

Examination System

Graduation Project

Submitted by

- Taher Moaz
- Mohamed Kadry
- Menna Mohamed
- Sara Abdelraheem
- Doaa Ibrahim

ABSTRACT

The **Examination System for ITI** is an advanced, automated platform designed to streamline the management of student enrollments, course materials, examinations, and post-graduation tracking. This system provides a structured approach to conducting online exams, maintaining a comprehensive database, and generating insightful reports to assess institutional effectiveness.

Key functionalities include student registration, course and material management, secure exam scheduling and correction, and real-time tracking of student performance. The system ensures seamless coordination between students, instructors, and administrators, supporting efficient learning processes and transparent evaluation mechanisms.

A robust **SQL database** underpins the system, incorporating **Entity-Relationship Diagrams (ERD)**, **stored procedures**, and **data backup mechanisms** to maintain data integrity and security. The system also features **automated report generation** via **SSRS**, enabling ITI staff to access critical insights on student progress, instructor performance, course details, and employment outcomes.

Additionally, the platform integrates **Power BI dashboards** for advanced analytics, providing a visual representation of key performance indicators (KPIs) related to student assessments, freelancing engagements, and job placements. By leveraging **modern data management and reporting tools**, the Examination System enhances educational outcomes and ensures ITI's mission of producing skilled graduates ready for the job market.

LIST OF ABBREVIATIONS

Keyword	Meaning
SQL	Structured Query Language
SSRS	SQL Server Reporting System
KPIs	key performance indicators

CHAPTER 1

System Overview



1.1 Introduction

In the digital era, educational institutions require efficient, secure, and scalable systems to manage online examinations. The **Automated Examination System** is designed to streamline the process of exam creation, delivery, grading, and reporting while ensuring security and integrity. This system provides an interactive platform for students to take exams online and for instructors to manage assessments effectively.

The system integrates a **structured database** to store and manage student records, exam details, and results, ensuring data accuracy and accessibility. It supports various functionalities such as **exam scheduling, automated correction, and result analysis** through **SQL stored procedures** and **customized reports**.

Key reports include student performance tracking, instructor course assignments, and detailed exam analysis. These reports help ITI staff gain valuable insights into student progress and overall exam efficiency. Additionally, advanced reporting tools such as **SSRS** are utilized to generate professional-grade analytical reports.

With a **user-friendly desktop application**, the system guarantees **ease of navigation, security, and optimal performance**. It is designed to handle **multiple concurrent users**, ensuring a seamless experience for students, instructors, and administrators.

This document outlines the **functional and non-functional requirements, database design, system architecture, and implementation details** of the **Automated Examination System**. It serves as a comprehensive guide for understanding the system's objectives, structure, and operational workflow.

1.2 Problem Statement

Traditional examination systems often suffer from **inefficiencies, security concerns, and administrative burdens**, making it challenging for educational institutions to manage exams effectively. Manual exam processes require significant effort for **scheduling, conducting, grading, and compiling results**, leading to **delays and potential errors**. Additionally, ensuring **exam integrity** and preventing **malpractice** remains a major concern.

Challenges of Traditional Examination Systems:

- **Time-Consuming Exam Management:** Manually preparing, distributing, and grading exams is inefficient and resource-intensive.
- **Human Errors in Evaluation:** Manual grading increases the risk of **inconsistencies and inaccuracies** in student assessments.
- **Limited Scalability:** Traditional methods struggle to accommodate **large numbers of students**, particularly in online learning environments.
- **Data Security Risks:** Paper-based records and **unprotected** digital storage methods make **exam data vulnerable to breaches and loss**.
- **Lack of Real-Time Reporting:** Manually generating student performance reports is slow and does not provide **instant insights** for decision-making.

Proposed Solution: Automated Examination System

To address these challenges, the **Automated Examination System** provides a **secure, efficient, and scalable** solution. It enables institutions to:

- Conduct **online exams** seamlessly.
- Automate **exam scheduling, grading, and result processing**.
- Ensure **exam integrity** through **secure authentication** and **anti-cheating mechanisms**.
- Maintain a **centralized and secure database** for storing student records.
- Generate **real-time analytical reports**, allowing for data-driven decision-making.

By implementing this system, educational institutions can **enhance operational efficiency**, improve the **accuracy of assessments**, and ensure a **seamless experience** for students and instructors alike.

Project Features

The Automated Examination System is designed to streamline and enhance the management of examinations and student progress. The key features of the system include:

- **Intake Management:** Efficiently manages student enrollments across multiple intakes and governorates, ensuring smooth admission processes.
- **Course and Material Provision:** Provides students with access to relevant courses and study materials tailored to their disciplines.
- **Instructor Support:** Facilitates instructor-student interactions, enabling continuous guidance and support throughout the learning journey.
- **Examination and Grading:** Conducts online exams, automates grading, and ensures fair assessment based on student performance.
- **Database Management:** Maintains a secure and comprehensive database of student records, including exam results and course progress.
- **Employment Tracking:** Monitors student employment status post-graduation to assess job placement success and industry relevance.
- **Freelancing Assessment:** Tracks students' engagement in freelancing activities to evaluate skill application in the job market.
- **Progress Monitoring:** Identifies students who do not meet the desired criteria and provides data-driven insights for improvement and intervention.

Literature Review

The literature review focuses on key aspects of examination systems, online learning, and student assessment to understand existing challenges and solutions. The key findings include:

1. Enrollment Management Systems

- Automates the student enrollment process, reducing manual errors and improving efficiency.
- Enhances data accuracy and administrative workflows.
- Provides features such as online applications, document verification, and real-time enrollment status tracking.
- Leads to better student satisfaction and streamlined institutional processes.

2. Online Learning Platforms

- Provides flexible and accessible learning experiences for students.
- Supports interactive learning materials and communication tools for instructor-student engagement.
- Emphasizes the importance of user-friendly interfaces and engagement features.
- Enhances learning outcomes through personalized content delivery and adaptive learning techniques.

3. Student Assessment Methods

- Examines different assessment strategies:
 - Traditional exams – Written tests and oral assessments.
 - Project-based assessments – Practical applications and case studies.
 - Continuous evaluation – Ongoing quizzes and assignments.
- Highlights the benefits of automated grading, plagiarism detection, and AI-driven feedback mechanisms.
- Stresses the importance of fair, reliable, and timely feedback to improve student performance.

4. Employment and Career Development

- Studies emphasize career-oriented education to bridge the gap between academia and industry.
- Recommends integrating industry-relevant skills into curricula.
- Highlights the role of internships, industry collaborations, and career counseling in job market preparedness.
- Suggests tracking student employment trends and freelancing activities to measure educational impact.

5. Data Management and Security

- Identifies the need for secure storage and management of student records.
- Highlights compliance with data protection regulations to safeguard sensitive information.
- Suggests implementing access control measures, encryption, and authentication protocols to prevent data breaches.
- Emphasizes the importance of regular backups and secure digital infrastructure for data integrity.

Objectives

The Automated Examination System for ITI aims to address inefficiencies in traditional examination methods by enhancing security, scalability, and administrative efficiency. The key objectives include:

1. Efficient Examination Management

- Automate exam scheduling, distribution, and grading to reduce manual workload.
- Enable real-time monitoring and proctoring for online exams.
- Ensure quick and accurate result compilation for timely feedback.

2. Enhanced Accuracy and Fairness

- Minimize human errors in grading by implementing automated assessment tools.
- Standardize evaluation criteria to ensure fair and consistent student assessments.
- Reduce bias and discrepancies in exam marking and result processing.

3. Scalability and Accessibility

- Support large-scale student enrollments across multiple locations.
- Enable remote and online examination capabilities for flexible learning.
- Ensure a user-friendly interface for both students and instructors.

4. Secure Data Management and Compliance

- Implement robust encryption and access control measures to protect exam data.
- Ensure compliance with data privacy regulations for student information security.
- Provide automated backups to prevent data loss and ensure system reliability.

5. Real-time Reporting and Insights

- Generate instant performance reports and analytics for students and instructors.
- Provide dashboard-based insights for tracking student progress and identifying areas for improvement.
- Support decision-making with data-driven recommendations.

6. Employment and Career Tracking

- Monitor students' job placements and freelancing activities post-graduation.
- Identify students requiring additional career guidance or support.
- Improve ITI's ability to align education with market demands.

System Development Requirements:

User Management

- Role-Based Access Control (RBAC): Define and manage distinct user roles, including administrators, instructors, and students, with appropriate permissions.
- Authentication & Authorization: Implement secure authentication methods, such as username/password authentication, Single Sign-On (SSO), and Multi-Factor Authentication (MFA) for enhanced security.
- User Profile Management: Enable users to update their profiles, manage credentials, and track their activities.

2. Enrollment Management

- Intake Management: Allow administrators to create and manage student intakes across various governorates or academic sessions.

- Online Application System: Provide a user-friendly interface for students to submit applications, select disciplines, and upload required documents.
- Application Verification & Approval: Implement an automated and manual verification process to ensure document accuracy and eligibility compliance.

