

بحث / مشروع بحثي
مقدم من

القسم / الشعبة : حاسبات وتحكم ألى

الفرقة / المستوى : الفرقة الثالثة

إسم المقرر : Software Engineering

كود المقرر : CCE3218

أستاذ المقرر: د / امانى سرحان

عنوان البحث / المقال البحثي / المشروع البحثي : School management software

رقم الطالب	اسم الطالب	الرقم القومى	البريد الالكترونى
9606	احمد خالد السيد العربى عبد الحق	29709101600198	ahmed_30863339@f-eng.tanta.edu.eg
9616	احمد مصطفى محمود ابراهيم	29705041600112	ahmed_30863070@f-eng.tanta.edu.eg
9619	اسلام حسين حسين جابر	29404011600711	eslam_30920253@f-eng.tanta.edu.eg
9699	ياسر مجدي حسن سليمه	29603051601918	yaser30817114@f-eng.tanta.edu.eg

نتيجة التقييم	مقبول	غير مقبول	
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SDLC Model

Prototyping Model has been used to develop this application.

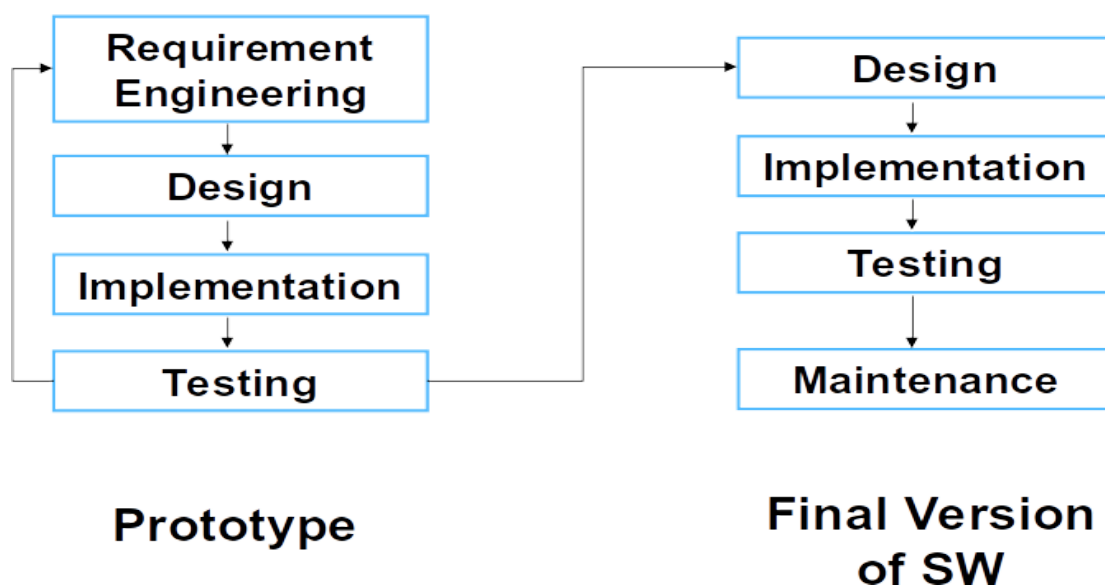
The Prototyping model is a technique for quickly building a function but incomplete model of the information system.

Advantages of prototyping

- Reduces development time.
- Reduces development costs.
- Requires user involvement.
- Developers receive quantifiable user feedback.
- Facilitate system implementation since users know what to expect.

Disadvantages of prototyping

- Developers can become too attached to their prototypes.
- Can cause systems to be left unfinished and/or implemented before they are ready.



Requirements of the project

1. Functional Requirement:

Functional requirements define what is the system or component that it should have. It defines the functions that the software must perform successfully. A function is nothing but inputs, its behavior, and outputs. It can be a calculation function, solving business problems, interacting with users, or any other functionality, which defines what the system will perform.

For our project, the functional requirements are divided into three sections:

Section 1 (Administrator):

1. He must have a login account with the full authentication.
2. He must be able to create login accounts for teachers and students.
3. He must be able to delete a teacher or student login account.
4. He must be able to add courses or delete courses.
5. He must be able to edit course or course content.
6. He must be able to add a course to a teacher.
7. He must be able to remove a teacher from a course.
8. He must be able to add/remove students to/from the course.
9. He must be able to add and manage the Employees of the school.

