

Term Project for Internet Application Design and Development CSC667, Spring 2022

Section 01, Team A: Spaghetti Factory

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MILESTONE 3 & 4

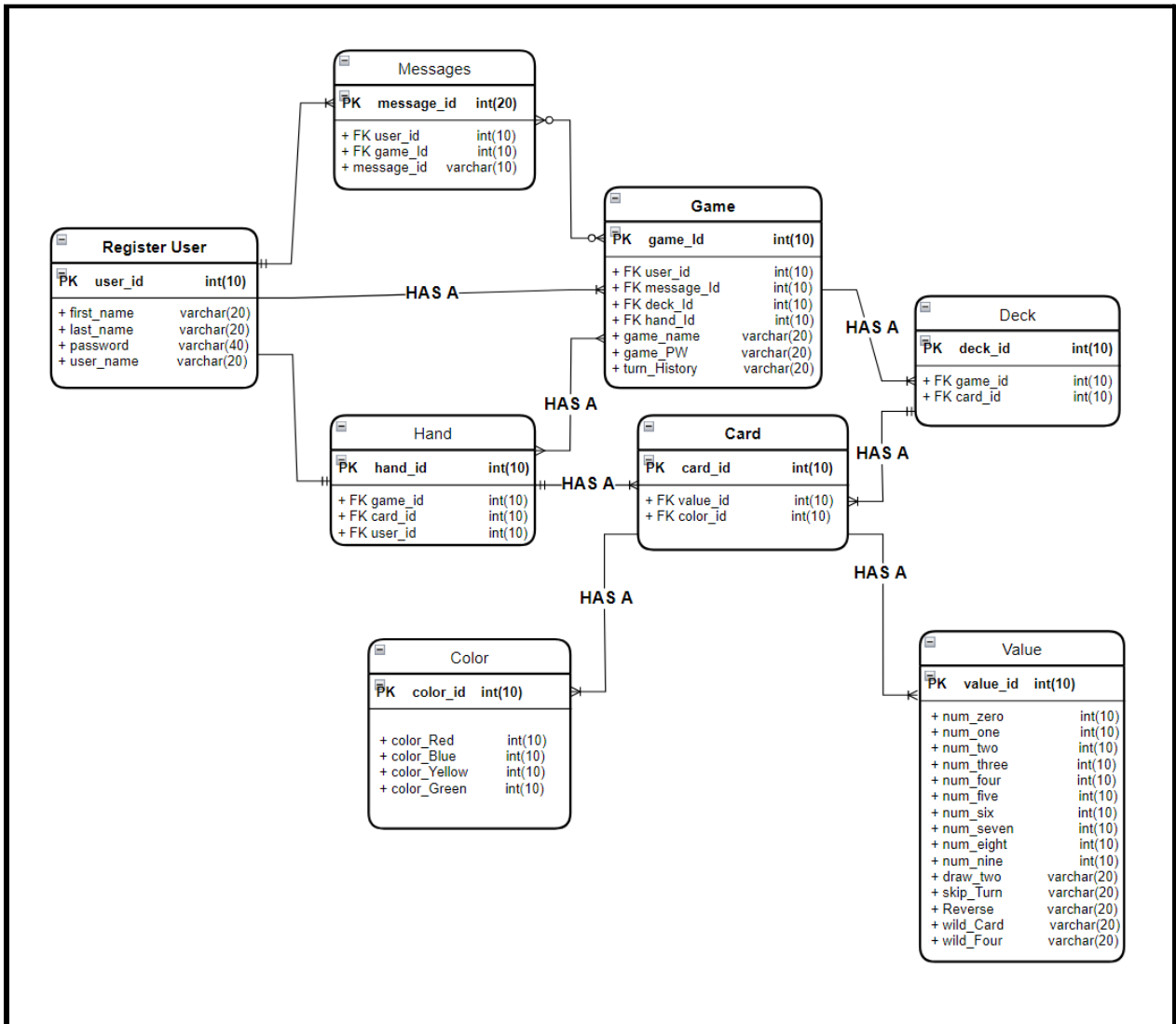
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<https://github.com/sfsu-csc-667-spring-2022-robots/term-project-spaghetti-factory>

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1 Entity Relationship Diagram



List All Entities and Their Purpose

→ Registered User

In the Registered User table, we would have a Primary Key of "user_id". The table should include the user's information such as their "first_name", "last_name", "password" (hashed with bcrypt), and their "user_name" that they have created when registering their account.