3. Course and Material Management

- Course Catalog Management: Maintain a comprehensive database of available courses, including descriptions, prerequisites, and assigned instructors.
- Study Material Repository: Enable instructors to upload, manage, and organize course materials such as lecture slides, video tutorials, and supplementary resources.
- Searchable Course Materials: Provide students with an intuitive search functionality to access learning materials efficiently.

4. Instructor Support and Communication

- Instructor Profiles & Expertise Showcase: Allow instructors to maintain detailed profiles with qualifications, expertise, and contact details.
- Student-Instructor Communication: Integrate messaging, discussion forums, and Q&A sections for enhanced interaction and support.
- Live Sessions & Announcements: Enable instructors to schedule live sessions and make important announcements to students.

5. Examination and Grading System

- Exam Scheduling & Management: Facilitate administrators in scheduling exams, assigning venues, and allocating invigilators.
- Secure Exam Delivery: Implement a secure online examination platform with measures such as randomized questions, session monitoring, and anti-cheating mechanisms.
- Automated & Manual Grading: Develop automated grading for objective-type questions while providing an intuitive grading interface for instructors to assess subjective answers.
- Result Processing & Feedback: Generate instant results for objective assessments and enable instructors to provide feedback on subjective evaluations.

6. Database Management and Security

- Centralized Student Records: Maintain a structured database storing student profiles, enrollment status, exam results, and academic progress.
- Data Backup & Disaster Recovery: Implement regular data backups and recovery protocols to prevent data loss and ensure system resilience.
- Data Privacy & Compliance: Enforce strict security measures, including encryption, role-based access controls, and adherence to data protection regulations

7. Employment and Freelancing Tracking

- Employment Status Tracking: Monitor and record students' employment status, job placements, and types of occupations post-graduation.
- Freelancing Engagement Analysis: Track students' involvement in freelancing projects, including project details and client feedback.
- Career Outcome Analytics: Generate reports evaluating the effectiveness of the educational program in enhancing career prospects and freelance success.

8. Dashboard and Analytics

- Real-Time Dashboard: Develop an intuitive dashboard displaying key performance indicators (KPIs) such as enrollment trends, exam results, and employment rates.
- Data Visualization & Reports: Integrate advanced analytics tools to provide graphical insights using charts, graphs, and interactive elements.
- Automated Notifications & Alerts: Implement real-time updates for exam schedules, deadlines, and performance tracking.

Requirements :

The System should provide these features:

Functional Requirements	Nonfunctional Requirements
<ul style="list-style-type: none">● User Registration & Management Enable users to register and create accounts with roles such as administrators, instructors, and students.	<ul style="list-style-type: none">● Usability & Accessibility<ul style="list-style-type: none">-Ensure a user-friendly interface with intuitive navigation and clear instructional guidelines.-Adhere to web accessibility standards to accommodate diverse

<p>Implement secure authentication mechanisms, including password policies and multi-factor authentication (MFA).</p> <p>Manage user permissions and access levels based on roles.</p>	<p>users, including those with disabilities.</p>
<ul style="list-style-type: none"> ● Course and Material Management <ul style="list-style-type: none"> Course Catalog: Maintain a structured course catalog, including descriptions, prerequisites, and instructor details. Study Materials Management: Allow instructors to upload and manage course materials (e.g., lecture slides, videos, and resources). Content Organization: Implement a structured system for organizing and categorizing course materials for easy accessibility. ● Examination and Grading System <ul style="list-style-type: none"> Exam Scheduling: Enable administrators to schedule exams, assign venues, and allocate invigilators. Secure Exam Delivery: Provide a secure online exam platform or guidelines for offline exams. Grading Mechanism: Develop an automated grading system for 	<ul style="list-style-type: none"> ● Performance & Scalability <ul style="list-style-type: none"> Ensure the system remains highly responsive, handling concurrent users efficiently. Support scalability to accommodate a growing number of users, courses, and data without performance degradation.

<p>objective questions and provide an interface for instructors to assess subjective responses.</p>	
<ul style="list-style-type: none"> ● Database Management and Security <p>Student Records: Maintain a centralized database for student records, including personal details, enrollment status, exam results, and course progress.</p> <p>Backup and Recovery: Implement automated data backup procedures and mechanisms for quick system recovery in case of failures.</p> <p>Data Privacy & Security: Ensure compliance with data protection regulations through encryption, access control, and security protocols.</p> 	<ul style="list-style-type: none"> ● Security & Data Integrity <p>-Implement robust security measures to protect user data from unauthorized access, data breaches, and cyber threats.</p> <p>-Ensure data integrity, preventing errors, inconsistencies, and unauthorized modifications in the database.</p>
<ul style="list-style-type: none"> ● Employment and Freelancing Tracking <p>Employment Tracking: Develop a system to track students' employment status after graduation, including job placements and job types.</p> <p>Freelancing Tracking: Monitor students' participation in</p> 	<ul style="list-style-type: none"> ● Reliability & Compatibility <p>-Ensure system reliability, minimizing downtime and incorporating mechanisms for fault tolerance and disaster recovery.</p> <p>-Provide compatibility with multiple devices, web browsers, and operating systems.</p>

<p>freelancing activities, capturing project details and client feedback.</p> <p>Reporting & Analytics: Generate analytical reports to assess employment outcomes and freelancing success.</p>	
<ul style="list-style-type: none"> ● Dashboard & Analytics <p>Provide an interactive dashboard to visualize key performance indicators (KPIs), such as student enrollment, exam results, and employment rates.</p> <p>Implement real-time monitoring and notifications for critical system updates, deadlines, and academic performance insights.</p> <p>Offer data visualization tools (charts, graphs) for enhanced decision-making.</p> 	<ul style="list-style-type: none"> ● Reporting & Decision Support <ul style="list-style-type: none"> -The system should generate comprehensive reports and analytics to support decision-making. -Provide clear visualizations and meaningful insights to assist administrators and instructors in evaluating performance and user engagement.

Chapter 2

Analysis

Entity-Relationship Diagram (ERD)

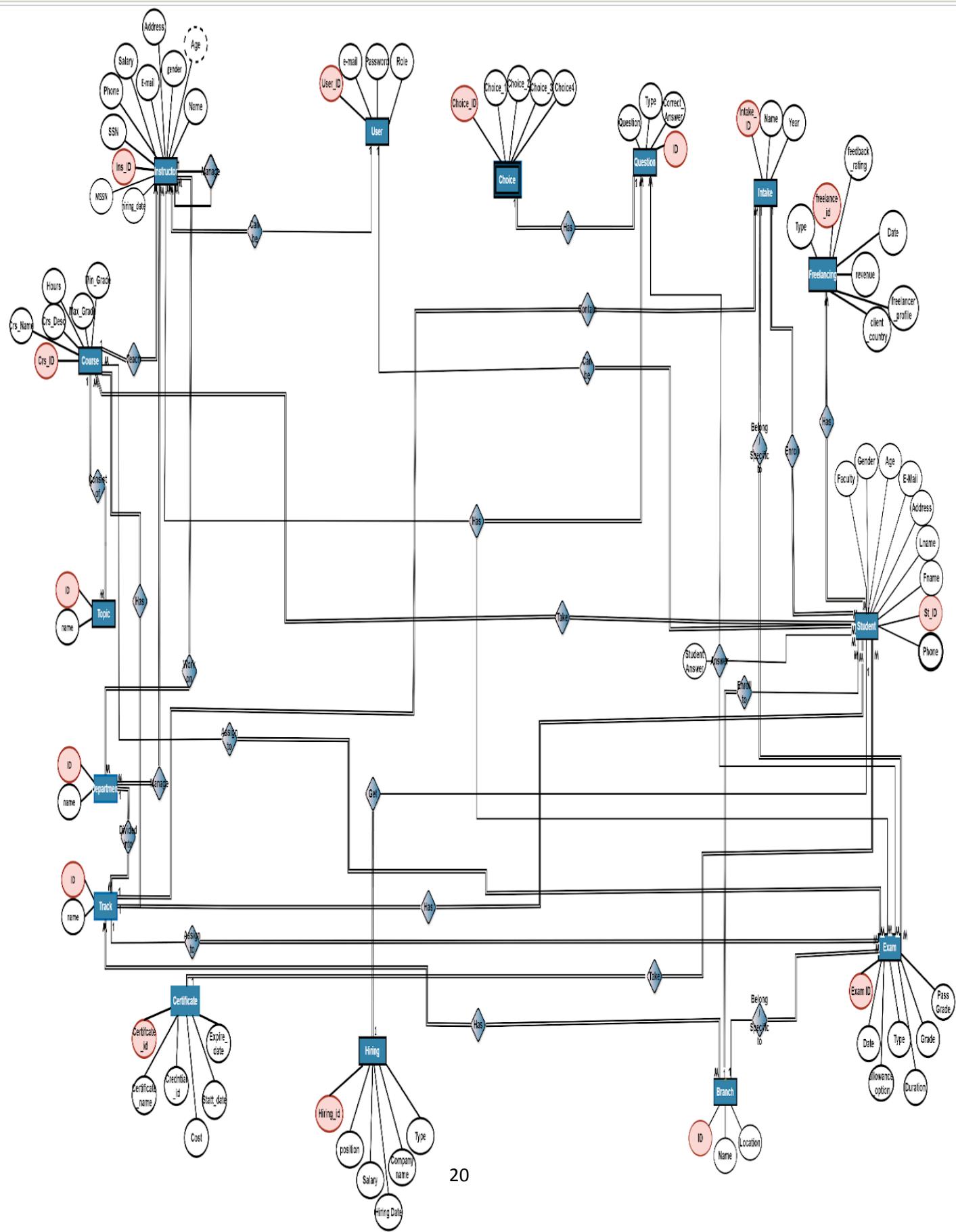
The **Entity-Relationship Diagram (ERD)** serves as a foundational blueprint for the **Automated Examination System for ITI**, illustrating the relationships between key entities within the system. It provides a visual representation of how data is structured, stored, and interconnected, ensuring efficient database design and management.