Section 2 (Teachers):

1. Each Teacher must have a login account to the system.
2. Each teacher must be able to upload his or her lectures.
3. Each teacher must be able to communicate with students.
4. Each teacher must be able to upload assignments with a due date.

5. Each teacher must be able to upload exams.
6. Each teacher must be able to review students' assignments.
7. Each teacher must be able to post students' grades.

Section 3 (Students):

1. They must have a login account that used to access their side of the software.
2. They must be able to view the course at which they enrolled.
3. They must be able to Download Teachers' lectures from the system.
4. They must be able to contact teachers.
5. They must be able to upload assignments.
6. They must be able to download exams and assignments.
7. They will be able to view their grades and print the grades report.

Section 4 (employees):

1. Each employees might have a login account to the system.
2. He might be able to manage student exams.
3. He might be able to upload students' final grades.
4. He might be able to manage students fees.

Functional requirements help to check if the application provides all the required functions or not. It also helps to deliver the client the desired system.

2. Non-Functional Requirement:

Non-functional requirements are the criteria that are used to judge the operation of the system and the quality of the software system. They are not directly related to the functions that the system must perform, alternatively it judges the

performance of the system.

Example: what is the speed of the application?

Non-functional requirement is essential to make sure that the usability, effectiveness and efficiency of the software system.

The types of Non-functional requirements are Reliability, Scalability, Data Integrity, Availability, Recoverability, etc.

In our project the Non-functional requirements are:

1. **Usability:** *The user should get used to the system on the first day of the usage.*
2. **Space:** *The system must rely on low space.*
3. **Security:** *The user login data must be encrypted.*
4. **Availability:** *The system must be available for the user almost all the time.*
5. **Recoverability:** *The system should be able to recover from crashing, also reduce the crash number as could.*
6. **Scalability:** *The system must be easy to update.*

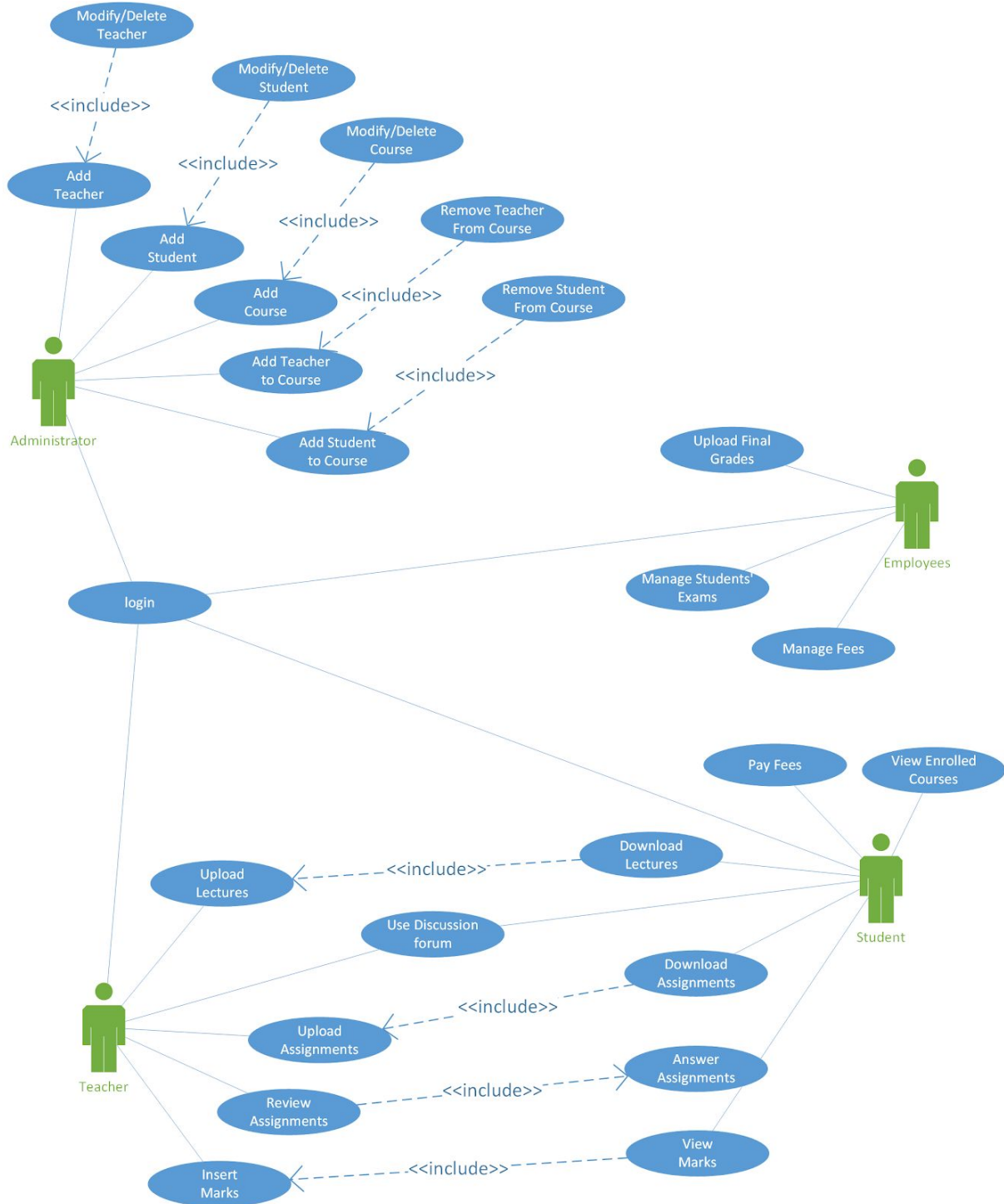
The requirement collection method:

- 1- At First, we depended on **Brainstorming** to ensure that we have a basic knowledge of how school management system should be and what functions should have.
- 2- Second: **Interviewing** with the system administrator to get his view of what the system should be.
- 3- Third: Deliver the customer a **prototype** of the System to verify that it is the right way of the desired system.
- 4- Last: Continue the development cycle and validate the full version then deliver it to the customer.

These methods helped us to reduce:

- 1- Lack of user engagement.
- 2- Unrealistic goals
- 3- Poor communication between customer, developer, and user.
- 4- Incomplete requirements

Use Case Diagram:



Expanded Use case Description:

Use Case: Login

Actors: Administrator, Teacher, Student

Purpose: How Actor can login to system

Overview (success scenario):

Actor request to login so system ask actor to enter username and password, when actor enters the valid credentials, the system allow him to enter and access resources

Type: Primary

Typical Course of Events:

<u>Actor Action</u>	<u>System Response</u>
1- The user requests to login to the system.	2- The system asks for credentials, i.e. Username and password.
3- User insert his user ID and password.	4- System checks for the user ID and password of the publisher whether it is valid
	5- System display message “ Successfully logged in ” and display dashboard

Alternatives:

- **Line 3:** actor insert invalid Name or Password, an error message is displayed.

Use Case: Download Lectures

Actor(s): Student

Purpose: How student can download wanted lecture

Overview (success scenario):

Student requests lecture list and select wanted lecture, then lecture is downloaded

Type: Primary

Typical Course of Events:

<u>Actor Action</u>	<u>System Response</u>
1- Student login to system	2- Dashboard page is opened
3- Student request lectures list	4- lectures page is displayed
5-Student select wanted lecture	
6- Request Download lecture	7- Download Success

Use Case: Insert Marks

Actor(s): Teacher

Purpose: Upload Marks of Students to system

Overview (success scenario):

Teacher click in insert mark button then choose the class and section after logging in the system, then he will insert the marks of exam

