of the module show exams inserted to the student with the status of the exam and student degree if the student done the exam. All exams appeared here are ordered upon their dates. After selecting a valid exam the exam window will be opened to the student.

3.5- Exam modules

1) Exam questions module



The screenshot shows a web browser window titled "Exam page". Inside the window, the question is displayed as follows:

Question id : 3

1) if the shift amount = 4 to the left, what is the equivalent multiplier?

- ☐ 8
- ☐ 16
- ☒ 32
- ☐ 64

Your answer is : 32

At the bottom right of the question area, there are two pink buttons labeled "Back" and "Next". A horizontal scrollbar is visible at the bottom of the content area.

All exam questions are appeared here to be answered by the student. Questions are shown in a randomized way to decrease cheating. Students can go next and back on questions for easing the examination mechanism. After finishing the exam a new module will be opened for reviewing answers and students will have another chance for correcting their answers. If there is any problem and the computer turned off and the student doesn't finish the exam the student will find all his answers after open the exam again in the valid time and he can complete it smoothly.

2) Review questions module

Exam review page

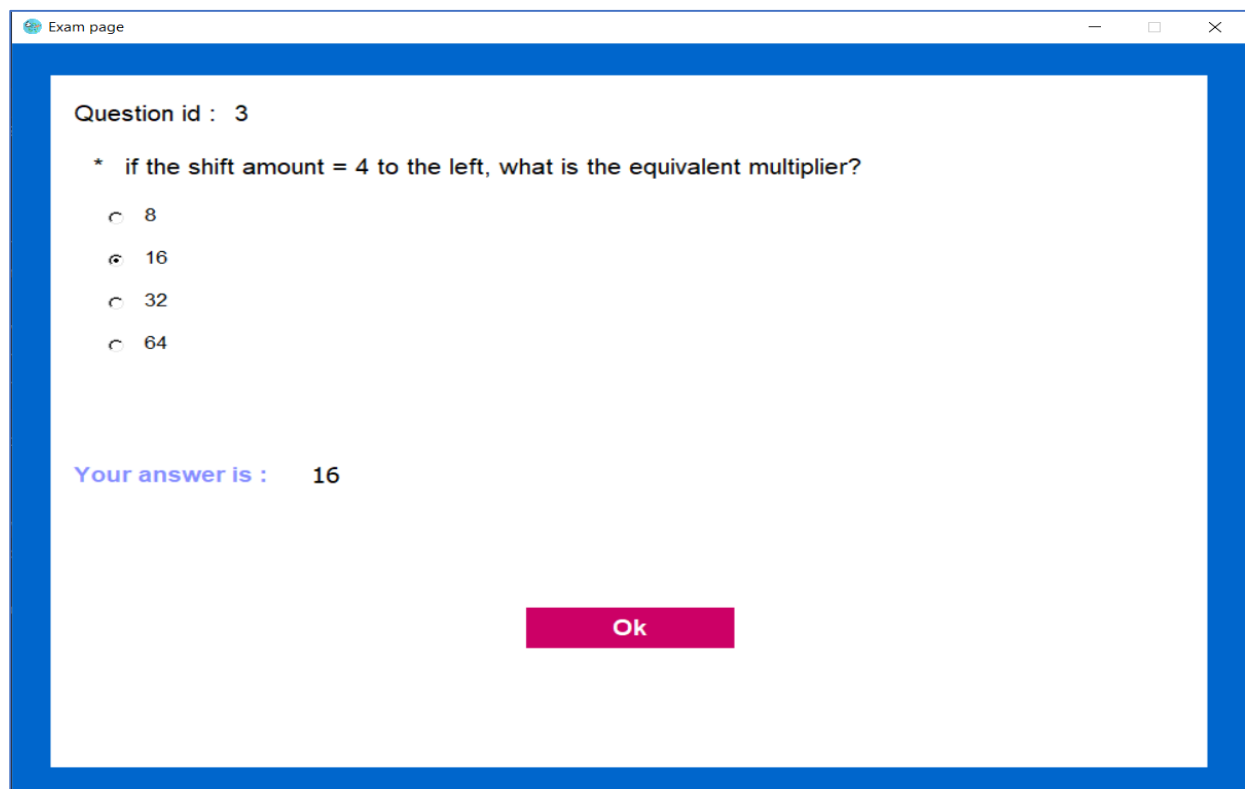
question number	question	1st choice	2nd choice	3rd choice	4th choice	Your answer
1	if the shift amount = 4 to the left, what is the result?	8	16	32	64	32
2	The decimal number 2022 is expressed in binary as:	0111111000000000	0010000000100010	0100000101000110	None of the above	0111111000000000
3	the following opcode "000010" stands for:	BEQ	ADD	JAL	J	J
4	To expand a 2-bit parallel adder to a 4-bit parallel adder, you should:	Use two 2-bit adders and connect their carry outputs to the inputs of the second adder.	Use two 2-bit adders with no interconnection.	Use four 2-bit adders with no interconnection.	Use two 2-bit adders with the carry output of the first adder connected to the input of the second adder.	Use two 2-bit adders with the carry output of the first adder connected to the input of the second adder.
5	MIPS consider as CISC instruction set:	True	False	None	None	False
6	How many wordlines are there in 4-tb memory?	4	12	16	32	16
7	Which is a good conductor for GND?	P-mos	N-mos	None	None	P-mos
8	How many flip-flop is there in 4-bit shift register?	1	2	3	4	4
9	The output depends on the current state and the input:	Moore Style	Mealy Style	A & B	None of them	Mealy Style
10	What is the type of the "ADD" instruction?	R-Type	I-Type	J-Type	None of the above	R-Type

