1-2: Introduction to Database

Exercise 1: Identify Database Design Considerations for Given Case Scenarios

1. ABC School District would like to create a student on-line information and registration system to capture student-related information. The system needs to be designed as an on-line process to allow all new students to register on-line. It should also allow existing students to update and review all information. Create a list of important data that would need to be captured and stored in the student registration database.

- Student names
- Student DOB
- Student address
- Student GPA
- Emergency contact information

2. XYZ community would like to create a library management system. The objective is for the database to handle all transactions for the library. The database needs to store all the data that is relevant to managing the books, managing customers, and the day-to-day activities of the library. Create a list of important data that would need to be captured and stored in the library management database.

- Book titles
- Book authors
- Book genre
- Customer names
- Library card owners
- List of books taken in/out daily & by whom

1-3: Types of Database Models

Exercise 1: Identify the Database Models

1. Identify the type of database model that has been represented in the given model snapshots: (see images)
    a) Hierarchical Model
    b) Network Model
    c) Object-Oriented Model
    d) Relational Model
    e) Flat File Model

1-4: Business Requirements

Exercise 1: Business Requirements

1. LibBook is a successful digital library that rents CDs and provides access to Internet for browsing their repository of articles and magazines. With the growing business, LibBook needs to enhance their information system to support proposed changes to the business. LibBook attracts new members easily and the number of members is growing rapidly. The membership base is not stable, however, which is a cause for concern. The main idea is to introduce the concept of membership at LibBook. Members will pay a membership fee and initially, there will be three types of membership (corporate, student, individual)

although more may be introduced later. Student membership is free. Corporate and Faculty memberships incur a fee but entitle the member to privileges. The type of membership can be changed only if sufficient justification is provided. Your task is to identify the business rules and the associated constraints from the case scenario described.

- Members pay a membership fee
- 3 types of memberships initially
- Student membership is free
- Corporate and Faculty members incur a fee but entitle the member to privileges
- The type of membership can be changed only if sufficient justification is provided

2. Star Care hospital is a multi-specialty hospital that caters to needs of different patients. Every doctor registered with this hospital is assigned a unique ID that starts with the letter "DC". The hospital ensures that the doctors associated with them have a minimum of seven years of working experience. Every patient is required to register with the hospital on their first visit. When a patient arrives, a unique patient number starting with the letters "PT" is assigned to him/her. Your task is to identify the business rules and the associated constraints from the case scenario described.

- Doctors associated with the hospital have a minimum of seven years of working experience
- Every patient is required to register with the hospital on their first visit
- Patient numbers starting with “PT” are assigned to every patient that arrives

2-1: Relational Databases

Exercise 1: Analyze the features of a Relational Database

In this practice you analyze the features of multiple table databases from a set of examples.

Tasks

1. Identify the possible tables and associated fields from the given scenario:

Book.com is an online virtual store on the Internet where customers can browse the catalog and select products of interest.

- Books Table (Fields: Book ID, Title, ISBN, Year, Price, Author ID)
- Authors Table (Author ID, Name, Address, Homepage URL)
- Publishers Table (Publisher ID, Name, Address, Phone Number, Website URL)
- Warehouses Table (Warehouse ID, Code, Address, Phone Number)
- Warehouse Stock Table (Warehouse ID, Book ID, Number of Copies)
- Customers Table (Customer ID, Name, Address, Email ID, Phone Number)
- Shopping Carts Table (Shopping Cart ID, Customer ID)
- Shopping Cart Details Table (Shopping Cart ID, Book ID, Quantity)
- Orders Table (Order ID, Customer ID, Billing Address, Shipping Address, Shipping Option, Payment Info, Email notification status)

2. ABC Ltd plans to computerize its sales ordering and stock control system. A feasibility study has strongly suggested that a relational database system be installed. The details of ABC's sales and stock control are as follows:

- Customers Table (Customer ID, Customer Name, Address, Phone Number, Email)

