



Assignment # 03

Subject: Database Systems -CS2005

Post Date: 13/10/2023

Total Marks: 30

Due Date: 29/10/2023

Course Instructors: Dr. Zulfiqar Memon, Dr. Anam Qureshi, Ms. Romasha Khurshid, Mr. Shahroz Bakht, Ms. Fizza Aqeel, Ms. Fizza Mansoor, Mr. Omar Qureshi, Ms. Abeer Gauher, Mr. Muhammad Ali Fatmi

Instructions to be strictly followed.

- For all questions submit a doc/pdf file.
- It should be obvious that submitting your work after the due date will result in zero points being awarded.
- Plagiarism (copying/cheating) and late submissions result in a zero mark.

Question #01:

Marks /10

XYZ Solutions is an innovative technology company dedicated to providing cutting-edge solutions to businesses worldwide that are currently working on different projects. The relation state shown below is in a denormalized state. You are required to normalize it up to 3NF.

Project Code	Project Name	Project Manager	Project Budget	Employee ID	Employee Name	Department No.	Department Name	Hourly Rate
P - 10	Inventory Management	John Smith	\$10000	E – 100	Emily	D – 01	Quality Assurance	\$ 10
P - 10	Inventory Management	John Smith	\$10000	E – 101	Anna	D – 03	R & D department	\$ 12.5
P - 10	Inventory Management	John Smith	\$10000	E – 102	Jamal	D – 02	IT department	\$ 11.5
P – 11	Supply Chain Management	Carlos Silva	\$20000	E – 103	Maria	D – 03	R & D department	\$ 15.5
P – 11	Supply Chain Management	Carlos Silva	\$20000	E – 104	Samuel	D – 02	IT department	\$ 14.5
P – 11	Supply Chain Management	Carlos Silva	\$20000	E – 105	Ethan	D – 01	Quality Assurance	\$ 13.5

Question #02:**Marks /10**

A university is restructuring its database. The table shows the grade report table in a denormalized state.

S – Student C – Course F - Faculty

S - ID	Sname	Campus Location	Major	C - ID	CTitle	FNam e	FLocation	CGrade
10056	Liam	123 Main Street	CS	CS 2001	Database	Laura	R - 15	A
10056	Liam	123 Main Street	CS	CS 2005	Operating Systems	Johns on	R - 18	B
10489	Martin	456 Avenue	IS	CS 2001	Database	Laura	R - 15	C
10489	Martin	456 Avenue	IS	IS 2014	Vulnerability Assessment	Brown	R - 18	B
10489	Martin	456 Avenue	IS	IS 2048	Reverse Engineering	Sam	R - 09	A

1. Specify the primary key (s) for the table.
2. Provide examples of insertion and updation anomalies.
3. Convert the table up to 3NF by identifying the functional dependencies represented by the attributes.
4. Draw a relational Schema for your 3NF relations and show the referential integrity constraints.

Question #03:**Marks /10**

Design ER Diagram of the following HMS situation:

Patients, doctors, nurses and departments are the key constructs of Hospital Management System. Every patient has a unique PatientID, a FirstName and LastName, DateOfBirth, Gender (can be male or female), must have multiple ContactNumber, Address and Email. A patient can consult one or more doctors and each doctor has a unique DoctorID, a FirstName and LastName, Specialization, ContactNumber, Email. A doctor can have many patients. There are nurses to work with doctors, each nurse has unique NurseID, a FirstName, a LastName, Department, ContactNumber, Email, one or more nurses can work with many doctors and each nurse is associated with only one department.

Regular Doctor's OPDs are scheduled by hospital in which a doctor has many appointments and one patient has one or more appointments as well having unique AppointmentID, PatientID, DoctorID, Date, Time, Status. HMS also maintaining a medical record of every patient with unique MR#, PatientID, DoctorID, Date, Diagnosis, Treatment, each patient can have multiple medical records.

Hospital is composed of many departments and every department has unique DepartmentID, DepartmentName, HeadOfDepartment and HOD must be a doctor. A department can have multiple beds each has a unique BedID, BedNumber, Ward, Availability and a bed belongs to one department.

A patient has to make payment against every availed service and can make multiple payments with unique PaymentID, PatientID, Amount, PaymentDate, PaymentMethod.

Create an Entity Relationship diagram that captures this information. Be certain to indicate identifiers and cardinality constraints.