CS320-103: Software Engineering, Spring Semester 2022
Team Project Proposal

Card Repository w/ Multiplayer & Bots

Team Members:

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Summary:

After an abundance of collaboration and thought, we as a team have decided to declare, implement, and program a card repository web application for our team project. Upon completion, we expect to have several card games ranging from BlackJack, Exploding Kittens, Uno, Uno Flip. We will be deconstructing each game and implementing the rules applied to each through the knowledge we possess throughout our experiences; this will allow each player to pick and choose the rules that they are in favor of and accustomed to. And while there is little freedom for us to change the rules of the game, our creativity will be put aside for much of the user interface, machine learning, and data collection aspect of our program. The program will possess a form of reusability as opponents are necessary for the goal of the program. Both bots, through the process of machine learning and network connectivity, will allow users to either play alone or with other individuals on separate computers. Additionally, the program will be able to store and retrieve player information depending on the individual's username. Some stored statistics will be able to be viewed by opposing players. This will ultimately create a casual environment with few competitive elements.

Features:

Necessary:

1. Login

   The user will create a unique username and password in order to store their progress. They will then be able to access their account by entering the same username and password any time they want.

2. Variety of games

    We want to include a multitude of games. Our core four will be Uno, Uno Flip, Blackjack, and Exploding Kittens. If we have time we want to include Sequence, Phase 10, and Mastermind.

3. Singleplayer

    To help us display the functionality of the program and the behaviorism of each game, we will be utilizing a single player feature using bots. These bots will execute moves to play against the user and the other bots.

4. Statistics tracking

    To give a sense of accomplishment, we want to implement stat tracking. We want to keep track of things like wins, losses, and games played. This will apply not only to each individual game but globally across the entire web application. Individual games will also have their own special statistics. For example Uno may have a stat tracking the number of reverse cards played.

5. Multiplayer

    Aside from the singleplayer functionality, the multiplayer option will allow us to implement SQL into our program (aside from statistical tracking). This will allow multiple users from different computers to play together. To execute this feature, we will be using the host/join method. Users will be able to host games and allow other players to join through a key. After all players have joined the game in which the number of players is determined by the host, the host can then start the game. After the game is over, all players will be put in the host/join lobby screen.

6. Adjustable bot properties

    Each game will have bots, the number of which can be set by the user. The user can also set the difficulty of the bots which will implement the machine learning aspects.

7. Adjustable game specific rules

    For reusability of the program, the implementation of adjustable game rules will bring diversity to each game. Each individual player has their own methods of playing each game which would be a good addition to the program. It should be kept in mind that each game has their own rules and behaviors.

Nice-to-have:

8. Adaptive theme

   When a game is selected, the background of the web page will change to match the theme of the game.

9. Neural Network AI - blackjack

   This blackjack AI will learn as it plays against different people online, storing its data and nodes inside of a SQL database.

10. Titles

    Players will have ranks based on the number of wins they have. For example, someone with zero wins would have the rank, “Rookie”, while someone with 500+ wins would have the rank, “Legend”.

11. External hosting

    This project will be able to be hosted on an external server, making it easier for multiple people to connect and play together. This will also allow anyone to play with just the URL, even if they do not have the project files. This can be done from a member’s home computer/ server.

12. Game chat/Global chat

    Players will be able to communicate with other players online via global chat, or with other players in the same lobby via game chat.

13. Profile pictures

    Users will be able to have their own personal profile picture through an upload feature. It will automatically pick the center of the image and scale it to prevent it from being visually impairing.

14. Stickers

    Stickers will act similar to emojis in chat. Stickers will be earned through various achievements implemented into each game. For example, a player can earn an Uno Reverse sticker after playing 200 reverse cards.

Responsibilities:

Tasks will be delegated by necessity. Each person will be assigned at least one game and everyone will work together on the development of the web page.

