



Information Technology Institute Power BI Developer Track

Examination System

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ABSTRACT

This Examination System documentation provides a comprehensive guide and reference for understanding and utilizing the system.

It aims to assist administrators, academic advisors, and other stakeholders involved in the evaluation and analysis of student and instructors performance. The document covers various aspects of the examination system, including its purpose, functionality, and usage. The Examination System Documentation includes sections the explain every part of the software, Furthermore, the documentation provides insights into the evaluation process, guiding professors on how to assess student answers, assign grades, and provide feedback.

It also explores the analysis capabilities of the system, allowing stakeholders to track and analyze student performance trends, identify areas of improvement, and generate comprehensive reports.

So that any stakeholder can use it to analyze its student, instructors, departments, courses and exam data and use the drived insights from it in improving the process of his educational institution.

INTRODUCTION

Welcome to the Examination System of ITI ..

Due our journey as being itian's students in power BI Track, we have been inspired actually to develop this examination system in a helpful manner, That covers different aspects of this huge educational institution so that any supervisor or manger can use it to analysis the data of the students instructors, departments, courses and exam performance and KPIs and job offers and progress through different dashboards for each of them which will help to give a useful insights to be used.

Once exams are administered, the evaluation phase becomes crucial. Professors will find detailed instructions on how to assess student answers, assign grades, and provide valuable feedback.

As after taking the data of the students and their grades of the courses this gonna help to know their progress in the study process and will help in the end to know the performance of them and try to improve it so they can achieve the kpis in an excellent way and get a good job

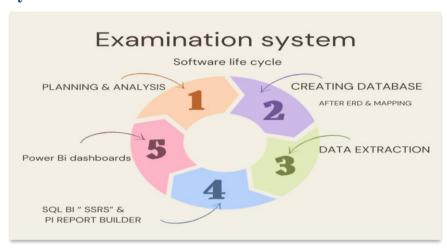
So we in our system explore methods for tracking and analyzing performance trends, identifying areas of improvement, and generating comprehensive reports. These insights empower educators to make data-driven decisions and implement targeted interventions to enhance learning outcomes.

Lets start our dive into the software ...

Software Development life cycle

In this section we are clarification the life cycle we have been through to develop the system:

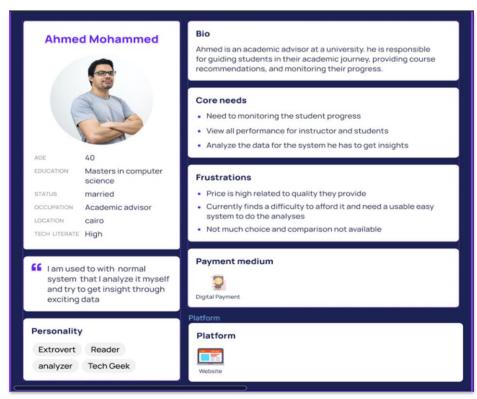
The life cycle:



Planning & Analysis:

In this phase we started to plan for the software by analysis the main idea of system and see what is the important features that the user will need, we did this by exploring how others system are applied and its user experience and the persona need.

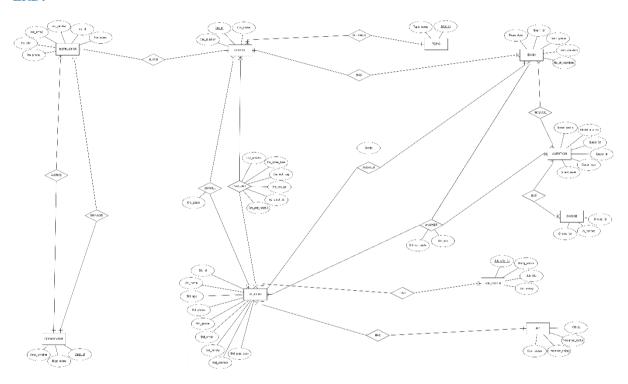
User persona:



ERD & Mapping:

at this phase we decided our entities and the tables which are : { Student ,Department ,Instructor,Course,Topic,Question,Exam ,Choice , Exam_Question ,student course student answer, student exam grade, Course evaluation,KPI ,Job offer } we made the mapping for it after creating it as the below :

ERD:



