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**SYSTEM ANALYSIS AND DESIGN FINAL PROJECT REPORT**

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# **PROJECT REPORT: E-LEARNING PLATFORM**

*Project Goal: Develop an e-learning platform for university students.*

## **Objectives:**

- Combine electronic content management systems (CMS) and social networking features.
- Facilitate student interaction and idea exchange for creative thinking.
- Ensure accessibility of educational materials for all students.
- Encourage student participation and active learning.
- Enhance student-to-student interaction and collaboration.

## **Success Factors:**

- Increased student interaction and collaboration.
- Improved understanding of learning materials through peer-to-peer support.
- A curated bank of high-quality educational content.
- Diverse question formats, including exams and quizzes.

## **Development Process:**

- System analysis: Identifying specifications and requirements.
- UML diagrams: Visualizing system stages.
- Interface design: Creating user-friendly interfaces.
- Implementation: Using UML, PYTHON (SPYDER), MS EXCEL, MS WORD and MS ACCESS.

## **Expected Outcomes:**

- Improved student engagement and learning outcomes.
- Enhanced collaboration and communication skills.
- Increased accessibility to educational resources.
- A user-friendly and efficient learning platform

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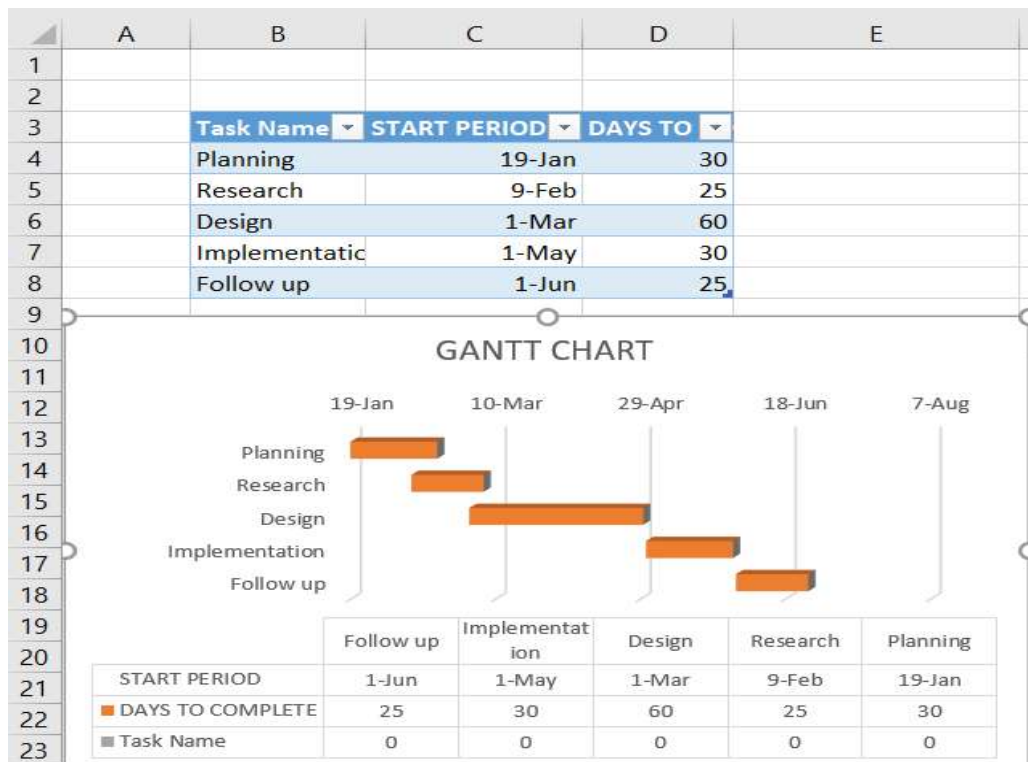
## INTRODUCTION

E-learning platforms are revolutionizing education, offering accessible and flexible learning experiences for students and instructors alike. Accessible 24/7 through a web browser or unique login, these platforms go beyond traditional training by facilitating idea exchange, individualized learning plans, and progress tracking. Their web-based nature empowers "anytime, anyplace, any pace" learning, making them ideal for large groups of geographically dispersed students. E-learning platforms empower efficient training management through software that simplifies access to learning materials, tests, assignments, and reports, making them invaluable tools in universities and colleges.

## PROJECT TIMELINE

### *Gantt chart*

In the initial stages of this project, a comprehensive planning and execution strategy were crucial for its success. To facilitate efficient project management, a Gantt Chart was meticulously designed and employed. The chart outlines key phases, milestones, and timelines, serving as a visual roadmap for the entire project lifecycle. The Gantt Chart played a pivotal role in organizing tasks and allocating resources effectively, ensuring that each stage - from planning and research to design, implementation, and follow-up - was carried out with precision and adherence to the established timeline. This visual representation is a testament to the project's structured approach and strategic implementation.



