CS 30700

Professor Turkstra

Team 20: Albert Xu, Prabhav Pande, Ruchitha Jagana, Jay Mehta, Dhruv Dhawan, Adithya Chandrasekar

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Purpose

Many friend groups and couples have difficulty deciding where to spend time together, especially college friends reuniting during breaks. Disagreements in eating choices can lead to indecisiveness, unnecessary tension, and ultimately a waste of time, which our app aims to reduce or eliminate by aggregating the group's preferences and selecting an "optimal" restaurant nearby for them based on geolocation and group member preferences.

The purpose of this project is to create an easy and convenient web application for group restaurant selection. Existing restaurant selection applications are only for the individual, but this project will provide a similar service that allows groups to get a restaurant based on all of their preferences via a web application.

Functional Requirements

Authentication

1) As a Nomster, I would like to create an account using email/password.
2) As a Nomster, I would like to create an account using various social platforms (Google, Facebook, etc)
3) As a Nomster, I would like to use NomNoms as a guest.
4) As a Nomster, I would like to easily access NomNoms across any device.
5) As a Nomster, I would like to log in to my NomNoms account with my email ID and password.
6) As a Nomster, I would like to *log in* to my NomNoms account with various social media platforms, such as Facebook or Instagram.
7) As a Nomster, I would like to add social authentication to an existing Email/Password account or vice-versa.
8) As a Nomster, I would like to be able to use the default username NomNoms provides.
9) As a Nomster, I would like to be able to reset my password in case I forget my password.
10) As a Nomster, I would like to have a code sent to my phone/email if I want to reset my password *(if time permits)*.
11) As a Nomster, I would like to be able to change my password if I want to, by reconfirming my current password.
12) As a Nomster, I would like to delete my account if I no longer want to keep the account or if I want to delete and create a new account for any reason.

13) As a Nomster, I would like to ensure my data is purged from NomNoms upon account deletion.

Tables

14) As a Nomster, I would like to be able to make a Table.
15) As a Nomster, I would like to receive a join link or code after I make a Table.
16) As a Nomster, I would like to be given the option to share this link or code by copying it to my clipboard.
17) As a Nomster, I would like to join my friends' Tables via a link or a code.
18) As a Nomster group leader, I would like to be able to enter a general location (preferably zip code or any other method) to find restaurants nearby to myself and my table.
19) As a Nomster group leader, I would like to be able to set a marker on the map and then select a radius to set the location of where restaurants will be recommended *(if time permits).*
20) As a Nomster, I would like to be able to see the locations of proposed restaurants on an embedded map *(if time permits).*
21) As a Nomster user, I would like to have a default radius set; however, if the radius is too small and does not show any restaurants that fit my preferences, I would like to be notified of this situation *(if time permits)*.
22) As a Nomster user, I would like to see markers or pins on the map for each restaurant *(if time permits)*.
23) As a Nomster user, I would like to be able to click on each pin and receive information on the restaurant *(if time permits).*
24) As a Nomster, I would like to receive information on the number of reviews of a restaurant.
25) As a Nomster, I would like to view the menu of a restaurant easily
26) As a Nomster, I would like to see what cuisines a restaurant has
27) As a Nomster, I would like to see the price point of a restaurant
28) As a Nomster, I would like to see the hours of a restaurant easily.
29) As a Nomster, I would have an easy ability to view some images of the food available at a restaurant.
30) As a Nomster, I would like to be able to be redirected to the restaurant's official page if I want to make a reservation or get more information *(if time permits)*.
31) As a Nomster, I would like to be able to be redirected to the appropriate service to receive directions to the restaurant *(if time permits)*.
32) As a Nomster, I would like to have a pin that has the time that it takes to go to the restaurant written on the pin *(if time permits).*