Go to question

Submit

This module will be opened after the exam questions module to open a new chance for students to correct their mistakes. Easily if there is a problem with any question student can choose it and push "Go to question" button and new module will be opened to the student to answer the selected question. Note that all questions appear in this module are in the same randomized order appeared in the exam module.

3) Gone question module



The screenshot shows a web browser window titled "Exam page". Inside the window, the text "Question id : 3" is displayed. Below it, a question is asked: "* if the shift amount = 4 to the left, what is the equivalent multiplier?". There are five radio button options: 8, 16, 32, and 64. The option "16" is selected. Below the options, the text "Your answer is : 16" is shown. At the bottom center of the window, there is a red button labeled "Ok".

This module will be opened to the student from the reviewing module after selecting a question to answer it again if there is a problem. After pushing "Ok" button student will returned back to the reviewing questions module and he can repeat this process with any number of questions.

4) Exam degree module

Exam degrees page						
Question	Correct answer	Your answer	Your mark	Question mark		
What is the type of the "ADD" instruction ?	R-Type	R-Type	1.0			
How many flip-flop is there in 4-bit register ?	4	4	1.0			
if the shift amount = 4 to the left, what is the eq	16	16	1.0			
the following opcode "000010" stands for ?	J	J	1.0			
MIPS consider as CISC instruction set	False	False	1.0			
The output depends on the current state only, w	Moore Style	Mealy Stly	0.0			
The decimal number 2022 is expressed in BCD as: 0010000000100010		0111111100000000	0.0			
To expand a 2-bit parallel adder to a 4-bit parallel Use two 2-bit adders with the carry output of on		Use two 2-bit adders and connect the sum outp	0.0			
How many wordlines are there in 4-bit input RA	16	16	1.0			
Which is a good conductor for GND ?	P-mos	P-mos	1.0			
Total marks of the exam : 10.0						
Your total marks in the exam : 7.0						
OK						

At this part students will be informed with their mark in the exam and each taken degree in each question. Also the correct answers will be shown to them. After clicking "Ok" button the student module will be opened again and the status of the exam will be changed and the student mark.