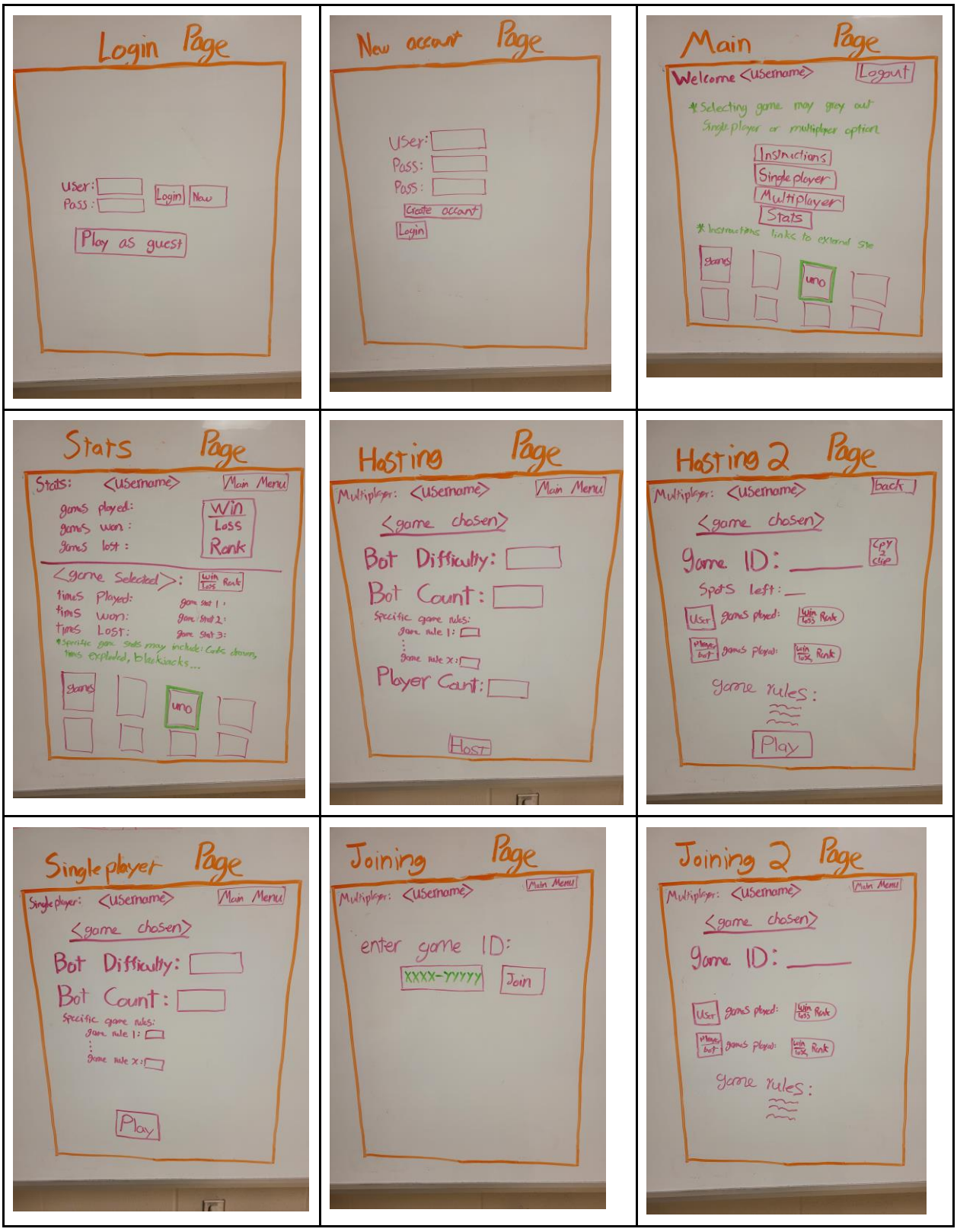
Challenges:

We believe that our biggest challenge will be the fact that this project is very robust, involving various concepts that we have little to no experience with. This creates a somewhat large learning curve for us to be able to pull this off. If we are to succeed, we have to follow the milestones presented and not fall behind with the three month period.

Development Environment:

We will mainly be using Java in Eclipse as our development environment, but also using HTML/CSS, SQL, and JavaScript. We will also need to scan various game cards such as Uno, Uno Flip, Exploding Kittens, and regular playing cards.

Sketches:


Login Page
User:
Pass:
Login
New
Play as guest
New account Page
User:
Pass:
Pass:
Create account
Login
Main Page
Welcome <username>
Logout
* Selecting game may grey out Single player or multiplayer option
Instructions
Single player
Multiplayer
Stats
* Instructions links to external site
Stats Page
Stats: <username>
Main Menu
games played:
games won:
games lost:
Win
Loss
Rank
<game selected>:
times played:
times won:
times lost:
* specific game stats may include: Cards drawn, times exploded, blackjacks...
Hosting Page
Multiplayer: <username>
Main Menu
<game chosen>
Bot Difficulty:
Bot Count:
Specific game rules:
Player Count:
Host
Hosting 2 Page
Multiplayer: <username>
Back
<game chosen>
Game ID:
Copy 2 Clip
Spots left:
User
games played:
Win Loss Rank
Game rules:
Play
Single player Page
Single player: <username>
Main Menu
<game chosen>
Bot Difficulty:
Bot Count:
Specific game rules:
Play
Joining Page
Multiplayer: <username>
Main Menu
enter game ID:
XXXX-YYYYY
Join
Joining 2 Page
Multiplayer: <username>
Main Menu
<game chosen>
Game ID:
User
games played:
Win Loss Rank
Game rules: