CPSC 304 Project Cover Page

Milestone #: 4

Date: <u>April 2, 2025</u>

Group Number: 114

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By typing our names and student numbers in the above table, we certify that the work in the attached assignment was performed solely by those whose names and student IDs are included above. (In the case of Project Milestone 0, the main purpose of this page is for you to let us know your e-mail address, and then let us assign you to a TA for your project supervisor.)

In addition, we indicate that we are fully aware of the rules and consequences of plagiarism, as set forth by the Department of Computer Science and the University of British Columbia

A short description of the final project, and what it accomplished.

Our final project is focused on modelling data from a generic RPG video game using Oracle SQL. This database was designed to efficiently store and manage game-related data, such as a player's details, item inventory, quests, as well as missions. Our final project was optimized using BCNF in our database design, which led to more efficient data storage and retrievals. Constraints were also added to ensure data integrity and used to ensure that the necessary fields were never null. This final project is an interactive website that demonstrates the 10 SQL queries, and allows the user to see how some of the tables are structured.

A description of how your final schema differed from the schema you turned in. If the final schema differed, explain why.

We found that there were some other attributes that should be NOT NULL and added the constraints accordingly.

For the create table statements, we also added a few ON DELETE CASCADE statements to some of our tables as we realized they were missing.

Constraints: if assertions or triggers are required, you may simply say what they would need to do, but not implement them.

We would need an assertion that each entry in Guild is in the relation PlayerJoins due to its total participation in Joins. It also makes sense to have a check for Guild's memberCount to be > 0. For the guild member count update, whenever a new player joins a guild (or is deleted/updated), we want the Guild.memberCount to update automatically. We implemented this in JavaScript, with custom logic instead of using TRIGGER in SQL on the PlayerJoins table.

For Consumable and Collectible, we would need to assert the total constraint in the ISA relation, so that all entries in Item have a corresponding entry in either Consumable or Collectible.

A list of all SQL queries used to satisfy the rubric items and where each query can be found in the code (file name and line number(s)).

The SQL for the following queries can be found in *AppService.js*:

1. Query #1 - insertPlayertable() - Line 112

INSERT INTO PlayerJoins VALUES (player_seq.NEXTVAL, :username, :email, SYSDATE, NULL, NULL)

2. Query #2 - updateUserGuild() - Line 135

UPDATE PlayerJoins SET guildName = :guildName, role = :guildRole WHERE username = :username

UPDATE Guild SET memberCount = (SELECT COUNT(*) FROM PlayerJoins P WHERE p.guildName = :guildName)

3. Query #3 - deletePlayer() - Line 161

DELETE FROM PlayerJoins WHERE username = :username

4. Query #4 - selectPlayerTuples() - Line 177

SELECT * FROM PlayerJoins WHERE \${query}

The query variable is a Boolean expression consisting of:

- Attributes (column names)
- Operators (=, <, >)
- Literals (user-input values wrapped in single quotes)
- Logical operators (AND, OR)
- 5. Query #5 selectArmourTuples() Line 191

SELECT \${query} FROM ArmourName

6. Query #6 - getUserArmour() - Line 87

SELECT armourID, boostType, name FROM PlayerJoins PJ INNER JOIN CraftsArmour CA ON PJ.accountID = CA.accountID WHERE PJ.username = :username

7. Query #7 - getMostPopularItems() - line 203

SELECT name AS itemName, COUNT(*) AS ownershipCount FROM Owns
GROUP BY name
ORDER BY ownershipCount DESC

Aggregation GROUP BY query - this query gets the most popular items from the Owns table. Uses count and groups by the item name.

8. Query #8 - getGuildsWithMoreThanTwoMembers() - line 218

```
SELECT guildName, COUNT(*) AS memberCount
FROM PlayerJoins
WHERE guildName IS NOT NULL
GROUP BY guildName
HAVING COUNT(*) > 1
ORDER BY memberCount DESC
```

Aggregation with HAVING query - this query retrieves all guids from the PlayerJoins table that have more than one member, counting the number of members in each guild. The results are grouped by guildName, filtered using the HAVING clause, and ordered by the member count in descending order.

9. Query #9 - getGuildsWithAboveAverageFriendship() - line 235

Nested Aggregation with GROUP BY query - this query calculates the average friendship level for each guild and compares it to the overall average friendship level across all friendships. It returns guilds where the average friendship level is higher than the overall average along with the difference from the overall average.

10. Query #10 - getPlayersMissionsCompletedDivision() - line 274

```
CREATE VIEW GivenMissions(missionID) AS

SELECT missionID

FROM Mission

WHERE (Note: the checkmarked missions in the frontend are given here in the format missionID = <id> OR missionID = <id> OR ...>)
```

SELECT accountID, username

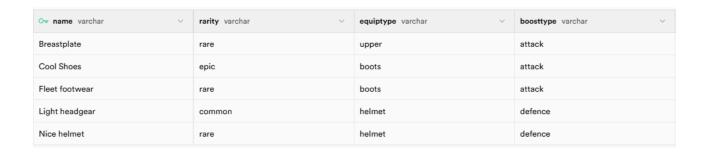
Division query - this query performs division on the players' accountIDs using the chosen missionIDs that are checkmarked by the user. It returns the accountIDs and usernames of the players who have completed all of the given missions.

Schema

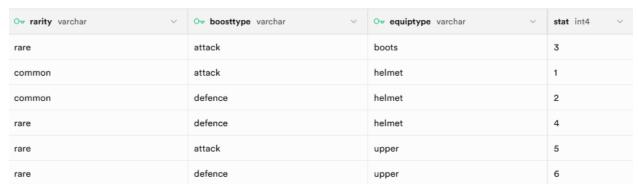
- PlayerJoins(<u>accountID</u>: integer (PK), username: varchar(16) unique not null (CK), email: varchar(255) not null, createDate: date, role: varchar, guildName: varchar(16) (FK referencing Guild(name)))
- Guild(name: varchar(16), memberCount: integer not null, description: varchar(255))
- Befriends(<u>accountID1</u>: integer (PK, FK referencing PlayerJoins(accountID)), <u>account2ID</u>: integer (PK, FK referencing PlayerJoin(accountID)), friendshipLevel: integer not null)
- Mission(missionID: integer (PK), requirement: varchar(255), reward: varchar(255))
- Completes(<u>accountID</u>: integer (PK, FK referencing PlayerJoins), <u>missionID</u>: integer (PK, FK referencing Mission), completionTimestamp: date)
- Item(<u>name</u>: varchar(16) (PK), description: varchar(64))
- ConsumableStat(<u>rarity</u>: varchar(16) (PK), stat: integer not null, <u>boostType</u>: varchar(8)
 (PK))
- Consumable(<u>name</u>: varchar (PK, FK referencing Item), count: integer not null, rarity: varchar(16) not null, boostType: varchar(8) not null)
- Collectible(<u>name</u>: varchar (PK, FK referencing Item), obtainedFrom: varchar(255))
- Owns(<u>accountID</u>: integer (PK, FK referencing PlayerJoins), <u>itemName</u>: varchar(16) (PK, FK referencing Item))
- CharacterStats(<u>level</u>: integer (PK), attack: integer not null, defence: integer not null, <u>class</u>: varchar(8) (PK))
- CreatesCharacter(<u>name</u>: varchar(16) (PK), level: integer not null, class: varchar(8) not null, **playerID**: integer unique not null (FK referencing PlayerJoins(accountID))
- ArmourStat(<u>rarity</u>: varchar(16) (PK), stat: integer, <u>boostType</u>: varchar(8) (PK), <u>equipType</u>: varchar(8) (PK))
- ArmourName(<u>name</u>: varchar(16) (PK), rarity: varchar(16) not null, equipType: varchar(8) not null, boostType: varchar(8) not null)
- CraftsArmour(<u>armourID</u>: integer (PK), name: varchar(16) not null, boostType: varchar(8) not null, **accountID**: integer not null (FK referencing PlayerJoins))
- Equips(<u>armourlD</u>: integer (PK, FK referencing ArmourCrafts), **characterName**: varchar(16) (FK referencing Character(name))
- LearnsSkill(<u>name</u>: varchar (PK), effect: varchar(64), **characterName**: varchar(16) (FK referencing Character(name))
- QuestLocation(location: varchar, bossCharacter: varchar(255) (PK))
- QuestInfo(questID: integer (PK), bossCharacter: varchar(255))
- HaveStage(<u>stageID</u>: integer (PK), objective: varchar, <u>questID</u>: integer (PK, FK referencing Quest))
- Challenges(<u>characterName</u>: varchar(16) (PK, FK referencing Character(name)), <u>questID</u>: integer (PK, FK referencing Quest), attemptTimestamp: smalldatetime)