Type: Primary

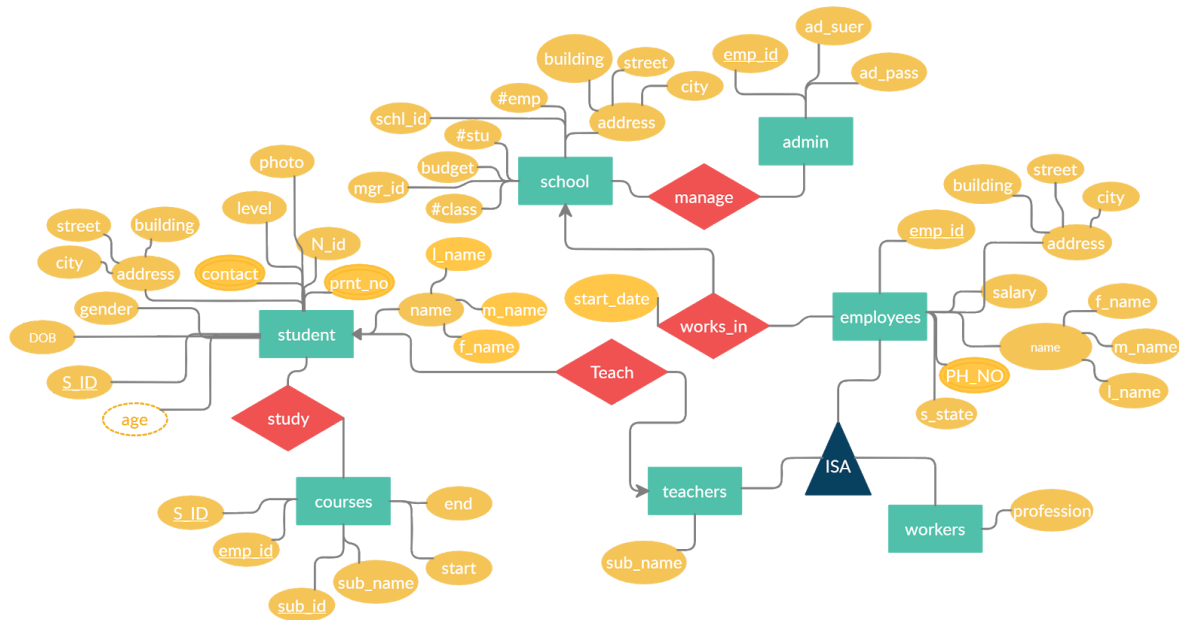
Typical Course of Events:

<u>Actor Action</u>	<u>System Response</u>
1- Teacher login to system	2- Dashboard page is opened
3- Teacher click on insert mark button	4- System ask for class and section ID.
5- Teacher enter class and section ID	
6- Teacher upload marks file	6- System stored marks

Alternatives:

- **Line 5:** Teacher enter invalid class id or section id, system display error message “Please Enter valid Id”.

ER diagram: we used creately.com to create this ER diagram



Relational database schema :we used creately.com to create this schema

STUDENT		admin	
S_ID	INT(10)	emp_id	CHAR(20)
DOB	VARCHAR(20)	ad_user	CHAR(20)
gender	VARCHAR(20)	ad_pass	CHAR(20)
city	VARCHAR(20)	EMPLOYEES	
street	VARCHAR(20)	emp_id	CHAR(20)
building	INT(10)	PH_NO	INT(20)
contact	INT(20)	f_name	CHAR(10)
study_level	INT(5)	m_name	CHAR(10)
National_ID	CHAR(20)	l_name	CHAR(10)
parent_phone	INT(20)	salary	INT(20)
f_name	CHAR(10)	city	VARCHAR(20)
m_name	CHAR(10)	street	VARCHAR(20)
l_name	CHAR(10)	building	INT(5)
photo	image	S_state	VARCHAR(10)
		school	
		emp_id	CHAR(20)
		PH_NO	INT(20)
		f_name	CHAR(10)
		m_name	CHAR(10)
		l_name	CHAR(10)
		salary	INT(20)
		city	VARCHAR(20)
		street	VARCHAR(20)
		building	INT(5)
		S_ID	INT(20)
		EMP_NO	INT(20)
		city	VARCHAR(20)
		street	VARCHAR(20)
		building	INT(5)
		courses	
		S_ID	CHAR(20)
		emp_id	CHAR(20)
		sub_id	CHAR(20)
		sub_name	INT(10)
		start	VARCHAR(20)
		end	VARCHAR(20)
works_in		teachers	
emp_id	CHAR(20)	emp_id	CHAR(20)
scl_id	INT(20)	subject	VARCHAR(20)
start_date	VARCHAR(20)	workers	
		emp_id	CHAR(20)
		profession	VARCHAR(20)