## **DESCRIPTION OF DATA FLOW DIAGRAMS (DFD):**

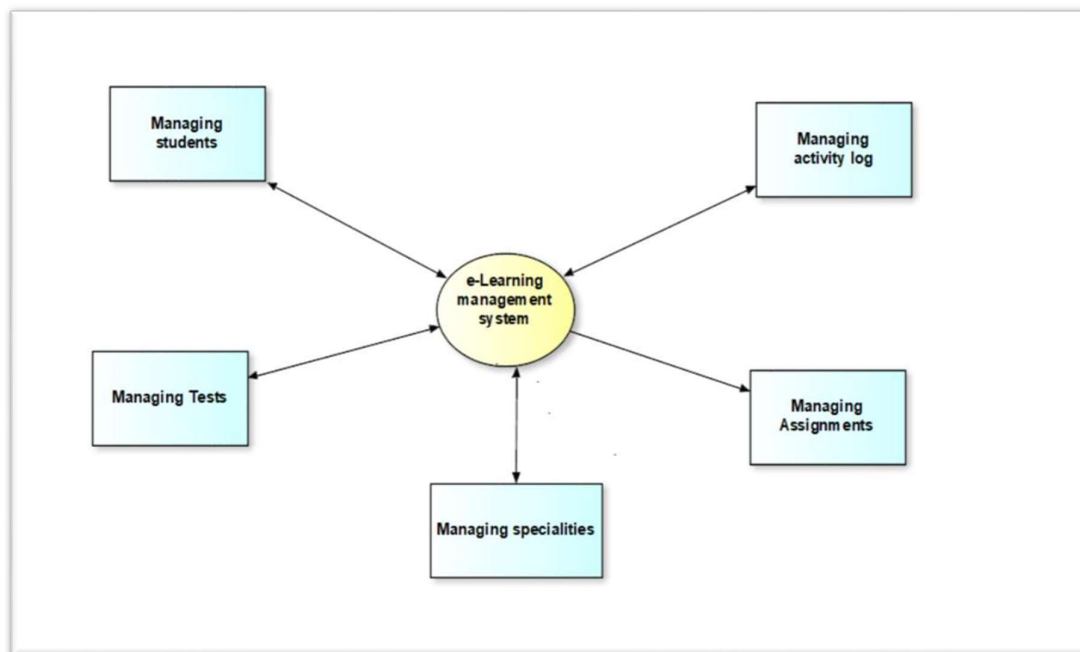
### ***Context Diagram:***

E-learning platform Data flow diagram is often used as a preliminary step to create a summary of the E-learning without going into great detail, which can later be elaborated. It normally consists of overall application dataflow and processes of the E-learning process. The context diagram for the E-learning platform includes the main process, "E-Learning Management System," and external entities such as the user flow and their entities such as all the flow of Student, Activity Log, Assignment, Tests, Subject, levels, specialties.

It is really designed to be an at-a-glance view of specialties and Student showing the system as a single high-level process, with its relationship to external entities of Student, Activity Log and Assignment, Test, levels. That should be easily realized by a wide audience, including Student, Assignment and specialties in zero level DFD of E-learning Platform, we now have a description of the high-level flow of the E-learning system.

High Level Entities and process stream of E-learning Platform:

- ☐ Managing all the Student
- ☐ Managing all the Activity Log
- ☐ Managing all the Assignment
- ☐ Managing all the Specialties
- ☐ Managing all the Tests



### ***Detailed Data Flows:***

#### **Level 0 Data Flow Diagram (Level 0 DFD):**

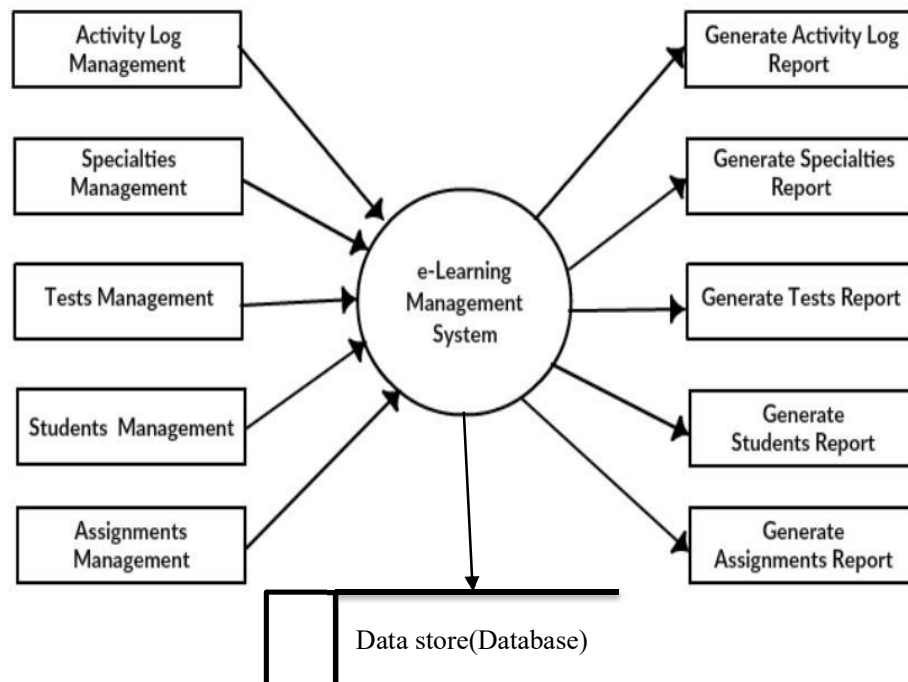
The zero-level DFD provides more details about the processes involved in managing students, assignments, tests, specialties, and activity logs. It also identifies inside data stores of college student, subject, test, specialties, task that must be present in order for the e-learning platform to do its job, and shows the flow of information between the various parts of student, assignment, check, specialty of the system.