- Orders Table (Order ID, Customer ID, Order Date, Order Status)
- Order Details Table (Order Detail ID, Order ID, Product ID, Quantity Ordered, Quantity Dispatched, Back Order Flag)
- Products Table (Product ID, Product Name, Description, Price, Stock Quantity, Reorder Level)
- Suppliers Table (Supplier ID, Supplier Name, Address, Phone #, Email)
- Back Orders Table (Back Order ID, Order ID, Product ID, Quantity, Reorder Date, Supplier ID)
- Payments Table (Payment ID, Customer ID, Payment Date)

2-2: Conceptual and Physical Data Models

Exercise 1: Conceptual and Physical Models

1. Provide five reasons for creating a conceptual data model.
    - Captures functional needs of a business
    - Captures informational needs of a business
    - Is based on current needs and may reflect future needs
    - Addresses the needs of a business
    - Identifies important entities and relationships among them
2. List two examples of conceptual models and physical models.
    - Conceptual: Entity-Relationship Diagram & Business Process Model
    - Physical: Organizational Chart & Physical Inventory System

2-3: Entities and Attributes

Exercise 1: Identify and draw entities as a beginning of an ERD

With the information provided above, identify and create the entities for the School Management System.

- School/University
- Department
- Course
- Faculty
- Student
- Enrollment
- Attendance
- Exam

Exercise 2: Identify and add Attributes and corresponding Mandatory and Optional notation to ERD

Add the appropriate attributes as well as the optionality (*, °) to all the entities of the Academic Database.

- SCHOOL/UNIVERSITY: School ID, School Name, Address, Phone #, Website
- COURSE: Course ID, Course Name, Credits, Department ID, Faculty ID
- DEPARTMENT: Department ID, Department Name, School ID, Department Head, Contact #
- STUDENT: Student ID, Name, DOB, Gender, Phone Number, Address
- FACULTY: Faculty ID, Name, Department ID, Email, Phone #, Login Time, Logout Time
- EXAM: Exam ID, Course ID, Exam Date, Exam Type, Exam Results
- ENROLLMENT: Enrollment ID, Student ID, Course ID, Enrollment Date

- ATTENDANCE: Attendance ID, Student ID, Course ID, Total Classes, Classes Attended, Attendance Percentage

2-4: Unique Identifiers

Exercise 1: Identify the Unique Identifier and corresponding Primary keys

1. How do you find a particular song in the whole collection? What would be a unique identifier for SONG?
    -Title
2. Think about all the students in the classroom. Each student is described by several traits or attributes. Which attribute or attributes allow you to pick a single student from the rest of the class?
    -Last name
3.For each entity, select the attribute that could be the unique identifier of each entity.

Entity: STUDENT
Attributes: student ID, first name, last name, address

Entity: MOVIE
Attributes: title, date released, producer, director

Entity: LOCKER
Attributes: size, location, number

Exercise 2: Identify the Unique Identifiers and add to the ERD

1. Use the Academic Database ERD from the previous exercises to identify the following:

a. Unique Identifiers: School ID, Course ID, Student ID, Department ID, Faculty ID, etc.

b. Candidate Unique Identifiers: School Name, Student Name, Faculty Name, Phone Number

2-5: Relationships

Exercise 1: Identify relationships from the ERD

1. Read the relationship. Which text corresponds to the diagram?

    B. Each EMPLOYEE must be assigned to one and only one DEPARTMENT.
    Each DEPARTMENT must be responsible for one or more EMPLOYEE

2. Read each relationship in the model below. For each relationship, write the ERD statement and your comments. Use your knowledge of normal people and towns in your comments. (see pic)
- A person must be born in a town, a town may be the birthplace of one or more people
- A town may be the hometown of one or more people living in it, One or more people must be living in the town
- One or more people may visit the town, the town must be visited by one or more people
- The town may be governed by a person living in the town, the mayor may be a person living in the town

Exercise 2: Analyze and Model Relationships

1.Write the ERDish for each of the relationships in the Academic Database including relationship names, optionality and cardinality.