33) As a Nomster, I would like to change the group leader to a different Nomster member in my Table if necessary.
34) As a Nomster leader, if I log out or disconnect, another user should automatically be set to the group leader.
35) As a Nomster, I would like to be able to easily view cuisines to choose from.
36) As a Nomster, I would like to be able to select cuisines to add to my preferences.
37) As a Nomster, I would like to be able to like restaurants and save them as I prefer *(if time permits).*
38) As a Nomster, I would like to select the price range for the restaurant.
39) As a Nomster, if I have an account, I would like to have my restaurant preferences remembered.
40) As a Nomster, I would like to have my restaurant preferences easily viewed by formatting them in a list.
41) As a Nomster, I would like to have my restaurant preferences easily rearranged/edited.
42) As a Nomster, I would like to temporarily disable certain preferences if I am not in the mood for that type of cuisine.
43) As a Nomster, I would like my proposed cuisines updated when certain preferences are disabled.
44) As a Nomster, I would like to easily view the various parameters for restaurant preferences, such as price or restaurant rating.
45) As a Nomster, I would like to easily select and change which parameters I want to keep to get restaurant choices.
46) As a Nomster, I would like to be able to join multiple tables.
47) As a Nomster, I would like to leave tables.
48) As a Nomster, I would like to have my options saved if I leave the table and rejoin *(if time permits).*
49) As a Nomster, I would like to be able to log out of my account from this page.

Restaurant List

50) As a Nomster, I would like to swipe left or right, or pick yes and no on each restaurant, i.e., a UI screen similar to tinder or dating applications.
51) As a Nomster, I would like to be able to view the restaurants in a specific order based on reviews.
52) As a Nomster, I would like to be able to view the restaurants in a specific order based on prices from low to high.

53) As a Nomster, I would like to be able to view the restaurants in a specific order based on prices from high to low.
54) As a Nomster, I would like to be able to view the restaurants in a specific order lexicographically.
55) As a Nomster, I would like to be able to view the restaurants in a specific order based on proximity.
56) As a Nomster, I would like to be able to rank the restaurants I swipe right on so I can have ordered preferences.
57) As a Nomster, if I am not happy with my restaurant choices, I would like to be able to reshuffle them or go back to the page where I can select my preferences.
58) As a Nomster, if I do not want to select any preferences or go through the process of swiping, I would like to be able to select a restaurant randomly.
59) As a Nomster, I would like to have the option of choosing how I want my restaurant preferences to be ordered (i.e. from lowest to highest prices or best rated to worst rated).

Miscellaneous

60) As a Nomster, if I accidentally log out of a room or disconnect, I should be able to reconnect to the page I left off at and have my selections saved *(if time permits).*
61) As a Nomster, I would like to be able to see what my friends have selected for their restaurants at the end *(if time permits).*
62) As a Nomster, I would like to have the option to enter my own location to help with location optimization *(if time permits).*
63) As a Nomster, I would like to see the highest ratings/highest reviewed restaurants out of the aggregated preferences.
64) As a Nomster, I would like to be able to randomly select a restaurant out of all the Table choices of my friends if there is no intersection.
65) As a Nomster, I would like to have a feature where I can randomly select a restaurant for the individual instead of having everyone swipe through options.
66) As a table, instead of swiping through options, I would like to be able to select a random restaurant for the group based on the original filters applied.
67) As a Nomster, if I am in a small group and everyone has a varied selection, I should still be able to receive a recommendation for a restaurant from the application side at the end.
68) As a Nomster, I would like to change the color of the app to customize it according to my preferences *(if time permits).*

69) As a Nomster, I would like to have the option of using the app for myself and be able to find restaurants as the only member in a room.
70) As a Nomster, I would like to be able to search for other users on the app *(if time permits).*
71) As a Nomster, I would like to be able to add friends to the app *(if time permits).*
72) As a Nomster, I would like to be able to search for specific restaurants *(if time permits).*
73) As a Nomster, I would like to be able to add a restaurant that is not shown on my table irrespective of its location *(if time permits).*
74) As a Nomster, I would like to see a rating system for restaurants *(if time permits).*
75) As a Nomster, I would like to be able to rate restaurants *(if time permits).*
76) As a Nomster, I would like to see if my friends have also rated a restaurant *(if time permits).*
77) As a Nomster, I would like to be able to review restaurants *(if time permits).*
78) As a Nomster, I would like to be able to read other reviews from other Nomsters or my friends *(if time permits).*
79) As a Nomster, I would like to set a date on a calendar for what date people want to meet *(if time permits).*
80) As a Nomster, I would like to pick a time for what time people want to meet *(if time permits).*
81) As Nomster Group Leader, I would like to be able to create a poll if I would like the whole group involved in the selection process for a location and the app chooses the majority *(if time permits).*
82) As a Nomster, I would like to be able to change my profile icon or choose from a preset of NomNoms icons *(if time permits)*.
83) As a Nomster, I would like to be able to copy and share the event including the date, time, and restaurant chosen after the restaurant has been picked at the very end *(if time permits).*
84) As a Nomster, I would like the event including date, time, and location to be integrated into google calendar or any other calendar service *(if time permits).*

