

ASSIGNMENT:

1. Find the functional dependencies for the below and normalize it till BCNF:

CustID	CustName	AccountManager	AccountManagerRoom	ContactName1	ContactName2
171	ABNAMro	Hans	12	Piet	Koos
190	RaboBank	Guus	15	Mona	Mieke

Solution: The table is already in 1 NF form because each attribute has atomic values.
The table is already in 2 NF form because there is no partial dependency.

The dependencies are as follows:

Custid \rightarrow CustName

Custid \rightarrow AccountManager

Custid \rightarrow ContactName1

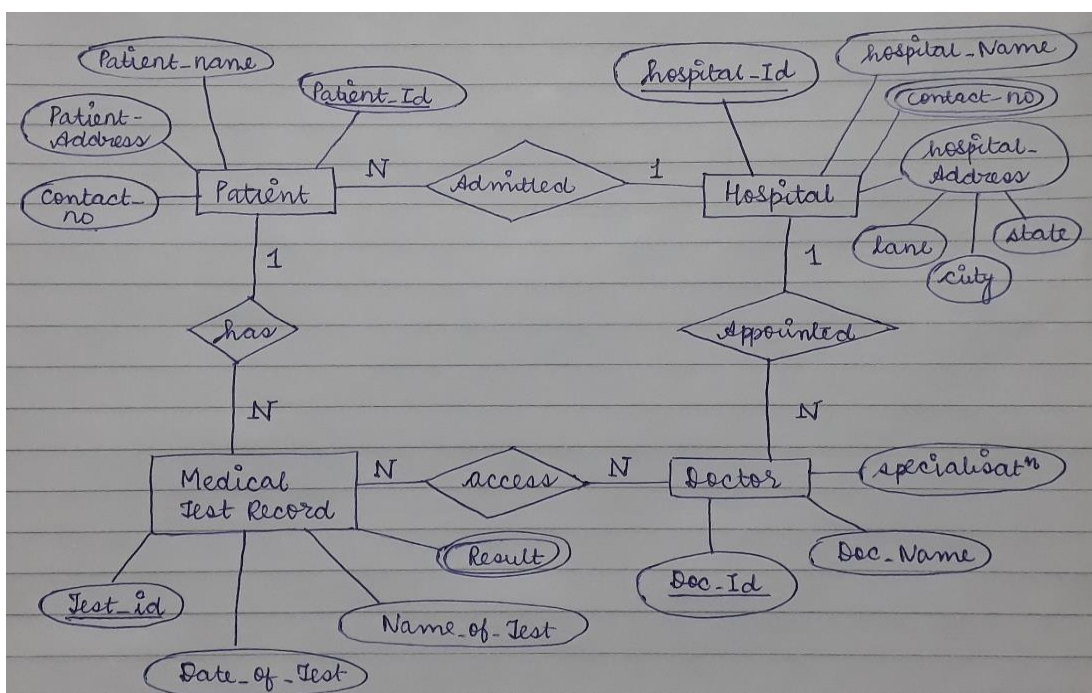
Custid \rightarrow ContactName2

AccountManager \rightarrow AccountManagerRoom ----- (1)

So, there is no partial but transitive dependency as in (1), hence we split the table into two, making it in 3NF and BCNF.

<u>Custid</u> (primary key)	CustName	AccountManager (foreign key)	ContactName1	ContactName2
<u>AccountManager</u> (Primary Key)		AccountManagerRoom		

2. Draw an ER diagram for a hospital management system.



3. Consider a relation Student (StudentID, ModuleID, ModuleName, StudentName, StudentAddress, TutorId, TutorName). Each student is given a StudentID and each module given a ModuleID. A student can register more modules and a module can be registered by more students. TutorID is the ID of the student's personal tutor, it is not related to the modules that the student is taking. Each student has only one tutor, but a tutor can have many tutees. Different students can have the same name. Different students can be living at the same address. Find all the functional dependencies holding in this relation and normalize the table to 3NF.

Solution: The dependencies are as follows:

StudentID \rightarrow ModuleId
ModuleId \rightarrow StudentID
StudentID \rightarrow StudentName
StudentID \rightarrow StudentAddress
StudentID \rightarrow TutorId
TutorId \rightarrow TutorName
ModuleId \rightarrow ModuleName

Also, given that a student can opt for multiple modules and a tutor is assigned to a student not to the module type.

Therefore, StudentID and ModuleId will be the candidate key.

Hence five tables will be formed to normalise the relation to 3 NF

R1(StudentID, ModuleId)

R2(StudentID, TutorId): functional dependency of tutor on the student

R3 (StudentID, StudentName, StudentAddress): separate relation due to partial dependency of attributes on StudentID

R4(TutorId, TutorName): transitive relationship from StudentID \rightarrow TutorId \rightarrow TutorName

R5(ModuleId, ModuleName): functional dependency of ModuleName on ModuleId

*underlined attributes are the primary key for the respective relations