SCC 201 DATABASE Coursework 2022/2023

A Database for a Multiplayer FPS game

by

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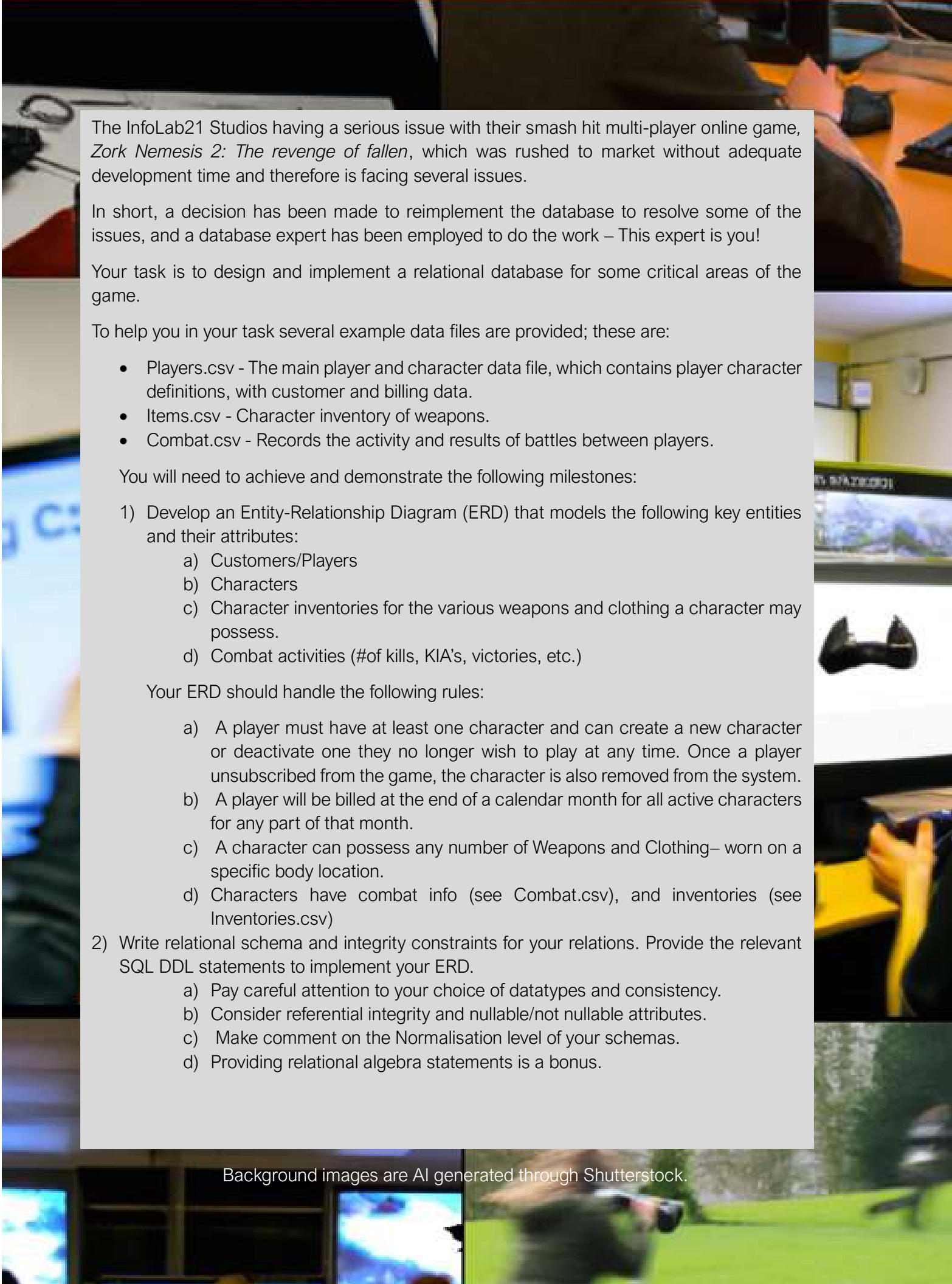

The InfoLab21 Studios having a serious issue with their smash hit multi-player online game, *Zork Nemesis 2: The revenge of fallen*, which was rushed to market without adequate development time and therefore is facing several issues.