Non-Functional Requirements

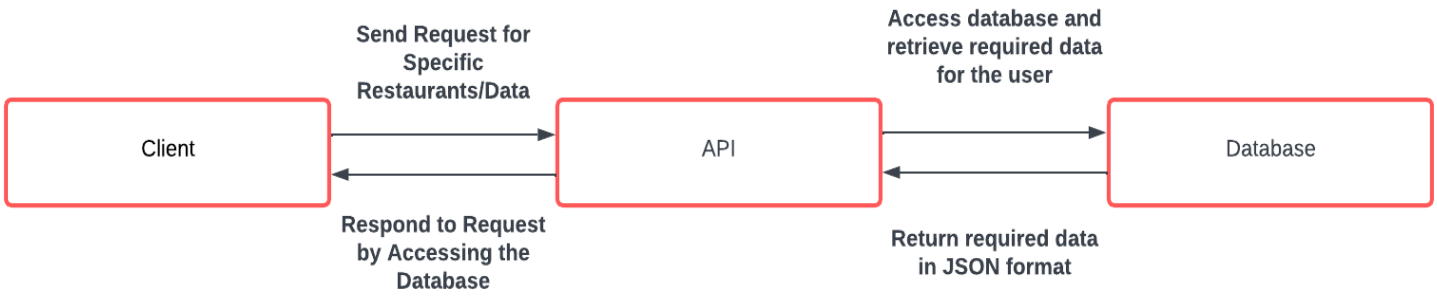
1) Front-end
    a) NextJS will be used for front-end
2) Physical Limits
    a) Free Limits of Firebase - Must optimize the app to comply with these guidelines
        i) 50k Monthly Active Authenticated Users
        ii) 5 GB Cloud Storage (Cached Yelp API Data Basically)
        iii) 1 GB Firestore Data (Table Data)
3) Scalability
    a) Potentially have a maximum of a couple of hundred users per table
    b) Allow users to join via a share link that has a room token as a suffix
    c) Rooms will be deleted within 24 hours of inactivity (may be reduced if we get more users)
4) Security
    a) User authentication handled by Firebase Authentication
    b) Get the minimum amount of data needed from the user to keep the app functioning and store that data in Firebase Cloud Storage
5) Usability
    a) The app should be inclusive of all popular viewport sizes (Desktop, Tablet, Mobile)
    b) UI should be consistent (for the most part) across all popular viewport sizes

Design Outline

High-Level Overview

This project will be a web application that allows one group leader to set a location and then lets users select restaurant choices from the location. After the users have selected, a top choice of restaurants will be displayed at the end. Our web app will use a client and then a Firebase API, and a database. The API will use the real-time database as the main platform for handling the changes made on the tables.

High-Level UML Model



Components & Purpose

1) Client
    a) The web app will be served through a Nomster's web browser as the client
    b) The client should be able to see a list of restaurants & interact with the options shown.
    c) The client should be able to send requests to the database based on changes in the UI and those changes should be sent through the API
    d) JSON data from the database will be parsed appropriately and displayed to the client.
2) API
    a) The API will provide a high-level abstraction between the client and the database.
    b) The API will handle all requests from the client and returns from the database.
    c) The API will return data that is requested in a JSON format.
3) Database
    a) A database that has all the information regarding the users, their preferences, and other details regarding the user.
    b) A real-time database that contains restaurants based on the restaurants that are generated.

Design Issues

Functional Issues

1. Do users need to log in to use our service?
    a. Allow the creation of log in using social media platforms
    b. Allow the creation of a username and password unique to our application to login
    c. Use as guests, without logging in
    d. All of the above as per user preference

    Justification: d. We chose to provide users the option of logging in if they want to, and using different services to log in as well. Users can create an account if they want to so that they have their preferences saved. Regular users will save time with this feature. By also providing them the guest option, we allow for a quick user experience for occasional users.