DFD level 0 provides a more detailed large of pieces.

You will highlight the primary features of e-learning.

#### ***Main entities and output of level zero DFD (level 0 DFD):***

- processing student data and generate report of most students
- processing assignment records and generate report of all assignment
- processing files data and generate report of all tests
- processing specialties records and generate survey of all specialties



#### **First Level Data Flow Diagram (1<sup>st</sup> Level DFD):**

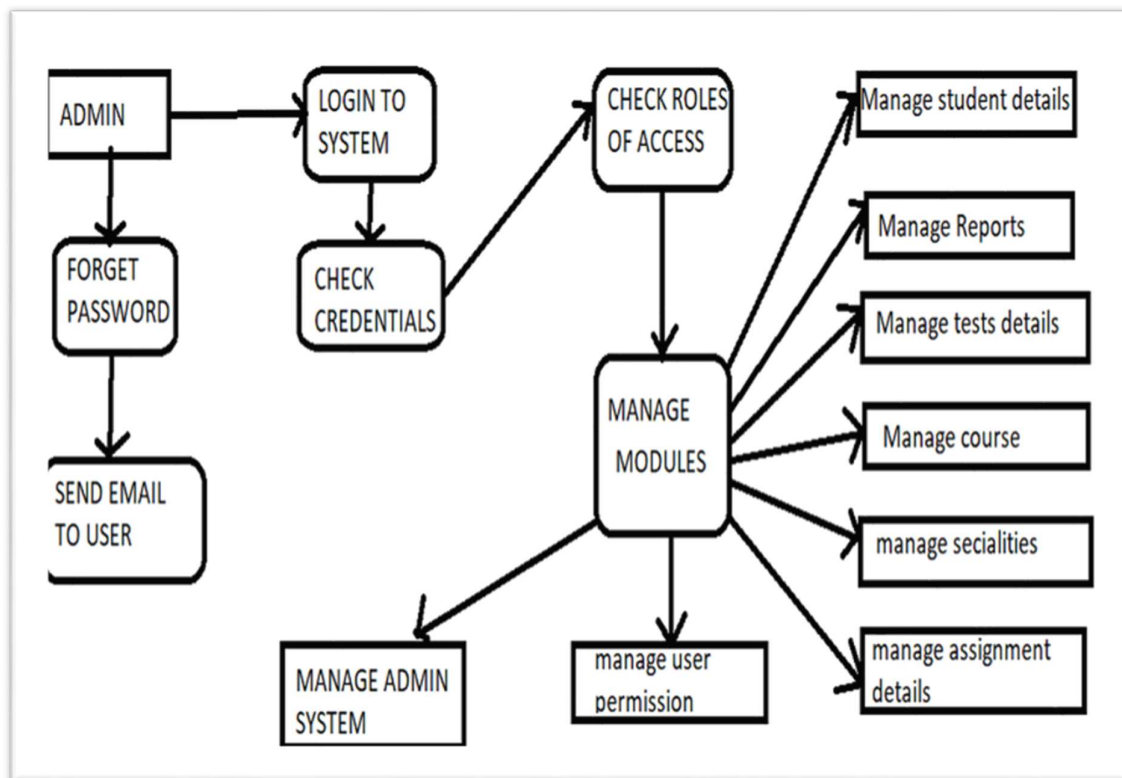
The first-level DFD delves deeper into the functionalities of the E-learning platform, showcasing administrator actions, such as login, managing functionalities, generating reports, and searching details.

It may require more functionalities of e-learning to reach the necessary level of detail about the e-learning functioning.

Zero level DFD (0 level) of e-learning platform shows how the system is divided into subsystems (processes). The 1st level DFD contains more details of students, tests, specialties, assignment, and activity log.

### *Main functionalities of e-learning platform:*

- Administrator logs in to the system and manage all the functionalities of e-learning platform.
- Administrator can add, edit, delete and view the records of student, assignment, test, specialty.
- Administrator can manage all the details of tests, specialties
- Administrator can also generate reports of student, assignment, tests, specialties
- Administrator can search the details of students, tests subjects
- Administrator can apply different level of filters on report of student, tests
- Administrator can track the detailed information of assignment, tests, specialties



### **E-LEARNING PLATFORM ENTITY RELATIONSHIP (ER) DIAGRAM**

This kind of ER (entity relationship) diagram shows the model of e-learning platform entity. The entity-relationship diagram of e-learning platform represents all the visual instrument of database tables and the relations between students, tests, specialties and assignment. It used structure data also to define the relationships between structured data sets of e-learning platform functionalities.

The main entities of the e-learning platform are students, courses, tests, specialties, assignment.

*e-learning platform entities and their attributes:*

- (1) *Student entity*: attributes of students are student\_id, student\_college\_id, student\_name, student\_mobile, student\_email, student\_password, student\_username, student\_password, student\_address, student\_level.

	Field Name	Data Type
STU	Student_id	Number
	Student_username	Short Text
	student_password	Short Text
	Student_email	Short Text
	Student_name	Short Text
	Student_ref id	Number
	Student_address	Short Text
	Student_level	Short Text
	Student_mobile	Number

- (2) *Course entity*: attributes of courses are course\_id, course\_name, course\_description.

