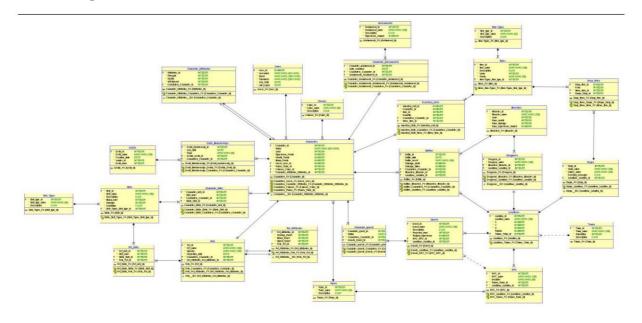| Faculty of Computer Science, Białystok University of Technology **Subject: Databases**	Date of completion: 24/01/2025
Project Topic: A system for managing an RPG game system with MMO elements **Name and surname:** 1. Rafał Ciereszko 2. Kiryl Alishkevich	**Leading:** Mg. Marek Kopczewski **Rate:**

PROJECT REQUIREMENTS

- SQL to create tables, SQL to add, update, delete data
- SQL for creating users and granting permissions
- ER Diagram, Project Description, Entity Description

PROJECT DESCRIPTION

The project's goal is to create a database to manage an online RPG system with MMO elements. The game allows players to create characters, gain experience, explore the game world, fight monsters, complete quests, acquire items, and interact with other players through guilds and trade.

The database also supports aspects such as character stats, skill management, and interactions with NPCs and monsters in the game.

ER DIAGRAM

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1. Achievements

Description: An entity represents various achievements that players can earn during gameplay. These may include challenges related to exploration, defeating enemies, completing difficult quests, or special achievements, such as those for performing a unique action in the game. Attributes:

- Character_achievement_id: Unique identifier.
- Date_unlocked: Date the achievement was unlocked.
- Characters_Character_Id: ID of the character who unlocked the achievement.
- Achievements_Achievement_id: The ID of the associated achievement.

2. Battles

Description: Stores information about a character's battles, such as the location of the battle, the outcome of the battle, and the amount of damage dealt and received. Battles can include monster duels, PvP battles, or dungeon boss fights. Attributes:

- Battle_id: Unique ID of the battle.
- Battle_date: Date of the battle.
- Battle_result: Battle result (e.g. win/loss).
- Damage_dealt: Total damage dealt.
- Damage_taken: Total damage taken.
- Characters_Character_Id: ID of the character participating in the fight.
- Monsters_Monster_id: ID of the monster being fought.
- Locations_Location_id: The ID of the combat location.

3. Character_Achievements

Description: Records achievements earned by specific characters. Includes the date they were unlocked, allowing players to track their progress. This is the link between the Characters and Achievements entities. Attributes:

- Character_achievement_id: Unique identifier of the entry.
- Date_unlocked: Date the achievement was unlocked.
- Characters_Character_Id: ID of the character who unlocked the achievement.
- Achievements_Achievement_id: The ID of the associated achievement.

4. **Character_Attributes**

Description: This entity stores a set of attributes assigned to each character, such as Strength, Dexterity, and Intelligence. These attributes influence the character's combat capabilities, skill effectiveness, and ability to use certain items. **Attributes:**

- Attributes_id: Unique identifier of the attribute set.
- Strength: The character's strength value.
- Agility: The character's dexterity score.
- Intelligence: The character's intelligence value.
- Characters_Character_Id: The ID of the character to which the characters are assigned attributes.

5. **Character_Quests**

Description: Records quests undertaken by characters. It also stores their status, allowing you to track which quests are completed and active.
or abandoned. **Attributes:**

- Character_quest_id: Unique identifier of the character quest.
- Status: Task status (e.g. active, completed).
- Characters_Character_Id: ID of the character who took the quest.
- Quests_Quest_id: Quest ID.

6. **Character_Skills**

Description: Contains information about skills that characters have acquired and are developing. Skills can include both combat abilities (e.g., "Strong Blow") and utility skills (e.g., "Blacksmithing"). **Attributes:**

- Character_skill_id: Unique identifier of the entry.
- Skill_level: Skill level.
- Characters_Character_Id: ID of the character that has the skill.
- Skills_Skill_id: Skill ID.