Mapping:

```
1-Student [Std_id (PK) - Std_name - Std_email - Std_age - Std_gender - Std_city - Std_phone - Std_grad_year - Std_faculty ]
2-Department [Dept_id (PK) - Dpet_name - Dept_location - Mgr_id (FK) ]
3-Instructor [Ins_id (PK) - Ins_name - Ins_email - Ins_city - Ins_phone - Ins_gender - Dept_id (FK)]
4-Course [Crs_id (PK) - Crs_name - Crs_duration - Topic_id (FK) - Ins_id (FK)]
5-Topic [Topic_id (PK) - Topic_name ]
6-Question [Quest_id (PK) - Quest_txt - Quest_type - Quest_mark - Model_ans_id (FK) - Model_ans_txt]
7-Exam [Exam_id (PK) - No_of_qs - Exam_duration - Exam_grade - Exam_date - Crs_id (FK)]
8-Choice [Choice_id (PK) - Choice_txt - Is_correct - Quest_id (FK)]
9- Exam_Question [ {Exam_id (FK) - Question_id (FK)} (PK) ]
10-Std_course [{Std_id (FK) - Crs_id (FK)} (PK) - Crs_grade ]
11-Std_answer [{Std_id (FK) - Exam_id (FK) - Quest_id (FK)} (PK) - Std_ans_txt - Std_qs_grade]
12-Std_Exam_Grade [ {ST_ID(FK) - Exam_ID(FK)}(PK) - Grade]
13-Crs_Evaluation [ { Std_id (FK) - Crs_id (FK) } (PK) - Crs_Material_helpful - Crs_Content - Crs_well-organised - Inst_ClassTime - Inst_Responce_Qus - Inst_GiveClearEx ]
14- KPI [KPI_id (PK) - Std_id (FK) - Freelance_status - Freelance_Salary - cert_status ]
15- Job_offer [Job_offer_id (PK) - Std_id (FK) - Hiring_status - Job_title - Job_salary ]
```

Creating Database & Implementation:

Creating a database for an examination system typically involves defining tables .

{Student ,Department ,Instructor,Course,Topic,Question,Exam ,Choice , Exam_Question ,student course student answer, student exam grade, Course evaluation,KPI ,Job offer }

Import data directly from Excel files by using the SQL Server Import and Export Wizard.

Creation:

1:

2:

```
--- FOREIGN KEYS ---

-- Department Table

ALTER TABLE Department

ADD FOREIGN KEY (Mgr_id) REFERENCES Instructor(Ins_id);

-- Instructor Table

ALTER TABLE Instructor

ADD FOREIGN KEY (Dept_id) REFERENCES Department(Dept_id);

-- Course Table

ALTER TABLE Course

ADD FOREIGN KEY (Topic_id) REFERENCES Topic(Topic_id);

ALTER TABLE Course

ADD FOREIGN KEY (Ins_id) REFERENCES Instructor(Ins_id);
```

4: storde prodeduer for table :

```
=-- Topic Table --
-- SP SELECT --
□CREATE PROCEDURE SelectTopic
 AS
BEGIN
     SELECT * FROM Topic
 END
 -- SP INSERT --
□CREATE PROCEDURE InsertTopic
     @Topic_Id INT,
     @topic_name VARCHAR(20)
 AS
BEGIN
   INSERT INTO Topic
     VALUES(@Topic_Id, @topic_name)
 END
```

sp for table:

```
-- SP UPDATE --
 G0
□CREATE PROCEDURE UpdateTopic
     @Topic_Id INT,
     @new_topic_name VARCHAR(20)
 AS
BEGIN
     UPDATE Topic
     SET Topic_Name = @new_topic_name
     WHERE Topic_Id = @topic_id
 -- SP DELETE --
□CREATE PROCEDURE DeleteTopic
     @topic_id INT
 AS
BEGIN
   DELETE FROM Topic
     WHERE Topic_Id = @topic_id
 END
```

Generating exam SP:

```
-- Exam Generation --
□ CREATE PROCEDURE GenerateExam
     @Exam_Id INT,
     @Crs_Id INT,
      @Ex_Duration INT,
     @No_Of_TF INT,
     @No_Of_MCQ_INT,
      @Ex_Grade INT,
      @No_of_qs INT
 AS
BEGIN IF
     IF EXISTS(SELECT Crs_id FROM Course WHERE Crs_id = @Crs_Id)
          IF EXISTS (SELECT Exam_id FROM Exam WHERE Exam_id = @Exam_Id)
              SELECT 'The exam id already exists' AS 'ErrMessage'
          ELSE
          BEGIN
              IF @No_Of_TF + @No_Of_MCQ = 20
              BEGIN
                  IF @No_Of_TF = 5
                  BEGIN
                      -- Generate a random exam with 10 questions --
                      INSERT INTO Exam (Exam_id, No_of_qs, Exam_duration, Exam_date, Exam_grade, Crs_id)
                      VALUES (@Exam_Id, @No_of_qs, @Ex_Duration,GETDATE(), @Ex_Grade, @Crs_Id);
```

```
-- Select True/False questions related to the same course--
                INSERT INTO Exam_Question (Exam_id, Quest_id)
                SELECT TOP (@No_Of_TF) @Exam_Id, q.Quest_id
                FROM Question q
                JOIN Exam_Question eq ON q.Quest_id = eq.Quest_id
                JOIN Exam e ON eq.Exam_id = e.Exam_id
                WHERE Crs_id = @Crs_Id
                AND Quest_type = 't/f'
                ORDER BY NEWID();
                -- Select Multiple Choice questions related to the same course --
                INSERT INTO Exam_Question (Exam_id, Quest_id)
                SELECT TOP (@No_Of_MCQ) @Exam_Id, q.Quest_id
                FROM Question q
                JOIN Exam_Question eq ON q.Quest_id = eq.Quest_id
                JOIN Exam e ON eq.Exam_id = e.Exam_id
                WHERE Crs_id = @Crs_Id
                AND Quest_type = 'mcq'
                ORDER BY NEWID();
                -- Select exam model --
                SELECT Q.*
                FROM Exam_Question eq, Question Q, Exam E
                WHERE eq.Exam_id = E.Exam_id AND eq.Quest_id = Q.Quest_id AND eq.Exam_id = @Exam_Id
            END
            ELSE
                SELECT 'No of TF questions must be 5' AS 'ErrMessage'
        FND
            SELECT 'No of questions must be 20' AS 'ErrMessage'
    END
FND
FLSE
    SELECT 'The course does not exist' AS 'ErrMessage'
```