- Each department must offer one or more courses, and each course must be offered by one department
- Each faculty must work in one department, and each department must have one or more faculty members
- Each faculty must teach one or more courses, and each course must be taught by one faculty member
- Each student may enroll in zero or more courses, and each enrollment must be linked to one student
- Each student may have zero or more attendance records, and each attendance must be recorded for one student
- Each course may hold zero or more exams, and each exam must be linked to one course

2-6: Entity Relationship Modeling (ERDs)

Exercise 1: Identify the components in the ERD

1. Identify the possible Entities and Attributes from the given scenario.

A company has several departments. Each department has a supervisor and at least one employee. Employees must be assigned to at least one, but possibly more departments. At least one employee is assigned to a project, but an employee may be on vacation and not assigned to any projects. The important data fields are the names of the departments, projects, supervisors and employees, as well as the supervisor and employee number and a unique project number.

- Department (Department ID, Department Name, Supervisor ID)
- Employee (Employee ID, First Name, Last Name, Phone #, Address)
- Project (Project ID, Project Name, Project Description)

2. Read the given business scenario. Draw the entities HAIRSTYLIST and CLIENT. List the attributes associated with each entity and specify whether they are mandatory or optional. Identify the UIDs. Follow the diagramming conventions discussed. State the ERDish for the relationships.

“In our salon, we have a number of hairstylists. They are all salaried employees, so we keep a record of their first name, last name, address, phone number, social-security number, and salary. During the course of a day, a hairstylist may see several clients. On a slow day, a hairstylist may not work on anyone at all. We have several walk-in clients, and they each get assigned to one hairstylist. We just ask for their first name. We also have customers who call to make an appointment. When they do this, we ask for their first name, last name, and phone number. We also ask if they would like a specific hairstylist. If they have no preference, we assign one for them. Of course, they are allowed to switch to another hairstylist for their next visit to the salon. We are interested in tracking the daily appointments -- which stylist works on which client during a given day.”

- Hairstylist (Hairstylist ID, First Name, Last Name, Address, Phone #, SSN, Salary)
- Client (Client ID, First Name, Last Name, Phone #)

3. Read the given business scenario. Draw the entities TEACHER and COURSE and CLASS. List the attributes underneath each entity. Specify whether they are mandatory or optional. Identify the UIDs. State the ERDish for the relationships.

“We have several teachers at our school. A teacher can be assigned up to three classes per semester. If a teacher is on sabbatical, he doesn’t teach that semester. We keep a record of the teacher’s first name, last name, address, phone number, and email address. Our school offers many courses -- such as Data

Modeling, Introduction to SQL, Trigonometry, Physics, and Biology. Each course has a code. For example: Data Modeling would be DM001, Trigonometry would be TR004, etc. During each semester, a course may be taught in several classes -- so there could be two classes of Physics, three classes of Biology, etc. Each class can be taught by only one teacher. We assign a unique ID for each class, and we also keep track of the day it is taught, the time, and the classroom."

- Teacher (Teacher ID, First Name, Last Name, Address, Phone #, Email)
- Course (Course ID, Course Name, Course Code)
- Class (Class ID, Day, Time, Classroom, Teacher ID, Course ID

3-1: More with Relationships

Exercise 1: Resolve M:M Relationships

1. Resolve M: M relationships between STUDENT and the COURSE using a barred relationship
    a. New Intersection Entity: ENROLLMENT
    b. Barred Relationship: A student has enrolled in a course, resolved using the enrollment entity
2. Resolve M: M relationships between FACULTY and the COURSE
    a. New Intersection Entity: Teaching Assignment
    b. Barred Relationship: A faculty member teaches a course, resolved using the teaching assignment entity
3. Resolve M: M relationships between STUDENT,COURSE and EXAM
    a. New Intersection Entity: Exam Taken
    b. Barred Relationship: A student takes an exam for a course, resolved using the exam taken entity

Exercise 2: Adding nontransferability option to an ERD

1.A STUDENT will be assigned an EXAM RESULT after taking an exam. Once an EXAM RESULT has been issued, it cannot be transferred to another STUDENT

- Once a student receives an exam result, it is linked to that specific student. This relationship is nontransferable, meaning that an exam result issued to one student cannot be assigned to another.