By defining entities such as **students, instructors, courses, exams, and results**, the ERD facilitates a clear understanding of data flow, integrity constraints, and system interactions. This structured approach enhances **data consistency, security, and scalability**, enabling seamless integration of exam management, grading, and student progress tracking.

The ERD plays a crucial role in system development, ensuring that all database components are logically organized to support optimal performance and functionality.

Figure (1).

Examination System (ERD)



Mapping the Entity-Relationship Diagram (ERD) to a Relational Model

The process of mapping an Entity-Relationship Diagram (ERD) to a relational database model involves converting conceptual entities, attributes, and relationships into well-defined database tables. This ensures efficient data storage, integrity, and retrieval within the Automated Examination System for ITI.

Mapping Process

1. Entities to Tables

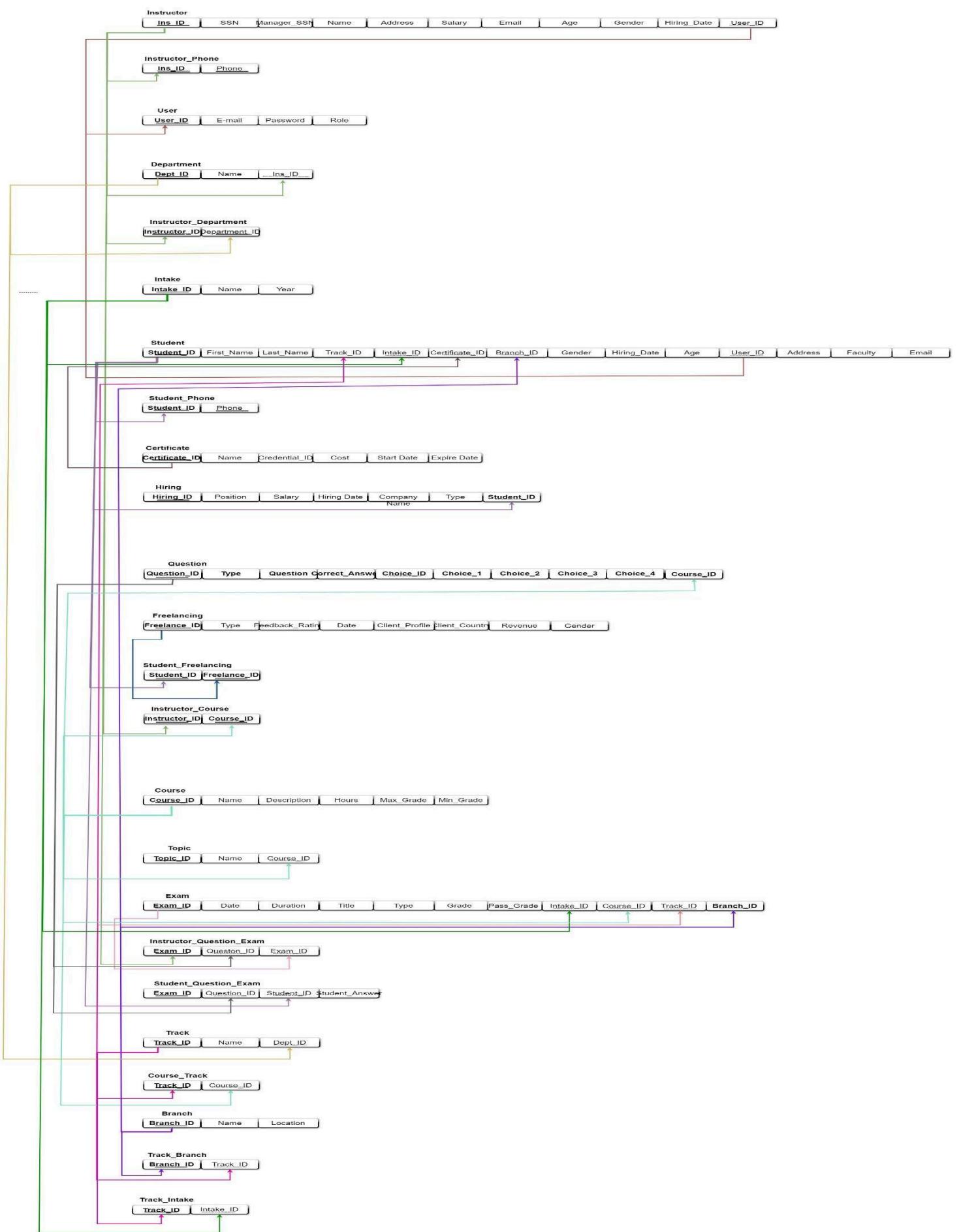
- Each entity in the ERD is mapped to a corresponding table.
- Attributes become columns within these tables.
- A Primary Key (PK) is assigned to uniquely identify each record.

2. Relationships to Foreign Keys

- One-to-Many (1:M) Relationships: The primary key of the parent entity is added as a foreign key (FK) in the child entity's table.
- Many-to-Many (M:N) Relationships: A junction table (bridge table) is created, containing foreign keys referencing both related tables.

3. Handling Attributes

Examination System Mapping



A photograph of four students—three boys and one girl—studying together at a wooden table in a library. They are looking down at their books and writing in notebooks. The room is filled with natural light from large windows behind them, which look out onto a forest. A bookshelf is visible on the left side of the frame.

Chapter 3

Design

Tables (Objects):

dbo.Branch

dbo.Certificate

dbo.Choices

dbo.course

dbo.Crs_Track

dbo.Department

dbo.Exam

dbo.Freelancing

dbo.Hiring

dbo.Ins_Dep

dbo.Ins_Q_Exam

dbo.Inst_Crs

dbo.Instructor

dbo.Instructor_Phone

dbo.Intake

dbo.Q_st_Ex

dbo.Question

dbo.St_Freelancing

dbo.student

dbo.student_Phone

dbo.Topic

dbo.Track

dbo.Track_Branch

dbo.Track_intake

dbo.users

Examination System > Tables > dbo.Branch

1. dbo.Branch

columns:

	Column Name	Data Type	Allow Nulls
PK	branch_id	int	<input type="checkbox"/>
	branch_name	varchar(100)	<input checked="" type="checkbox"/>
	location	varchar(500)	<input checked="" type="checkbox"/>

2. dbo.Certificate

columns:

certificate_id	int	DontAllowNull
certificate_name	varchar(200)	AllowNull
credential_id	varchar(100)	AllowNull
cost	money	AllowNull
start_date	date	AllowNull
expire_date	date	AllowNull
		DontAllowNull

3- dbo.Choices

columns:

Choice_id	int	DontAllowNull
Question_id	int	DontAllowNull
Choice	varchar(255)	DontAllowNull

4- dbo.Course

columns:

course_id	int	DontAllowNull
Name	varchar(50)	AllowNull
description	varchar(MAX)	AllowNull
max_grade	int	AllowNull
min_grade	int	AllowNull

hour	int	AllowNull
-------------	-----	-----------

5- dbo.Crs_Track

columns:

course_id	int	DontAllowNull
track_id	int	DontAllowNull

6- dbo.Department

columns:

Dept_id	int	DontAllowNull
name	varchar(50)	AllowNull
MGR_ID	int	AllowNull

7 - dbo.Exam

columns:

xam_id	int	DontAllowNull
date	date	AllowNull
duration	float	AllowNull
title	varchar(50)	AllowNull
type	varchar(50)	AllowNull
min_grade	int	AllowNull
max_grade	int	AllowNull
pass_grade	int	AllowNull
intake_id	int	AllowNull
course_id	int	AllowNull
track_id	int	AllowNull
branch_id	int	AllowNull

8- dbo.Freelancing

columns:

freelance_id	int	DontAllowNull
type	varchar(100)	AllowNull
feedback_rating	decimal(18, 0)	AllowNull
date	date	AllowNull
client_profile	varchar(100)	AllowNull
client_country	varchar(50)	AllowNull
freelancer_profile	varchar(100)	AllowNull
revenue	int	AllowNull

9- dbo.Hiring

columns:

hiring_id	int	DontAllowNull
stu_id	int	AllowNull
position	varchar(200)	AllowNull
salary	money	AllowNull
hiring_date	date	AllowNull
company_name	varchar(200)	AllowNull
type	varchar(50)	AllowNull