2. Based on what algorithm should the restaurants be displayed once preferences are selected?
    a. Create a yes/no or swipe right/left UI and use the majority of yes or nos to decide the restaurant pick
    b. Allow users to rank each of the restaurants on a 0-10 scale and then take an average of each of the restaurants to decide the restaurant pick
    c. Select just one restaurant from the swipe right/left UI

    Justification: a. We decided that there is a much higher chance of an intersection of such a design compared to selecting just one restaurant. Additionally, it is much quicker than rating the restaurants, making it the ideal choice.

3. How should the restaurant choices be displayed after the user selects their preferences?
    a. List the restaurants that are an intersection of the individuals with the group leader's choices such that the list of restaurants may be at least slightly different for each user.
    b. List the restaurants that are an intersection of everyone's individual preferences such that the same list of restaurants are displayed on each user's screen.

    Justification: b. We decided to stick with this option as there might be no intersections at all with the other choice. The need for our app to be user friendly and quick to use made option b right choice

4. How should the final top restaurant choices be shown ?
    a. Just have the top choice of restaurant shown with a button for the group leader to go back to the home page in case the users want to redo their preferences

b. Have the top three restaurant choices displayed with a button to see the ranking of the others as well, and a button for the group leader to go back to the home page to redo the preferences.

Justification: b. We decided that the users should know the top three choices as well as be able to see all their top choices so that, in the event of a change of mind, they do not always have to redo the entire process, and can just choose from the other choices.

Non-Functional Issues

1. What UI Framework should we use?
    a. NextJS
    b. ReactJS
    c. HTML/CSS + JS

    Justification: a. We are using NextJS for dynamic page routing, built in servers-side rendering for good performance and search engine optimization (SEO). NextJS is one of the best web frameworks in 2023 and is suitable for an application like this. React itself lacks the dynamic page routing abilities needed for dynamically generated Tables. HTML/CSS and JS would be tedious for our needs and its level of fine-grained customization is unnecessary.
2. What database should we use?
    a. Firebase
    b. AWS
    c. MongoDB
    d. Azure

    Justification: a. We are using Firebase because it offers authentication, database, and cloud functions all in one free platform. While AWS offers these to some extent as well, AWS has notoriously poor pricing scheme documentation and it is very difficult to do things for free. MongoDB would be great if we wanted to implement everything on our own but Firebase already does everything we need so it makes no sense. We are choosing not to use Azure for the same reasons we are not using AWS.
3. What UI Framework should we use?
    a. Mantine
    b. React-Bootstrap
    c. Chakra
    d. Material

    Justification: a. We are using Mantine because of the strong component library and built in utility hooks. More than any of the other libraries, Mantine is the most plug n' play and

