ERD – Lab1

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Track : Open source – Intake 46

(Note that the Identification number is unique)

Problem 1

A professional educational organization named **EduSphere** has decided to store information about its instructors, students, courses, attendance, evaluations, and payments in a database. The organization has wisely chosen to hire you as a **database designer**. Prepare an **E–R diagram** for this organization according to the following description:

· The organization has a number of **instructors**. Each instructor has an Instructor_ID, Name (Fname, Lname), Email, Phone Numbers, Specialization, and Hire_Date.

· Each **student** is registered in the organization's programs has a Student_SSN (unique), Name (Fname, Lname), Gender, Email, Phone, and an Address (Street, City, Zip) and Enrollment_Date.

· The organization offers a set of **courses**. Each course has a unique Course_Code, Course_Name, Description, Duration_Hours, Start_Date, and End_Date.
Each course must be taught by one instructor, but each instructor may teach several courses.

· Each student may **enroll** in several courses, and each course may have several students enrolled.
For each enrollment, the system records the Enrollment_Date and the Grade.

. Each instructor works under a **supervisor**, and each supervisor may manage several instructors.

· Each **instructor** belongs to a **department**, and each department may have several instructors.
. Each department has a Dept_ID, Dept_Name, and Location.
. Each department is managed by one instructor who acts as a department head.

· The system records attendance for each student per course with Attendance_Date and Status (Present/Absent).
· After completing a course, each student may fill an evaluation form about the instructor with Rating 1-5 and Comments. (Ternary)

Problem 2

A hospital called HealthCare Plus has decided to store information about patients, doctors, nurses, departments, appointments, drugs, and billing in a database. The hospital has wisely chosen to hire you as a database designer. Prepare an E–R diagram for this hospital according to the following description:

· Each department has a Dept_ID, Dept_Name, and Location.
· Each doctor has a Doctor_ID, Name, Specialization, Email, and Phone.
· Each doctor works in exactly one department, and a department may have several doctors.
· Each patient has a Patient_ID, Name, Gender, Birth_Date, Address, and Phone.
· Each patient may book several appointments, and each appointment is handled by one doctor.
· Each appointment has an Appointment_ID, Date, Time, and Reason.
· Each nurse has a Nurse_ID, Name, Address, and Hire_Date, and each nurse must serve in one department and department can have many nurses.
· Each drug has a Drug_Code, Name, Recommended_Dosage, Price and one or more brand name.
· The system records when a nurse gives a patient a certain drug with specified dosage, date, and time.
· Each patient has a bill, and each bill includes Bill_ID, Date, and Total_Amount.

Problem 3

A company named ConnectMe has decided to store information about users, posts, comments, and interactions in a database. The company has wisely chosen to hire you as a database designer. Prepare an E–R diagram for this company according to the following description:

· Each user has a User_ID, Full_Name, Email,Phone, Password, Gender, and Join_Date.
· Each user may create several posts, and each post must be created by one user.
· Each post has a Post_ID, Content, Post_Date, and Privacy_Status.
· Each post may receive several comments, and each comment belongs to one post.
· Each comment has a Comment_ID, Text, Comment_Date, and belongs to one user (the author).
· Users can interact with posts using reactions (like, love, etc.), and each reaction is stored with the type and date.
· A user can follow other users, and this relationship is stored with the date of following.

Design a conceptual schema showing all keys, cardinality constraints, and assumptions.

Problem 4

A large online store named MegaMart has decided to store information about customers, orders, products, suppliers, and payments in a database. The company has wisely chosen to hire you as a database designer. Prepare an E–R diagram for this company according to the following description:

· Each customer has a Customer_ID, Name, Email, Phone, and Address.
· Each product has a Product_ID, Product_Name, Category, Price, and Stock_Quantity.
· Each supplier has a Supplier_ID, Supplier_Name, Contact_Number, and City.
· Each supplier may supply several products, and each product may be supplied by several suppliers.
· Each order has an Order_ID, Order_Date, and Total_Amount.
· Each order is placed by one customer, but a customer can place several orders.
· Each order can contain several products, and each product can appear in many orders.
· For each ordered product, the system stores the Quantity and Unit_Price.
· Each order has one or more payments, each with a Payment_ID, Payment_Date, Payment_Type, and Amount_Paid.

Problem 5

Major airlines companies that provide passenger services keep database with lots of information on all airlines.

1. Each airline has an identification number, name and address, name of the contact person and telephone numbers.

2. Each employee works in Airline Company has an employee identification number, name, address, birthday recorded as (day, month, year), gender, position with the company, and qualifications.

3. Each airline owns different aircrafts. For each aircraft an aircraft identification number, capacity, and model is recorded.

4. The aircrafts are assigned to different routes. An aircraft can work on more than one route and a route has many aircrafts going on it. Some information as number of passengers, price per passenger, departure date time, arrival date time and the time that aircraft spent in travelling the route are recorded.

Each route has a route identification number, origin, destination, distance,classification (e.g. domestic or international route).

5. Each aircraft has its own crew (major pilot, assistant pilot and two hostesses), the aircraft crew not stored as employee. Each crew is assigned to only one aircraft.

6. Each airline keeps information about their buy/sell transactions (for example selling an airplane ticket is a sell transaction, paying for maintenance is a buy transaction). Each transaction has a transaction identification number, date, description, and amount of money paid/received.