10.dbo.Ins_Dep

columns:

ins_id	int	DontAllowNull
Dept_id	int	DontAllowNull

11- dbo.Ins_Q_Exam

columns:

ins_id	int	DontAllowNull
que_id	int	DontAllowNull
Exam_id	int	DontAllowNull

12- dbo.Inst_Crs

columns:

ins_id	int	DontAllowNull
course_id	int	DontAllowNull

13 - dbo.Instructor

columns:

ins_id	int	DontAllowNull
ssn	varchar(50)	AllowNull
MGR_ID	int	AllowNull
name	varchar(50)	AllowNull
phone	varchar(50)	AllowNull
address	varchar(MAX)	AllowNull
salary	money	AllowNull
email	varchar(50)	AllowNull
age	int	AllowNull
gender	varchar(10)	AllowNull
hiring_date	date	AllowNull
user_id	int	AllowNull

Procedures

14 – dbo. Instructor Phone

columns:

instructor_id	int	DontAllowNull
Phone_Num	int	DontAllowNull

15 – dbo. Intake

columns:

intake_id	int	DontAllowNull
name	varchar(50)	AllowNull
year	int	AllowNull

16 - dbo. Q_st_Ex

columns:

que_id	int	AllowNull
stu_id	int	AllowNull
exam_id	int	AllowNull
stu_answer	nvarchar(100)	DontAllowNull

17 - dbo. Question

columns:

que_id	int	AllowNull
stu_id	int	AllowNull
exam_id	int	AllowNull
stu_answer	nvarchar(100)	DontAllowNull

Procedures

18 - dbo. St_Freelancing

columns:

stu_id	int	DontAllowNull
freelance_id	int	DontAllowNull

Procedures

19 - dbo.student

columns:

stu_id	int	DontAllowNull
stu_fname	varchar(50)	AllowNull
stu_lname	varchar(50)	AllowNull
phone	varchar(20)	AllowNull
address	varchar(MAX)	AllowNull
email	varchar(50)	AllowNull
age	int	AllowNull
gender	varchar(10)	AllowNull
faculty	varchar(50)	AllowNull
user_id	int	AllowNull
intake_id	int	AllowNull
track_id	int	AllowNull
certificate_id	int	AllowNull
branch_id	int	AllowNull

Procedures

20 - dbo.student_Phone

columns:

student_id	int	DontAllowNull
student_Num	varchar(50)	DontAllowNull

Procedures

21 - dbo.Topic

columns:

topic_id	int	DontAllowNull
topic_name	varchar(100)	AllowNull
course_id	int	AllowNull

Procedures

22 - dbo.Track

columns:

track_id	int	DontAllowNull
name	varchar(100)	AllowNull
Dept_id	int	AllowNull

Procedures

23 - dbo.Track_Branch

columns:

track_id	int	DontAllowNull
branch_id	int	DontAllowNull

Procedures

24 - dbo.Track_intake

columns:

track_id	int	DontAllowNull
intake_id	int	DontAllowNull

Procedures

25 - dbo.USers

columns:

userid	int	DontAllowNull
role	nvarchar(255)	AllowNull
Email	varchar(50)	AllowNull
password	varchar(50)	AllowNull
created_at	timestamp	DontAllowNull

Procedures

CRUD Stored Procedure

Procedure Name	Description	Parameters
InsertUser	Inserts a new user record	@userid INT, @role NVARCHAR(255), @Email VARCHAR(50), @password VARCHAR(50), @created_at TIMESTAMP
UpdateUser	Updates an existing user record	@userid INT, @role NVARCHAR(255), @Email VARCHAR(50), @password VARCHAR(50), @created_at TIMESTAMP
DeleteUser	Deletes a user record	@userid INT
SelectUser	Retrieves a specific user record	@userid INT
InsertIntake	Inserts a new intake record	@intake_id INT, @name VARCHAR(50), @year INT
UpdateIntake	Updates an existing intake record	@intake_id INT, @name VARCHAR(50), @year INT
DeleteIntake	Deletes an intake record	@intake_id INT

SelectIntake	Retrieves a specific intake record	@intake_id INT
InsertCertificate	Inserts a new certificate record	@certificate_id INT, @certificate_name VARCHAR(200), @credential_id VARCHAR(100), @cost MONEY, @start_date DATE, @expire_date DATE
UpdateCertificate	Updates an existing certificate record	@certificate_id INT, @certificate_name VARCHAR(200), @credential_id VARCHAR(100), @cost MONEY, @start_date DATE, @expire_date DATE
DeleteCertificate	Deletes a certificate record	@certificate_id INT
SelectCertificate	Retrieves a specific certificate record	@certificate_id INT
InsertFreelancing	Inserts a new freelancing record	@freelance_id INT, @type VARCHAR(100), @feedback_rating DECIMAL, @date DATE, @client_profile VARCHAR(100), @client_country VARCHAR(50), @freelancer_profile VARCHAR(100), @revenue INT

UpdateFreelancing	Updates an existing freelancing record	@freelance_id INT, @type VARCHAR(100), @feedback_rating DECIMAL, @date DATE, @client_profile VARCHAR(100), @client_country VARCHAR(50), @freelancer_profile VARCHAR(100), @revenue INT
DeleteFreelancing	Deletes a freelancing record	@freelance_id INT
SelectFreelancing	Retrieves a specific freelancing record	@freelance_id INT
InsertCourse	Inserts a new course record	@course_id INT, @Name VARCHAR(50), @description VARCHAR(MAX), @hours TIME, @max_grade INT, @min_grade INT
UpdateCourse	Updates an existing course record	@course_id INT, @Name VARCHAR(50), @description VARCHAR(MAX), @hours int, @max_grade INT, @min_grade INT
DeleteCourse	Deletes a course record	@course_id INT

SelectCourse	Retrieves a specific course record	@course_id INT
InsertDepartment	Inserts a new department record	@Dept_id INT, @name VARCHAR(50), @MGR_SSN INT
UpdateDepartment	Updates an existing department record	@Dept_id INT, @name VARCHAR(50), @MGR_SSN INT
DeleteDepartment	Deletes a department record	@Dept_id INT
SelectDepartment	Retrieves a specific department record	@Dept_id INT
InsertTrack	Inserts a new track record	@track_id INT, @name VARCHAR(100), @Dept_id INT
UpdateTrack	Updates an existing track record	@track_id INT, @name VARCHAR(100), @Dept_id INT
DeleteTrack	Deletes a track record	@track_id INT
SelectTrack	Retrieves a specific track record	@track_id INT
InsertBranch	Inserts a new branch record	@branch_id INT, @branch_name VARCHAR(100), @location VARCHAR(100)

UpdateBranch	Updates an existing branch record	@branch_id INT, @branch_name VARCHAR(100), @location VARCHAR(100)
DeleteBranch	Deletes a branch record	@branch_id INT
SelectBranch	Retrieves a specific branch record	@branch_id INT
InsertQuestion	Inserts a new question record	@Question_ID INT, @Question_Type VARCHAR(20), @Question_ModelAn swer VARCHAR(100), @Question VARCHAR(500)
UpdateQuestion	Updates an existing question record	@Question_ID INT, @Question_Type VARCHAR(20), @Question_ModelAn swer VARCHAR(100), @Question VARCHAR(500)
DeleteQuestion	Deletes a question record	@Question_ID INT
SelectQuestion	Retrieves a specific question record	@Question_ID INT
InsertChoices	Inserts a new choice record	@Choice_id INT, @Question_id INT, @Choice VARCHAR(255)

UpdateChoices	Updates an existing choice record	@Choice_id INT, @Question_id INT, @Choice VARCHAR(255)
DeleteChoices	Deletes a choice record	@Choice_id INT
SelectChoices	Retrieves a specific choice record	@Choice_id INT
InsertStudent	Inserts a new student record	@stu_id INT, @stu_fname VARCHAR(50), @stu_lname VARCHAR(50), @phone VARCHAR(20), @address VARCHAR(MAX), @email VARCHAR(50), @age INT, @gender VARCHAR(10), @faculty VARCHAR(50), @user_id INT, @intake_id INT, @track_id INT, @certificate_id INT, @branch_id INT

UpdateStudent	Updates an existing student record	<code>@stu_id INT, @stu_fname VARCHAR(50), @stu_lname VARCHAR(50), @phone VARCHAR(20), @address VARCHAR(MAX), @email VARCHAR(50), @age INT, @gender VARCHAR(10), @faculty VARCHAR(50), @user_id INT, @intake_id INT, @track_id INT, @certificate_id INT, @branch_id INT</code>
DeleteStudent	Deletes a student record	<code>@stu_id INT</code>
SelectStudent	Retrieves a specific student record	<code>@stu_id INT</code>

InsertInstructor	Inserts a new instructor record	@ins_id INT, @ssn INT, @MGR_SSN INT, @name VARCHAR(50), @phone VARCHAR(50), @address VARCHAR(MAX), @salary MONEY, @email VARCHAR(50), @age INT, @gender VARCHAR(10), @hiring_date DATE, @user_id INT
UpdateInstructor	Updates an existing instructor record	@ins_id INT, @ssn INT, @MGR_SSN INT, @name VARCHAR(50), @phone VARCHAR(50), @address VARCHAR(MAX), @salary MONEY, @email VARCHAR(50), @age INT, @gender VARCHAR(10), @hiring_date DATE, @user_id INT
DeleteInstructor	Deletes an instructor record	@ins_id INT
SelectInstructor	Retrieves a specific instructor record	@ins_id INT