→ Messages

Once a user is registered, they have the option to message to other users on the platform. The table will have its down Primary Key of "message_id".

Foriegn keys will consist of the "user_id", (which will allow us to know who is messaging), and "game_id"(which will allow us to know which game the messages are in). The table will also have the "message_id".

→ Game State

The Game table must have the Foriegn Keys "user_Id" and "message_id" as that will let us know who is in the game, and what messages will be there.

When each user creates a game, they have the option of making it a private game. If a user wants to make it a private game, they must add a password which will be stored in "game_PW". Along with that, the users must have a unique game name in order to not have a crossfire happen. That will be stored in "game_Name". We would also implement a "turn_History" that will be allocated with the previous turns that have been played. This will be displayed in the game to see every user's previous moves.

→ Card

The Card table will be basically forming all of the information into a card. It will have a Primary Key of "card_id" to know what card it is. But in order to structure the card, it must have Foriegn Keys from the Values table("value_Id"), and the Color table ("color_Id").

→ Deck

The Deck table is a main component of a game. An Uno deck will consist of 108 cards. However, to know what game this deck belongs to it will have a

Foreign Key "game_id", and to know what cards are in the deck, it will have a Foreign Key of "card_id". And for the Game to know which deck it is using,

→ Hand

The Hand table will be the hand of every player in the game. With that being said, it must have the Foreign Keys, "game_id", "card_id", along with "user_id". The "game_id" will let the hand know which game to be in, "card_id" will let it know what cards it will have, and lastly the "user_id" will let it know who's hand it is. And to let the game know what hand each player has, it will have a Primary Key "hand_id".

→ Value

The Value table is to let the Card table know what the card's value is. Inside, it will have all of the numerical cards along with the special card's values. The Card table will inherit this table so the Value table will have a Primary Key of "value_id".

→ Color

The Color table is to let the Card table know what the color of the card is. Inside this table, it will consist of all the colors that are in an Uno Deck. Since the Card table will inherit this table, the Primary Key of this table is "color_id".

2 Initial List of User Inputs and Outcomes

List all actions a user can perform as well as the expected outcome(s).

→ Registration

If the user clicks on the registration button on our website, they will be redirected to our registration page. Then, they will be prompted to enter a unique username, password, click on a checkbox to confirm they are 7-years-old or older, and another checkbox to confirm they agree to our terms and conditions. After successfully entering the relevant information and following all standards required for a successful username and password, they can hit the sign up button at the bottom of the page to create their profile successfully, after which they will be redirected to the home page if successful. If not, the user will remain on the registration page and the error that prevents them from signing up successfully (invalid username, password, incorrect password confirmation, or checkboxes for terms and conditions or age restrictions not selected) will appear as a notification for the user on the registration page.

→ Login Page

If the user clicks on the login button on our navbar at the top of our website, they will be redirected to our login page. Then, they will be prompted to enter their relevant username and password to successfully login to our website. If successful, then they will be redirected back to the home page, after which the login and registration buttons on the navbar at the top of the page will be replaced with a logout button instead. If they are not successful in logging in, they will remain at the login page and the error that prevents

them from logging in successfully will appear as a notification for the user on the login page.

→ **Logout Button**

If the user clicks on the logout button on our navbar at the top of our website (appears after user login), they will be logged out of our website and their access to certain features of our website (like playing the UNO game) will be reset/revoked until they login once more. The user will also be redirected to our home page after the logout button is clicked, and the logout button on the navbar will once again become the login and registration buttons.

→ **Rules Page**

If the user clicks on the rules page button on our website, they will be redirected to our UNO game rules page. This is simply a game rules page that introduces the game of UNO and the relevant rules of the card game to users that are either new to the game or require a refresher on the game rules.

This page only contains text and images that would produce no further 'user input outcomes' to consider.

→ **About Page**

If the user clicks on the about page button on our website, they will be redirected to our team's about page. This is simply our team's introduction page that introduces the four members of our team that were involved in the creation of our UNO game web application. This page only contains text and images that would produce no further 'event outcomes' to consider.

