Normalization GTU Exampls

1. A college maintains details of its lecturers' subject area skills. These details comprise: Lecturer Number, Lecturer Name, Lecturer Grade, Department Code, Department Name, Subject Code, Subject Name, Subject Level Assume that each lecturer may teach many subjects but may not belong to more than one department. Subject Code, Subject Name and Subject Level are repeating fields. Normalize this data to Third Normal Form.

   UNF Lecturer Number ,Lecturer Name,Lecturer Grade,Department Code,Department Name,SubjectCode,Subject Name,Subject Level

   1NF
   Lecturer Number, Lecturer Name, Lecturer Grade, Department Code, Department Name
   Lecturer Number, Subject Code, Subject Name,Subject Level

   2NF
   Lecturer Number,Lecturer Name,Lecturer Grade,Department Code,Department Name
   Lecturer Number, Subject Code
   Subject Code,Subject Name,Subject Level

   3NF
   Lecturer Number,Lecturer Name,Lecturer Grade
   *Department Code
   Department Code,Department Name
   Lecturer Number, Subject Code
   Subject Code, Subject Name, Subject Level

2. A software contract and consultancy firm maintain details of all the various projects in which its employees are currently involved. These details comprise: Employee Number, Employee Name, Date of Birth, Department Code, Department Name, Project Code, Project Description, Project Supervisor Assume the following: • Each employee number is unique. • Each department has a single department code. • Each project has a single code and supervisor. • Each employee may work on one or more projects. • Employee names need not necessarily be unique. • Project Code, Project Description and Project Supervisor are repeating fields. Normalize this data to Third Normal Form

   UNF

   Employee Number, Employee Name, Date of Birth, Department Code, Department Name, ProjectCode, Project Description, Project Supervisor

   1NF

   Employee Number, Employee Name, Date of Birth

Department Code, Department Name

Employee Number, Project Code, Project Description, Project Supervisor

2NF
Employee Number, Employee Name, Date of Birth, Department Code, Department Name
Employee Number, Project Code,
Project Code, Project Description, Project Supervisor
3NF
Employee Number,Employee Name,Date of Birth,*Department Code
Department Code, Department Name
Employee Number, Project Code
Project Code, Project Description, Project Supervisor

3. Consider the relation R = {A, B, C, D, E, F, G, H, I, J} and the set of functional dependencies F={{A, B} → C, A → {D, E}, B → F, F →{G, H}, D →{I, J}} What is the key for R? Decompose R into 2NF, then 3NF relations

A→DE (given) => A→D and A→ D
Since A→D and D→IJ (given) => A→IJ
Using the union rule A→ ADEIJ, thus AB → ABDEIJ (augmentation)
Also AB→C (given) => AB→ ABCDEIJ.
Since B→F (given) and F→ GH (given), B→GH (transitivity)
Thus AB→AGH holds. Also AB→AF holds from B→F (given)
Finally, using the union rule AB→ABCDEFGHIJ.
So AB is a key. This can also be determined by calculating AB^+ with respect to the set F.

2NF	3NF	
R1 (A, B, C)	R1 (A, B, C)	
R2 (A,D,E,I,J)	R2.1 (A,D,E)	R2.2 (D, I, J)
R3 (B, F, G, H)	R3.1 (B, F)	R3.2 (F, G, H)

now the given relation R is in 3NF.