InsertTrackIntake	Inserts a new track-intake relationship	@track_id INT, @intake_id INT
UpdateTrackIntake	Updates a track-intake relationship	@track_id INT, @intake_id INT
DeleteTrackIntake	Deletes a track-intake relationship	@track_id INT, @intake_id INT
SelectTrackIntake	Retrieves a specific track-intake relationship	@track_id INT, @intake_id INT
InsertInstructorPhone	Inserts a new instructor phone number	@instructor_id INT, @Phone_Num INT
UpdateInstructorPhone	Updates an instructor phone number	@instructor_id INT, @Phone_Num INT
DeleteInstructorPhone	Deletes an instructor phone number	@instructor_id INT, @Phone_Num INT
SelectInstructorPhone	Retrieves a specific instructor phone number	@instructor_id INT, @Phone_Num INT
InsertStudentPhone	Inserts a new student phone number	@student_id INT, @student_Num INT
UpdateStudentPhone	Updates a student phone number	@student_id INT, @student_Num INT
DeleteStudentPhone	Deletes a student phone number	@student_id INT, @student_Num INT
SelectStudentPhone	Retrieves a specific student phone number	@student_id INT, @student_Num INT

InsertExam	Inserts a new exam record	<pre> @Exam_id INT, @date DATE, @duration INT, @title VARCHAR(50), @type VARCHAR(50), @min_grade INT, @max_grade INT, @pass_grade INT, @intake_id INT, @course_id INT, @track_id INT, @branch_id INT </pre>
UpdateExam	Updates an existing exam record	<pre> @Exam_id INT, @date DATE, @duration INT, @title VARCHAR(50), @type VARCHAR(50), @min_grade INT, @max_grade INT, @pass_grade INT, @intake_id INT, @course_id INT, @track_id INT, @branch_id INT </pre>
DeleteExam	Deletes an exam record	@Exam_id INT
SelectExam	Retrieves a specific exam record	@Exam_id INT

InsertHiring	Inserts a new hiring record	@hiring_id INT, @stu_id INT, @position VARCHAR(200), @salary MONEY, @hiring_date DATE, @company_name VARCHAR(200), @type VARCHAR(50)
UpdateHiring	Updates an existing hiring record	@hiring_id INT, @stu_id INT, @position VARCHAR(200), @salary MONEY, @hiring_date DATE, @company_name VARCHAR(200), @type VARCHAR(50)
DeleteHiring	Deletes a hiring record	@hiring_id INT
SelectHiring	Retrieves a specific hiring record	@hiring_id INT
InsertTopic	Inserts a new topic record	@topic_id INT, @topic_name VARCHAR(100), @course_id INT
UpdateTopic	Updates an existing topic record	@topic_id INT, @topic_name VARCHAR(100), @course_id INT
DeleteTopic	Deletes a topic record	@topic_id INT

SelectTopic	Retrieves a specific topic record	@topic_id INT
InsertInstCrs	Inserts a new instructor-course relationship	@ins_id INT, @course_id INT
UpdateInstCrs	Updates an instructor-course relationship	@ins_id INT, @course_id INT
DeleteInstCrs	Deletes an instructor-course relationship	@ins_id INT, @course_id INT
SelectInstCrs	Retrieves a specific instructor-course relationship	@ins_id INT, @course_id INT
InsertInsDep	Inserts a new instructor-department relationship	@ins_id INT, @Dept_id INT
UpdateInsDep	Updates an instructor-department relationship	@ins_id INT, @Dept_id INT
DeleteInsDep	Deletes an instructor-department relationship	@ins_id INT, @Dept_id INT
SelectInsDep	Retrieves a specific instructor-department relationship	@ins_id INT, @Dept_id INT
InsertCrsTrack	Inserts a new course-track relationship	@course_id INT, @track_id INT

UpdateCrsTrack	Updates a course-track relationship	@course_id INT, @track_id INT
DeleteCrsTrack	Deletes a course-track relationship	@course_id INT, @track_id INT
SelectCrsTrack	Retrieves a specific course-track relationship	@course_id INT, @track_id INT
InsertStFreelancing	Inserts a new student-freelancing relationship	@stu_id INT, @freelance_id INT
UpdateStFreelancing	Updates a student-freelancing relationship	@stu_id INT, @freelance_id INT
DeleteStFreelancing	Deletes a student-freelancing relationship	@stu_id INT, @freelance_id INT
SelectStFreelancing	Retrieves a specific student-freelancing relationship	@stu_id INT, @freelance_id INT
InsertTrackBranch	Inserts a new track-branch relationship	@track_id INT, @branch_id INT
UpdateTrackBranch	Updates a track-branch relationship	@track_id INT, @branch_id INT
DeleteTrackBranch	Deletes a track-branch relationship	@track_id INT, @branch_id INT

SelectTrackBranch	Retrieves a specific track-branch relationship	@track_id INT, @branch_id INT
InsertInsQExam	Inserts a new instructor-question-exam relationship	@ins_id INT, @que_id INT, @Exam_id INT
UpdateInsQExam	Updates an instructor-question-exam relationship	@ins_id INT, @que_id INT, @Exam_id INT
DeleteInsQExam	Deletes an instructor-question-exam relationship	@ins_id INT, @que_id INT, @Exam_id INT
SelectInsQExam	Retrieves a specific instructor-question-exam relationship	@ins_id INT, @que_id INT, @Exam_id INT
InsertQStEx	Inserts a new question-student-exam relationship	@que_id INT, @stu_id INT, @Exam_id INT, @St_Answer VARCHAR(50)
UpdateQStEx	Updates a question-student-exam relationship	@que_id INT, @stu_id INT, @Exam_id INT, @St_Answer VARCHAR(50)
DeleteQStEx	Deletes a question-student-exam relationship	@que_id INT, @stu_id INT, @Exam_id INT

SelectQStEx	Retrieves a specific question-student-exam relationship	@que_id INT, @stu_id INT, @Exam_id INT
-------------	---	--

Exam generation stored procedure:

Procedure Name	Parameters	Description
examCorrection	@examID INT, @studentID INT	Corrects an exam and calculates the score by counting correct answers
Exam_Generation	@Exam_Title VARCHAR(50), @Exam_Duration INT, @Exam_Date DATE, @Exam_Grade INT, @Course_ID INT, @Track_ID INT, @Branch_ID INT, @Exam_ID INT	Creates a new exam record in the database
Exam_Answer	@Student_Id INT, @Exam_Id INT, @Question_ID INT, @Student_Answer VARCHAR(50)	Records student answers for exam questions

SSRS Reports:

1.Student Information report



Students Information

Student id	Full name	Phone	Age	Gender	Branch	Certificate	Intake
392	Arny Jakubovicz	433 368 3657	29	Male	Mansoura	Certified Ethical Hacker (CEH)	Intake 32
393	Rosette Caldecutt	289 548 1985	26	Female	Mansoura	AWS Certified Data Analytics	Intake 33
394	Ainslie Gerge	898 467 5171	23	Female	Mansoura	Microsoft Power BI Data Analyst	Intake 34
395	Lonny Gemson	668 736 0733	26	Male	Mansoura	Google Associate Cloud Engineer	Intake 35
396	Yasmin O.Corren	193 804 1163	23	Female	Mansoura	Scrum Master Certified (SMC)	Intake 36
397	Terry Drust	582 172 3895	24	Male	Mansoura	Certified Information Systems Security Professional (CISSP)	Intake 37
398	Tersina Linfitt	321 513 1362	25	Female	Mansoura	AWS Certified DevOps Engineer	Intake 38
399	Lorianna Zapata	660 446 8607	27	Female	Mansoura	Certified Kubernetes Administrator (CKA)	Intake 39
400	Aidan Mounsey	747 562 7891	22	Female	Mansoura	Data Science with Python	Intake 40
401	Robin Novik	443 794 1290	26	Male	Mansoura	Microsoft Certified: Azure Fundamentals	Intake 41
402	Peyter Luck	951 806 8682	27	Male	Mansoura	AWS Certified Solutions Architect	Intake 42
403	Vail Lanaway	739 839 1211	23	Male	Mansoura	Microsoft Certified: Azure Fundamentals	Intake 43
736	Trisha Willers	886 994 1356	28	Female	Aswan	Scrum Master Certified (SMC)	Intake 16

2.Student grade report



Student Grade

Course name	Grade Percentage
Cyber Security	50%
OS	100%
Cloud Deployment with Azure	66%
GraphQL & REST API Integration	100%
Presentation Skills	58%
3D Motion Design	100%

3.Instructor report



Instructor

Instrucor	Stirling	Department	Software Development & Programming
Course Name		Number of Students	
Presentation Skills		750	

4.Course Topics report



Course Topics	
Course	Java
Topic	
Principles: Encapsulation. Inheritance. Polymorphism. Abstraction	
Classes & Objects	
Constructors & Destructors	
Interfaces & Abstract Classes	
Static & Dynamic Binding	
Design Patterns (Singleton. Factory. etc.)	
Exception Handling	
File Handling	
Object-Oriented Analysis & Design (OOAD)	
Unit Testing in OOP	

