

Tutorial 6: Functional Dependency & Normalization

CS3402 Database Systems

Question 1

- Examine the **Branch** table shown below.
- a) Why this table is not in 1NF?
 - b) Describe and illustrate the process of normalizing the data shown in this table to third normal form (3NF).

BranchNo	BranchAddress	TelNo
B001	8 Jefferson Way, Portland, OR 97201	503-555-3618, 503-555-2727, 503-555-6534
B002	City Center Plaza, Seattle, WA 98122	206-555-6756, 206-555-8836
B003	14 – 8th Avenue, New York, NY 10012	212-371-3000
B004	16 – 14th Avenue, Seattle, WA 98128	206-555-3131, 206-555-4112

Question 2

➤ Examine the **StaffBranchAllocation** table shown below.

- {StaffNo, BranchNo} is the primary key.
- FDs: StaffNo → {Name, Position} and BranchNo → BranchAddress

a) Why this table is not in 2NF?

b) Describe and illustrate the process of normalizing the data shown in this table to third normal form (3NF).

StaffNo	BranchNo	BranchAddress	Name	Position	HoursPerWeek
S4555	B002	City Center Plaza, Seattle, WA 98122	Ellen Layman	Assistant	16
S4555	B004	16 – 14th Avenue, Seattle, WA 98128	Ellen Layman	Assistant	9
S4612	B002	City Center Plaza, Seattle, WA 98122	Dave Sinclair	Assistant	14
S4612	B004	16 – 14th Avenue, Seattle, WA 98128	Dave Sinclair	Assistant	10

Question 3

➤ Examine the **BranchManager** table shown below.

- BranchNo is the primary key
- FD: MgrStaff → MgrName

a) Why this table is not in 3NF?

b) Describe and illustrate the process of normalizing the data shown in this table to third normal form (3NF).

BranchNo	BranchAddress	TelNo	MgrStaffNo	MgrName
B001	8 Jefferson Way, Portland, OR 97201	503-555-3618	S1500	Tom Daniels
B002	City Center Plaza, Seattle, WA 98122	206-555-6756	S0010	Mary Martinez
B003	14 – 8th Avenue, New York, NY 10012	212-371-3000	S0145	Art Peters
B004	16 – 14th Avenue, Seattle, WA 98128	206-555-3131	S2250	Sally Stern

Question 4

➤ Examine the table shown below and the set of functional dependency on its attributes:

- CourseRmAlloc (CourseId, CourseName, Year, Lecturer, Enrollment, RoomId, RoomCapacity, Day, Time)

• FDs:

1. $\text{CourseId} \rightarrow \text{CourseName}$
2. $\text{CourseName} \rightarrow \text{CourseId}$
3. $\{\text{CourseId}, \text{Year}\} \rightarrow \text{Lecturer}$
4. $\{\text{CourseId}, \text{Year}\} \rightarrow \text{Enrollment}$
5. $\text{RoomId} \rightarrow \text{RoomCapacity}$
6. $\{\text{RoomId}, \text{Year}, \text{Day}, \text{Time}\} \rightarrow \text{CourseId}$
7. $\{\text{CourseId}, \text{Year}, \text{Day}, \text{Time}\} \rightarrow \text{RoomId}$

- a) Find all candidate keys of this table.
- b) Decompose this table into a design into BCNF.