Tutorial B01: Normalization

Question 1

You are given the following Student_Course_Module table containing data as shown:

Adm_No	Stud_Name	Crse_cd	Crse_Name	Mod_Cd	Mod_Name	Mark
A001	Janice	DIT	Diploma in Information Technology	COS	Computer Operating System	83
				DBMS	Database Management System	72
				JPRG	Java Programming	78
				NETF	Network Fundamentals	87
A002	Anita	DBIT	Diploma in Business Information Technology	SAD	Software Application Development	87
				WCD	Web Client Development	83
				JPRG	Java Programming	78
				NETF	Network Fundamentals	87
…	…	…	…	…	…	…

(a) Is the Student_Course_Module table in 0NF? Justify your answer.

(b) Write the table in the relational heading format.

(c) What is a first normal form (1NF) table? Transform the table, if it is not already in the 1NF, into the first normal form. Present your 1NF table in
(i) a table form at as shown above
(ii) relational heading format

(d) Using the 1NF table Student_Course_Module, explain, what is insert, update and delete anomaly.

(e) Transform the 1NF relation of Student_Course_Module into a set of 2NF relations.

(f) What is a 2NF table?

(g) Transform the set of 2NF relations of into a set of 3NF relations.

Question 2

The following table stores the project charges of a software house:

ProjectCharges

Pno	Pname	Eno	Ename	JobType	Man_Day_ Rate	Man_Day_ Billed	Total Charge
102	VesselSoft	565	Tan	PM	1000	5	5,000
		798	Lim	PL	800	20	16,000
		885	Gay	SE	400	50	20,000
201	Soft Machine	565	Tan	PM	1000	4	4,000
		698	Lin	PL	800	10	8,000
		888	Sia	SE	400	100	40,000
		555	Chan	Prog	200	100	20,000

Legend

Pno	Project Number which uniquely identifies a project
Pname	Project Name
Eno	Employee Number which uniquely identifies an employee
Ename	Employee Name
JobType	Job designation held by an employee
Man_Day_Rate	Rate charged per day for a specific job type
Man_Day_Billed	Number of days to be billed for an employee working in a project
TotalCharge	Total amount charged for an employee in a project

- Each employee can only hold one job type.
- The Man_Day_Rate is dependent on the job type
- The number of days an employee worked on a project is recorded in the Man_Day_Billed column.

(a) The following is an *incorrect* first normal form (1NF) for the above ProjectCharges table:

ProjectCharges (Pno, Pname, {Eno, Ename, JobType, Man_Day_Rate, Man_Day_Billed, TotalCharges})

Explain the error(s) in the given 1NF table, and write the corrected 1NF table.

(b) State if the following statements are True or False:
(i) A first normal form relation is also in second normal form if it has a simple primary key.
(ii) Deletion anomalies cannot exist in second normal form tables.

(c) Derive the second normal form relation(s) from the corrected first normal form relation.

(d) Derive the third normal form relations from the second normal form relations in (d).