IT214 Database Management Systems

Version Control System Database

Relational-Schema

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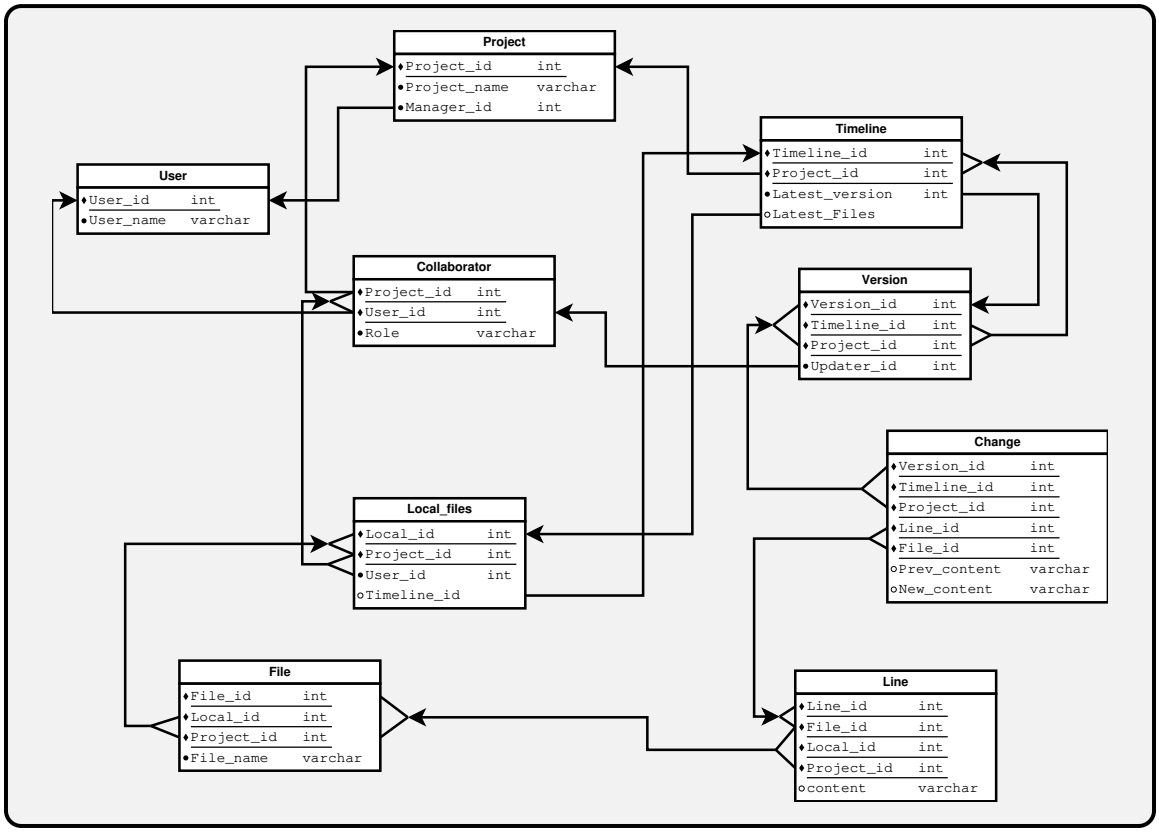
Contents

1 Relational-Schema:



2 Relation wise Minimal FD set:

- Project(Project_id,Project_name,Manager_id)
  Project_id → Project_name,Manager_id keys: Project_id
- User(User_id,User_name)
  User_id → User_name
- Collaborator(Project_id, User_id, Role)
  Project_id, User_id → Role
- Local_Files(Local_id, Project_id, User_id, Timeline_id)
  Local_id, Project_id → User_id, Timeline_id
- File(File_id, Local_id, Project_id, File_name, Length)
  File_id, Local_id, Project_id → File_name, Length

- Line(Line_id, File_id, Local_id, Project_id, Content)
  Line_id, File_id, Local_id, Project_id → Content
- Timeline(Timeline_id,Project_id,Latest_Version, Latest_Files)
  Timeline_id, Project_id → Latest_Version, Latest_Files
- Version(Version_id,Timeline_id,Project_id,Updater_id)
  Version_id, Timeline_id, Project_id → Updater_id
- Change(Version_id,Timeline_id,Project_id,Line_id,File_id,
  Previous_content, New_content)
  Version_id, Timeline_id, Project_id,Line_id, File_id → Previous_content,
  New_content

3 Proof that relations are in BCNF:

Each relation has a primary key consisting of all the attributes on the left side of each relation. This means that for every functional dependency (FD) A → B that exists in relation R, A must be a super-key. As a result, all relations are in Boyce-Codd Normal Form.