Possible functions interface design :

The screenshot shows a web application for 'Tanta engineering school'. The main header contains the school name and a search bar. A left sidebar lists navigation options: Dashboard, School management (highlighted), Student, Teacher, subjects, Attendance, Exams, Grades, and Message. The main content area is titled 'School management system' and features a 'Student list' button and an 'Add new' button. Below these is a table with the following data:

photo	Student name	Contact	Level	Action
	Yasser magdy	yasser@gmail.com	two	Edit Delete
	Ahmed mostfa	01765457838	two	Edit Delete
	Ahmed khaled	01865434563	three	Edit Delete
	Eslam gaber	eslam@gmail.com	three	Edit Delete

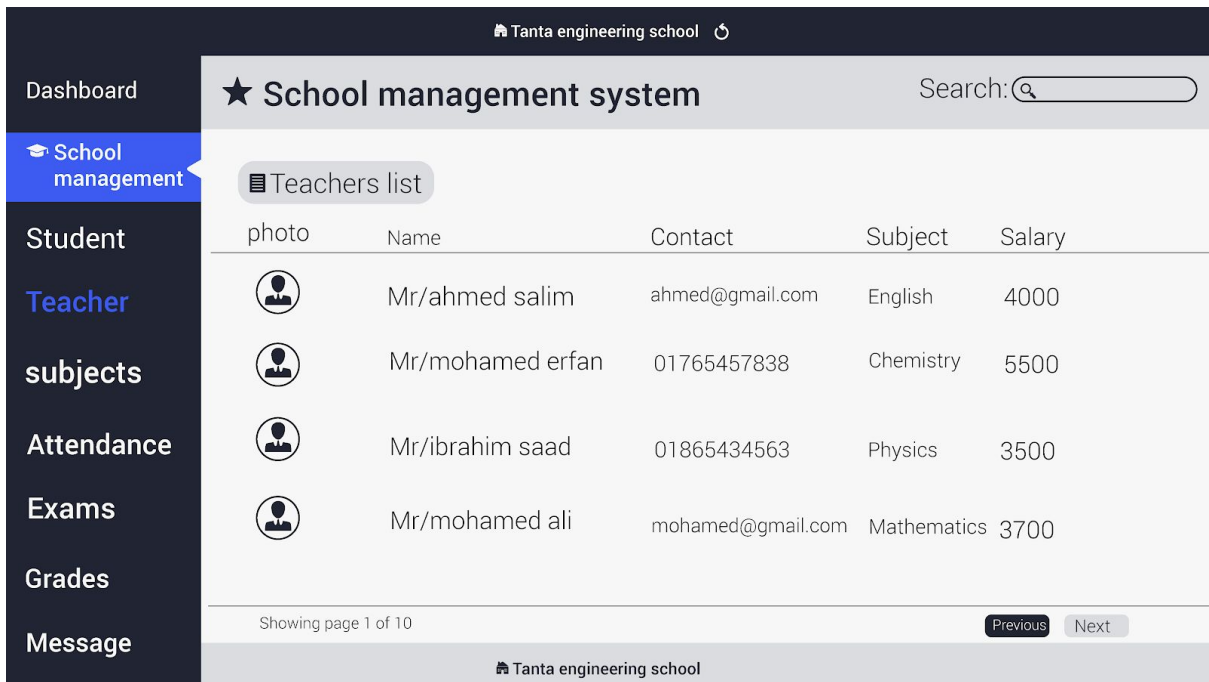
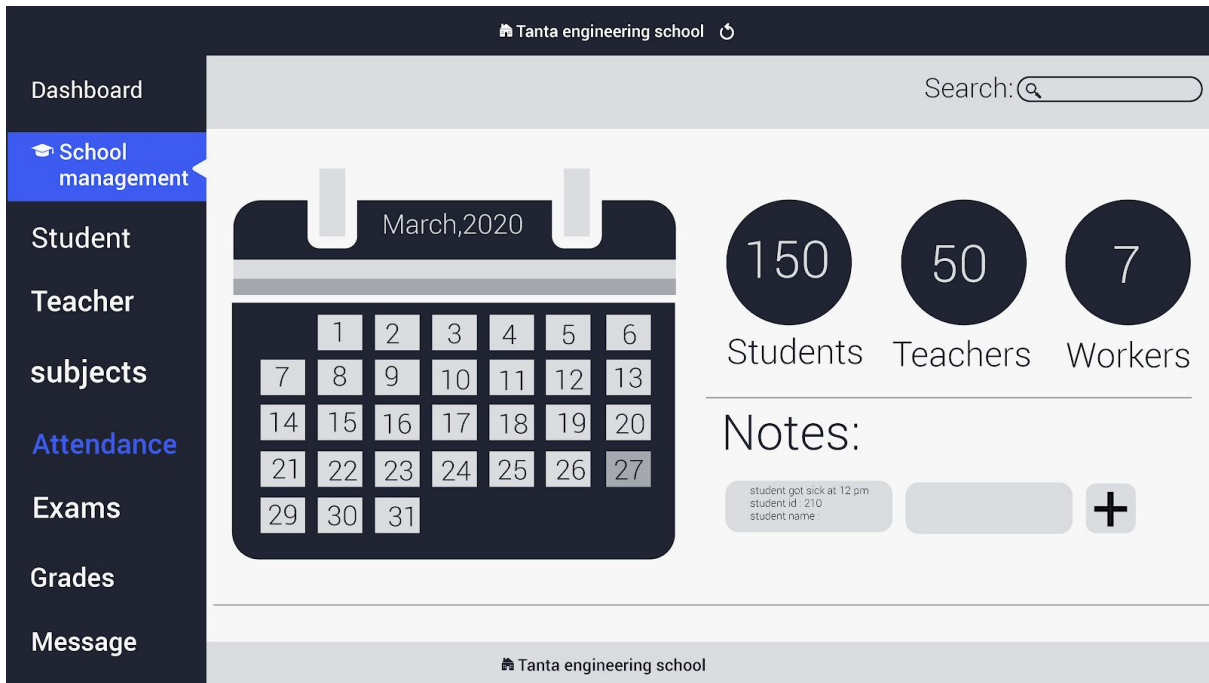
At the bottom of the table, it says 'Showing page 1 of 20' with 'Previous' and 'Next' navigation buttons. The footer of the page also displays 'Tanta engineering school'.