7. **Characters**

Description: Represents player characters in the game world. Each character has a name, level, experience points, and a set of attributes, skills, and inventory items. Characters belong to specific races and classes. **Attributes:**

- Character_Id: Unique identifier of the character.
- Name: The name of the character.
- Level: Character level.
- Experience_Points: The number of experience points of the character.
- Health_Points: The number of health points of the character.
- Mana_Points: The number of mana points the character has.
- Users_User_id: ID of the user who controls the character.
- Races_Race_id: The character's race ID.
- Classes_Class_id: The character's class ID.
- Character_Attributes_Attributes_id: ID of the attributes assigned
    characters.

8. **Classes**

Description: Determines the available character classes in the game, such as warrior, mage, or rogue. Each class has a unique set of skills, starting attributes, and playstyle. **Attributes:**

- Class_id: Unique identifier of the class.
- Class_name: The name of the class.
- Description: Description of the class.

9. **Dungeons**

Description: Represents dungeons that players can explore. They contain monsters, treasures, and challenges. Dungeons are often the site of boss fights and special quests. **Attributes:**

- Dungeon_id: Unique identifier of the dungeon.
- Dungeon_name: The name of the dungeon.
- Monsters_Monster_id: ID of the main monster in the dungeon.
- Locations_Location_id: The dungeon location ID.

10.Guild_Memberships

Description: Records a character's guild affiliation. Also includes the date they joined and their rank within the guild (e.g., leader, officer, member), allowing for the organization of group activities in the game. **Attributes:**

- Guild_membership_id: Unique membership identifier.
- Join_date: Date of joining the guild.
- Guild_Rank: The character's rank in the guild.
- Guilds_Guild_id: Guild ID.
- Characters_Character_Id: The ID of the character belonging to the guild.

11.Guilds

Description: Stores information about player guilds, such as their name, founding date, guild level, and leader. Guilds can wage war against each other, organize expeditions, and develop their headquarters together. **Attributes:**

- Guild_id: The unique guild identifier.
- Guild_name: Guild name.
- Creation_date: Date the guild was founded.
- Leader_id: Guild leader ID.
- Guild_level: Guild level.

12.Inventory_Slots

Description: Represents the character's inventory, where items are stored. Each slot in the inventory can contain a specific item in a specific quantity. **Attributes:**

- Inventory_slot_Id: Unique identifier of the inventory slot.
- Character_Id: Character ID.
- Item_id: The ID of the item in your inventory.
- Quantity: Number of items in the slot.
- Characters_Character_Id: The ID of the character associated with the location in equipment.
- Items_Item_id: Item ID.

13. **Items**

Description: This entity stores information about items available in the game, such as weapons, armor, potions, and artifacts. Each item has a name, description, value, and rarity. **Attributes:**

- Item_id: Unique identifier of the item.
- Item_name: Name of the item.
- Description: Description of the item.
- Value: The value of the item (e.g. price).
- Rarity: The rarity of an item.
- Item_Types_Item_type_id: Item type ID.

14.Item_Types

Description: Identifies item categories such as weapons, armor, potions, and resources. This allows for easier organization of items in your inventory and management in-game. **Attributes:**

- Item_type_id: Unique identifier of the item type.
- Item_type_name: Item type name.
- Description: Description of the item type

15. Locations

Description: Stores information about various locations in the game world. Locations can be cities, camps, caves, dungeons, or open areas. Each location has coordinates and a radius defining its size. **Attributes:**

- Location_id: Unique identifier of the location.
- Location_name: Name of the location.
- X, Y, Z: Location coordinates.
- Radius: Radius of the location area.
- Towns_Town_id: The ID of the town in this location (if applicable).

16. **Monsters**

Description: Represents the monsters in the game. These can be common creatures, elite monsters, or bosses. Each monster has a specific difficulty level, stats, and rewards for defeating it. **Attributes:**

- Monster_id: The unique identifier of the monster.
- Monster_name: The name of the monster.
- Level: Monster level.
- Base_health: Base health.
- Base_damage: Base damage amount.
- Base_experience_reward: Base reward for defeating a monster.

