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Database Design Exercise: Organizational Networking Platform

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1. Overview

This document describes the database schema and entity relationships for the Organizational Networking Platform. The system is designed to manage users, organizations, hierarchical structures, professional connections, and membership workflows within organizations.

The database follows a **relational model**, ensuring data integrity, scalability, and efficient querying for social and organizational interactions.

2. Design Objectives

- Support multiple organizations with hierarchical structures
- Manage users and their memberships across organizations
- Enable professional connections and connection requests between users
- Handle authentication-related workflows such as password reset

3. Entities and Description

3.1 User

Purpose:
Stores core user account and profile information.

Attributes:

- `user_id` (PK): Unique identifier for each user
- `username`: Unique display name
- `email`: Registered email address
- `profile_photo`: User profile image
- `bio`: Short user description
- `created_at`: Account creation timestamp
- `updated_at`: Last profile update timestamp
- `is_active`: Indicates whether the account is active

Relationships:

- One user can have multiple password reset requests
- One user can send and receive multiple connection requests
- One user can participate in multiple connections
- One user can belong to multiple organizations through membership

3.2 PasswordReset

Purpose:
Handles secure password reset functionality.

Attributes:

- `reset_id` (PK): Unique reset request identifier
- `user_id` (FK): References User
- `expires_at`: Expiry time for reset token

Relationship:

- Many password reset records belong to one user

3.3 ConnectionRequest

Purpose:
Manages connection requests between users.

Attributes:

- `request_id` (PK): Unique request identifier
- `requester_id` (FK): User sending the request
- `recipient_id` (FK): User receiving the request
- `request_type`: Type of connection request
- `status`: Pending, Accepted, or Rejected
- `created_at`: Request creation timestamp
- `updated_at`: Last update timestamp

Relationship:

- Each request links two users (requester and recipient)

3.4 Connection

Purpose:
Represents established relationships between users.

Attributes:

- `connection_id` (PK): Unique connection identifier
- `follower_id` (FK): User initiating the connection
- `leader_id` (FK): Connected user
- `created_at`: Connection creation timestamp

Relationship:

- One user can have many connections

3.5 Organization

Purpose:
Stores organization-level information.

Attributes:

- `organization_id` (PK): Unique organization identifier
- `name`: Organization name
- `created_at`: Organization creation timestamp
- `updated_at`: Last update timestamp

Relationships:

- One organization can have many members
- One organization can have many departments
- One organization can have many positions
- One organization has one organizational tree

3.6 Membership

Purpose:
Maps users to organizations and defines their role/status.

Attributes:

- `membership_id` (PK): Unique membership identifier
- `user_id` (FK): References User
- `organization_id` (FK): References Organization
- `membership_type`: Role type (e.g., admin, member)
- `status`: Active, Pending, or Removed
- `joined_at`: Membership start timestamp
- `is_founder`: Indicates if user is the organization founder

Relationship:

- Many users can belong to many organizations

3.7 Department

Purpose:
Defines departments within an organization.

Attributes:

- `dept_id` (PK): Unique department identifier
- `organization_id` (FK): References Organization
- `name`: Department name
- `created_at`: Creation timestamp

Relationship:

- One organization can have many departments

3.8 Position

Purpose:
Defines job positions and hierarchical roles in an organization.

Attributes:

- `position_id` (PK): Unique position identifier
- `organization_id` (FK): References Organization
- `title`: Position title
- `is_vacant`: Indicates if the position is open
- `parent_position_id` (FK): Self-referencing hierarchy

Relationship:

- Positions form a hierarchical structure within an organization

3.9 OrgTree

Purpose:
Represents the organizational hierarchy structure.

Attributes:

- `org_tree_id` (PK): Unique tree identifier
- `organization_id` (FK): References Organization

Relationship:

- One organization has one organizational tree

4. Normalization

- The database follows **Third Normal Form (3NF)**
- Redundant data is eliminated
- All non-key attributes depend solely on the primary key

Given Below is the ER diagram of the Database Model :-