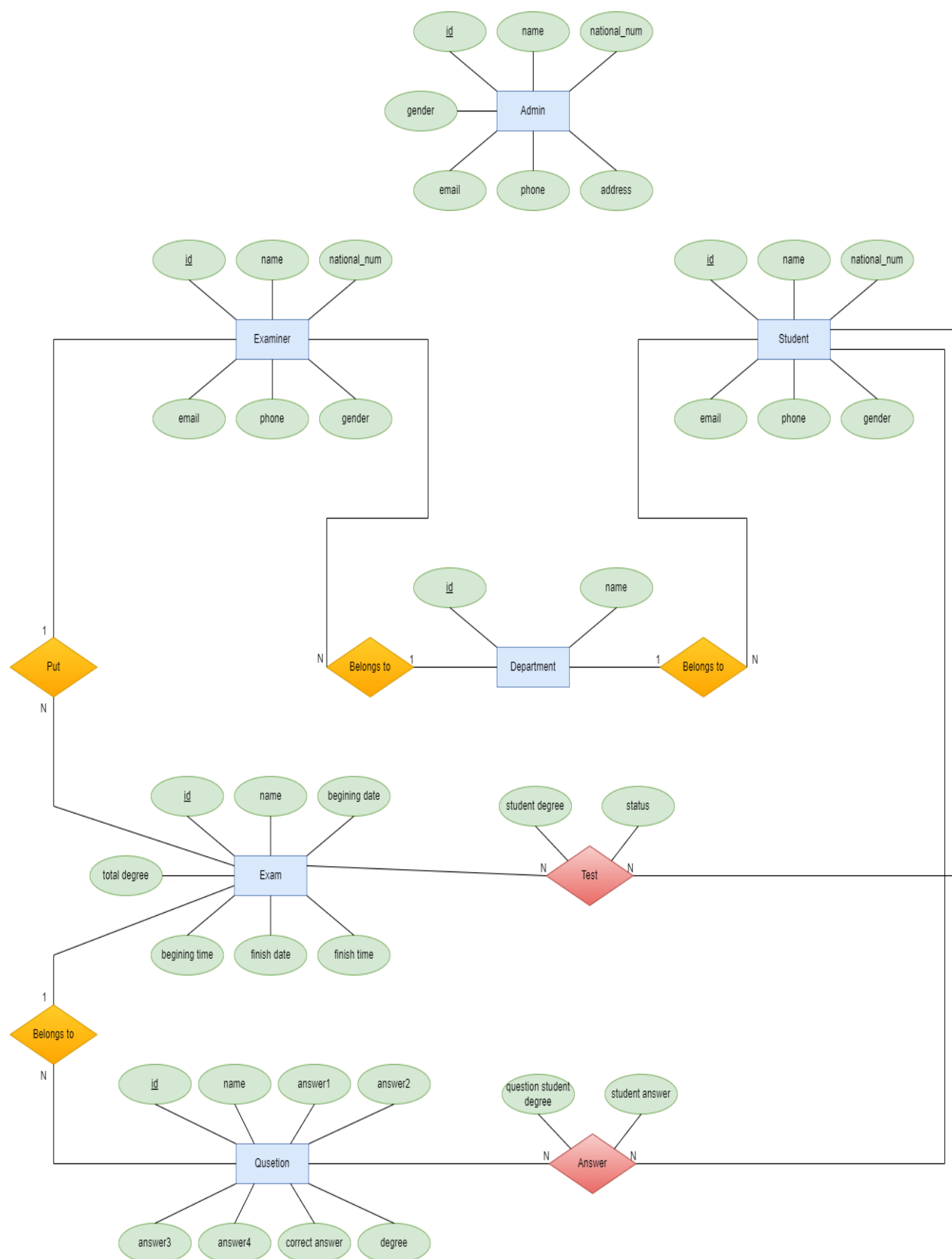
4- Modules we used from python

Module name	The reason of use
tkinter	We used this module for making all the graphical user interfaces in the system.
PIL	This module was used to use images in the system in the backgrounds.
tkcalendar	“tkcalendar” module was used to show the calendar to user for easing entering dates process.
tktimepicker	It was used for showing the digital clock and help user in entering exams times.
datetime	It was used to make some computations on dates and times to keep the performance and usage of the system.
openpyxl	We used this module to deal with excel sheets.
sqlite3	This module was used for dealing with database file.

5- Used tools

Module name	The reason of use
Visual studio code	This the main used software for developing the system and writing the code then test it.
Pycharm	Some team members prefer using this softwarefor developing the system.
Microsoft excel 2013	This software was used and integrated it in the system to promote its functionality.
Draw io	It was used for choosing system colors and helped us in some designs. We used it also in drawing ERD and mapping for the database.
Adobe Photoshop 2020	This software was used for making the system backgrounds.
DB browser for sqlite	It was used for easing development of system database.

6- Entity relationship diagram



7- Mapping

Admin

<u>adm_id</u>	adm_name	adm_num	adm_gen	adm_email	adm_phone	adm_address
---------------	----------	---------	---------	-----------	-----------	-------------

Departments

<u>dep_id</u>	dep_name
---------------	----------

Examiners

<u>examiner_id</u>	examiner_name	examiner_num	examiner_gen	examiner_email	examiner_phone	dep_id
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Students

<u>stu_id</u>	stu_name	stu_num	stu_gen	stu_email	stu_phone	dep_id
---------------	----------	---------	---------	-----------	-----------	--------

Exames

<u>ex_id</u>	ex_name	beg_dat	beg_time	fin_dat	fin_time	total_deg	examiner_id
--------------	---------	---------	----------	---------	----------	-----------	-------------

StudentExames

<u>stu_id</u>	<u>ex_id</u>	status	stu_deg
---------------	--------------	--------	---------

Questions

<u>q_id</u>	q_name	ans1	ans2	ans3	ans4	correct_ans	q_deg	ex_id
-------------	--------	------	------	------	------	-------------	-------	-------

StudentQuestions

<u>stu_id</u>	<u>q_id</u>	ans	deg
---------------	-------------	-----	-----