4 DDL scripts:

```
DROP SCHEMA DBMS_PROJECT CASCADE;
CREATE SCHEMA DBMS_PROJECT;
SET search_path TO DBMS_PROJECT;
CREATE TABLE "User" (
    User_id INT NOT NULL,
    User_name VARCHAR(20) NOT NULL,
    PRIMARY KEY(User_id)
);
CREATE TABLE Project (
    Project_id INT NOT NULL,
    Project_name VARCHAR(20) NOT NULL,
    Manager_id INT NOT NULL,
```

```
    PRIMARY KEY(Project_id)
);
CREATE TABLE Collaborator (
    Project_id INT REFERENCES Project(Project_id)
    ON DELETE CASCADE ON UPDATE CASCADE,
    User_id INT REFERENCES "User"(User_id)
    ON DELETE CASCADE ON UPDATE CASCADE,
    Role VARCHAR(20) NOT NULL,
    PRIMARY KEY (Project_id, User_id)
);
CREATE TABLE Timeline (
    Timeline_id INT NOT NULL,
    Project_id INT REFERENCES Project(Project_id)
    ON DELETE CASCADE ON UPDATE CASCADE,
    Latest_Version INT NOT NULL,
    Latest_Files INT NOT NULL,
    PRIMARY KEY (Project_id, Timeline_id)
);
CREATE TABLE "Version" (
    Timeline_id INT NOT NULL,
    Project_id INT NOT NULL,
    Version_id INT NOT NULL,
    Updater_id INT NOT NULL,
    CONSTRAINT Version_PFK FOREIGN KEY (Timeline_id, Project_id)
     REFERENCES Timeline(Timeline_id, Project_id)
     ON DELETE CASCADE ON UPDATE CASCADE,
    PRIMARY KEY (
        Timeline_id,
        Project_id,
        Version_id
    )
);
CREATE TABLE Local_Files (
    Local_id INT NOT NULL,
    Project_id INT REFERENCES Project(Project_id)
     ON DELETE CASCADE ON UPDATE CASCADE,
    User_id INT,
    Timeline_id INT DEFAULT 0 NOT NULL,
    PRIMARY KEY (Local_id, Project_id)
);
CREATE TABLE "File" (
    Local_id INT NOT NULL,
    Project_id INT NOT NULL,
    File_id INT NOT NULL,
```

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    File_name VARCHAR(20) NOT NULL,
    Length INT NOT NULL,
    CONSTRAINT File_PFK FOREIGN KEY (Local_id, Project_id)
     REFERENCES Local_Files(Local_id, Project_id)
     ON DELETE CASCADE ON UPDATE CASCADE,
    UNIQUE(File_id, Local_id, Project_id),
    PRIMARY KEY (
        Local_id,
        Project_id,
        File_id
    )
);
CREATE TABLE "Line" (
    Local_id INT NOT NULL,
    Project_id INT NOT NULL,
    File_id INT NOT NULL,
    Line_id INT NOT NULL,
    Content VARCHAR(1024) NOT NULL,
    CONSTRAINT Line_PFK FOREIGN KEY (
        Local_id,
        Project_id,
        File_id
    ) REFERENCES "File"(
        Local_id,
        Project_id,
        File_id
    ) ON DELETE CASCADE ON UPDATE CASCADE,
    PRIMARY KEY (
        Local_id,
        Project_id,
        File_id,
        Line_id
    )
);
CREATE TABLE Change (
    Version_id INT NOT NULL,
    Timeline_id INT NOT NULL,
    Project_id INT NOT NULL,
    Line_id INT NOT NULL,
    File_id INT NOT NULL,
    Local_id INT NOT NULL,
    Previous_content VARCHAR(1024) NOT NULL,
    New_content VARCHAR(1024) NOT NULL,
    CONSTRAINT Change_PFK FOREIGN KEY (
```

```
        Project_id,
        Line_id,
        File_id,
        Local_id
    ) REFERENCES "Line"(
        Project_id,
        Line_id,
        File_id,
        Local_id
    ) ON DELETE CASCADE ON UPDATE CASCADE,
    CONSTRAINT Change_PFK2 FOREIGN KEY (
        Version_id,
        Timeline_id,
        Project_id
    ) REFERENCES "Version"(
        Version_id,
        Timeline_id,
        Project_id
    ) ON DELETE CASCADE ON UPDATE CASCADE,
    PRIMARY KEY (
        Version_id,
        Timeline_id,
        Project_id,
        Line_id,
        File_id
    )
);

ALTER TABLE Local_Files
ADD FOREIGN KEY (User_id) REFERENCES "User"(User_id)
ON DELETE SET NULL ON UPDATE CASCADE;

ALTER TABLE "Version"
ADD FOREIGN KEY (Updater_id) REFERENCES "User"(User_id)
ON DELETE SET NULL ON UPDATE CASCADE;

ALTER TABLE Timeline
ADD FOREIGN KEY (Latest_Files, Project_id)
 REFERENCES Local_Files(Local_id, Project_id)
 ON DELETE SET NULL ON UPDATE CASCADE,
ADD FOREIGN KEY (Latest_Version, Timeline_id, Project_id)
 REFERENCES "Version"(Version_id, Timeline_id, Project_id);
```