The screenshot shows the same web application as above, but with the 'Add new' button selected, leading to a registration form. The form fields are as follows:

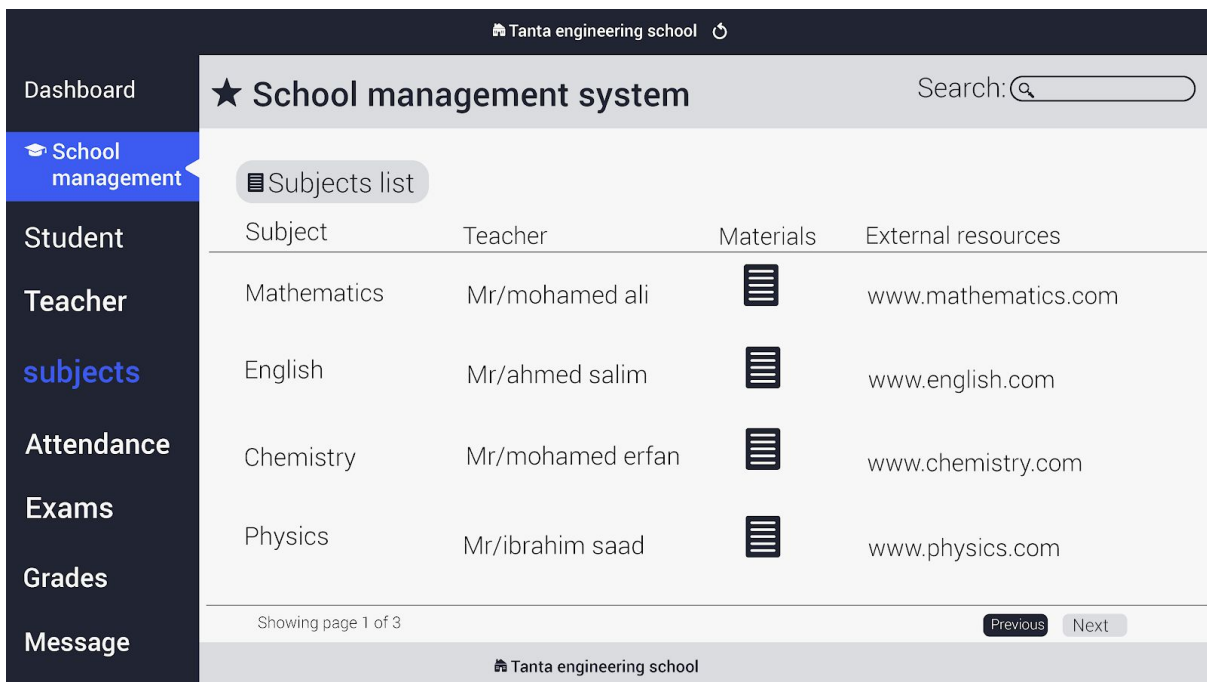
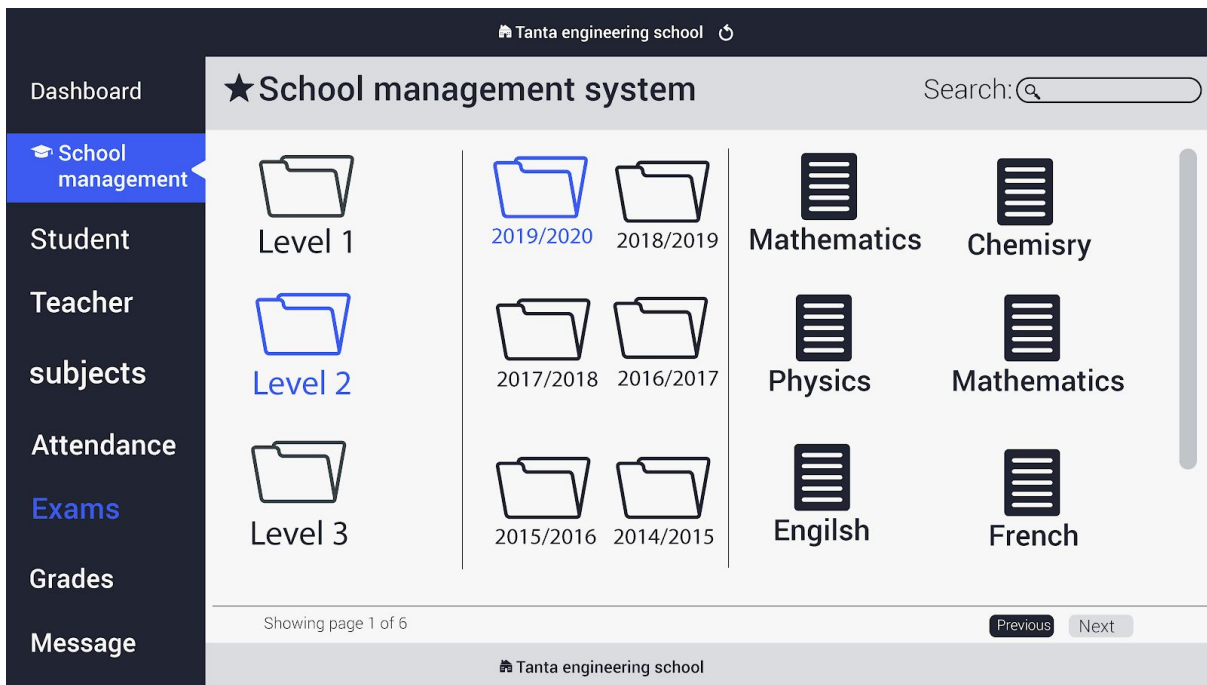
- Student id:
- Gender:
- First name:
- Address:
- Middle name:
- Parent phone:
- Last name:
- National id:
- Birth date:
- Private phone:
- Age:
- Photo:

The footer of the page also displays 'Tanta engineering school'.

Note: all the names , phone numbers, emails ,external links in this interface design are not real and just for example
(all the design source files could be delivered if asked for)



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Programming language we use and why we choose it:

Front-End:

HTML5:

- It is at the core of every web page, regardless the complexity of a site or number of technologies involved.
- all browsers support HTML5 tags.
- It's easy to implement and it works with CSS3
- Bring improvements in usability and user experience
- It's capable of handling multimedia content without the necessity of installing plugins so it makes video and audio easily accessible.
- It has come along with clean markup and clean code that make it more accessible

CSS:

It's used to control the style of a web document in a simple and easy way.