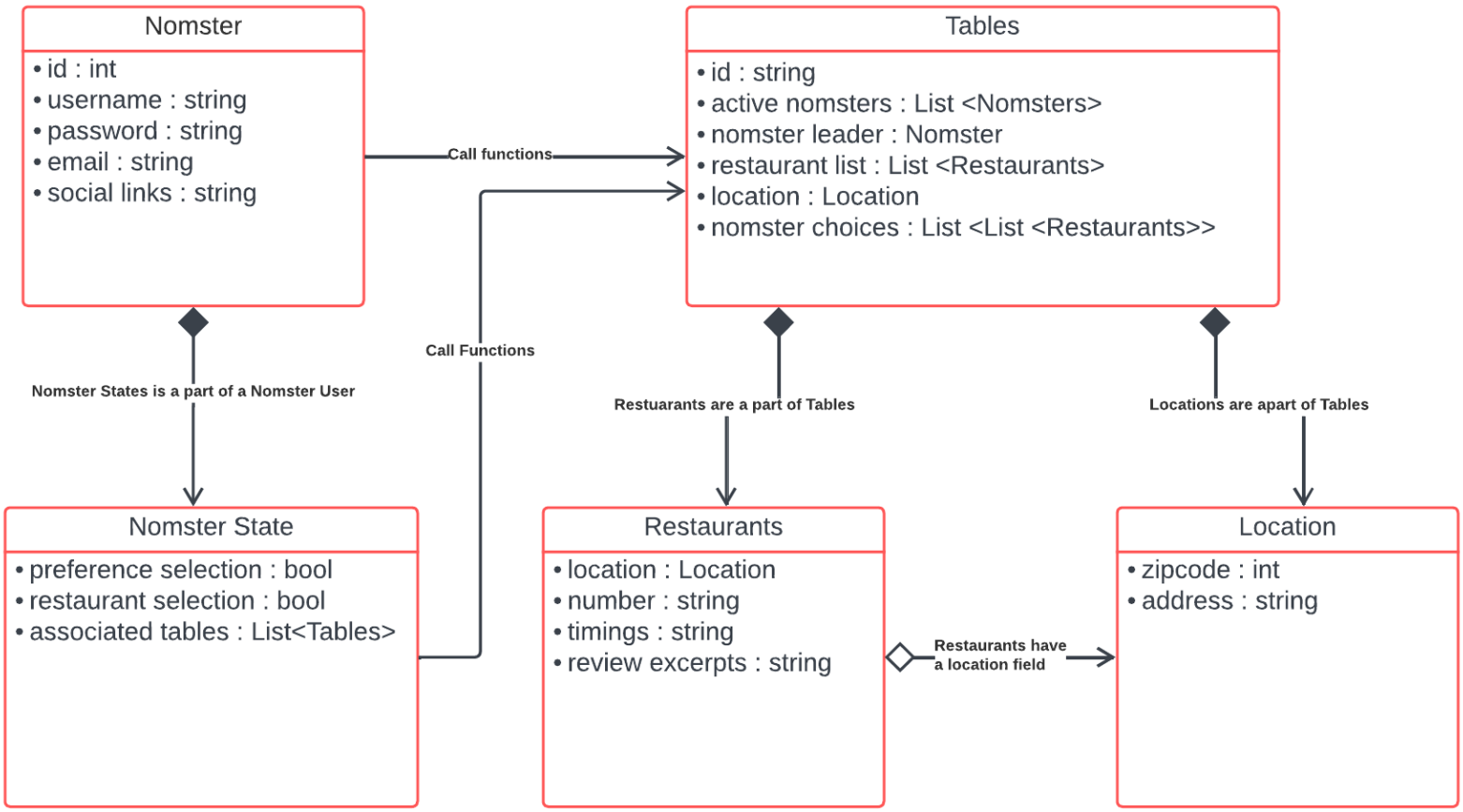
requires little to no additional customization. None of the other frameworks provide the level of utility or components that Mantine does. While the other components are a little bit less opinionated than Mantine, we don't believe it will be too much of an issue having to customize the feel of everything using a CSS library.

4. What CSS Framework should we use?
    a. Tailwind
    b. Bootstrap
    c. Write our own CSS

    Justification: a. We are using Tailwind because it has a set of extremely handy utility classes that include reactive variants for different breakpoints and on different component conditions like hover. It also makes transitions much easier with its transition tags. Bootstrap has some of the utility features Tailwind and brings in a strong base set of UI components has but lacks the transitions and more fine grained utility we need since we are already using Mantine for the components. We are also not going to write our own CSS because it doesn't make sense to rewrite new utility classes when they already exist.

Design Details

Class-Level Design



Class Description and Interactions

Our data classes are determined based on the Nomsters (users), and tables (groups of users that join on the same database). These all contain sub-attributes that allow each to be functionally complete.