Screenshots of relations

ArmourName



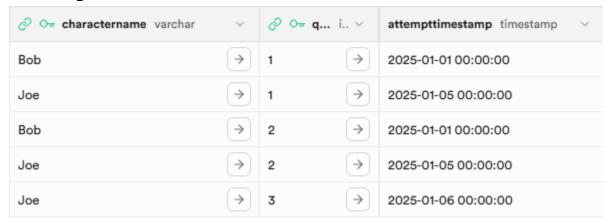
ArmourStat



Befriends

Account1ID	Account2ID	FriendshipLevel
1	2	10
2	3	23
2	5	5
3	5	1
7	8	5

Challenges



CharacterStats

○ class varchar ∨	Ov characterlevel int4	attack int4 v	defence int4 ∨
fighter	1	5	3
mage	1	7	1
tank	1	3	5
fighter	2	6	4
mage	2	8	2
tank	2	4	6
fighter	3	8	4
mage	3	9	3
tank	3	4	8

Completes

AccountID	MissionID	CompletionTimestamp
1	101	2025-01-01T07:00:00.000Z
1	102	2025-01-01T07:00:00.000Z
1	103	2025-01-05T07:00:00.000Z
1	104	2025-01-05T07:00:00.000Z
1	105	2025-01-05T07:00:00.000Z
2	101	2025-01-01T07:00:00.000Z
2	103	2025-01-05T07:00:00.000Z
2	104	2025-01-05T07:00:00.000Z
3	101	2025-01-01T07:00:00.000Z
3	103	2025-02-05T07:00:00.000Z
5	101	2025-02-22T07:00:00.000Z
5	103	2025-02-22T07:00:00.000Z
7	103	2025-02-25T07:00:00.000Z
8	103	2025-02-25T07:00:00.000Z

Consumable

Name	Count	Rarity	BoostType
Sandwich	5	common	attack
Strength potion	2	rare	attack
Healing Herb	3	rare	health
Energy Drink	4	common	stamina
Elixir of Wisdom	1	legendary	mana

ConsumableStat

Rarity	Stat	BoostType
common	2	attack
common	4	defence
common	5	stamina
common	5	health
rare	5	attack
rare	8	defence
rare	10	stamina
rare	10	health
rare	10	mana
legendary	10	attack
legendary	16	defence
legendary	20	mana

Collectible

Name	ObtainedFrom
Bracelet	Mission reward
Crown	Mission reward
Ancient Coin	Hidden treasure
Golden Feather	Rare bird drop
Dragon Scale	Defeated a dragon