- Separation of style and structure, the basic idea behind CSS is to separate the structure of a document from the presentation of the document.
- It gives greater control of presentation.
- It's easier to maintain and update.
- It's faster web page download time.
- It gives ease of presenting different styles to different viewers.
- Search engine optimization benefits.

Javascript with Angular Framework:

- It helps us to keep code clean, understandable, easy to discover & eliminate bugs & makes debugging quicker and easier to maintain a large codebase.
- It Supported by Google so it has a large and active community.
- Two-way Data Binding which synchronizes the data between model and view components, When we do any changes in the backend, we can easily make necessary changes in the front-end without upsetting the app.

- It makes quality assessment very simple with its built-in real-time test modules as we can test the components of the module simultaneously while developing the modules, it will save time and efforts.

Back-End:

Python with framework Django:

- It's high-level object-oriented programming language, used for general-purpose programming with a simple syntax which easily achieve more functions with fewer lines of code
- Django aims to follow Python's "batteries included" philosophy, so it provides a wide range of features and functionalities.
- It provides robust security features as it helps to protect from a variety of targeted security attacks, SQL injection and cross-site request forgery.
- Django is object-relational mapper "ORM" which makes it easier to work with several widely used databases. and it used to perform common database operations and migrate from one database to another without writing additional code.
- It's an open source framework, so it is supported by a large and active community.
- It supports major OSs like Windows, Linux and MacOS
- Django admin panel is generated automatically from Python code, whereas creating an admin panel manually would take a lot of time and be absolutely pointless.

MySQL:

- It's most secure and reliable database management system
- It offers unmatched scalability to facilitate the management of deeply embedded apps using a smaller footprint even in massive warehouses that stack terabytes of data.
- It features a distinct storage-engine framework that facilitates system administrators to configure the MySQL database server for a flawless performance,
- It saves our troubleshooting time which is otherwise wasted in fixing downtime issues and performance problems.

Testing Methods

As First:

- 1- **Unit testing:** Which is the first testing level and done by the developers. Unit testing is useful to ensure that each part of the system that the developer writes is functional and works as it was designed for. Unit testing makes the debugging easier as discovering faults earlier means less time to fix. In addition, unit testing helps to reduce the system errors by 30%.

Second:

- 2- **INTEGRATION TESTING:** is a software testing where all the units from the unit test are combined in the project. This method is used to expose errors in the interaction between these units.

Third:

- 3- **Performance Testing:** which is a non-functional testing technique used to verify that loading time, response times and throughput rates are acceptable and satisfy its objective. Moreover, to ensure that the system is stable during the usage of the user. Which includes:
 - a- **Load testing:** is a process done to ensure that the system can handle the large amount or requests at the same time.
 - b- **Endurance testing (soak testing):** is used to analyze how the system will operate under an amount of load over a long duration of time. This method helps to understand the system's behavior and to release the memadequacyory leakage.

Last:

- 4- **Acceptance Testing:** is the process of ensuring that the system is satisfying the requirements of the customer and ready to deliver. This method of testing is performed by the customer.

Maintenance :

Corrective Maintenance:

Corrective maintenance of a software product may be essential either to rectify some bugs observed while the system is in use, or to enhance the performance of the system.

These faults were not discovered at the sw company at the test phase due to many factors such as:

- Low test .
- Short time assigned to test phase.
- Complexity of the sw under which the whole functions can not be tested.

Perfective Maintenance:

A software product needs maintenance to support the new features that the users want or to change different types of functionalities of the system according to the customer demands.

References:

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- <https://medium.com/agiletransformation/what-comes-first-functional-or-non-functional-requirements-b3ee96424742>
- IEEE Guide to Software Requirements Specifications.
- INTRODUCTION TO: SOFTWARE TESTING .
- The Art of Software Testing, 3rd Edition

Programs we used:

- Adobe illustrator for designing the possible functions interface
- Microsoft Visio for design Use Case Diagram
- <https://creately.com/>