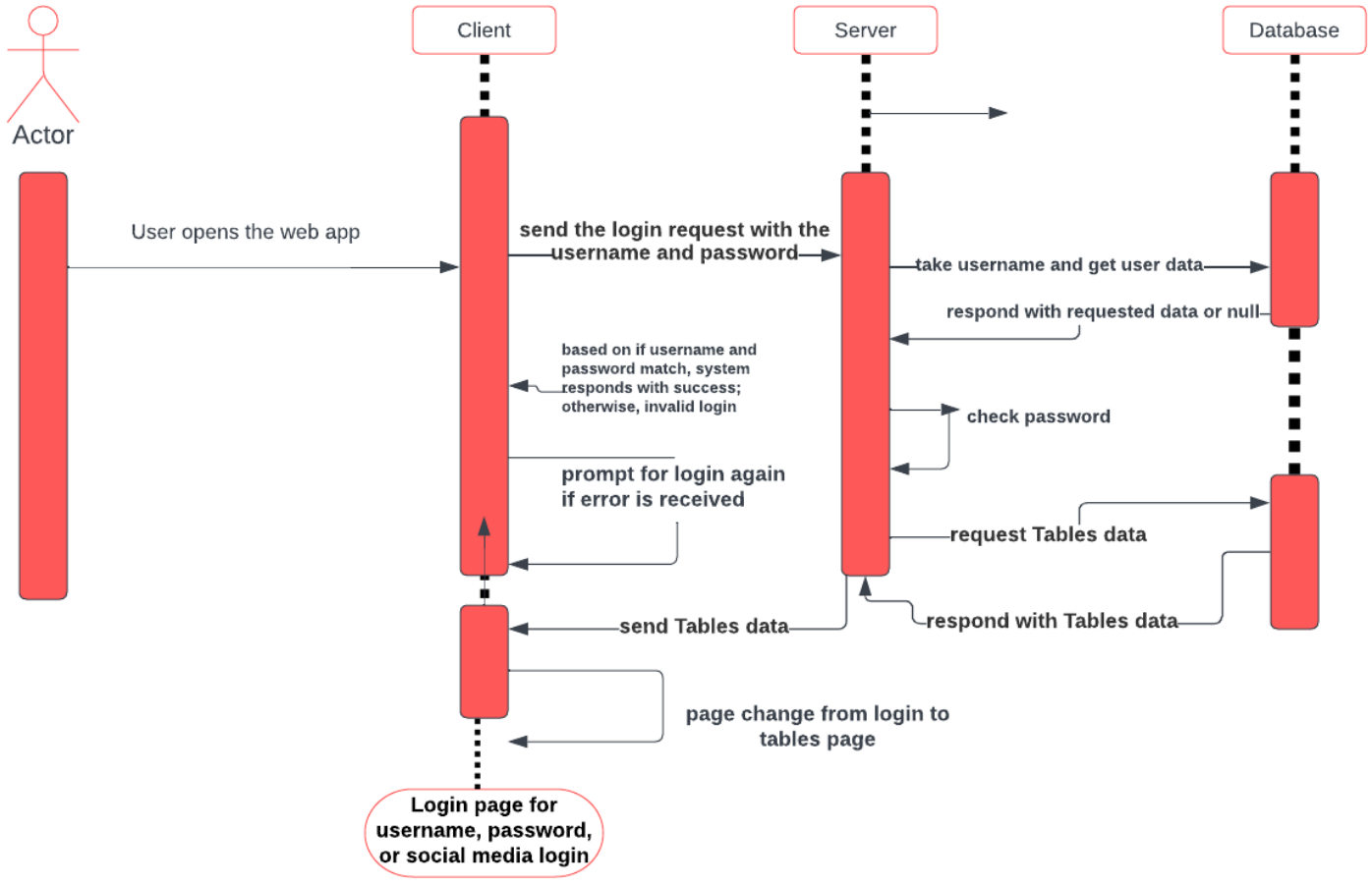
- Nomster
  - A Nomster is created when a user decides to create an account.
  - Each Nomster will have a unique username (e.g. TastyBurrito#1).
  - Nomsters will have either their socials like Facebook or Instagram for login or will have an email associated with the account.

    - Nonsters will also have a password for login purposes.
- Table
    - Each table will have a unique ID.
    - Each table will have a list of Nomsters that are currently on it.
    - Each table will have a group leader.
    - Each table will contain a list of restaurants that are pulled from an API depending on what the group leader sets as the location.
    - Each table will have a set location that it derives restaurants from.
    - Tables are subject to change in real time depending on what the group leader sets as preferences.
    - Each table will save the user's restaurant choices.
- Restaurants
    - Each restaurant will have attributes that are pulled from the Yelp API that we use, these will be split into categories in our database.
    - Each restaurant will have a location
    - Each restaurant will have a phone number.
    - Each restaurant will have its timings.
    - Each restaurant has 3 review excerpts.
- User State or Nomster States
    - Used to represent whether all users are done selecting their preferences.
        - This will be launched for users when they are on the preferences page for restaurants and are changing their preferences to see certain restaurants.
    - Used to represent whether all users are done selecting their restaurants.
        - This will be launched when users are swiping through restaurants and selecting yes/no.
    - Each Nomster state will have a list of the table's that it is associated with.
- Location
    - This will represent a location that is identifiable via a zip code.
    - This will be used to locate restaurants within that zip code.
    - It will also contain attributes like a complete address.