	Field Name	Data Type
CUR	Course_id	Number
	Course_title	Short Text
	Course_description	Short Text

- (3) *Test entity*: attributes of test are test\_id, test\_name, test\_file, test\_description, course\_id

	Field Name	Data Type
TES	Test_id	Number
TES	Course_id	Number
	Test_description	Short Text
	Test_file	Short Text
	Test_title	Short Text

- (4) *Assignment entity*: attributes of assignments are assignment\_id, assignment\_name, assignment\_file, assignment\_description, course\_id, student\_id.

	Field Name	Data Type
ASS	Assignment_id	Short Text
ASS	Course_id	Number
	Assignment_description	Short Text
	Assignment_file	Short Text
	Assignment_title	Short Text
	Student_id	Number

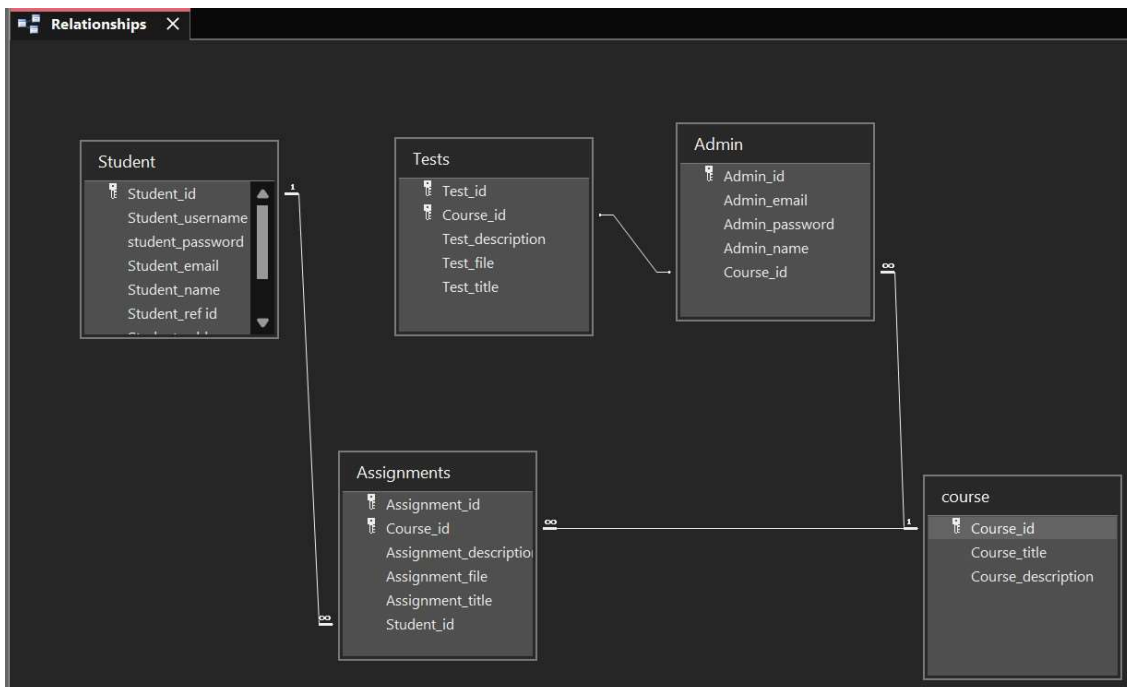


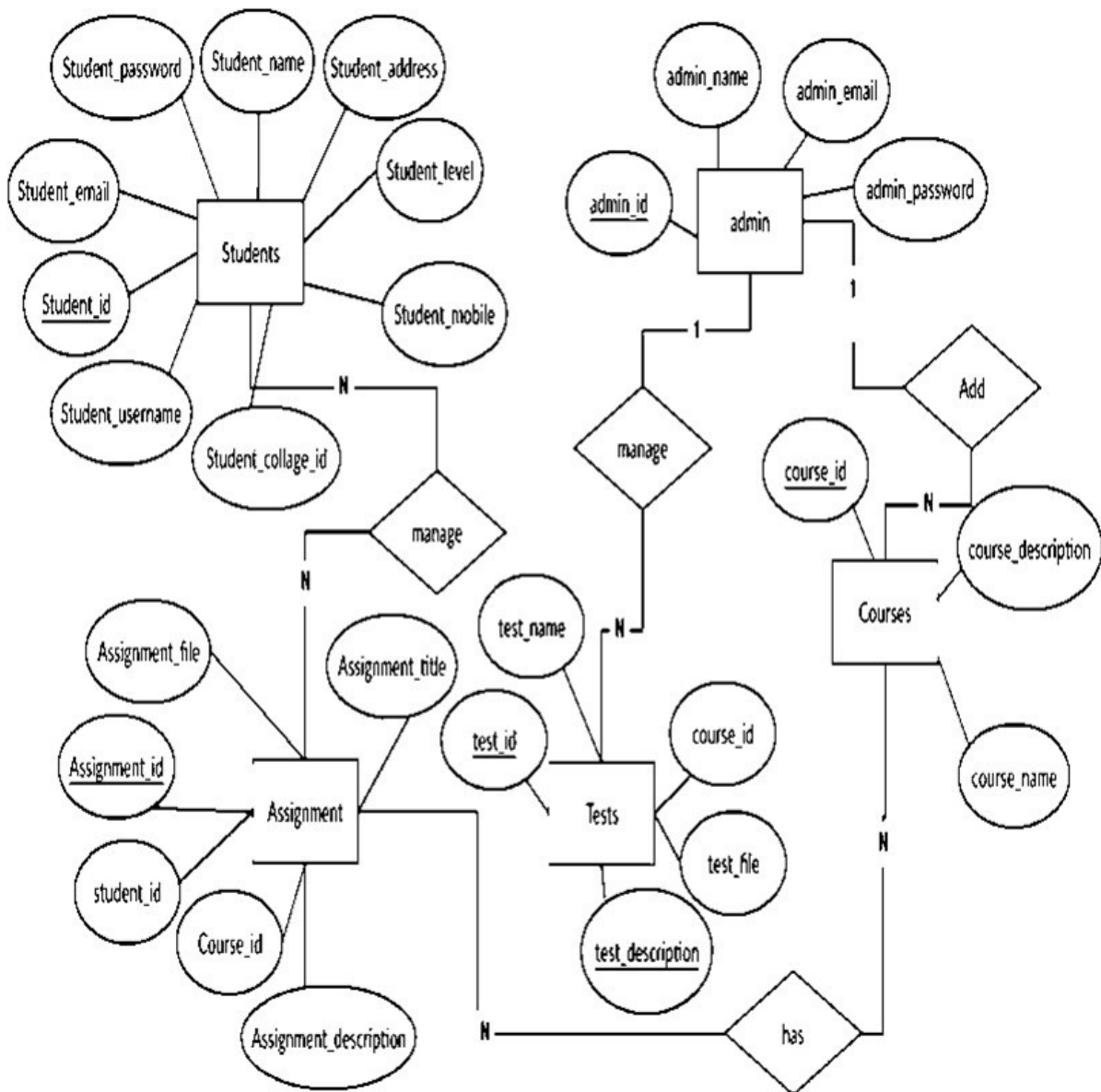
(5) *Admin entity*: attributes of admin are Admin\_name, Admin\_id, Admin\_email and Admin\_password.