17. **NPC**

Description: An entity represents non-player characters (NPCs) that interact with players. These may include merchants, guards, quest givers, or story characters. Each NPC has its own behavior, and some may have unique dialogue lines. **Attributes:**

- NPC_id: Unique identifier of the NPC.
- NPC_name: Name of the NPC.
- Behavior: The behavior of an NPC (e.g. merchant, guard).
- Races_Race_id: The race ID of the NPC.
- Locations_Location_id: NPC location ID

18. **Pet_Attributes**

Description: This entity stores attributes related to improving the stats of the player's pets. These attributes may include bonuses to healing, mana, or speed. Each pet may have various attributes assigned to it, which influence its performance during gameplay.

- Pet_attributes_id: Unique identifier of the pet's attributes.
- Healing_Boost: Increases healing power.
- Mana_Boost: Increase mana power.
- Speed_Boost: Speed increase.
- Pets_Pet_id: Pet ID.

19. Pet_Skills

Description: This entity gathers information about the skills of individual pets. Each pet can have a specific skill level, which can be developed over the course of the game. These skills can affect its combat abilities, support, or other interactions.

- Pet_skill_id: The unique identifier of the pet skill.
- Skill_level: Skill level.
- Skills_Skill_id: Skill ID.
- Pets_Pet_id: Pet ID.

20. Pets

Description: This entity stores data about pets that players own during the game. It includes information such as the pet's name, species, acquisition date, and the character's connection to the owner.

- Pet_id: The unique identifier of the pet.
- Pet_name: Name of the pet.
- Species: A species of animal.
- Acqisition_date: Date the animal was acquired.
- Characters_Character_Id: The character ID of the pet owner.
- Pet_Attributes_Pet_attributes_id: Pet attribute ID.

21. Quests

Description: This entity contains all the quests available in the game that players can undertake. Each quest has a name, description, required character level, and an experience reward. Some quests may be tied to NPCs and specific locations.

- Quest_id: Unique quest identifier.
- Quest_name: Name of the quest.
- Description: Description of the task.
- Required_level: The level required to start the quest.
- Reward_experience: Reward for completing the task (experience).
- NPC_NPC_id: ID of the NPC offering the quest.
- Locations_Location_id: The ID of the location associated with the task.

22. Races

Description: This entity stores information about the various races that may appear in the game. These races have unique traits that influence character attributes. Example races may include humans, elves, dwarves, orcs, etc.

- Race_id: Unique identifier of the race.
- Race_name: Name of the race.
- Description: Description of the breed.

23. Shop_items

Description: This entity stores data about items available in in-game shops. Each item has a specific price and may be associated with a specific shop.

- Shop_item_id: Unique identifier of the item in the shop.
- Price: Price of the item.
- Items_Item_id: Item ID.
- Shops_Shop_id: The ID of the store where the item is available.

24. Shops

Description: This entity collects information about the shops available in the game. Each shop has a name, an owner, and a location. Shops can offer a variety of items, including potions, weapons, and equipment.

- Shop_id: Unique shop identifier.
- Shop_name: Shop name.
- Owner_name: The name of the store owner.
- Greeting_message: Welcome message to the store.
- Locations_Location_id: Store location ID.

25. Skill_Types

Description: This entity contains data about the types of skills in the game. This may include combat skills, spells, support skills, etc. Each skill type has a name and description.

- Skill_type_id: Unique identifier of the skill type.
- Skill_type_name: Name of the skill type.
- Description: Description of the skill type.

26.   Skills

Description: This entity contains data about skills that characters can develop and use in the game. Each skill has an assigned type, mana cost, damage, and cooldown. Skills can be combat-related, healing-related, or other.

- Skill_id: Unique skill identifier.
- Skill_name: Name of the skill.
- Description: Description of the skill.
- Mana_cost: The mana cost of using the skill.
- Damage: Damage dealt by the skill.
- Cooldown: Skill cooldown time.
- Skill_Types_Skill_type_id: Skill type identifier.