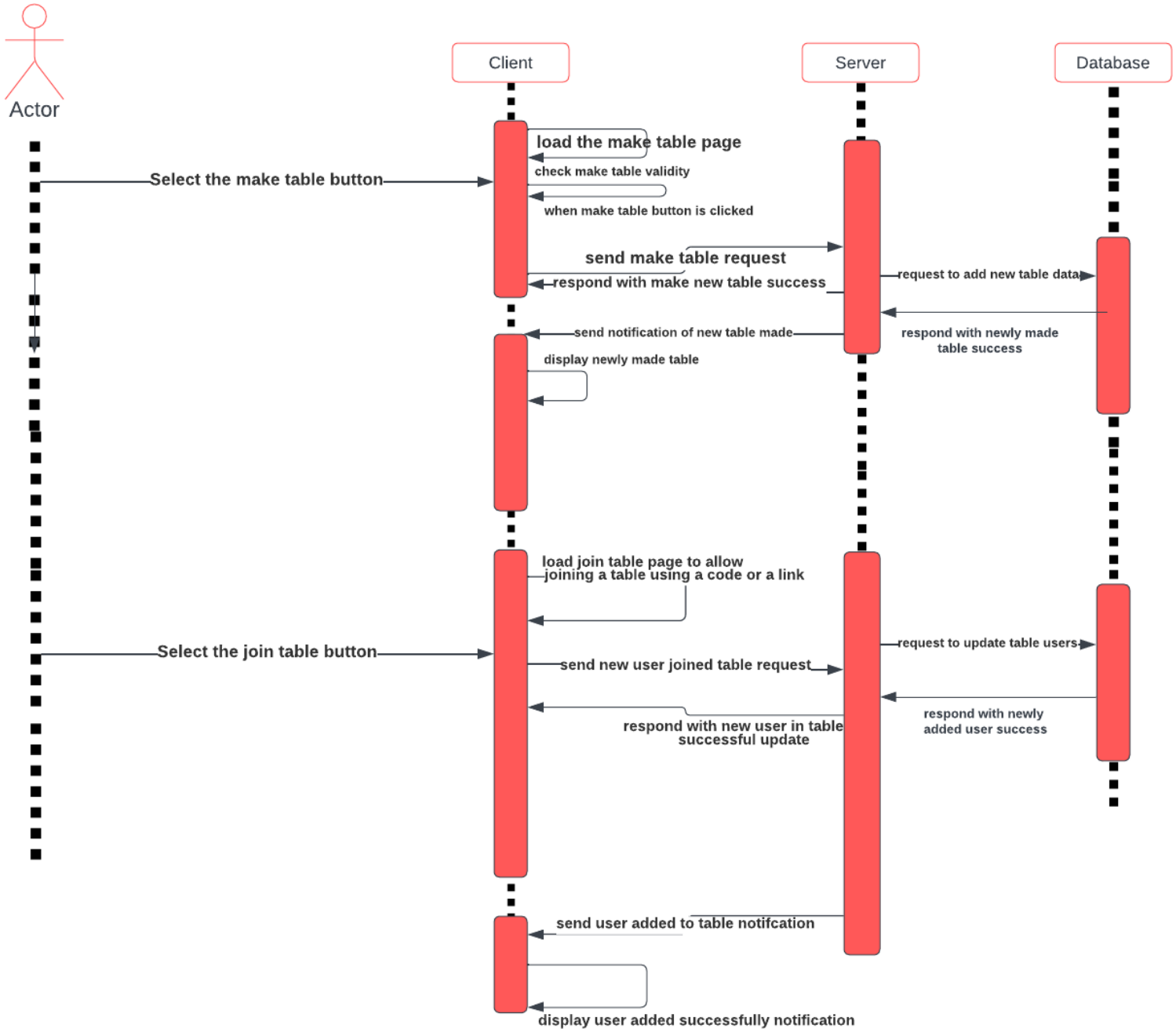
Sequence Diagrams

The following diagrams depict the sequence of the major events that occur in the web application, including when the user logs in, when the user needs to create a table or join an existing table, when the user selects their restaurant preferences, and when the user swipes their choice on each of the restaurants. The sequence diagrams show how each of the events occur between the client and the server. The client represents what the users sees on their screen, so when a user does any type of action on the front end UI, the client will then send a request to the server, which the server will then respond to appropriately. This is done by a query to the database, which contains all the necessary data or information, which is then relayed back to the server and then back to the client for the client to accordingly process the information and update the front end display.