	Field Name	Data Type
	Admin_id	Number
	Admin_email	Short Text
	Admin_password	Short Text
	Admin_name	Short Text
	Course_id	Number

**Description of e-learning platform database:**

1. The details of courses is store into the course tables respective with all tables
2. The details of students is store into the students' tables respective with all tables
3. Each entity (courses, students, assignments, tests and admin) contains primary key.
4. The entity tests, assignment has related with course, students' entities with foreign key
5. There are one-to-one and one-to-many relationships available between courses, students, assignments, tests, and admin.
6. All the entities courses, students, assignments, tests, admin are normalized to reduce duplicity of records.





## THE UNIFIED MODELING LANGUAGE (UML)

### *Overview:*

UML serves as the international standard notation for Object-Oriented Analysis and Design (OOAD). It provides a standardized way to create abstract models of a system. UML is process-independent, allowing for visualization, construction, specification, and documentation of a system.

It is not a methodology but a standard for modeling, defining, and documenting software systems, also applicable to business process modeling and systems engineering.

### Goals of UML:

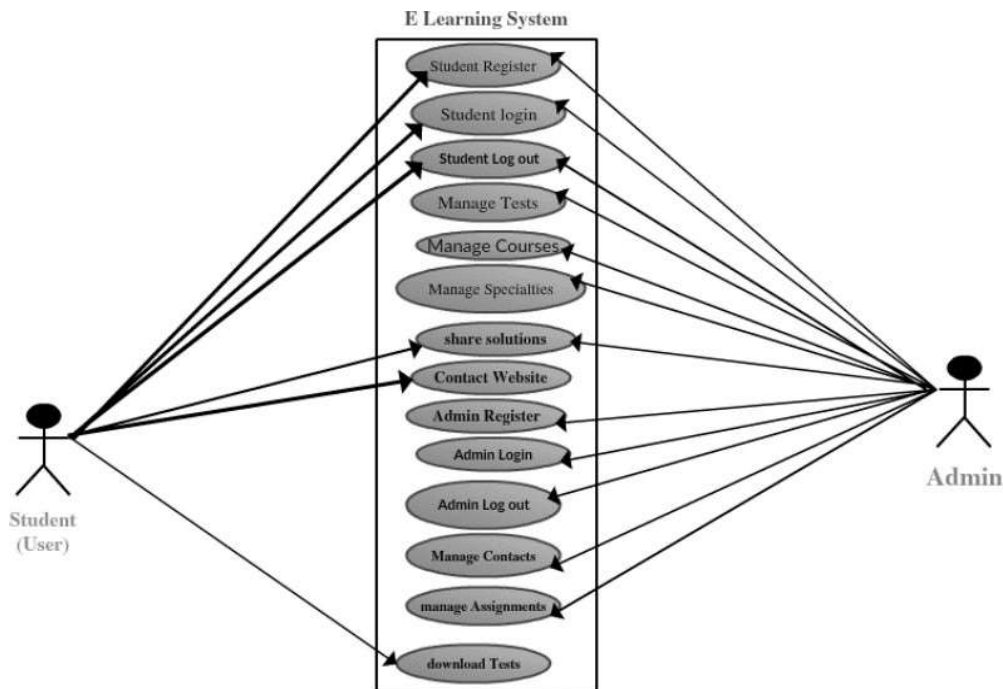
- Define an easy-to-use and visual modeling language for a system's structure.
- Provide extensibility.
- Be language and platform-independent.
- Incorporate best industry practices.
- Support Object Orientation, design, and application of frameworks and patterns.