In short, a decision has been made to reimplement the database to resolve some of the issues, and a database expert has been employed to do the work – This expert is you!

Your task is to design and implement a relational database for some critical areas of the game.

To help you in your task several example data files are provided; these are:

- Players.csv - The main player and character data file, which contains player character definitions, with customer and billing data.
- Items.csv - Character inventory of weapons.
- Combat.csv - Records the activity and results of battles between players.

You will need to achieve and demonstrate the following milestones:

1) Develop an Entity-Relationship Diagram (ERD) that models the following key entities and their attributes:
    a) Customers/Players
    b) Characters
    c) Character inventories for the various weapons and clothing a character may possess.
    d) Combat activities (#of kills, KIA's, victories, etc.)

    Your ERD should handle the following rules:

    a) A player must have at least one character and can create a new character or deactivate one they no longer wish to play at any time. Once a player unsubscribed from the game, the character is also removed from the system.
    b) A player will be billed at the end of a calendar month for all active characters for any part of that month.
    c) A character can possess any number of Weapons and Clothing– worn on a specific body location.
    d) Characters have combat info (see Combat.csv), and inventories (see Inventories.csv)
2) Write relational schema and integrity constraints for your relations. Provide the relevant SQL DDL statements to implement your ERD.
    a) Pay careful attention to your choice of datatypes and consistency.
    b) Consider referential integrity and nullable/not nullable attributes.
    c) Make comment on the Normalisation level of your schemas.
    d) Providing relational algebra statements is a bonus.

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3) Create a java library containing methods to read given .csv files that match the supplied example files and generate the relevant SQL insert statements to populate the database (your final submission will be tested using data imported this way).

a) You will need to consider which columns in the csv files map to the relevant Entities.
b) Pay careful attention to the order in which entities need to be populated.

4) Create a set of SQL queries to perform the following tasks:

a) List the top 5 characters with the highest number of successful combats attacks.
b) Include the name and total number of attacks per character.
c) Order from highest to lowest number of attacks.
d) List the name of Players with at least 5 characters.
e) List the name of weapons that is used by at least 10 Players.

5) Add methods to your java library to perform these queries using JDBC when called.

Assessment

Work will be assessed after Week 10. You will receive feedbacks during workshops. Please have a look at your calendar, your workshop date, location, and time is provided. We will assess your project in three stages:

1. Your initial E-R diagram (30%)
   You will provide two outputs: 1) An English paragraph given in a PDF file that describes your ERD and 2) your ERD (embedded in the PDF file). We will assess your ERD by reading your paragraph.
   You will receive full mark if your paragraph matches to your ERD. Otherwise we will reduce your mark based on the followings:
   a) Participation constraint fault -5 pts.
   b) Multiplicity fault -5 pts.
   c) Notation/Symbol fault -5 pts.
2. SQL DDL (30%)
   You will provide a PDF file that contains your Relational Schemas (RS), Integrity Constraints (IC), Normalisation reports for each RSs and the DDL statements written in SQL. You will receive full mark if your RS and ICs matches with your ERD. Otherwise, you we will reduce your mark based on the followings:
   a) Typo for SQL code -2pts.
   b) Reporting wrong Normalisation level -5pts.
   c) IC mismatch from ERD to ICs or from ICs to DDL -10 pts.
   d) Providing Relational Algebra statements (Bonus 10 pts)

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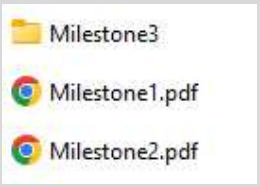
3. Java Library and SQL queries (40%)
You will provide a java library that reads CSV file and builds required tables and answers the queries given above. You will receive full mark if your library successfully accomplishes these tasks. Otherwise we will reduce your mark according to the following rules:
   a) Not compiles -100pts.
   b) Compiles but cannot populate tables -50pts.
   c) Cannot read CSV files but reads from other file format and populates tables -0pts.
   d) SQL Integrity Constraint warning, error while populating -10pts.
   e) Failed to retrieve the answer for a query -10pts.

Submission

You will provide one zip file (in **ZIP format**) using Coursework interface given in Moodle under Week 6.

