



ERD and Relational Schema

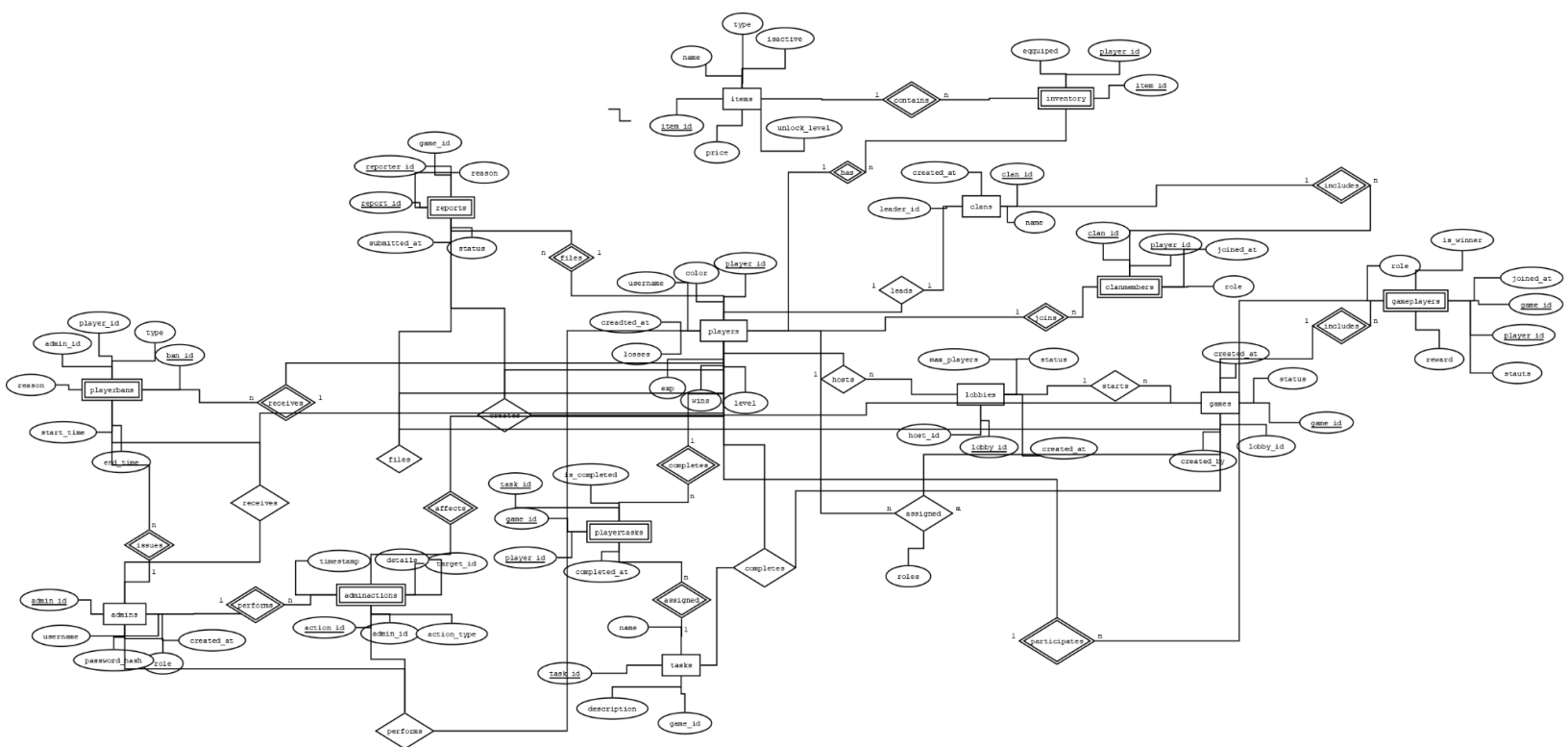
Team-14 Members

Devarsh Vasani 202301251

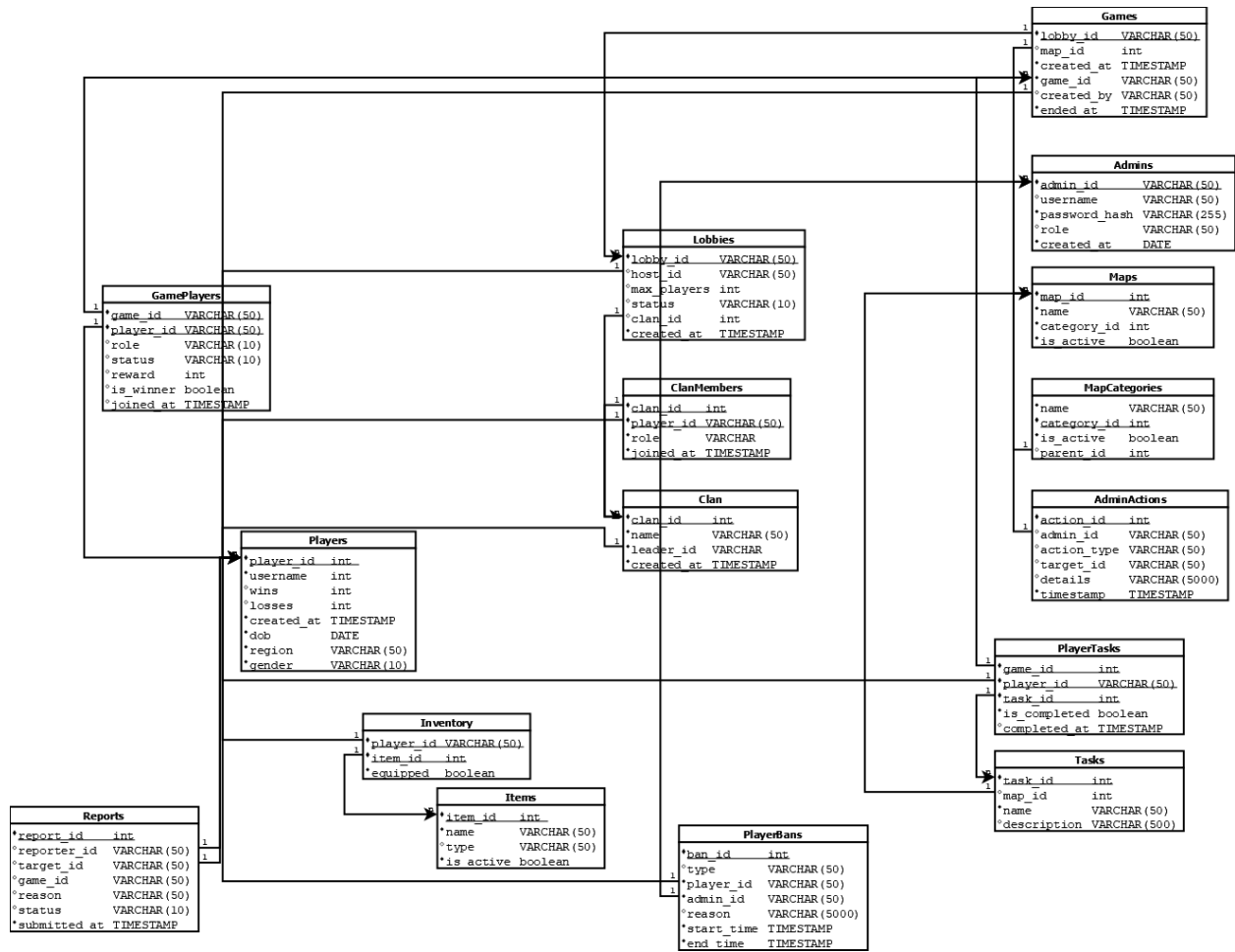
Meet Gandhi 202301219

Vansh Vora 202301266

Entity Relationship Model:



Relational Schema :



Normalization Proofs:

Example: Players

- Candidate Key: player_id
- All FDs like player_id → username, email, level, xp, role, created_at use full key ⇒ BCNF holds

Example: Items

- Candidate Key: item_id
- All FDs like item_id → name, description, rarity, type use full key ⇒ BCNF holds

Example: Inventory

- **Candidate Key: (player_id, item_id)**
- **All FDs like (player_id, item_id) → equipped use full key ⇒ BCNF holds**

Example: Clans

- **Candidate Key: clan_id**
- **All FDs like clan_id → name, created_at use full key ⇒ BCNF holds**

Example: ClanMembers

- **Candidate Key: (clan_id, player_id)**

- All FDs like (clan_id, player_id) → role, joined_at use full key ⇒ BCNF holds

Example: Lobbies

- Candidate Key: lobby_id
- All FDs like lobby_id → host_player_id, created_at use full key ⇒ BCNF holds

Example: Maps

- Candidate Key: map_id
- All FDs like map_id → name, category_id, created_at use full key ⇒ BCNF holds

Example: MapCategories

- Candidate Key: `category_id`
- All FDs like `category_id → name` use full key \Rightarrow BCNF holds