→ **Game Lobby Page**

If the user clicks on the 'Play Now!' button on our navbar (or any other such buttons on our website), they will be redirected to the UNO game lobby

selection page. However, note that if the user is not logged in, then this button will instead redirect users to the login page. On the game lobby page, users have three options available: playing against random users, joining a server, or creating their own server.

→ **Playing Against Random Users**

If the user selects the 'Playing Against Random Users' option on the game lobby page, they will be redirected to a waiting lobby page. If any of the users that join the waiting lobby via the 'play against random users' option by any chance disconnect from the waiting lobby page (logging out, computer shuts down, or page closes), then said user(s) will be removed from the waiting lobby and the search for user(s) will continue. This waiting lobby page will become 'full' when four random users are matched together, upon which it will transfer the four users to the UNO game page.

→ **Joining a Lobby**

If the user selects the 'Joining a Lobby' option on the game lobby page, they will be redirected to a join lobby page. In this join lobby page, the user will have the option of searching for a game lobby via a unique game lobby name or viewing available public lobbies, ordered by most recently to least recently created. Users can select any of the game lobbies from the list to join the waiting lobby, provided that it is not already full (based on whatever maximum number of users is specified by the game lobby's creator) and it is a public lobby with no password required for joining (private lobby). If it is a private lobby, then the user will be prompted to enter the lobby password. If the password entered is successful, then

they will be able to join the waiting lobby, provided it is not already full (based on whatever maximum number of users is specified by the game lobby's creator). In any instance of joining a lobby (private or public), if the lobby is full or the password entered for private lobbies is incorrect, an error message will pop up on the user's screen upon trying to join or enter the password reflecting said error.

If the user searches for a game lobby, and there is no game name matched, then the user will see a message on their screen saying: "No game lobby is found under the name searched. Please try again." Otherwise, the game lobby that matches the name searched will appear. If the user clicks on this game lobby they searched for, they will be able to automatically join the lobby provided it is not already full (based on whatever maximum number of users is specified by the game lobby's creator) and it is a public lobby with no password required for joining. If it is a private lobby, then the user will be prompted to enter the lobby password. If the password entered is successful, then they will be able to join the waiting lobby, provided it is not already full (based on whatever maximum number of users is specified by the game lobby's creator). In any instance of joining a lobby (private or public), if the lobby is full or the password entered for private lobbies is incorrect, an error message will pop up on the user's screen upon trying to join or enter the password reflecting said error.

All users sent to the waiting lobbies via the 'join a lobby' option will only be redirected to the game page when the game server's creator joins the waiting lobby and hits the 'start game' button (only the creator of the server will be allowed to do so). Note that the creator can only hit the

'start game' button with a minimum of two players present in the lobby (including the creator), and any attempt to do so without the minimum required number of players will do nothing.

→ **Creating a Game**

If the user selects the 'Creating a Game' option on the game lobby page, they will be redirected to a create game page. In this create game page, if the user successfully enters a unique game instance name, an optional password if they want to create a private game, and a specified maximum number of players (up to 10), they can then hit the create server button which will redirect them to the waiting lobby for the game they have created. If the minimum number of players required to start the game (two users including the user who has created the lobby) have joined, then the user who has created the lobby can click the 'Start Game' button at any time to redirect all users in the lobby to the game instance page. If the minimum number of users have not joined, then the 'Start Game' button will be grayed out.

→ **Post a chat message**

The user can send a message in the chat when they are waiting in a lobby and when they are in a game. When a user posts a message in the chat all users in the lobby or game can see the message.

→ **Click deck to get a card**

If there are no playable cards in players' hand, then players are able to click on the deck to move card(s) from the deck to the players' hand, until they draw a card that is playable.

→ Click Card to Play a Card from Hand

If a card is clicked and it matches the number or color of the current top card in the discard pile, then the clicked card is removed from the player hand and placed as the new top card in the discard pile. If the card is unplayable (number or color do not match the current top card in the discard pile), then clicking on the card will have no effect. The only exception is for wild and wild draw four cards, which can be played regardless of the color or number of the card at the top of the discard pile.

→ User clicks to play last card in hand successfully

The game ends and the first player with no cards in their hand wins the game (win and lose messages displayed for each relevant user). Each user in the game is then redirected to the game lobby page after the game ends.