Exercise 3: Identify and draw supertype and subtype entities

Tasks

1.Faculty can be either full time or part time. Full time faculty receive a salary and are entitled to an insurance plan. Part time faculty are paid on an hourly basis and receive no benefits. Redraw the following entity as a supertype with subtype entities reflecting the new information

- Supertype: Faculty
- Subtypes: Full time faculty, part time faculty

Exercise 4: Examine Exclusive Relationships (Arcs)

1.Determine how exclusive relationships should be modeled in the following scenario.

Each COURSE instance in the Academic Database can either be held ONLINE or in a SEATED location. Each SEATED location has a building name, room number and a date/time when the COURSE is offered. The ONLINE classes have a logon id and a password required to enter the COURSE. Model this new information as an Arc in the Academic Database.

- Supertype: Course (Course ID, Course Name)
- Subtypes: Seated Course (Building Name, Room #, Date, Time) & Online Course (Log on ID, Password)

Exercise 5: Model Hierarchical Data

1.In this practice, model the entities, relationships, attributes, and unique identifiers for the hierarchy of a hotel. The hotel has many floors, many suites on each floor, and many rooms within each suite.

1. Hotel
    a. Attributes: Hotel ID (PK), Hotel Name, Address
2. Floor
    a. Attributes: Floor Number (PK), Hotel ID (FK)
3. Suite
    a. Attributes: Suite Number (PK), Floor Number (FK), Hotel ID (FK)
4. Room
    a. Attributes: Room Number (PK), Suite Number (FK), Floor Number (FK), Hotel ID (FK)

Exercise 6: Model Hierarchical Data and Recursive Relationships

Tasks

1.Develop two ERDs to represent the following situation. Develop one as a hierarchical structure and one as a recursive structure.
Curves Dynamics sells products throughout the United States. They are divided into four major sales regions: the Northern, Eastern, Southern, and Western regions. Each sales region has a unique region code.
Each sales region is then divided into sales districts. For example, the Western Region is divided into the Rocky Mountain, Northwest, Pacific Coast, and Pacific districts. Each district has a unique district code.
Each district is made up of sales territories. The Rocky Mountain district is composed of three territories: Wyoming-Montana, Colorado, and Utah-New Mexico. The Northwest district is made up of two territories: the Washington and Oregon-Idaho territories. The Pacific Coast district is composed of two territories: the California and Nevada territories. The Pacific district includes theHawaii territory and the Alaska territory. Each territory has a unique territory code.
Each sales territory is broken down into sales areas. For example, Colorado is made up of two sales areas: the Front Range and the Western Slope sales areas. Each sales area has a unique sales-area code.
Each salesperson is responsible for one or more sales areas, and has a specific sales quota. Each sales manager is responsible for one or more sales districts and sales directors who are responsible for one or more sales regions. Each sales manager is responsible for the territories within his districts. Employees' responsibilities do not overlap. A sales area is always the responsibility of a single salesperson, and managers and directors' responsibilities do not overlap. Sometimes salespersons, managers, and directors will be on leave or special assignments and will not have sales area responsibilities. All sales personnel are identified by their employee IDs.

1. Hierarchical Structure ERD

- Region
    - Attributes: Region Code (PK), Region Name
- District
    - Attributes: District Code (PK), Region Code (FK), District Name
- Territory
    - Attributes: Territory Code (PK), District Code (FK), Territory Name
- Sales Area
    - Attributes: Sales Area Code (PK), Territory Code (FK), Sales Area Name
- Salesperson
    - Attributes: Employee ID (PK), Sales Area Code (FK), Sales Quota
- Sales Manager
    - Attributes: Employee ID (PK), District Code (FK)
- Sales Director
    - Attributes: Employee ID (PK), Region Code (FK)

