

Principle of Data Base Systems : Assignment 1

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1 Question 2

Question : Identify dependencies (Trivial, Fully Functional, Transitive, Multi-valued) in the context of academic system at IIT Kanpur.

1.1 Trivial Dependencies

A trivial functional dependency occurs when you describe a functional dependency of an attribute on a collection of attributes that includes the original attribute i.e it is only a trivial functional dependency when a subset of attributes depends from the full set.

Definition of trivial functional dependency: Example.: (a, b) depends from (a, b, c) attributes.

- (Name, Roll Number) \rightarrow Name
- (Course Name, Course Code) \rightarrow Course Name
- (Roll No., CPI) \rightarrow CPI
- (Name , Date of Birth) \rightarrow Date of Birth
- (Roll No., Email) \rightarrow Email

1.2 Fully Functional Dependencies

A full functional dependency occurs when you already meet the requirements for a functional dependency and the set of attributes on the left side of the functional dependency statement cannot be reduced any farther.

- Course Number \rightarrow (Course Name, Instructor, Credits, Prerequisite)
- Department Name \rightarrow (Department Code, Department Area)
- Lab Course No. \rightarrow (Lab Location, Lab Department)
- (Course No., Day) \rightarrow (Lecture Time, Lecture Location)
- Roll No. \rightarrow (Name, Email, Address, CPI, Department, Sex)

1.3 Transitive Dependencies

Transitive dependencies occur when there is an indirect relationship that causes a functional dependency.

- (Course, Roll No.) \rightarrow Grade \rightarrow (Pass/Fail/Not Done)
- (Roll No., Semester) \rightarrow (Credits) \rightarrow (AP/not)
- Roll No. \rightarrow Address \rightarrow Hall No.
- Email \rightarrow Roll No. \rightarrow Name
- Roll No. \rightarrow Hall \rightarrow Warden-In-Charge

1.4 Multi valued Dependencies

Multivalued dependencies occur when the presence of one or more rows in a table implies the presence of one or more other rows in that same table.

- Course No. \twoheadrightarrow Instructor
- Course No. \twoheadrightarrow Reference Books
- Course, Book and Instructor : (Course \twoheadrightarrow Book) and (Course \twoheadrightarrow Lecturer)
- (Name, Address, Phones, Subjects Liked) : A Student's phones are independent of the subject they like and each of a student's phones appears with each of the subjects they like in all combinations
- (Course No., Labs No., Instructor) : There can be many labs and many instructor for a instructor. Hence, Redundant Information.
- (Course No, Student Roll No., Instructor) : Same as above