3 Initial List of System Events and Outcomes

List All System-Generated Events and Their Outcomes.

→ Registration

The username is compared to see if there is already a username in the database. The password is then compared to see if they match each other then encrypted to store in the database. If conditions are not met then prompt the error to the user.

→ Login

The username and the encrypted password is compared with the ones in the database to see if they match. If successful login the player in and direct them to the landing page. If not then redirect to the login page.

→ Playing Against Random Users

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→ **Game Loading**

At the start of a game, all users must be connected to the game instance. Once all users are connected, the deck will be filled and shuffled, and all of the users will each have 7 cards allocated to their hands (drawn from deck).

The messaging feature present in the game lobby will continue in the game instance as well, and the history of the messaging will also be reflected (from game lobby to game instance) based on the unique game ID.

→ **Turn**

After the game has been loaded, the order of the players' turns will be decided randomly and stored in a circular linked list. Note that before the first turn, the first card in the discard pile where players will play their cards will be the top card in the deck. Once a player plays a card, their turn is now over, and the following user's turn can begin.

→ **Turn History**

After the game has been loaded, turn history will be implemented to show the game instance's play history. At the end of each turn, the card that was played will be pushed into a stack which will then be displayed on the UI. This would help every other player know the list of cards that have been played since the beginning of the game. Note that the turn history will only be activated once a user plays a card.

→ **Skip card**

If the card is unplayable (color does not match the current top card in the discard pile), then clicking on the card will have no effect. If a skip card is clicked and it matches the color of the current top card in the discard pile, then the clicked card is removed from the player hand and placed as the new top card in the discard pile. The next player's turn is then skipped.

→ **Reverse card**

If the card is unplayable (colors do not match the current top card in the discard pile), then clicking on the card will have no effect. If a reverse card is clicked and it matches the color of the current top card in the discard pile, then the clicked card is removed from the player hand and placed as the new top card in the discard pile. The order in which each player can play a card is reversed.

→ **Draw Two card**

If the card is unplayable (colors do not match the current top card in the discard pile), then clicking on the card will have no effect. If a draw of two cards is clicked and it matches the color of the current top card in the discard pile, then the clicked card is removed from the player hand and placed as the new top card in the discard pile. The next player has to draw two cards and their turn is skipped.

→ **Wild card**

If a wild card is clicked, the player gets to choose the color that can be played immediately proceeding their turn onwards, then the clicked card is removed from the player hand and placed as the new top card in the discard pile.

→ **Wild Draw Four card**

If a wild draw four card is clicked, the player gets to choose the color that can be played immediately proceeding their turn onwards, then the clicked card is removed from the player hand and placed as the new top card in the discard pile. The player on the next turn has to draw four cards and their turn is skipped.

→ User Disconnection

A user disconnection is when a user logs out while they are present in a game lobby or game instance or they have disconnected from the web socket, which would end the game session which correlates with the session ID.

Once a player has been disconnected in a two player game mode, the user that has been disconnected will be kicked out of the Game instance. They will not receive a "Lose State" but they will be prompted with a "Disconnected" alert message. The other user who is in the game instance will be prompted with a "Win State".

If a player has been disconnected in a game with more than two players, the remaining players in the lobby will be able to continue with the game until one person wins, or there is one person left inside the game instance. The player that is connected will be prompted with a "Disconnected" alert message and will be kicked out of the game instance.

→ Win State

If the user has no more cards left in their hand, then they have reached the win state, meaning they have won the game. A user can also win if all other players in the game have disconnected, meaning they are the last player remaining in the game instance, meaning the game state is updated to reflect that the only remaining user has won the game by default.

→ Lose State

If the user has cards left in their hand while any other user (only needs to be one other user) in the game has no more cards left in their hand, then the user(s) with cards left in their hand at that point reach a lose state. This

means the game state is updated to reflect that all other players except for the one that has no cards remaining in their hand have lost. A user can also reach the lose state if they disconnect from the game instance or game lobby.

4 API Documentation

/login POST (account registration)

/register POST (account login)

/play/:gameId GET (connects the server and clients for the game)

/play/:gameId?player=""&action="" POST (player action)

/chat/:roomId GET and POST (chat messages)