Database System

Project Proposal

Source Control Management System

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Database Overview:

The database contains tables for managing users, repositories, issues, comments, commits, branches, collaborators, stars, and followers for a version control platform. Triggers and views are also implemented to track and display various actions and relationships within the system.

Key Tables:

1. User Table:
    - Stores user information such as user ID, username, email, password, creation date, and last login time.
    - Triggers track insertions, updates, deletions, and selections on this table.
2. Repository Table:
    - Manages repositories with attributes like repository ID, name, description, owner (user ID), and creation date.
    - Triggers handle insertions, updates, deletions, and selections on this table.
3. Issue Table:
    - Tracks issues including ID, title, description, associated repository, reporter (user ID), timestamps, status, etc.
    - Triggers manage insertions, updates, deletions, and selections for issues.
4. Comment Table:
    - Stores comments linked to issues with details like comment ID, issue ID, commenter (user ID), text, timestamps, etc.
    - Triggers handle insertions, updates, deletions, and selections on comments.
5. Commit:
    - Manages commits with commit ID, associated repository, committer (user ID), message, commit date, etc.
    - Triggers track insertions, updates, deletions, and selections for commits.

6. Branch Table:

- Tracks branches created within repositories, including branch IDs, related repositories, branch names, and creation dates.

7. Collaborator Table:
    - Manages collaborators added to repositories, including collaborator IDs, related repositories, and collaborators (users).
8. Star Table:
    - Tracks stars (likes) given to repositories by users, including star IDs, related repositories, and star givers (users).
9. Follower:
    - Manages followers of users, including follower IDs, followed users, and followers (users).

Functionality:

1. User Management:
    - Allows users to register, login, and update their profiles. The system enforces password length requirements for security.
2. Repository Management:
    - Enables users to create, update, and delete repositories. Each repository has a name, description, owner, and creation date.
3. Issue Tracking:
    - Supports the creation, updating, and closure of issues within repositories. Issues have titles, descriptions, creators, creation dates, update dates, closure dates, and statuses.
4. Collaboration:
    - Facilitates collaboration by allowing users to comment on issues, create branches, add collaborators to repositories, and star repositories.
5. Version Control:
    - Manages commits made by users to track changes in repositories. Commits include commit messages, creators, and dates.
6. Logging:

- Logs user actions such as user creation, updates, and deletions, repository actions, issue actions, comment actions, commit actions, branch actions, collaborator actions, star actions, and follower actions.

Views:

1. Repository_User_View:
    - Combines repository and user information.

2. Issue_User_View:
    - Links issues with reporter user details.

3. Comment_User_View:
    - Connects comments with the user who made them.

4. Commit_User_View:
    - Displays commits along with the user who committed them.

5. Branch_Repository_View:
    - Shows branches along with their repository details.

6. Collaborator_Repository_View:
    - Connects collaborators with their respective repositories and user details.

7. Star_Repository_View:
    - Links stars with repositories and the users who starred them.

8. Follower_User_View:
    - Shows followers along with the users they are following.

9. Repository_Collaborator_User_View:
    - Displays repositories with collaborators and owner details.

10. Issue_Comment_User_View:
    - Connects issues with comments and user details.

11. Branch_Commit_Repository_View:
    - Links branches, commits, repositories, and user details.

12. Star_Repository_User_View:
    - Connects stars with repositories and user details.

Triggers:

Types of Triggers:

1. Insert Triggers:
    - These triggers execute when new data is inserted into a table. In our system, insert triggers are used to track user actions such as creating repositories, adding issues, or commenting on code.

2. Update Triggers:
    - Triggered upon updating existing data, update triggers are essential for monitoring changes made by users. For example, updating repository details or modifying issue statuses triggers update triggers.

3. Delete Triggers:
    - Executed when data is deleted from a table, delete triggers are utilized to maintain referential integrity and track data removal actions within the system. Deleting repositories or issues invokes delete triggers.