27.   Towns

Description: This entity stores data about the game's cities. Each city has a name, population, and description. Cities can serve various functions, such as trading centers, recreation areas, or starting points for players.
- Town_id: Unique identifier of the city.
- Town_name: The name of the town.
- Population: The number of people in the city.
- Description: Description of the city.

28.   Users

Description: This entity stores data about game users, including their login information, email address, and game activity history. Each user is associated with a character they created in the game.
- User_id: Unique user identifier.
- Username: Username.
- Email: User's email address.
- Password: User password.
- Join_Date: The date the user joined.
- Last_Login: Date the user last logged in.

SQLADDING DATA

```
1  INSERT INTO Races
2  VALUES
3  (1, 'Człowiek', 'Rasa ludzi, znana ze swojej wszechstronności.');
4  INSERT INTO Shops
5  VALUES
6  (1, 'Sklep Magii', 'Magister Merlin', 'Witaj w moim sklepie, młody czarodzieju!', 1);
7  INSERT INTO Skill_Types
8  VALUES
9  (1, 'Ofensywny', 'Umiejętności, które mają na celu zadawanie obrażeń przeciwnikom.');
10 INSERT INTO Shops
11 VALUES
12 (3, 'Sklep z eliksirami', 'Elira Zielark', 'Oferuję najlepsze mikstury w królestwie!', 3);
13 INSERT INTO Towns
14 VALUES
15 (1, 'Złote Miasto', 5000, 'Wielkie miasto handlowe, centrum wymiany towarów i kultury.');
16
```

```
1  INSERT INTO NPC
2  VALUES (1, 'Handlowiec', 'Handluje', 1, 1);
3
4  INSERT INTO Pet_Attributes
5  VALUES (1, 10, 5, 2, 1);
6
7  INSERT INTO Quests
8  VALUES (1, 'Zbieranie ziół', 'Zbierz 10 ziół w lesie', 5, 100, 1, 2);
9
10 INSERT INTO Skills
11 VALUES (1, 'Ognisty pocisk', 'Atakująca umiejętność zadająca obrażenia', 10, 50, 2.5, 1);
12
13 INSERT INTO Shops
14 VALUES (1, 'Sklep Magii', 'Magister Merlin', 'Witaj w moim sklepie!', 1);
15
16
```

SQLDATA UPDATE

```sql
1  UPDATE NPC
2  SET NPC_name = 'Strażnik'
3  WHERE NPC_id = 1;
4
5  UPDATE Pet_Attributes
6  SET Healing_Boost = 15
7  WHERE Pet_attributes_id = 1;
8
9  UPDATE Quests
10 SET Reward_experience = 200
11 WHERE Quest_id = 1;
12
13 UPDATE Skills
14 SET Damage = 60
15 WHERE Skill_id = 1;
16
17 UPDATE Shops
18 SET Greeting_message = 'Witaj, jak mogę Ci pomóc?'
19 WHERE Shop_id = 1;
20
```

```sql
1  UPDATE Pets
2  SET Pet_name = 'Luna'
3  WHERE Pet_id = 1;
4
5  UPDATE Races
6  SET Description = 'Rasa ludzi, silna i zręczna.'
7  WHERE Race_id = 1;
8
9  UPDATE Shop_items
10 SET Price = 150
11 WHERE Shop_item_id = 1;
12
13 UPDATE Towns
14 SET Population = 1200
15 WHERE Town_id = 1;
16
17 UPDATE Skill_Types
18 SET Description = 'Typ umiejętności oparty na manipulacji ogniem.'
19 WHERE Skill_type_id = 1;
```

SQL - DELETE DATA

```
1  DELETE FROM NPC
2  WHERE NPC_id = 1;
3
4  DELETE FROM Pet_Attributes
5  WHERE Pet_attributes_id = 1;
6
7  DELETE FROM Quests
8  WHERE Quest_id = 1;
9
10 DELETE FROM Skills
11 WHERE Skill_id = 1;
12
13 DELETE FROM Shops
14 WHERE Shop_id = 1;
```

```
1  DELETE FROM Pets
2  WHERE Pet_id = 1;
3
4  DELETE FROM Races
5  WHERE Race_id = 1;
6
7  DELETE FROM Shop_items
8  WHERE Shop_item_id = 1;
9
10 DELETE FROM Towns
11 WHERE Town_id = 1;
12
13 DELETE FROM Skill_Types
14 WHERE Skill_type_id = 1;
```