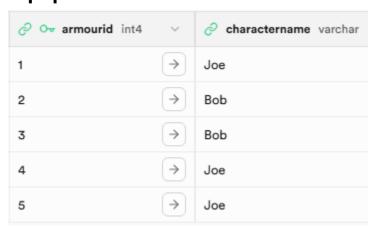
CraftsArmour



CreatesCharacter



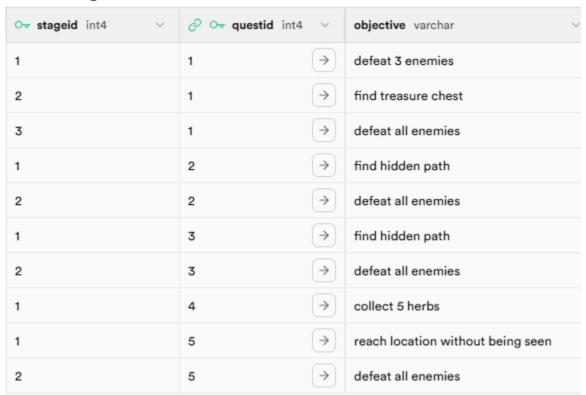
Equips



Guild

Name	MemberCount	Description	
Goats Guild	3	A guild for goats all around the world	
Best Players	2	Only the best players are in this guild	
Guild 1	1	guild 1 description	
Guild 2	1	guild 2 description	
Guild 3	1	guild 3 description	

HaveStage



Item

Name	Description
Bracelet	A token of your friendship
Crown	Reward for defeating your first boss
Ancient Coin	A rare coin from ancient times
Golden Feather	A shimmering feather from a rare bird
Dragon Scale	A tough scale from a defeated dragon
Sandwich	A tasty sandwich that boosts attack
Strength potion	A potion that increases your strength temporarily
Healing Herb	A magical herb that restores health
Energy Drink	A beverage that restores stamina
Elixir of Wisdom	A rare potion that increases mana

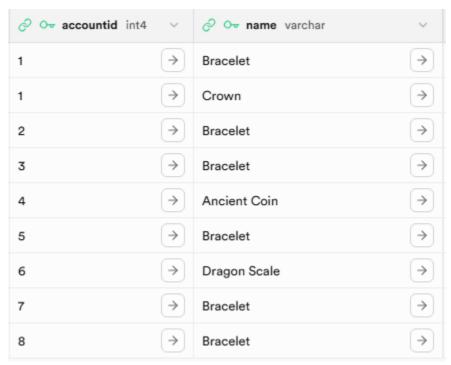
LearnsSkill

O v name varchar ∨	effect varchar	charactername varchar
Alice Cast	Grants a 1.5x buff for magical attacks	Alice
Alice Dodge	50% chance of taking no damage	Alice
Bob Block	Decreases incoming damage by defence	Bob
Bob Punch	Deals damage to enemy based on attack	Bob
Joe Protect	Decreases incoming damage by 2x defend	Joe

Mission

MissionID	Requirement	Reward
101	kill 3 monsters	10 coins
102	defeat a boss character	crown
103	add a friend	friendship bracelet
104	finish first quest	10 coins
105	finish all quests	100000 coins

Owns



PlayerJoins

AccountID	Username	Email	CreateDate	Role	GuildName
1	playerone	iplaygames@email.com	2025-01-01T07:00:00.000Z	member	Best Players
2	thegoat	goatedgamer@email.com	2025-01-05T07:00:00.000Z	leader	Goats Guild
3	legoat	goatedgamer@email.com	2025-02-05T07:00:00.000Z	deputy	Goats Guild
4	dabest	bestest@email.com	2025-02-20T07:00:00.000Z	leader	Best Players
5	mountaingoat	mountaingoat@email.com	2025-02-21T07:00:00.000Z	member	Goats Guild
6	solo	soloplayer@email.com	2025-02-22T07:00:00.000Z		
7	lesunshine	a@gmail.com	2025-02-22T07:00:00.000Z	leader	Guild 1
8	lebron	b@gmail.com	2025-02-22T07:00:00.000Z	leader	Guild 2
9	leGM	c@gmail.com	2025-02-22T07:00:00.000Z	leader	Guild 3

QuestInfo

○ questid int4 ∨	bosscharacter varchar
1	Skeleton King
2	Ferocious Bear
3	Prickly Cactus
4	Aquatic Monstrosity
5	Arrogant Tyrant

QuestLocation

○ bosscharacter varchar ∨	location varchar
Aquatic Monstrosity	Enchanted Lake
Arrogant Tyrant	Castle
Ferocious Bear	Forest
Prickly Cactus	Desert
Skeleton King	Dungeon