2. Recursive Structure ERD

- Sales Region
    - Attributes: Region Code (PK), Region Name, Parent Region Code (FK) (nullable for top-level regions)
- Sales District
    - Attributes: District Code (PK), District Name, Parent Region Code (FK) (references Region Code)
- Sales Territory
    - Attributes: Territory Code (PK), Territory Name, Parent District Code (FK) (references District Code)
- Sales Area
    - Attributes: Sales Area Code (PK), Sales Area Name, Parent Territory Code (FK) (references Territory Code)
- Salesperson
    - Attributes: Employee ID (PK), Sales Area Code (FK), Sales Quota
- Sales Manager
    - Attributes: Employee ID (PK), Managed District Code (FK)
- Sales Director
    - Attributes: Employee ID (PK), Managed Region Code (FK)

Exercise 7: Developing a complete ERD using Supertype/Subtypes and Arcs

1.Develop an ERD for the following information requirements:

The Right-Way Rental Truck Company rents small moving trucks and trailers for local and one-way usage. There are 347 rental offices across the western United States. The rental inventory includes a total of 5,750 vehicles, including various types of trucks and trailers. The data that needs to be tracked is rental agreements and vehicle assignments. Each rental office rents vehicles that they have in inventory, to customers ready to take possession of the vehicle. Reservations are not taken, and speculation on when the customer will return the rented vehicles is not tracked. The central office oversees the vehicle distribution, and directs transfers of vehicles from one rental office to another.

Each rental office has an office name like “Madison Right-Way” and address. Each office also has a unique three-digit office number. Each office is a home office for some vehicles, and each vehicle is based out of a single home office.

Each vehicle has a vehicle ID, state of registration, and a license plate registration number. There are five different types of vehicles: 36-foot trucks, 24-foot trucks, 10-foot trucks, 8-foot covered trailers, and 6-foot open trailers, each with a type code. For all vehicles, a last maintenance date and expiration date of its registration needs to be tracked. In addition, for trucks, the current odometer reading, the gas tank capacity, and whether or not it has a working radio needs to be stored. For long moves, customers really prefer a radio. The current mileage is logged before the truck is rented, and then again when it returns. Additionally for trailers the maximum weight capacity must be logged.

Most rental agreements are for individual customers, but a rental agreement can be for either an individual or a company. A small percentage of trucks are rented to companies. Each company is assigned a company number and the name and address of the company are tracked. The corporate sales group handles all the information separately.
For each individual customer, the following information is tracked: name, home phone, address, and driver’s license state, number and expiration date. If a customer damaged a vehicle, abandoned it, or did not fully pay the bill, the customer is tagged as a poor risk, and the customer may not rent again.

Only a single individual or company can obtain a rental agreement, and a separate rental agreement is written for each vehicle.Customers can rent two or more vehicles at the same time. Each rental

agreement is identified by the originating rental office number and a rental agreement number. In addition, the rental date, anticipated duration of the rental, the originating rental office, the drop-off rental office, the amount of the deposit paid, the quoted daily rental rate, and the quoted rate per mile are tracked. For trailers, there is no mileage charge.

- Entity: Rental Office
    - Attributes: Office #, Office Name, Address
- Entity: Vehicle (Supertype)
    - Attributes: Vehicle ID, State of Registration, License Plate #, Last Maintenance Date, Expiration Date, Vehicle Type Code
    - Subtypes of Vehicle
        - Truck
            - Attributes: Odometer reading, gas tank capacity, working radio
        - Trailer
            - Attributes: Maximum weight capacity
- Entity: Customer (Supertype)
    - Attributes: Customer ID, Name, Home Phone, Address Drivers License State, Drivers License #, License Expiration Date, Poor Risk
        - Subtypes of Customer
            - Individual
            - Company
- Entity: Rental Agreement
    - Attributes: Agreement #, Rental Date, Anticipated duration, Deposit date, quoted daily rental rate, quoted rate per mile, originating rental office #, Drop off rental office #