SP Exam Answer:

```
-- Exam Answers --
 GO
□ CREATE PROCEDURE StudentAnswer
     @Exam_Id INT,
     @Std_Id_INT,
     @Quest Id INT,
     @Std_Ans_txt nvarchar(255) = 'No Answer'
 AS
BEGIN IF
     IF NOT EXISTS (SELECT * FROM Student WHERE Std_id = @Std_Id)
         SELECT 'The student does not exist' AS 'ErrMessage'
     END
         ELSE IF NOT EXISTS (SELECT * FROM Exam WHERE Exam_id = @Exam_Id)
         BEGIN
              SELECT 'The exam does not exist' AS 'ErrMessage'
              ELSE IF NOT EXISTS (SELECT * FROM Question WHERE Quest_id = @Quest_Id)
              BEGIN
                  SELECT 'The question does not exist' AS 'ErrMessage'
              END
                 ELSE
                 BEGIN
```

SP Exam Correction:

```
-- Exam Correction --
 GCREATE PROCEDURE ExamCorrect
      @Std_Id INT,
     @Exam_Id INT
 BEGIN
      IF NOT EXISTS (SELECT * FROM Exam WHERE Exam_id = @Exam_Id)
      BEGIN
          SELECT 'The exam does not exist' AS 'ErrMessage'
      ELSE IF NOT EXISTS (SELECT * FROM Student WHERE Std_ID = @Std_Id)
      BEGIN
         SELECT 'The student does not exist' AS 'ErrMessage'
      END
      ELSE
      BEGIN
          -- Calculate the total number of questions --
          DECLARE @total_questions int
          SELECT @total_questions = count (Quest_id) FROM Std_Answer WHERE Std_id = @Std_Id AND Exam_id = @Exam_Id
           -- Calculate the total number of correct answers --
          DECLARE @total_right_questions float
          SELECT @total_right_questions = count(SE.Quest_id)
          FROM Std_Answer SE JOIN Question Q ON SE.Quest_id = Q.Quest_id WHERE Std_id = @Std_Id AND Exam_id = @Exam_Id AND SE.Std_ans_txt = Q.Model_ans_tx
          -- Calculate the grade --
          DECLARE @Grade float
          SELECT @Grade = (@total_right_questions* 5)
          -- Update Crs_grade based on the student's answers --
          UPDATE Std_course
         SET Crs_grade = @Grade WHERE Std_id = @Std_Id and Crs_id = (Select Crs_id from Exam where Exam_id = @Exam_Id)
           - Return the grade --
          SELECT 'student degree percentage ' + str(@Grade) + ' of ' + str(@total_questions * 5)
```

After fishing the storde procedures and testing them we moved to the phase of:

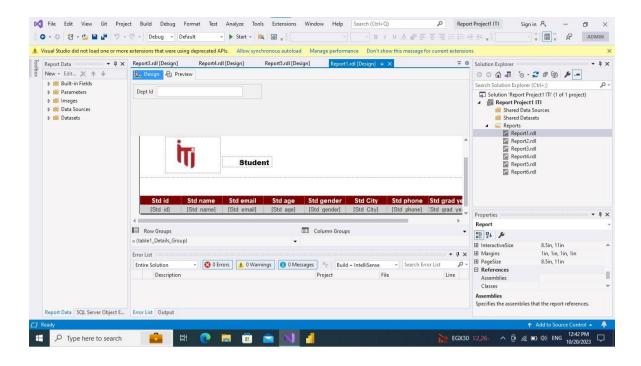
Data extraction:

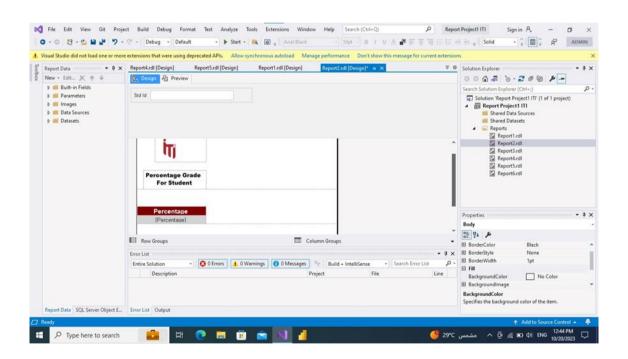
At this phase we have extracted data from a database for generating reports in Power BI Desktop, SQL Server Report Service, Power BI Report Builder that need querying database, saving the data as a CSV file, then importing it into the reporting tool

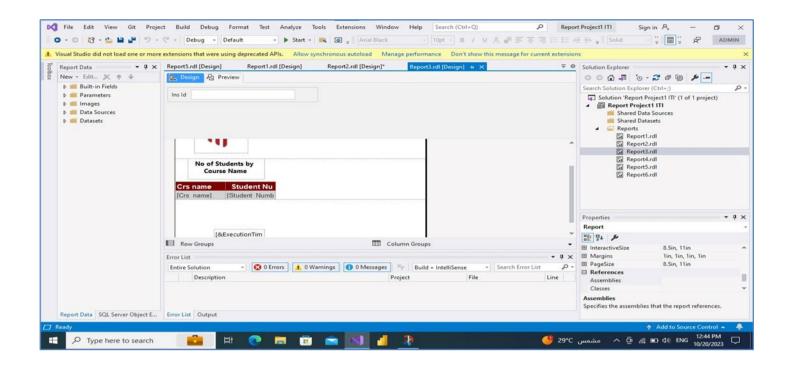
SSRS:

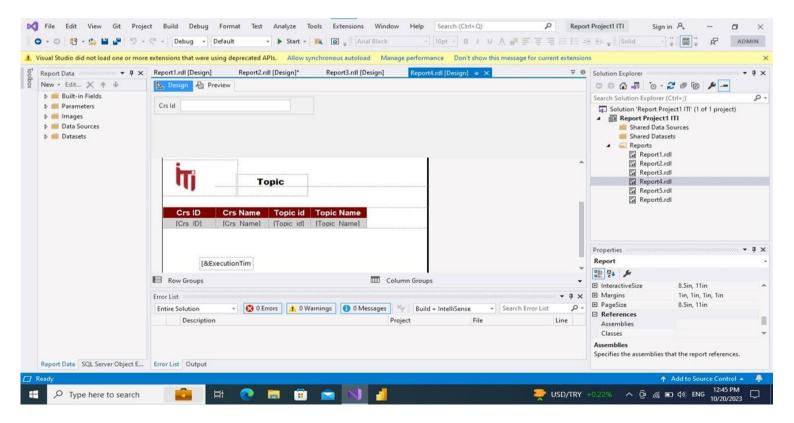
SQL Server report server to present the data from stored procedures to SSRS as the upcoming :

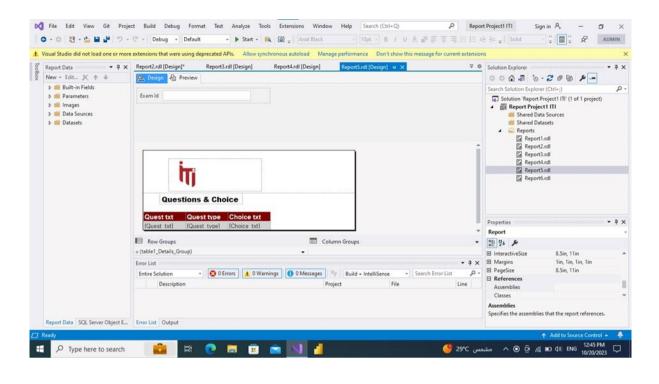
- 1- Report that returns the students information according to Department No parameter.
- 2- Report that takes the student ID and returns the grades of the student in all courses.
- 3- Report that takes the instructor ID and returns the name of the courses that he teaches and the number of student per course.
- 4- Report that takes course ID and returns its topics
- 5- Report that takes exam number and returns the Questions in it and choices [free-form report]
- 6- Report that takes exam number and the student ID then returns the Questions in this exam with the student answers.