### DIAGRAMS

#### Use case diagram

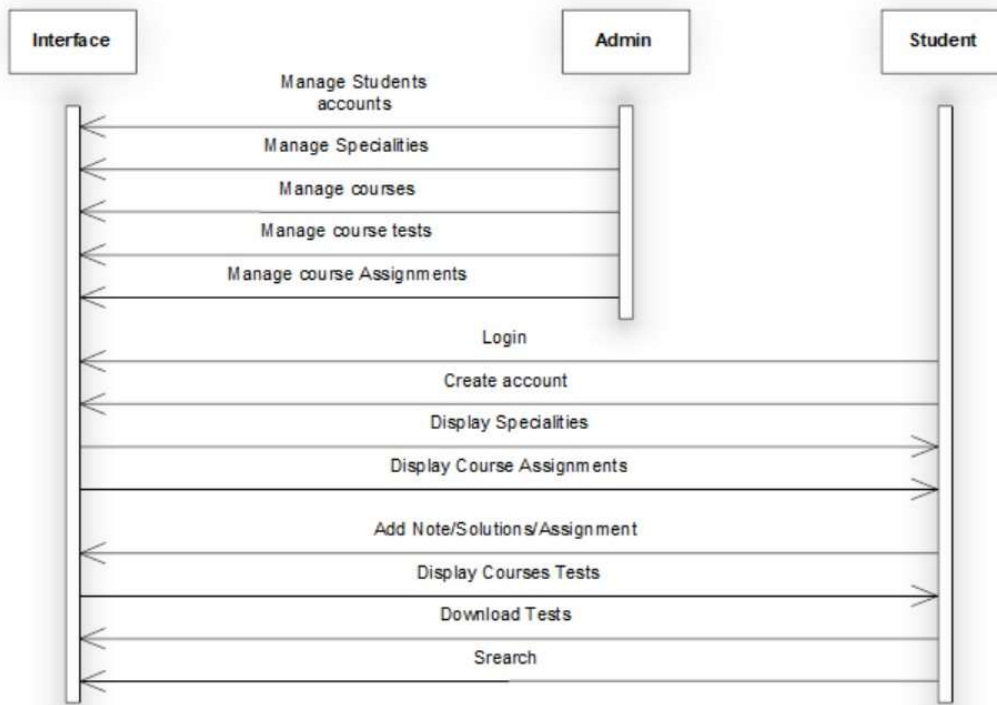
This Use Case Diagram is a graphic depiction of the interactions among the elements of E-Learning Management System. It represents the methodology used in system analysis to identify, clarify, and organize system requirements of E-Learning Management System.

Major elements of the UML use case diagram of E-Learning Management System are shown in figure below, administrator of the system and the students have various use cases shared with login case.



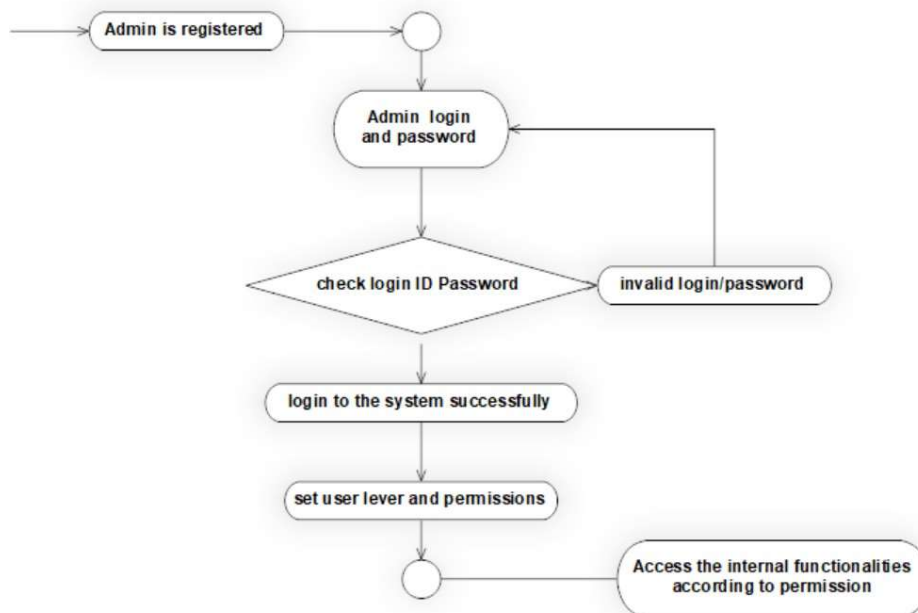
#### Sequence Diagram:

As shown in figure below the interactions between interface (objects) and admin like managing the students, specialties, assignments and tests also it shows the interactions between objects and students like creating account and adding note, assignments or solutions.