3-2: Tracking Data Changes

Exercise 1: Track Data Change over Time

1. Construct the ERD for the given scenario.

In the Academic Database a Grade is issued to each STUDENT for each COURSE taken and stored in the STUDENT COURSE DETAILentity. A STUDENT may decide to re-take a COURSE to better their Grade. The administration would like to keep a record of the old/previous Grade as well as the new Grade. Show how the ERD would be modified to include historical Grades if the STUDENT should have them.
** We will not make this actual change to the ERD

- Student
    - Attributes: Student ID (PK), Name, etc.
- Course
    - Attributes: Course ID (PK), Course Name, etc.
- StudentCourseDetail
    - Attributes: Student ID (FK), Course ID (FK), Grade, Date Issued, Version/Timestamp

*Version/Timestamp helps in identifying the record version or when it was changed, allowing for historical tracking.

2. Examine the ERD that represents classroom assignments for different exams.

    a. Why is start time part of the UID of ASSIGNMENT?
    -Start time ensures that each assignment can be uniquely identified and provides contextual information for when the assignment occurs to avoid scheduling conflicts with other events and exams

    b. Name at least three time-related constraints. For example: End time must be later than start time. Indicate if the constraint represents conditional non-transferability
        - End Time Must Be Later Than Start Time

    - Constraint: The end time should always be after the start time to ensure that the assignment has a valid duration.
    - Type: Conditional Non-Transferability (the constraint is inherent and must be met for valid data).
- Date of Exam Must Be a Valid Calendar Date
    - Constraint: The date must be a real, existing calendar date.
    - Type: Conditional (ensures that the date is valid and logical).
- Assignments Must Not Overlap in the Same Classroom
    - Constraint: No two assignments should have overlapping times in the same classroom to avoid scheduling conflicts.
    - Type: Conditional Non-Transferability (ensures proper scheduling and avoids conflicts).

3-3: Normalization and Business Rules

Exercise 1: Relational Databases

1. Analyze the given table which is not normalized. The table holds information specific to items such as the Item ID, Color of the item, and the Unit price of each of the item. Some of the rows in the table have repeating group of information. Evaluate the data in the table and bring the table to first normal form

Item ID	**Unit Price**
IT001	$16.56
IT002	$17.48
IT003	$19.76
IT004	$20.00

Item ID	**Color**
IT001	Red
IT001	Blue
IT002	Yellow
IT003	Green
IT004	Blue
IT004	Yellow

2. Analyze the given table. The table is in the first normal form and has composite primary key made up of the Suppler ID and Store Id. The non-key attribute location is only dependent on the Store ID. Evaluate the data stored in the table and bring the table to second normal form:

Supplier ID	**Store ID**

SP001	S1
SP001	S3
SP002	S1
SP003	S2
SP004	S3

Store ID	**Location**
S1	New York
S2	Rhode Island
S3	Vermont
S3	Illinois

3. Analyze the given table and the data stored. In the table the Book ID is the primary key and the Category Description is dependent on the Category ID. Evaluate the data stored in the table and eliminate the transitive dependency to bring the table to the third normal form:

Book ID	**Category ID**	**Price**
1	1	$27.99
2	2	$17.99
3	1	$20.99
4	3	$40.99
5	2	$19.99

Category ID	**Category Desc**
1	Cooking
2	Travel
3	Computers

3-4: Data Modeling Terminology and Mapping

Exercise 1: Identify entities, attributes, instances and their corresponding tables, rows and columns

1.Match the ERD elements to their corresponding database elements
    1. Attribute - a. Column

2. Entity - f. Table
3. ER Model - c. Physical design
4. Instance - e. Row
5. Primary UID - d. Primary key
6. Relationship - b. Foreign key
7. Secondary UID - g. Unique key

2. Identify the table diagram notations listed below.

a. Pk - Primary key

b. Fk - Foreign key

c. Uk - Unique key

d. * - Required attribute

e. O - Optional attribute

3.Create short names for the terms below based on the naming conventions rules.

a. Authors - AUTH

b. Publishers - PUB

c. Customers - CUST

4.The goal of this practice is to recognize attributes for an entity.
These three entities—SONG, EVENT, and CUSTOMER—play a role in a DJ business and are listed as the first three column headings in the table below. The fourth column contains a list of attributes. Use an X or a check mark to indicate that the attribute could belong to one or more of the entities listed. For example, could Title be an attribute for Song, for Event, and/or for Customer?

