DATA MODEL E-R DIAGRAM:

Entities and Attributes with their Datatypes: -

ENTITY	ATTRIBUTES		DATATYPES	CONSTRAINTS
	Name	**Type**		
Admin	Admin_Id	Key	Number	Primary Key, Auto Generated
	Admin_Name	Single	Varchar2	Not Null

ENTITY	ATTRIBUTES		DATATYPES	CONSTRAINTS
	Name	**Type**		
Professor	Prof_Id	Key	Number	Primary Key, Auto-Generated
	Prof_Name	Single	Varchar2	Not Null
	Prof_Email_Id	Single	Varchar2	Not Null, Unique
	Prof_Phone_No	Single	Number	Not Null, Unique
	Address_Id	Key	Number	Foreign Key
	Prof_DOB	Single	Date	Not Null
	Dept_Id	Key	Number	Foreign Key

ENTITY	ATTRIBUTES		DATATYPES	CONSTRAINTS
	Name	**Type**		
Professor_ Schedule	Schedule_Id	Key	Number	Primary Key, Auto-Generated
	Schedule_Day	Single	Varchar2	Not Null
	Duration	Single	Number	Not Null
	Prof_Id	Key	Number	Foreign Key
	Schedule_Start_Time	Single	Date	Not Null

ENTITY	ATTRIBUTES		DATATYPES	CONSTRAINTS
	Name	**Type**		
Department	Dept_Id	Key	Number	Primary Key, Auto Generated
	Dept_Name	Single	Varchar2	Not Null

ENTITY	ATTRIBUTES		DATATYPES	CONSTRAINTS
	Name	**Type**		
Program	Program_Id	Key	Number	Primary Key, Auto Generated
	Program_Name	Single	Varchar2	Not Null
	Dept_Id	Key	Number	Foreign Key

ENTITY	ATTRIBUTES		DATATYPES	CONSTRAINTS
	Name	Type		
	Student_Id	Key	Number	Primary Key, Auto-Generated
Student	Student_Name	Single	Varchar2	Not Null
	Student_Email_Id	Single	Varchar2	Not Null, Unique
	Student_Phone_No	Single	Number	Not Null, Unique
	Address_Id	Key	Number	Foreign Key
	Student_DOB	Single	Date	Not Null
	Program_Id	Key	Number	Foreign Key

ENTITY	ATTRIBUTES		DATATYPES	CONSTRAINTS
	Name	Type		
	Course_Id	Key	Number	Primary Key, Auto-Generated
Course	Course_Name	Single	Varchar2	Not Null, Unique
	Course_Credit	Single	Varchar2	Not Null
	Program_Id	Key	Number	Foreign Key

ENTITY	ATTRIBUTES		DATATYPES	CONSTRAINTS
	Name	Type		
	Class_Id	Key	Number	Primary Key, Auto-Generated
	Course_Id	Key	Number	Foreign Key
	Prof_Id	Key	Number	Foreign Key
	Class_Mode	Single	Varchar2	Not Null
Class	Class_Total_Seats	Single	Number	Not Null
	Class_Day	Single	Varchar2	Not Null
	Class_Start_Time	Single	Date	Not Null
	Class_Location	Single	Varchar2	Not Null
	Class_Duration	Single	Number	Not Null
	Semester	Single	Varchar2	Not Null

ENTITY	ATTRIBUTES		DATATYPES	CONSTRAINTS
	Name	Type		
	Registration_Id	Key	Number	Primary Key, Auto-Generated
Registration	Class_Id	Key	Number	Foreign Key
	Student_Id	Key	Number	Foreign Key
	Reg_Date	Single	Date	Not Null
	Reg_Status	Single	Varchar2	Not Null

ENTITY	ATTRIBUTES		DATATYPES	CONSTRAINTS
	Name	Type		
	Fee_Id	Key	Number	Primary Key, Auto-Generated
	Registration_Id	Key	Number	Foreign Key
Fee	Amount	Single	Number	Not Null
	Fee_submitted_date	Single	Date	
	Fee_last_date	Single	Date	Not Null
	Fee_Status	Single	Varchar2	

ENTITY	ATTRIBUTES		DATATYPES	CONSTRAINTS
	Name	**Type**		
	Grade_Id	Key	Number	Primary Key, Auto-Generated
Grade	Student_Id	Key	Number	Foreign Key
	Class_Id	Key	Number	Foreign Key
	Grade	Single	Varchar2	Not Null

ENTITY	ATTRIBUTES		DATATYPES	CONSTRAINTS
	Name	**Type**		
	Address_Id	Key	Number	Primary Key, Auto-Generated
Address	City_Id	Key	Number	Foreign Key
	Address_Line_1	Single	Varchar2	Not Null
	Address_Line_2	Single	Varchar2	
	ZipCode	Single	Number	Not Null

ENTITY	ATTRIBUTES		DATATYPES	CONSTRAINTS
	Name	**Type**		
	City_Id	Key	Number	Primary Key, Auto-Generated
City	State_Id	Key	Number	Foreign Key
	City_Name	Single	Varchar2	Not Null

ENTITY	ATTRIBUTES		DATATYPES	CONSTRAINTS
	Name	**Type**		
	State_Id	Key	Number	Primary Key, Auto-Generated
State	Country_Id	Key	Number	Foreign Key
	State _Name	Single	Varchar2	Not Null

ENTITY	ATTRIBUTES		DATATYPES	CONSTRAINTS
	Name	**Type**		
	Country_Id	Key	Number	Primary Key, Auto-Generated
Country	Country _Name	Single	Varchar2	Not Null

Business Roles:

Entity	Rules
Admin	Admin will be uniquely identified by Admin_Id.
	Admin_name must be included.
	Admin can create/update/delete multiple departments, programs, professors, students, and courses.
Department	Each department can be uniquely identified by Dept_Id and Dept_Name
	Every department will have multiple programs and professors under it
Program	Each program will have unique Prog_Id
	Multiple programs can be assigned to a single department
Courses	Course must contain Course_Id, Course_Name, Course_Credit, and Semester_Name
	The course entity can be uniquely identified by Course_Id
	Multiple courses can be assigned under a single program
Class	It is uniquely identified by Class_Id. There can be multiple classes for a single course
	Class must include Class Mode, Class_Total_Seats, Class_Day, Class_Start_Time, Class_Duration, and Class_Location.
	Several classes of the same course can be taught by a single professor based on the class timings and the schedule of the professor.
	Class_Location will be dependent on Class_Mode(if Class_Mode='Online' then Class_Location=Remote)
Professor	Each professor can belong to a single department
	It can be uniquely identified by Prof_Id
	Professor entity must contain Prof_id, Dept_id, Prof_Name, Prof_Email_id, Prof_Phone_no, Address_id, and Prof_DOB.
	Every Professor can take multiple classes of same/different courses.
Professor Schedule	Each time slot of the professor can be identified by a unique Schedule_id
	Professor can have multiple schedules based on their availability
	Professor Schedule must contain Schedule_id, Prof_id, Schedule_Day, Schedule_Start_Time, and Duration.
Student	Student must contain Student_id, Prog_id, Student_Name, Student_Email_id, Address_id, Student_Phone_no, and Student_DOB.
	Every student can be uniquely identified by Student_id
	Every student will belong to a single program.
Registration	A student can register for multiple courses
	It contains Registration_id, Student_id, Class_id, Reg_status, and Reg_date
	Registration can be uniquely identified by Registration_id
	A single student can be enrolled in a single class of a course

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Fee	Each Fee_id will contain a unique Registration_id
	It can be uniquely identified by Fee_id
	A student can pay fees once the registration is completed
	Fee includes Fee_id, Registration_id, Amount, Fee_submitted_date, Fee_Status, Fee_last_date
Grade	It can be uniquely identified by Grade_id
	A student can be graded for multiple classes
	A professor can grade for different classes
	It contains Grade_id, Student_id, Class_id, and Grade

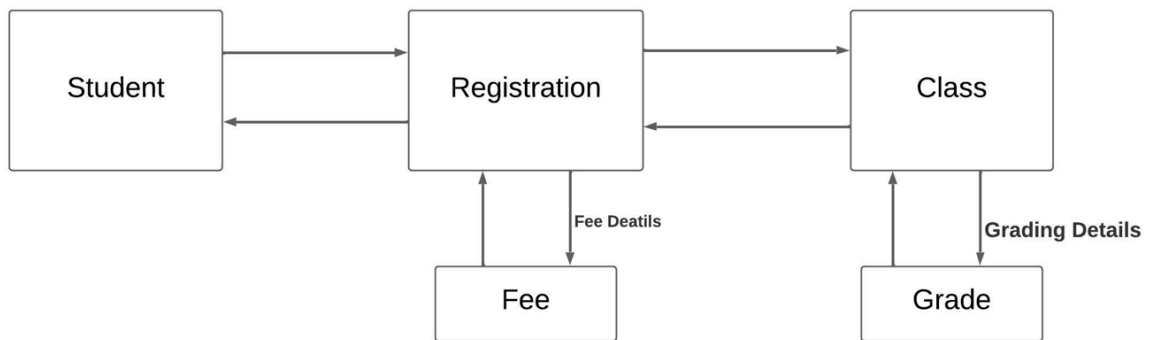**Data Flow Diagram**:
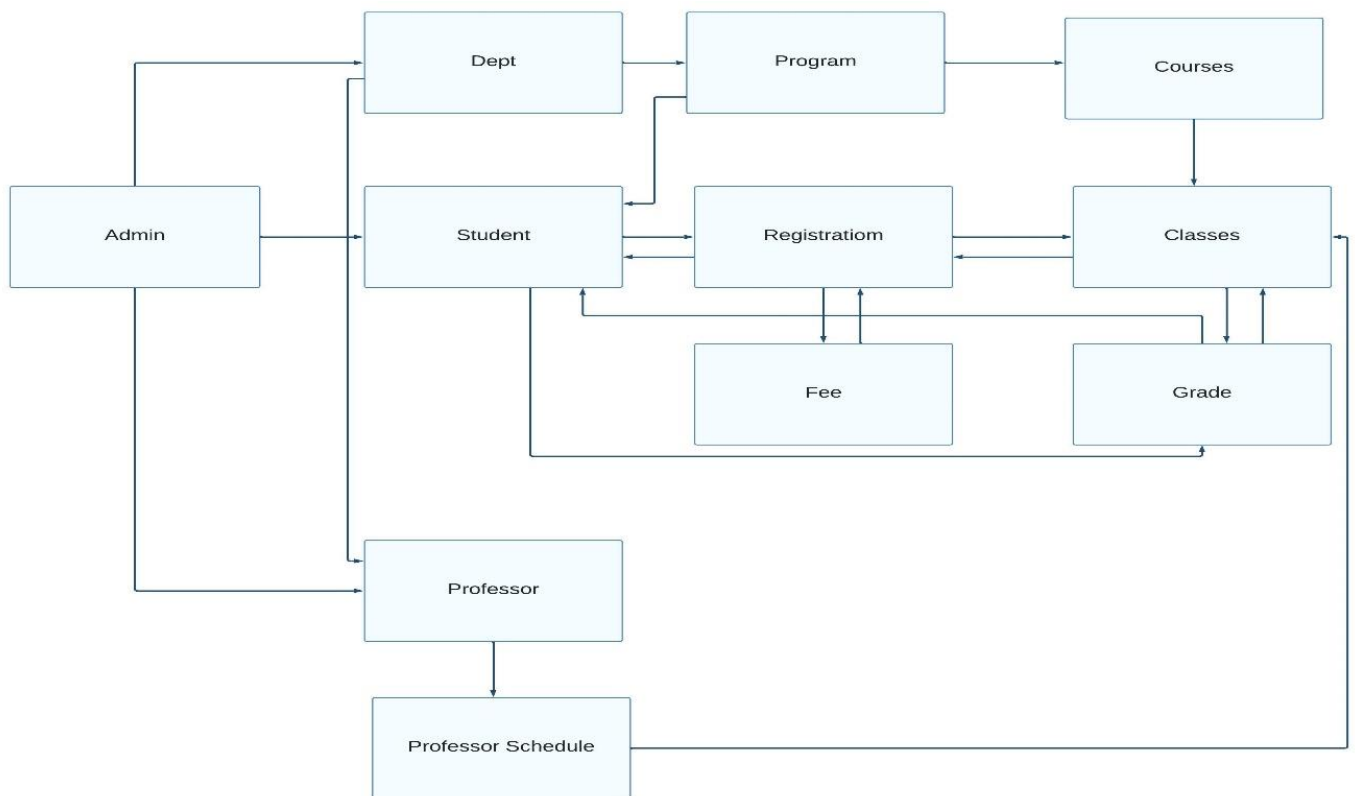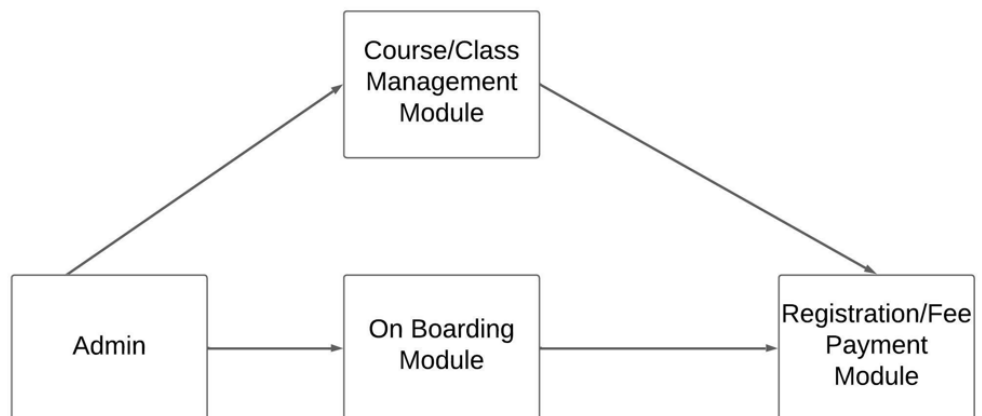

Data Flow Diagram of the entire system
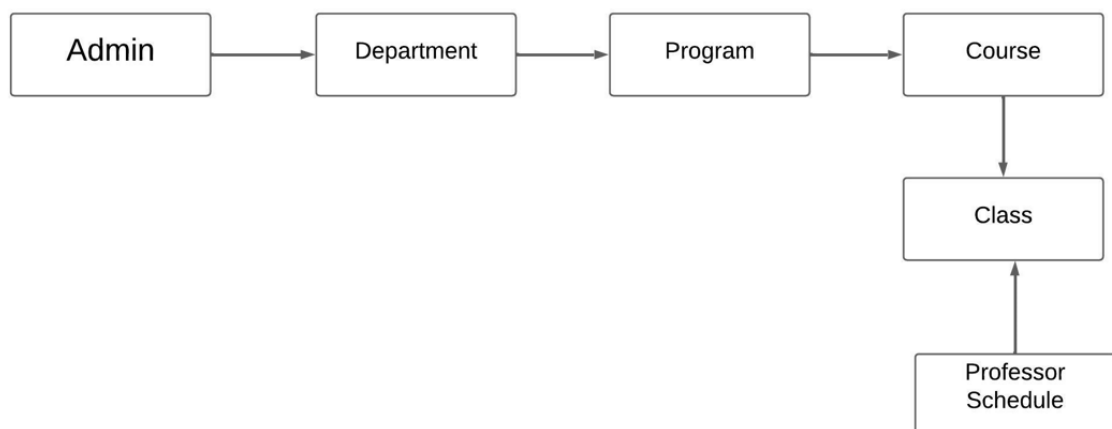
Course/Class Management Module
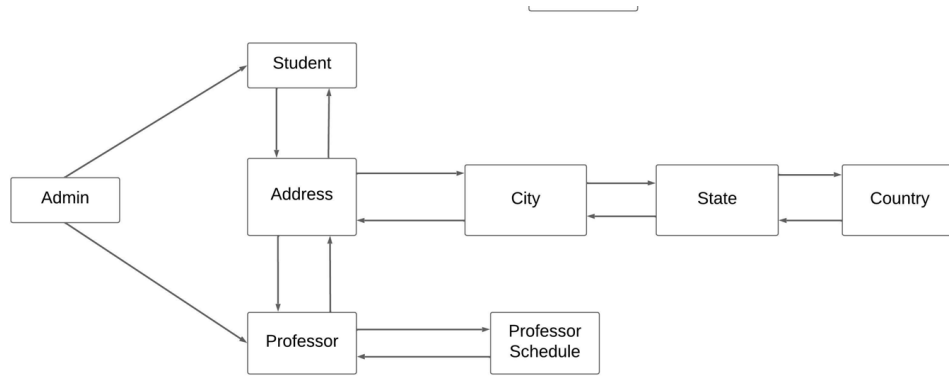
On-Boarding Module

Registration Module

Module wise Data Flow Diagram

Views:

1) EnrollStudentsForCourse
This view will showcase all the students that have registered for a particular course in any given semester.

2) ProfessorAssignedToCourse
This view will give us all the teachers that have been assigned to a particular course.

3) StudentFeeInformation
This view will provide us with all the fee information for all the registered courses by a student in a particular semester.

4) StudentGradeInformation
It will display the grades students have scored in a given semester provided by the professors.

5) DepartmentsProgram
It will display all the programs under each department.

6) StudentsEnrollInProgram
This will provide an insight into all the students enrolled in a particular program.

7) ProfessorDepartmentInfo
This view will keep track of all the professors in a particular department.

8) PopularProfessor
It will showcase ranking wise professors with the highest number of students enrolled under them.

9) PopularCourses
It will provide the ranking of courses with the highest number of students enrolled for it.

Security, User Level Access, and Permissions: -

Access To	Permission To	Functions Allowed To Perform
Admin	Open / Run System	Open the database, any table, or any report.
	Access System Design	View the design of all objects in the system.
	Update System Design	Edit, modify, or delete the design of objects in the system.
	Administer	Set database passwords, duplicate databases, and change database properties. Assign permissions to make database changes.
	Read Data	View data, but not tables or database queries.
	Update Data	View and edit data, but not insert or delete any data.

	Insert Data	View and insert data, but not update or delete data.
	Delete Data	View and delete data, but not modify or insert data.

Access To	Permission To	Functions Allowed To Perform
Students	Read Data	View data from table Program, Course, Class and can view other tables such as Student, Fee, Register, Grades. Address, City, State, and Country for a particular Student_ID only.
	Update Data	View and update data in the Student and Registration table for their particular Student_ID.

Access To	Permission To	Functions Allowed To Perform
Professor	Read Data	View data from tables Department, Program, Course and can view other tables such as Professor, Professor Schedule, Class, Address, city, State, and Country for a particular Professor_Id. Based on Class_Id professor can view details from Register, Grade, and Student table.
	Insert Data	View and insert data in the Professor_Schedule and Grades tables.
	Update Data	View and update data in the Professor, Professor_Schedule, Grades, Address, City, State, and Country. .
	Delete Data	View and delete data in theProfessor_Schedule.