SQL ADDING USERS WITH BROADCASTING POWERS

```
1 CREATE USER 'admin'@'localhost' IDENTIFIED BY 'admin123';
2 CREATE USER 'manager'@'localhost' IDENTIFIED BY 'manager123';
3 CREATE USER 'developer'@'localhost' IDENTIFIED BY 'developer123';
4 CREATE USER 'editor'@'localhost' IDENTIFIED BY 'editor123';
5 CREATE USER 'guest'@'localhost' IDENTIFIED BY 'guest123';
6 CREATE USER 'support'@'localhost' IDENTIFIED BY 'support123';
```

✔ MySQL zwrócił pusty wynik (zero wierszy). (Wykonanie zapytania trwało 0,0029 sekund(y).)

```
1 GRANT ALL PRIVILEGES ON projekt.* TO 'admin'@'localhost';
2 GRANT SELECT, INSERT, UPDATE ON projekt.Quests TO 'manager'@'localhost';
3 GRANT CREATE ON projekt.Quests TO 'developer'@'localhost';
4 GRANT SELECT, INSERT, UPDATE ON projekt.Skills TO 'editor'@'localhost';
5 GRANT SELECT ON projekt.Quests TO 'guest'@'localhost';
6 GRANT ALL PRIVILEGES ON projekt.Shops TO 'support'@'localhost';
```

✔ Pokazano wiersze 0 - 12 (13 total, Wykona

```
SELECT user, host FROM mysql.user;
```

☐ Show all | Liczba wierszy: 25 ⌄

Extra options

User	Host
root	127.0.0.1
root	::1
admin	localhost
deleter	localhost
developer	localhost
editor	localhost
guest	localhost
manager	localhost
pma	localhost
reader	localhost
root	localhost
sprzedawca	localhost
support	localhost

SQL CREATE 3 SAMPLE TABLES

```
 1  CREATE TABLE Quests
 2      (
 3        Quest_id              INTEGER  NOT NULL ,
 4        Quest_name            VARCHAR (100)  NOT NULL ,
 5        Description           TEXT  NOT NULL ,
 6        Required_level        INTEGER  NOT NULL ,
 7        Reward_experience     DECIMAL  NOT NULL ,
 8        NPC_NPC_id            INTEGER ,
 9        Locations_Location_id INTEGER  NOT NULL
10      );
11      ALTER TABLE Quests
12      ADD CONSTRAINT Quests_PK PRIMARY KEY ( Quest_id ) ;
```

```
 1  CREATE TABLE Guilds
 2      (
 3        Guild_id      INTEGER  NOT NULL ,
 4        Guild_name    VARCHAR (150)  NOT NULL ,
 5        Creation_date DATE  NOT NULL ,
 6        Leader_id     INTEGER  NOT NULL ,
 7        Guild_level   INTEGER  NOT NULL
 8      );
 9  ALTER TABLE Guilds
10      ADD CONSTRAINT Guilds_PK PRIMARY KEY ( Guild_id ) ;
```

```
 1  CREATE TABLE Battles
 2      (
 3        Battle_id               INTEGER  NOT NULL ,
 4        Battle_date             DATE  NOT NULL ,
 5        Battle_result           VARCHAR (100)  NOT NULL ,
 6        Damage_dealt            DECIMAL  NOT NULL ,
 7        Damage_taken            DECIMAL  NOT NULL ,
 8        Characters_Character_Id INTEGER  NOT NULL ,
 9        Monsters_Monster_id     INTEGER  NOT NULL ,
10        Locations_Location_id   INTEGER  NOT NULL
11      );
12  ALTER TABLE Battles
13      ADD CONSTRAINT Battles_PK PRIMARY KEY ( Battle_id ) ;
```