Attribute	Song	Event	Customer
Title	x		
Description	x	x	
Venue		x	
First Name			x
Phone Number			x
Release Date	x		
Last Name			x
Type	x		
Email Address			x

Exercise 2: Mapping the Academic Database

1. With the ERD provided below, map the entities, attributes and UIDs to tables, rows, and keys using a table diagram as shown:

1. **STUDENT**

- **Table**: STUDENT
- **Rows**: Each row represents a student with a unique ID.
- **Columns**: ID (Primary Key), First Name, Last Name, Registration Year, Email

2. PARENT INFORMATION

- **Table**: PARENT_INFORMATION
- **Rows**: Each row represents a set of parent information with a unique ID.
- **Columns**: ID (Primary Key), Parent 1 First Name, Parent 1 Last Name, Parent 2 First Name, Parent 2 Last Name

3. ACADEMIC SESSION

- **Table**: ACADEMIC_SESSION
- **Rows**: Each row represents an academic session with a unique ID.
- **Columns**: ID (Primary Key), Name

4. STUDENT COURSE DETAIL

- **Table**: STUDENT_COURSE_DETAIL
- **Rows**: Each row represents a student's course detail.
- **Columns**: Grade, Student ID (Foreign Key), Course ID (Foreign Key)

5. COURSE

- **Table**: COURSE
- **Rows**: Each row represents a course with a unique ID.
- **Columns**: ID (Primary Key), Name

6. DEPARTMENT

- **Table**: DEPARTMENT
- **Rows**: Each row represents a department with a unique ID.
- **Columns**: ID (Primary Key), Name, Head

7. EXAM RESULT

- **Table**: EXAM_RESULT
- **Rows**: Each row represents an exam result for a student.
- **Columns**: Grade, Student ID (Foreign Key), Exam ID (Foreign Key)

8. STUDENT ATTENDANCE

- **Table**: STUDENT_ATTENDANCE
- **Rows**: Each row represents attendance details for a student.
- **Columns**: Number of Working Days, Number of Days Off, Eligibility for Exam, Student ID (Foreign Key)

9. ONLINE

- **Table**: ONLINE
- **Rows**: Each row represents a unique online logon.
- **Columns**: Logon ID (Primary Key), Password

10. SEATED

- **Table**: SEATED
- **Rows**: Each row represents an exam seating arrangement.
- **Columns**: Building, Room, Date/Time

11. FACULTY

- **Table**: FACULTY
- **Rows**: Each row represents a faculty member with a unique ID.
- **Columns**: ID (Primary Key), First Name, Last Name, Email

12. EXAM

- **Table**: EXAM
- **Rows**: Each row represents an exam with a unique ID.
- **Columns**: ID (Primary Key), Start Date

13. EXAM TYPE

- **Table**: EXAM_TYPE
- **Rows**: Each row represents an exam type with a unique type.
- **Columns**: Type (Primary Key), Name, Description

14. FACULTY COURSE DETAIL

- **Table**: FACULTY_COURSE_DETAIL
- **Rows**: Each row represents faculty involvement in a course.
- **Columns**: Contact Hours, Faculty ID (Foreign Key), Course ID (Foreign Key)

15. FACULTY LOGIN DETAIL

- **Table**: FACULTY_LOGIN_DETAIL
- **Rows**: Each row represents a faculty login detail.
- **Columns**: Login DateTime, Faculty ID (Foreign Key)

16. FULL TIME

- **Table**: FULL_TIME

- **Rows**: Each row represents a full-time faculty member's details.
- **Columns**: Salary, Insurance Plan, Faculty ID (Foreign Key)

17. PART TIME

- **Table**: PART_TIME
- **Rows**: Each row represents a part-time faculty member's details.
- **Columns**: Hourly Rate, Faculty ID (Foreign Key)