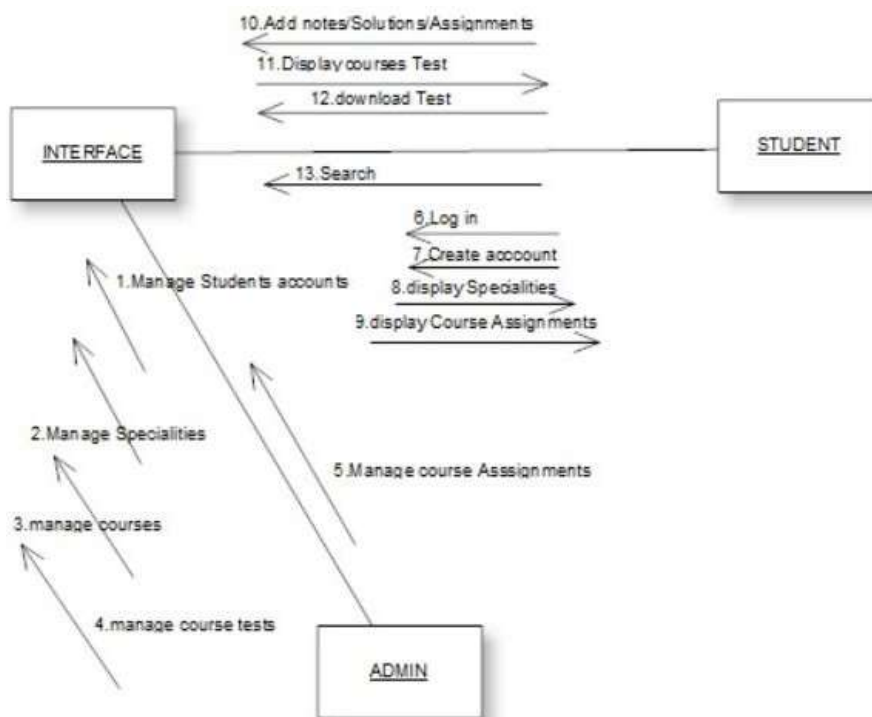


#### Flowchart login diagram:

In our E-learning Management System project, the login process is succinctly depicted through a UML-based Flowchart. This visual representation highlights the streamlined steps for user authentication, emphasizing the project's commitment to a secure and user-friendly login experience.



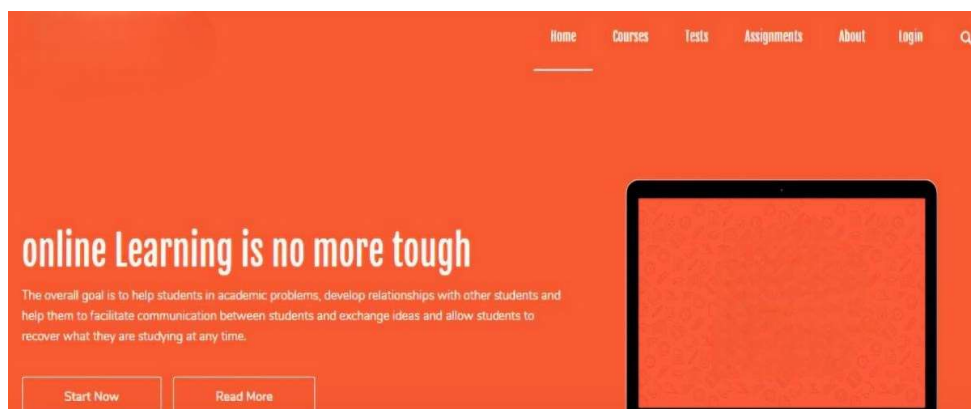
### Collaboration diagram:



## USER INTERFACES DESIGN

### *Main Page:*

The main page design of our E-learning Management System, implemented using Python Tkinter for the GUI, is crafted for intuitive navigation and accessibility. A clean and user-friendly interface welcomes users, offering a centralized hub for accessing courses, announcements, and essential functionalities. The design prioritizes clarity and ease of use to enhance the overall user experience.



