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# IT214 Database Management Systems



## Version Control System Database

ERD and relational schema with normalization proofs

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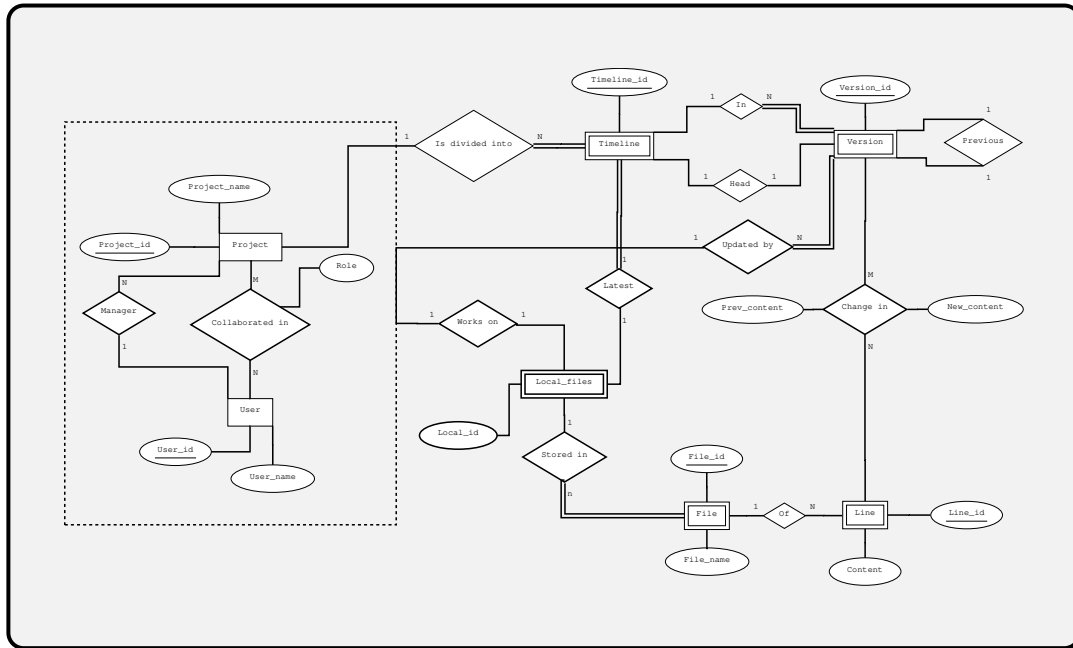
Soham Viradiya	202101472
Om Gor	202101484
Shivang Kacha	202101488
Sahil Lakdawala	202101495

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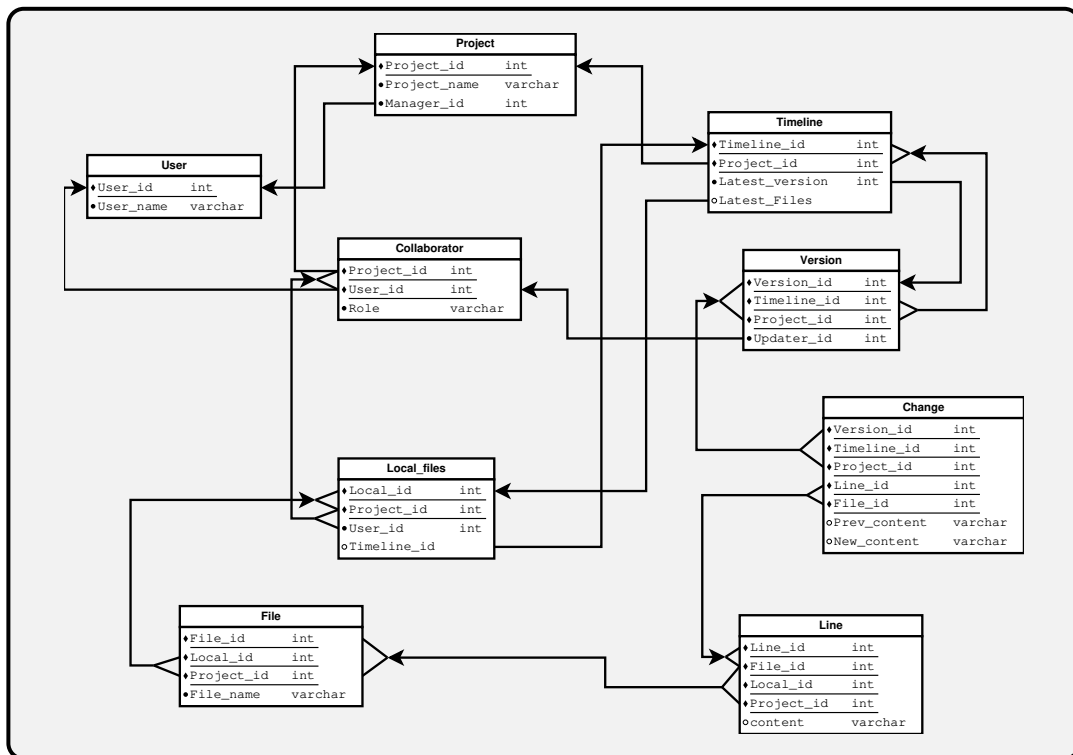
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## 1 ER diagram:



## 2 Relational Schema:



### 3 Normalization proof:

#### Minimal FD set:

- Project(Project\_id, Project\_name, Manager\_id)  
Project\_id  $\rightarrow$  Project\_name, Manager\_id keys: Project\_id
- User(User\_id, User\_name)  
User\_id  $\rightarrow$  User\_name
- Collaborator(Project\_id, User\_id, Role)  
Project\_id, User\_id  $\rightarrow$  Role
- Local\_Files(Local\_id, Project\_id, User\_id, Timeline\_id)  
Local\_id, Project\_id  $\rightarrow$  User\_id, Timeline\_id
- File(File\_id, Local\_id, Project\_id, File\_name, Length)  
File\_id, Local\_id, Project\_id  $\rightarrow$  File\_name, Length
- Line(Line\_id, File\_id, Local\_id, Project\_id, Content)  
Line\_id, File\_id, Local\_id, Project\_id  $\rightarrow$  Content
- Timeline(Timeline\_id, Project\_id, Latest\_Version, Latest\_Files)  
Timeline\_id, Project\_id  $\rightarrow$  Latest\_Version, Latest\_Files
- Version(Version\_id, Timeline\_id, Project\_id, Updater\_id)  
Version\_id, Timeline\_id, Project\_id  $\rightarrow$  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  $\rightarrow$  Previous\_content, New\_content

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)  $A \rightarrow B$  that exists in relation R, A must be a super-key. As a result, all relations are in Boyce-Codd Normal Form.