Page 1 of 2

5.Exam report



1. What is OLAP used for in BI?

- A. Data entry
- B. Online analysis of multidimensional data
- C. Predictive analysis
- D. Real-time data processing

2. In the context of BI, what is a "data mart"?

- A. A small data warehouse used for specific business functions
- B. A data model
- C. A data cleaning technique
- D. A data integration tool

6.Student answer report



Student answer

No	Question	Student answer	Answer Status
1	What is OLAP used for in BI?	Online analysis of multidimensional data	Correct Answer
2	In the context of BI, what is a "data mart"?	A small data warehouse used for specific business functions	Correct Answer
3	Garbage Collection is manual process.	FALSE	Correct Answer
4	There is an equivalent join expression that can be substituted for all subquery expressions.	TRUE	Correct Answer
5	SELECT DISTINCT is used if a user wishes to see duplicate columns in a query.	FALSE	Correct Answer
6	The semicolon terminates a SQL statement (and executes it).	TRUE	Correct Answer
7	Operating systems are a widely recognized example of system software.	TRUE	Correct Answer
8	Every Server control of ASP.NET must have an id?	TRUE	Correct Answer
9	A software engineer designs the user interface by applying an iterative process that draws on predefined design principles.	TRUE	Correct Answer
10	A white box test scales up well at different granularity levels of testing.	FALSE	Wrong Answer



Information Technology Institute

**Examination
System**

Student

Exam

Instructor

Department

Course



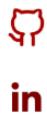
Navigation



Team Members



Menna



in



Taher Moaz



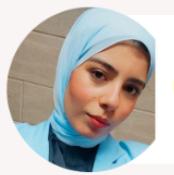
in



Mohamed Qadri



in



Doaa Ibrahim



in



Sara Eldamarany



in



Navigation



Filters

Governorate

All

faculty

All

gender

All

age

All



Number Of Students

1000



Number Of Faculties

80

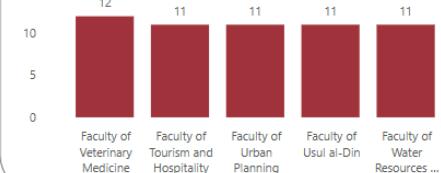


Number Of Cities

19



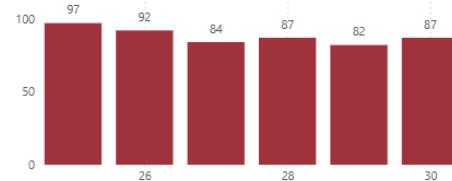
Major 5 Colleges Supplying Students



Gender Distribution of Students



Top 6 Age Groups of Students



Student Distribution Across Governorates



Navigation



Filters

hiring_date

1/4/2010

2/21/2025

1/4/2010 - 2/21/2025



Number Of Instructors

200



Average Instructor Age

39.56



Number Of Managers

8



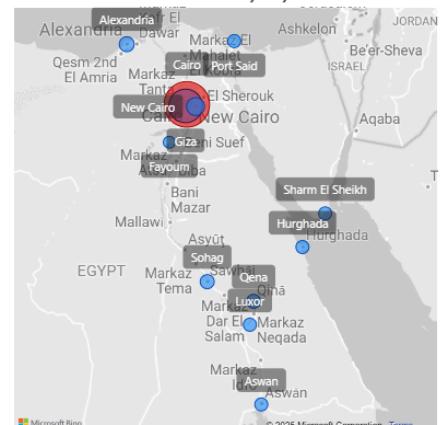
Instructor By Gender

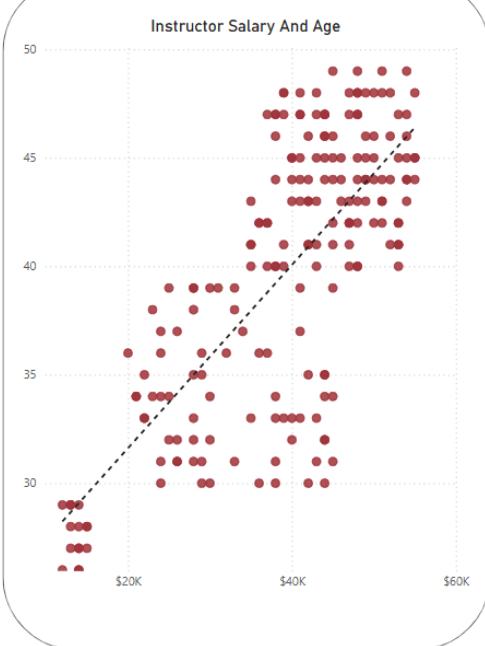


Number Of Instructors Over Years



Instructor By City

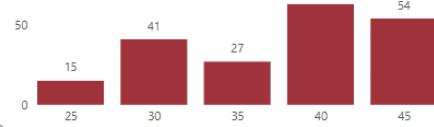


**Navigation****Filters**

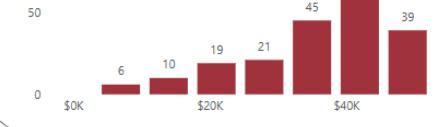
correlation for age and salary



Instructor By Age



Instructor By Salary

**Navigation****Filters**

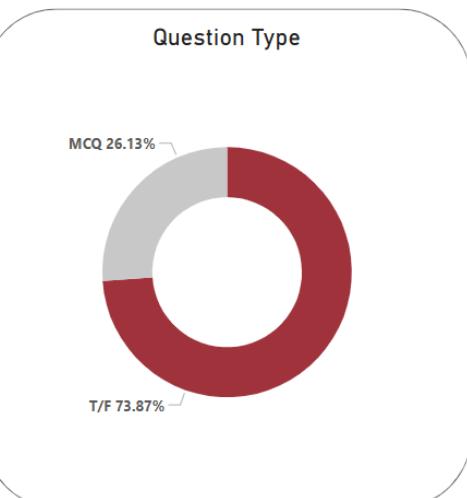
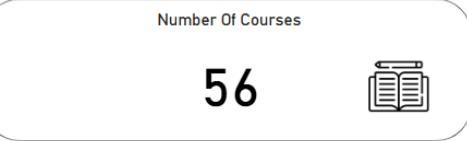
Question Type
All



Number Of Questions

111

Course ID	Course Name	Question ID
1	Web Services	10
3	Web Services	22
5	Web Services	45
6	Web Services	53
7	Web Services	59
8	Web Services	69
8	Web Services	75
8	Web Services	78
9	Web Services	81
10	Web Services	93



itj

Navigation



Filters

Role: All

i Filter

Number Of Users

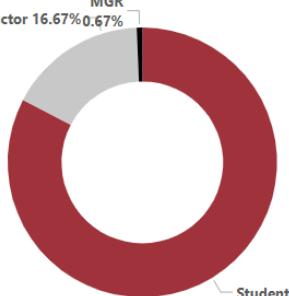
1200 

User ID	Email	Role
396	Yasmin395	Student
821	Yankee820	Student
672	Ximenes671	Student
680	Wynn679	Student
600	Wrennie599	Student
9	Woodman8	MGR
173	Winne172	Student
271	Winna270	Student
913	Winifred912	Student
351	Wilmette350	Student
507	Willow506	Student

Number Of Roles

3 

Number Of Users By Role



itj

Navigation



Filters

i Filter

Number Of Freelancers

300 

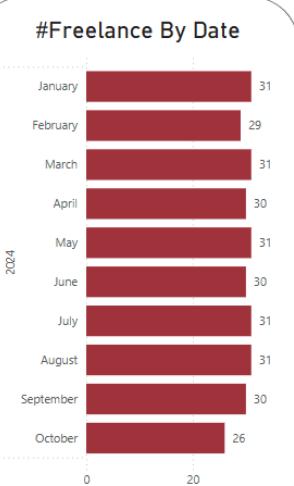
Number Of Countries

10 

Average Rating

4.80 

#Freelance By Date



Date	Count
January	31
February	29
March	31
April	30
May	31
June	30
July	31
August	31
September	30
October	26

Client Country

Client Country	Average Rating
Spain	4
UAE	4
Australia	5
Canada	5
France	5
Germany	5
India	5
Netherlands	5
UK	5
USA	5

Freelancing By Country

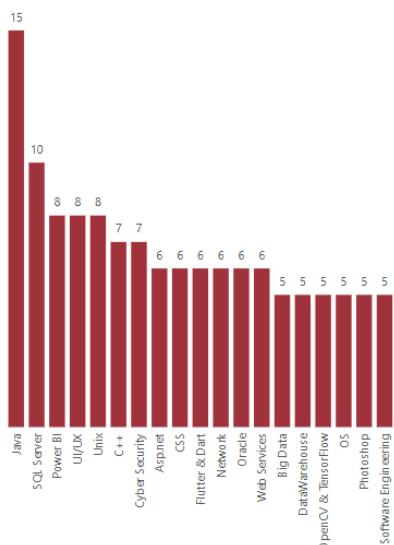
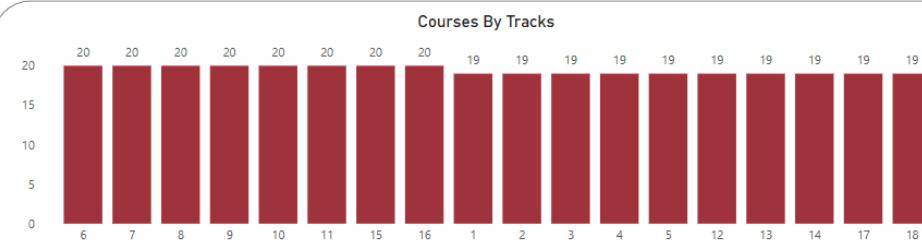


Microsoft Bing © 2025 Microsoft Corporation [Terms](#)

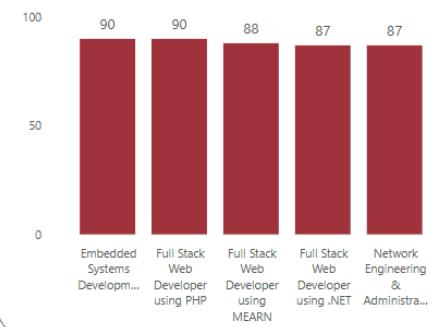
**Navigation****Filters** 0

Course	Topic Name
Unit Testing & Debugging	Writing Unit Tests with xUnit & NUnit
Adobe After Effects	Working with Keyframes & Animation
Flutter & Dart	Working with APIs & JSON Parsing
Network	Wireless Networks & Security
UI/UX	Wireframing & Prototyping (Figma, Adobe XD)
UI/UX	Wireframing & Prototyping
Windows XP	Windows XP Architecture
Flutter & Dart	Widgets, State Management & UI Design
Web Services	WebSockets & Real-time Communication

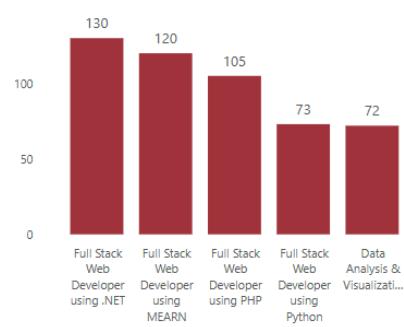
Topics Covered in Each Course

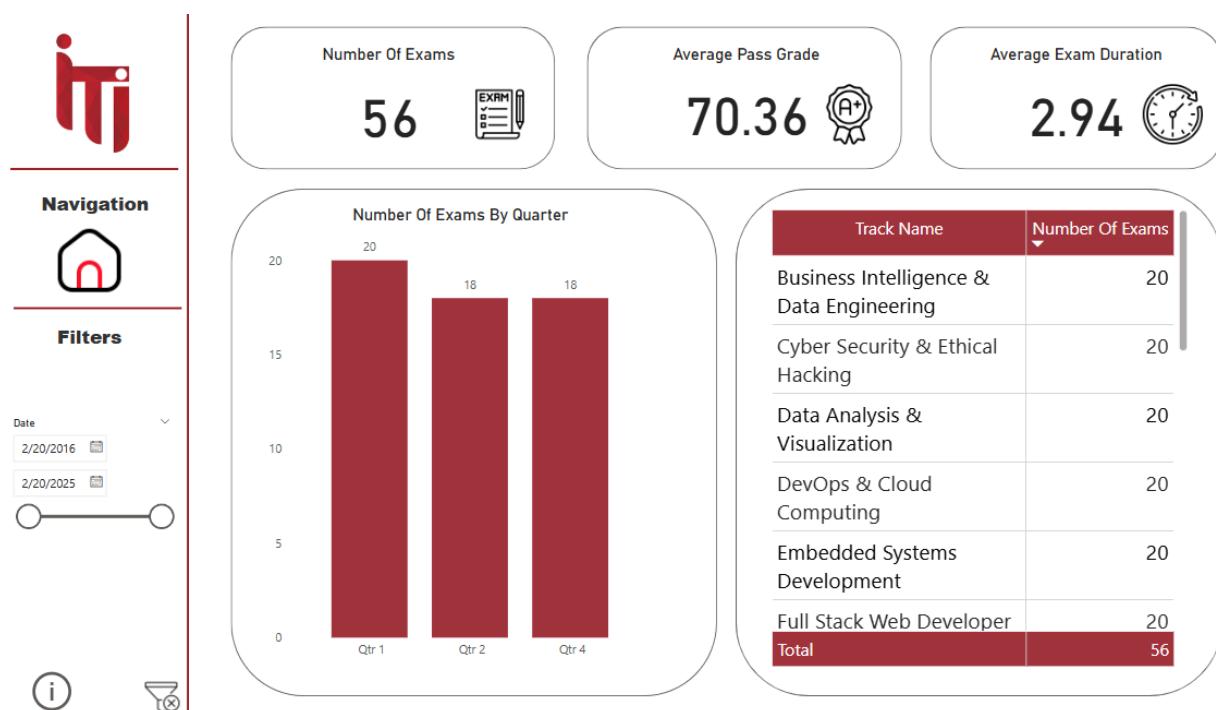
**Navigation****Filters** 0

Top 5 Tracks By Topics



Top 5 Tracks By Students







Navigation



Filters

Department ▼
All ▼



Number Of Departments

7



Number Of Tracks

18



Instructor By Department

QA Engineer...	59
Cybersecurity...	39
Embedded Sy...	32
Multimedia &...	25
Business & IT...	18
Artificial Intell...	14
Software Dev...	13

Tracks Per Department

Software Dev...	5
Artificial Intell...	3
Cybersecurity...	3
Multimedia &...	3
Business & IT...	2
Embedded Sy...	1
QA Engineer...	1

Dept Name	MGR ID	MGR Name	Salary	Instructors
QA Engineering & Validation	164	Emlyn	\$49,000	59
Software Development & Programming	9	Gregoor	\$47,000	13
Artificial Intelligence & Data Science	23	Janos	\$38,000	14
Cybersecurity & Networks	62	Ky	\$21,000	39
Embedded Systems & IoT	186	Livvie	\$50,000	32
Business & IT Management	122	Regan	\$41,000	18
Multimedia & Graphic Design	147	Royall	\$39,000	25