Example: Games

- Candidate Key: `game_id`
- All FDs like `game_id → lobby_id, map_id, start_time, end_time, status` use full key \Rightarrow BCNF holds

Example: GamePlayers

- Candidate Key: (`game_id, player_id`)
- All FDs like (`game_id, player_id`) \rightarrow `role, status,`

reward, is_winner, joined_at use full key \Rightarrow BCNF holds

Example: Tasks

- Candidate Key: task_id**
- All FDs like task_id \rightarrow name, description, created_at use full key \Rightarrow BCNF holds**

Example: PlayerTasks

- Candidate Key: (game_id, player_id, task_id)**
- All FDs like (game_id, player_id, task_id) \rightarrow completed_at, status use full key \Rightarrow BCNF holds**

Example: Reports

- **Candidate Key: report_id**
- **All FDs like report_id → reported_player_id, reporter_id, reason, reported_at use full key ⇒ BCNF holds**

Example: Admins

- **Candidate Key: admin_id**
- **All FDs like admin_id → username, email, role, created_at use full key ⇒ BCNF holds**

Example: PlayerBans

- **Candidate Key: ban_id**

- All FDs like `ban_id` → `player_id`, `reason`, `banned_at`, `duration`, `status` use full key ⇒ BCNF holds

Example: AdminActions

- Candidate Key: `action_id`
- All FDs like `action_id` → `admin_id`, `action_type`, `target_type`, `target_id`, `description`, `action_time` use full key ⇒ BCNF holds