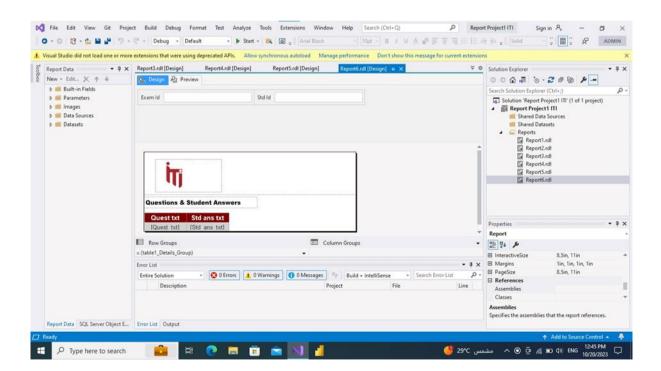






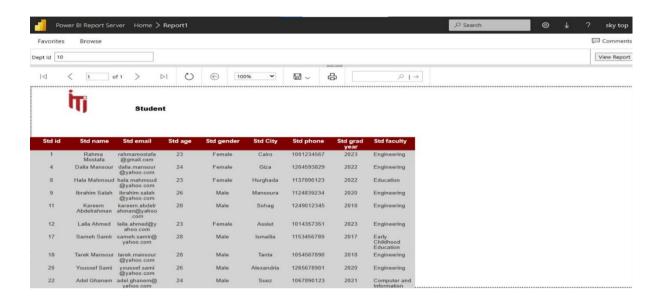


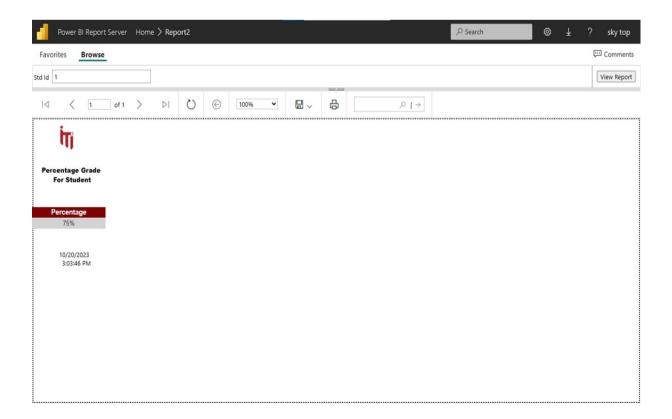


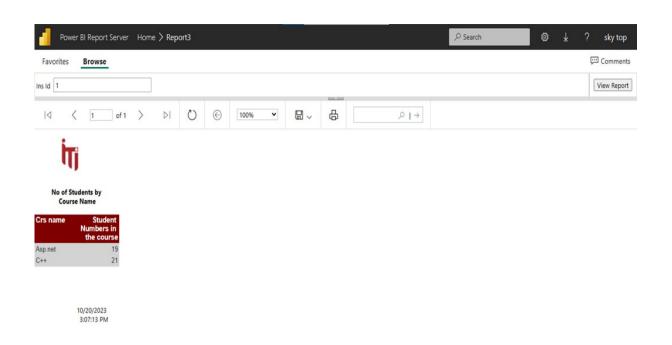


Power BI Report builder:

paginated report designed for creating a report has the information of students, instructor, exams like following:

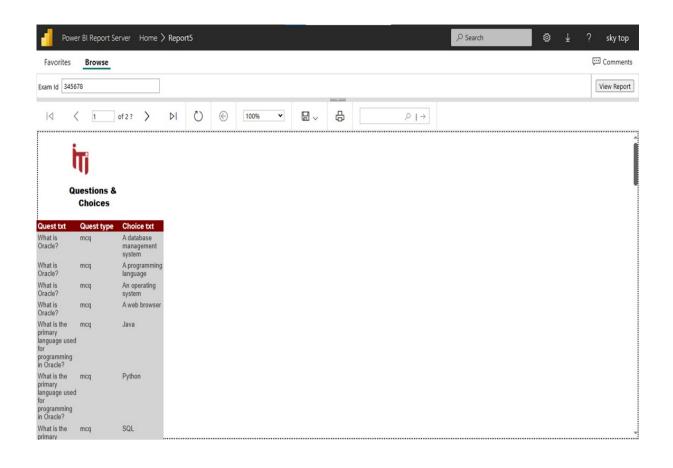


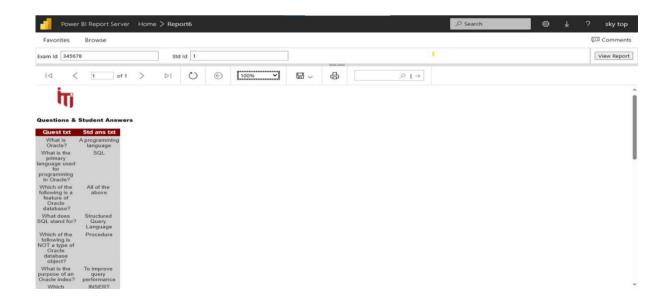












Power BI Dashboard:

After the above phases up we came to the time of making the Dashboards that supervisor or the manager or any stake holder will use it to analyze the needed data from any table we mentioned in our system to get the important insights that will be so useful in tracking the performance of the system overall we have made 20 dashboards but we will focus now on the main 6 overview in the upcoming screens:

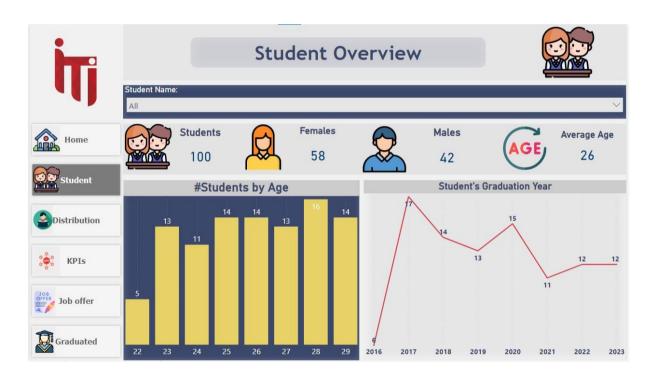
First over view when you log into the system dashboard:

Here we can see the 5 main sections for the system that can the user navigate through it to get his needed information and insights contains student, instructor, department, course, exam:



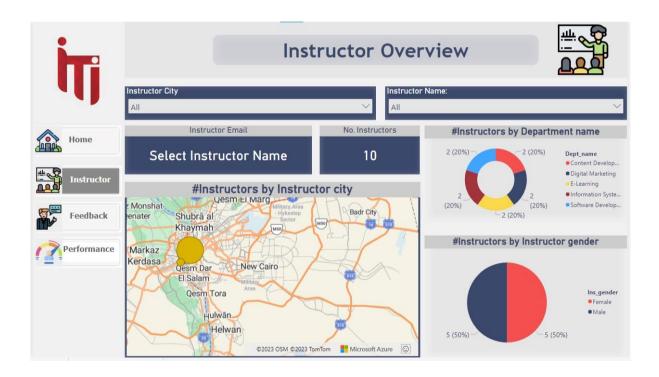
2- Student overview:

Here we can see the total number of the students and number due to the gender distribution and the average age , also you can find student by age and student graduation year , and we should mention that we made filter so that you can enter any name for the student and get the needed insight due to the student you wrote his name and there is important navigation buttons in the left side to choose from it thing you need to know from distribution or the KPIs or the job offers or graduated students to get the insights you want



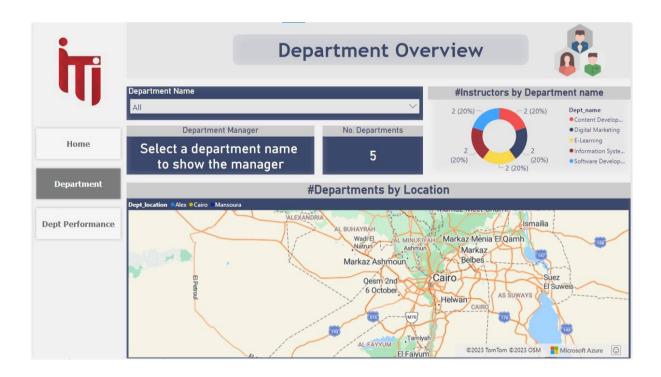
3- Instructor overview:

Here we can see there is 2 main filters one by the instructor city and the other by the instructor name to filter the data due this two mentioned then when you choose the instructor name you can have its mail, also we made a card to the total number of instructors we have, and number of instructors in each department in the system and also we got map to get the number of the instructor in each city and the distribution of the instructors by its gender also you can find in the left related navigation button for the instructors to choose from and they are : feedback or the instructor performance



4-Department overview:

Here we can see there is main filters on the dashboard here and it is the department name, and when you choose the name the manger of it will show immediately, we made a card to show the total number of the departments we have, and distribution and total number for the instructor in each department and numbers of the departments by its location and as usual there in the left you can find 2 navigate buttons to choose from department or department performance



4- Course overview:

Here we can see there is main filters on the dashboard here and it is the course name , and when you choose the name it will show immediately the insights due to it , we made a card to show the total number of the courses and average courses duration , also we have the course duration due to the topic name and the number of courses by department name , also we have table to show information like the course name and its duration and topic name and number of students , and as usual there in the left you can find navigation buttons to choose from course , course grade course feedback and student course