Your zip file name should be **<your student id>.zip**. For example if your student id is **31384013** than your zip file name should be **31384013.zip.** The zip file contains two PDF files belonging to Milestones 1 and 2 (**Milestone1.pdf** and **Milestone2.pdf)** and a Folder named **Milestone3** that contains your java code. So the content of your zip file will be like the following.



The deadline is 24 March 23:59 UK time.

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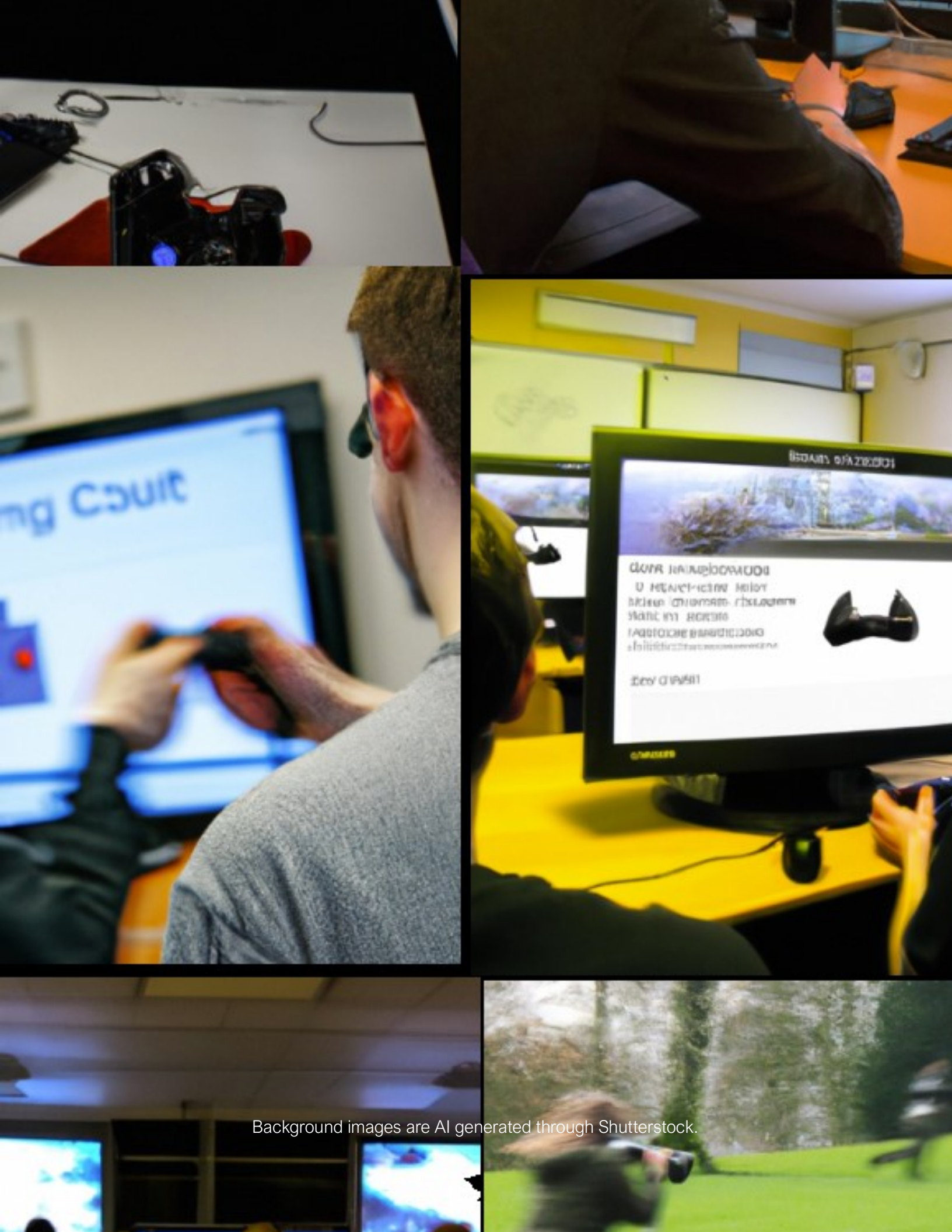

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