## Source code:

```
import tkinter as tk

class HomePage(tk.Frame):
    def __init__(self, master):
        super().__init__(master)

        # Create the main frame
        self.main_frame = tk.Frame(self)

        # Create the header label
        self.header_label = tk.Label(self.main_frame, text="E-Learning Management System", font=("Arial", 24))
        self.header_label.pack(pady=20)

        # Create the navigation bar
        self.navigation_bar = tk.Frame(self.main_frame)

        # Create the courses button
        self.courses_button = tk.Button(self.navigation_bar, text="Courses", command=self.open_courses)
        self.courses_button.pack(padx=10)

        # Create the tests button
        self.tests_button = tk.Button(self.navigation_bar, text="Tests", command=self.open_tests)
        self.tests_button.pack(padx=10)

        # Create the assignments button
        self.assignments_button = tk.Button(self.navigation_bar, text="Assignments", command=self.open_assignments)
        self.assignments_button.pack(padx=10)

        # Create the about button
        self.about_button = tk.Button(self.navigation_bar, text="About", command=self.open_about)
        self.about_button.pack(padx=10)

        # Pack the navigation bar
        self.navigation_bar.pack()

        # Create the main content area
        self.main_content_area = tk.Frame(self.main_frame)

        # Create the welcome label
        self.welcome_label = tk.Label(self.main_content_area, text="Welcome to the E-Learning Management System!")
        self.welcome_label.pack(pady=20)

        # Create the login button
        self.login_button = tk.Button(self.main_content_area, text="Log In", command=self.open_login)
        self.login_button.pack(pady=20)

        # Pack the main content area
        self.main_content_area.pack()

        # Pack the main frame
        self.main_frame.pack()

    def open_courses(self):
        # TODO: Implement this method to open the courses page
        pass

    def open_tests(self):
        # TODO: Implement this method to open the tests page
        pass

    def open_assignments(self):
        # TODO: Implement this method to open the assignments page
        pass

    def open_about(self):
        # TODO: Implement this method to open the about page
        pass

    def open_login(self):
        # TODO: Implement this method to open the login page
        pass

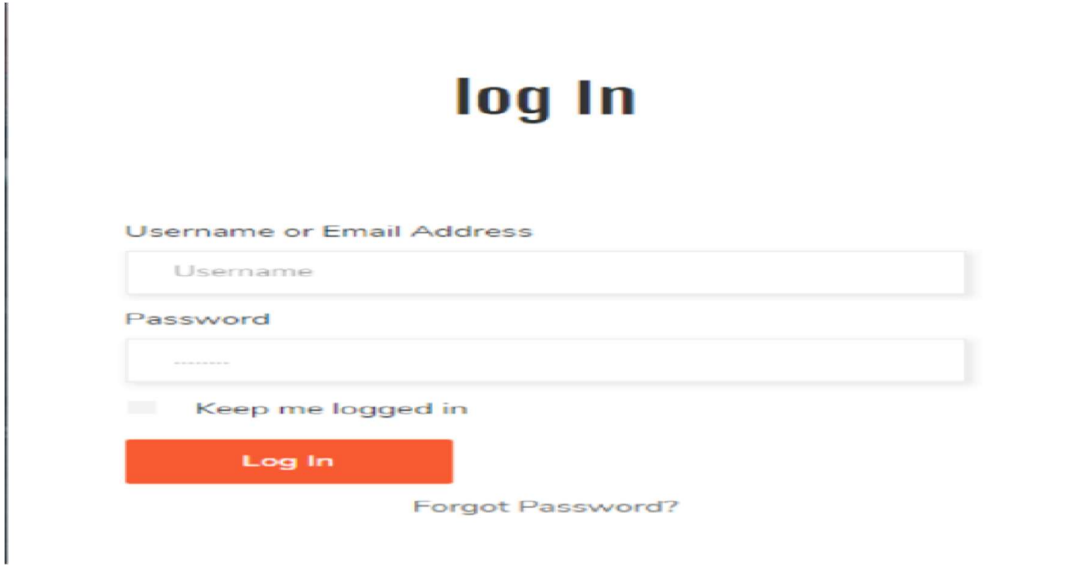
if __name__ == "__main__":
    root = tk.Tk()
    root.title("E-Learning Management System")

    home_page = HomePage(root)
    home_page.pack()

    root.mainloop()
```

### ***Login Page:***

The login page, also developed using Python Tkinter for the GUI, serves as the gateway to our E-learning platform. Featuring a sleek and secure design, the page ensures a seamless login experience for both administrators and students. The design emphasizes user authentication while maintaining an aesthetic appeal, contributing to the platform's commitment to usability and data protection.



### ***Source code:***

```
import tkinter as tk

class LoginPage(tk.Frame):
    def __init__(self, master):
        super().__init__(master)

        # Create the login form
        self.login_form = tk.Frame(self)

        # Create the username label
        self.username_label = tk.Label(self.login_form, text="Username or Email Address")
        self.username_label.pack()

        # Create the username entry
        self.username_entry = tk.Entry(self.login_form)
        self.username_entry.pack()

        # Create the password label
        self.password_label = tk.Label(self.login_form, text="Password")
        self.password_label.pack()

        # Create the password entry
        self.password_entry = tk.Entry(self.login_form, show="*")
        self.password_entry.pack()

        # Create the keep me logged in checkbox
        self.keep_me_logged_in_checkbox = tk.Checkbutton(self.login_form, text="Keep me logged in")
        self.keep_me_logged_in_checkbox.pack()

        # Create the login button
        self.login_button = tk.Button(self.login_form, text="Log In", command=self.login)
        self.login_button.pack()

        # Create the forgot password link
        self.forgot_password_link = tk.Label(self.login_form, text="Forgot Password?", foreground="blue", cursor="hand2")
        self.forgot_password_link.pack()

        # Pack the login form
        self.login_form.pack()
```

```

def login(self):
    # Validate the username and password
    username = self.username_entry.get()
    password = self.password_entry.get()

    # If the username and password are valid, log in the user
    # Otherwise, display an error message
    pass

if __name__ == "__main__":
    root = tk.Tk()
    root.title("Login Page")

    login_page = LoginPage(root)
    login_page.pack()

    root.mainloop()

```

## **CONCLUSION:**

The E-learning Management System project successfully achieved its goal of creating a versatile platform for university students. By integrating electronic content management systems with social networking features, the system promotes student interaction, idea exchange, and easy access to educational materials. The project's strategic execution, guided by a meticulously designed Gantt Chart, covered key phases such as planning, research, design, implementation, and follow-up. The implementation, featuring Python (Spyder), MS Excel, MS Word, MS Access, UML and a user-friendly interface developed with Python Tkinter, ensures a dynamic and accessible learning experience.

The expected outcomes encompass improved student engagement, enhanced collaboration, increased accessibility to educational resources, and the establishment of a user-friendly learning environment. This project stands as a testament to the transformative potential of innovative educational technologies, catering to the evolving needs of modern students and educators.