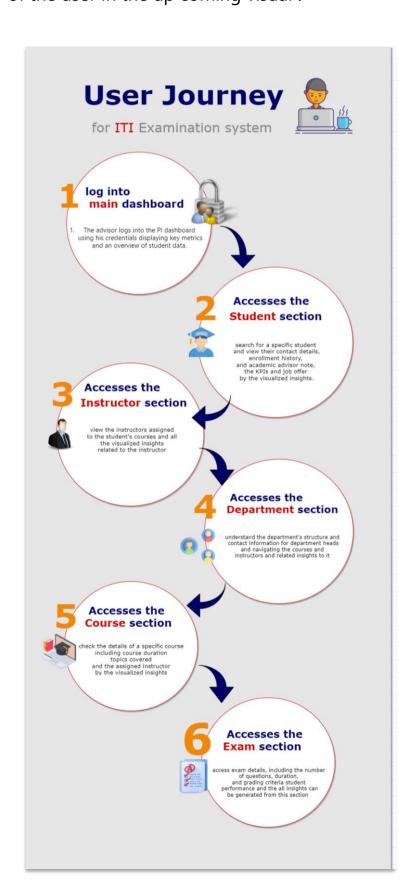


5- Exam overview:

Here we can see there is main filters on the dashboard here and it is the course name , and when you choose the name it will show immediately the insights due to it the total Exams number and number of total questions and exam duration , and also we have the number of exams by the month and number of questions by the question type and a table show information about the exam date and its day and number of exams and its id



By all of those dashboards you can navigate through the system and get the main insight you want and do the analysis in an easy way to help you in improving your progress in the educational institution and the progress of the student and we can sum this up in the journey map of the user in the up coming visual:



Student Portal Website

This documentation provides a comprehensive overview of the student portal website, including descriptions, user interfaces, and functionalities for each component.

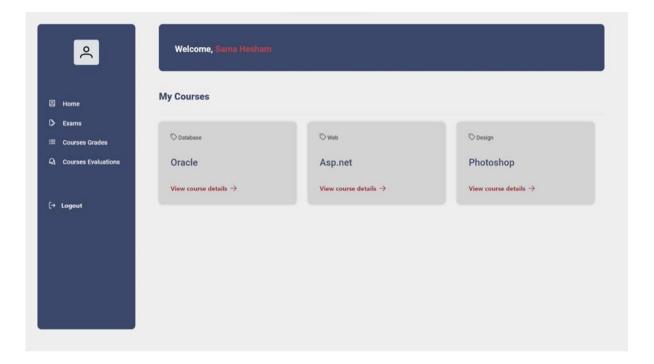
1- Login page:

- The login page provides access for registered students to log into their accounts.
- Users enter their credentials (username and password) to log in.

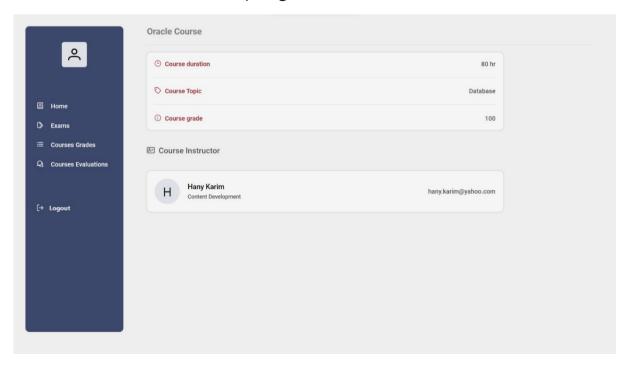


2- Home Page:

- The home page serves as the central dashboard for students after logging in.
- Displays a list of courses assigned to the student.
- Each course has a "View Course Details" button.

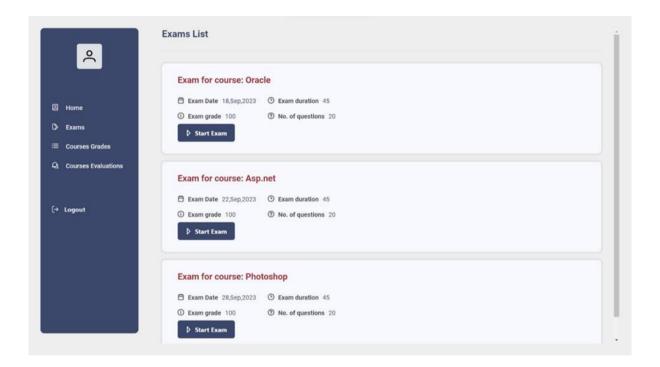


- provides specific information about a selected course.
- Course duration, topic, grade, and instructor.

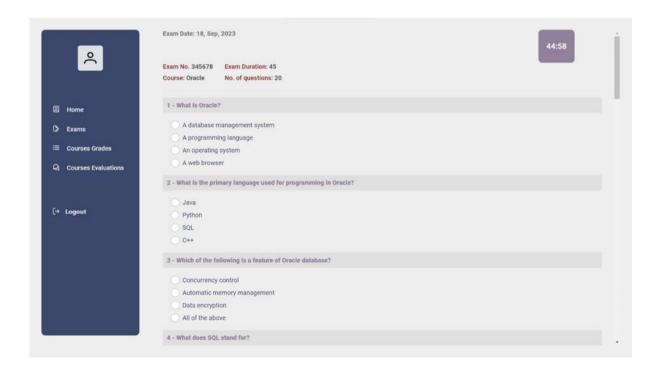


3- Exam Page:

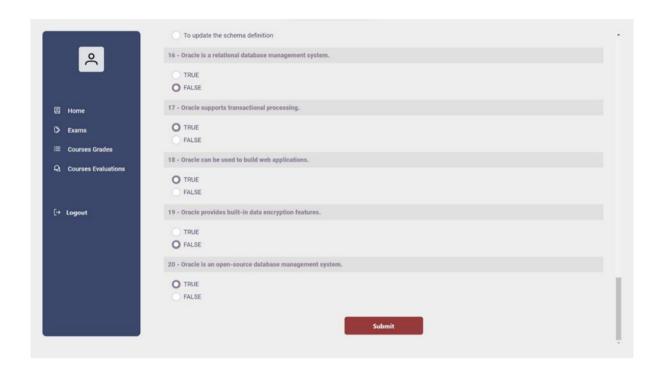
- The exam page allows students to access and complete exams for their assigned courses.
- Displays available exams for the student.
- "Start Exam" button initiates the exam.



- Exam timer is visible.



- Students answer questions and submit.

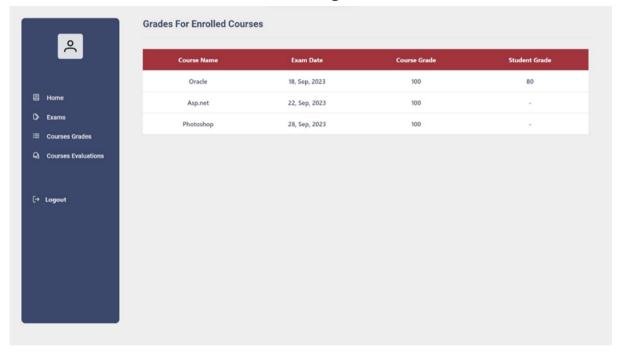


- After submission, score and option to revisit the exam.



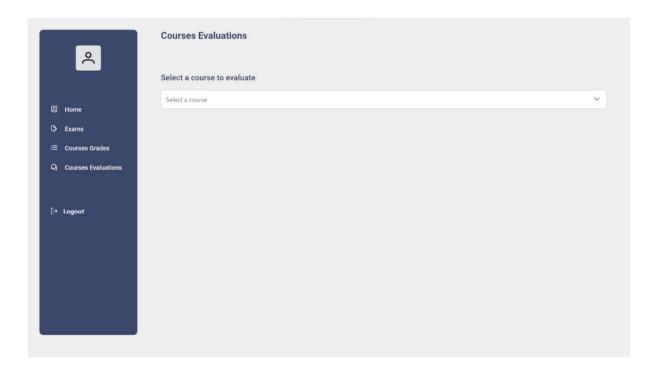
4- Courses Grades Page:

- The courses grades page provides an overview of the student's performance in each course.
- Course name, exam date, and grade.

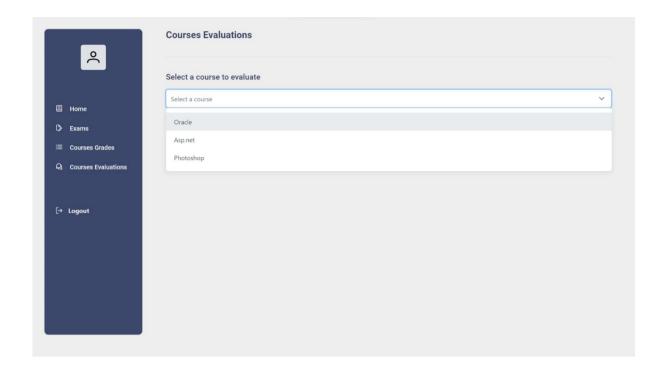


5- Courses Evaluation Page:

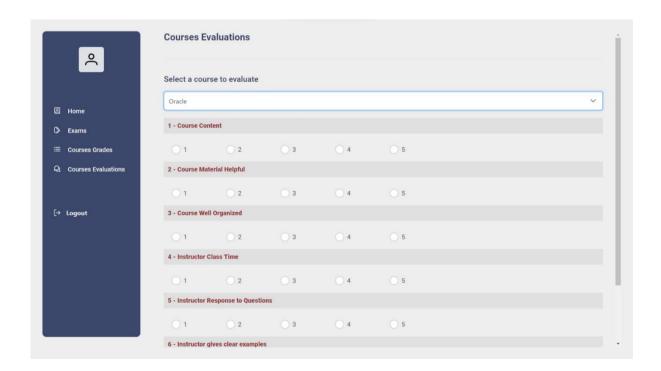
- The courses evaluation page allows students to give feedback on their courses.



- Dropdown menu to select the course for evaluation.



- Feedback questions with 1 to 5 rating options.



- Then Submit

