Centralized Research Information

Project Milestone 3

Team ID: 29

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Task A

1. **Professor**:
   - ◆ FirstName: first name of the professor, type: VARCHAR(20)
   - ◆ MI: middle initial of the professor, type: CHAR
   - ◆ LastName: last name of the professor, type: VARCHAR(20)
   - ◆ ProfessorID : unique ID of the professor, type: VARCHAR(10)
   - ◆ Email: email address of the professor, type: VARCHAR(40)
   - ◆ DepartmentID: ID of the professor's department, type: VARCHAR(8)

   Here, ProfessorID is a primary key. The dependencies are:
   ProfessorID -> FirstName
   ProfessorID -> MI
   ProfessorID -> LastName
   ProfessorID -> Email
   ProfessorID -> DepartmentID
   Email->FirstName
   Email->MI
   Email->LastName

   1NF: There are no composite, multivalued or nested attributes.
   2NF: Every non prime attribute is fully functionally dependent on the primary key.
   3NF: Since all dependencies have primary key in the left hand side, any non trivial dependency X->Y will have X as a super key here
   BCNF: This is not in BCNF since in the last three dependencies, Email is not a superkey. However, this is not a very important functional dependency and the

information of names being present in the tuple is more helpful. Also, since the name comes only once each tuple, there isn't the problem of redundancy.

2. **Department:**
   ◆ DepartmentName: name of the department, type: VARCHAR(15)
   ◆ DepartmentID : unique ID of the department, type: VARCHAR(8)
   ◆ No_of_research: number of research projects that are going on in the department, type: INT
   ◆ No_of_citations: number of citations from the research projects in the department, type: INT

   Here, DepartmentID is the primary key. The dependencies are:
   DepartmentID->DepartmentName
   DepartmentID->No_of_research
   DepartmentID->No_of citations

   1NF: There are no composite, multivalued or nested attributes.
   2NF: Every non prime attribute is fully functionally dependent on the primary key.
   3NF: Since all dependencies have primary key in the left hand side, any non trivial dependency X->Y will have X as a super key here
   BCNF: Since all dependencies have primary key in the left hand side, any non trivial dependency X->Y will have X as a super key here

3. **Research**:
   ◆ Title : title of the research project, type: TEXT
   ◆ No_of_reseachers: number of people working on the research, type: INT
   ◆ Vacancy: how many people are needed for the research (number of missing research assistants), type: INT
   ◆ Funding: how much funding the research receives, type: DOUBLE(12, 2)
   ◆ StartDate: the date when the research first started, type: DATE
   ◆ EndDate: the tentative date when the research will end, type: DATE
   ◆ Contact_email: email address of the contact person, type: VARCHAR(40)
   ◆ Contact_position: position of the contact person within that research project, type: TEXT

   Here, the primary key is Title. The dependencies are:
   Title->No_of_researchers
   Title->Vacancy

Title->Funding
Title->StartDate
Title->EndDate
Title, Contact_email -> Contact_position

1NF: There are no composite, multivalued or nested attributes.
2NF: Every non prime attribute is fully functionally dependent on the primary key.
3NF: Since all dependencies have primary key in the left hand side, any non trivial dependency X->Y will have X as a super key here
BCNF: Since all dependencies have primary key in the left hand side, any non trivial dependency X->Y will have X as a super key here

4. **Works_on**:
   - ◆ ProfessorID : unique ID of the professor, type: VARCHAR(10)
   - ◆ Title : title of the research project, type: TEXT

   Both the given attributes form the primary key here. So, there are no functional dependencies. It's already in BCNF.

5. **In_department**:
   - ◆ DepartmentID : unique ID of the department, type: VARCHAR(8)
   - ◆ Title : title of the research project, type: TEXT
   - ◆ Citation_no: number of citations for a specific research, type: INT

   Here, DepartmentID and Title are the primary keys. The functional dependency is:
   DepartmentID, Title -> Citation_no

   1NF: There are no composite, multivalued or nested attributes.
   2NF: Every non prime attribute is fully functionally dependent on the primary key.
   3NF: Since all dependencies have primary key in the left hand side, any non trivial dependency X->Y will have X as a super key here
   BCNF: Since all dependencies have primary key in the left hand side, any non trivial dependency X->Y will have X as a super key here

6. **Research_field**:
   - ◆ Title : title of the research project, type: TEXT

◆ Field : field that the research project is related to, type: TEXT

Here, both the attributes form the primary key. So, there are no functional dependencies. It’s already in BCNF.