Navigation



Filters



Number Of Intakes

45



Number Of Tracks

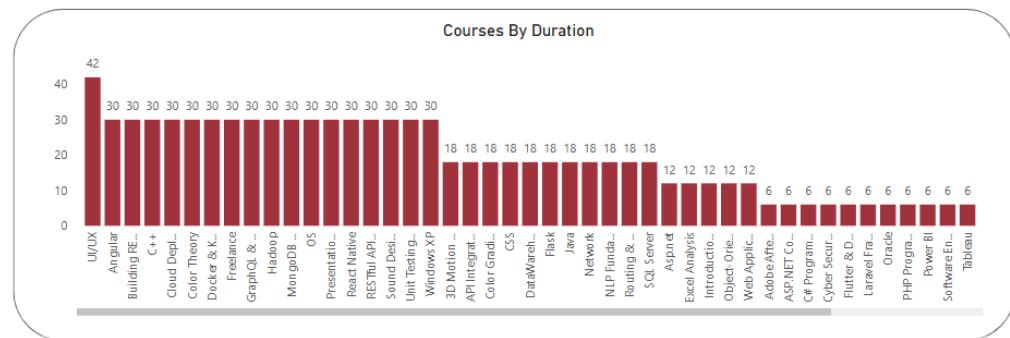
18



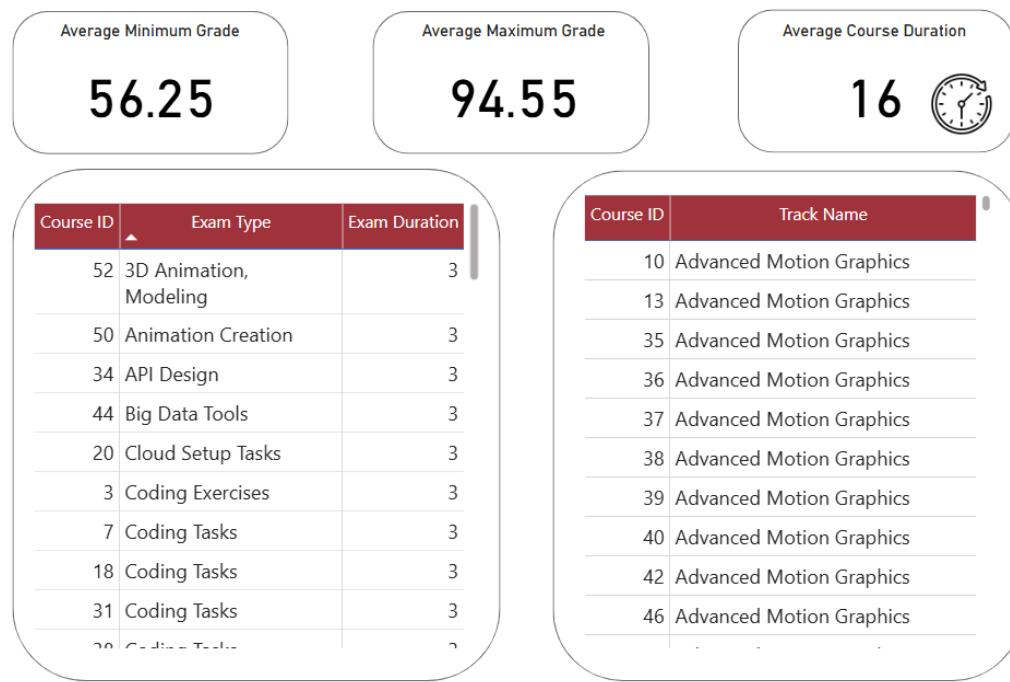
Track By Intake

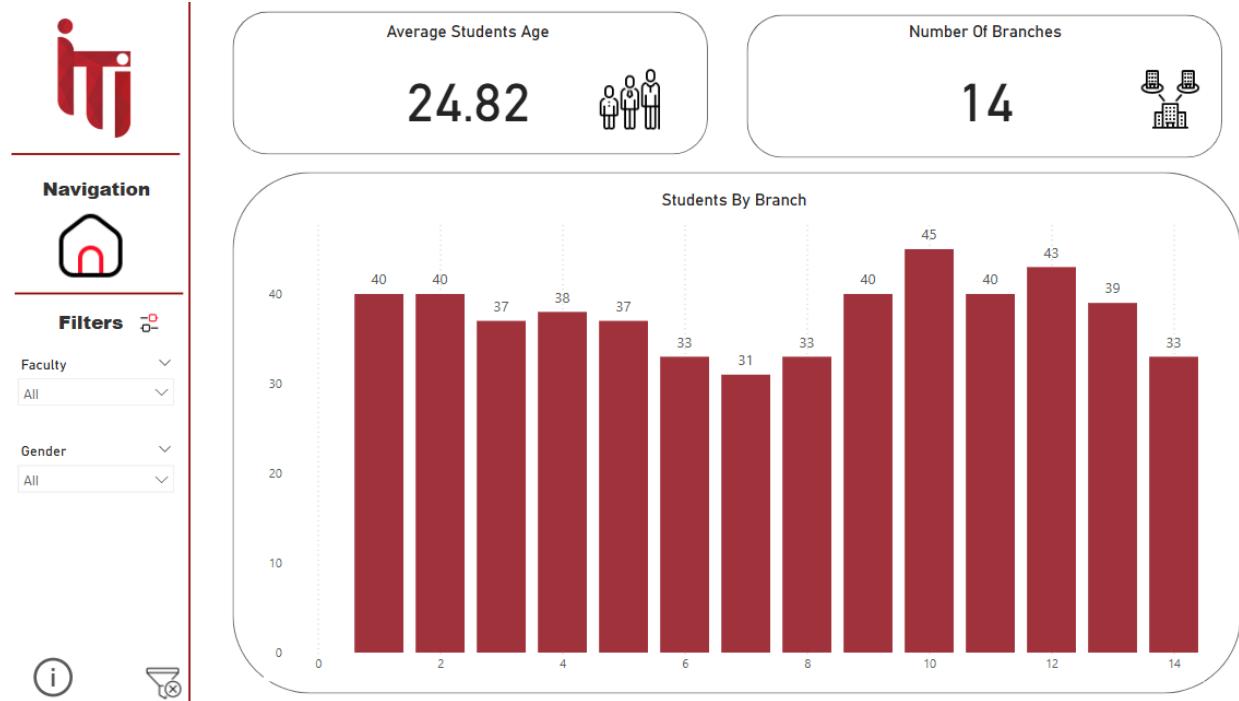
Intake 32	18
Intake 33	18
Intake 34	18
Intake 35	18
Intake 36	18
Intake 37	18
Intake 38	18
Intake 39	18
Intake 40	18
Intake 41	18
Intake 42	18
Intake 43	18
Intake 44	18
Intake 45	18
Intake 31	13
Intake 30	12
Intake 28	11
Intake 29	11
Intake 27	10
Intake 19	5
Intake 20	5

Intake ID	Intake Name	Year	Student ID	Track ID
1	Intake 1	1993	23	1
2	Intake 2	1994	23	1
3	Intake 3	1994	23	1
4	Intake 4	1995	23	1
5	Intake 5	1995	23	1
6	Intake 6	1996	23	1
7	Intake 7	1996	23	1
8	Intake 8	1997	23	1
9	Intake 9	1997	23	1
Total		90275	1000	

**Navigation****Filters**

Name	Description
3D Motion Design	Create dynamic 3D animations using industry-standard tools and techniques.
Adobe After Effects	Learn animation, visual effects, and motion tracking for video production.
Angular	Develop dynamic web apps with Angular. Learn components, directives, RxJS, routing, and API integration.
API Integration & Web Services	Connect apps using REST & GraphQL APIs. Handle authentication, security, and third-party integrations.
Asp.net	ASP.NET framework for building web applications.

**Navigation****Filters**

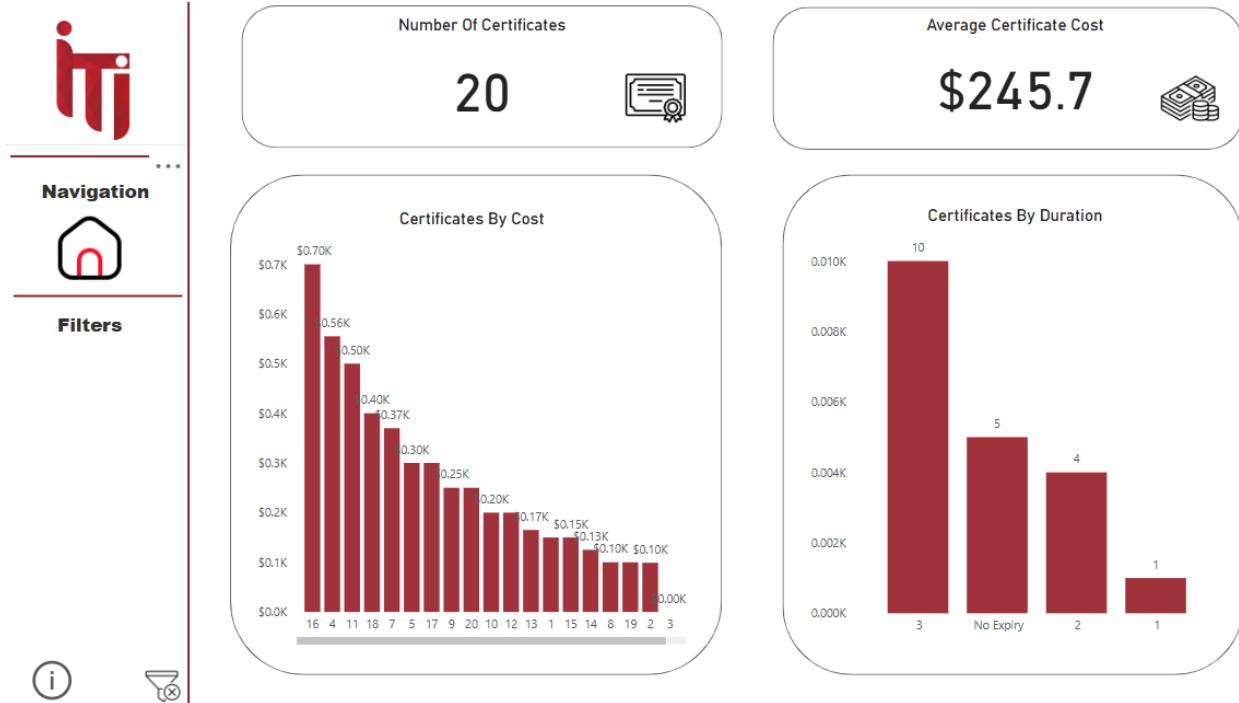


Question ID

Choice

Question Model Answer

Question ID	Choice	Question Model Answer
1	To collect personal data from users	To make business decisions based on historical data
1	To create marketing campaigns	To make business decisions based on historical data
1	To design websites for businesses	To make business decisions based on historical data
1	To make business decisions based on historical data	To make business decisions based on historical data
2	Enter, Translate, Log	Extract, Transform, Load
2	Execute, Test, Link	Extract, Transform, Load
2	Extract, Test, Load	Extract, Transform, Load
2	Extract, Transform, Load	Extract, Transform, Load
3	A centralized repository for integrated data from different sources	A centralized repository for integrated data from different sources
3	A place for storing documents	A centralized repository for integrated data from different sources



Student ID

Student Full Name

Certificate ID

Certificate Name

Student ID	Student Full Name	Certificate ID	Certificate Name
523	Aarika Haire	2	Microsoft Certified: Azure Fundamentals
541	Abbey Petters	2	Microsoft Certified: Azure Fundamentals
159	Abbott Grierson	19	Data Science with Python
444	Adah Van Leijjs	3	Google Data Analytics
937	Adan Meiklejohn	16	Certified Information Systems Security Professional (CISSP)
924	Addia Trevain		
297	Addie Cauderlie	17	AWS Certified DevOps Engineer
198	Addie Creak	18	Certified Kubernetes Administrator (CKA)
558	Adelaida Gilpin	17	AWS Certified DevOps Engineer
763	Adella Sapp	2	Microsoft Certified: Azure Fundamentals
900	Adolph Hodgen	19	Data Science with Python
138	Adolphe Stitt	18	Certified Kubernetes Administrator (CKA)
497	Adolpho Lexa	16	Certified Information Systems Security Professional (CISSP)