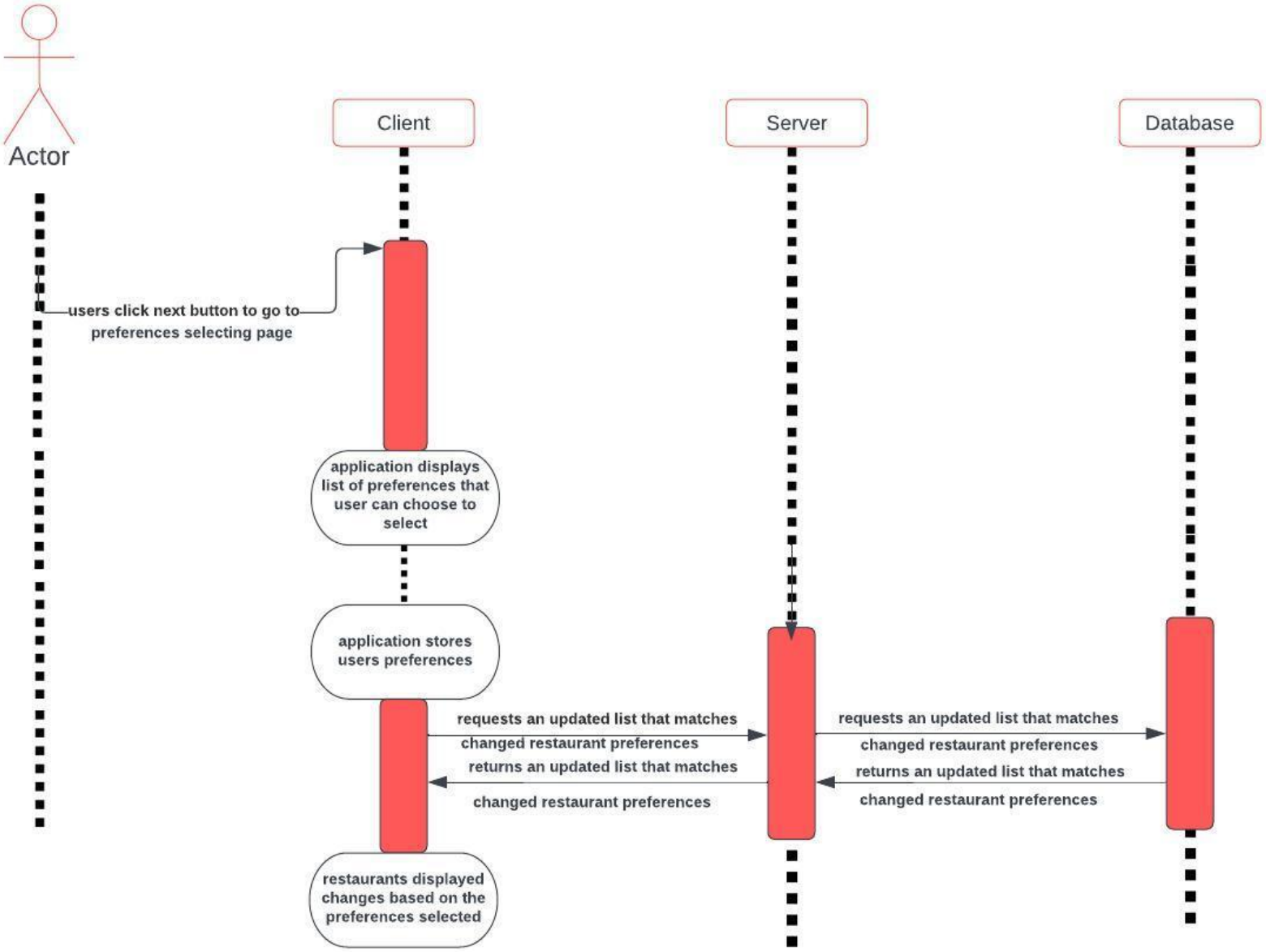
1. Sequence of Events when Users Login



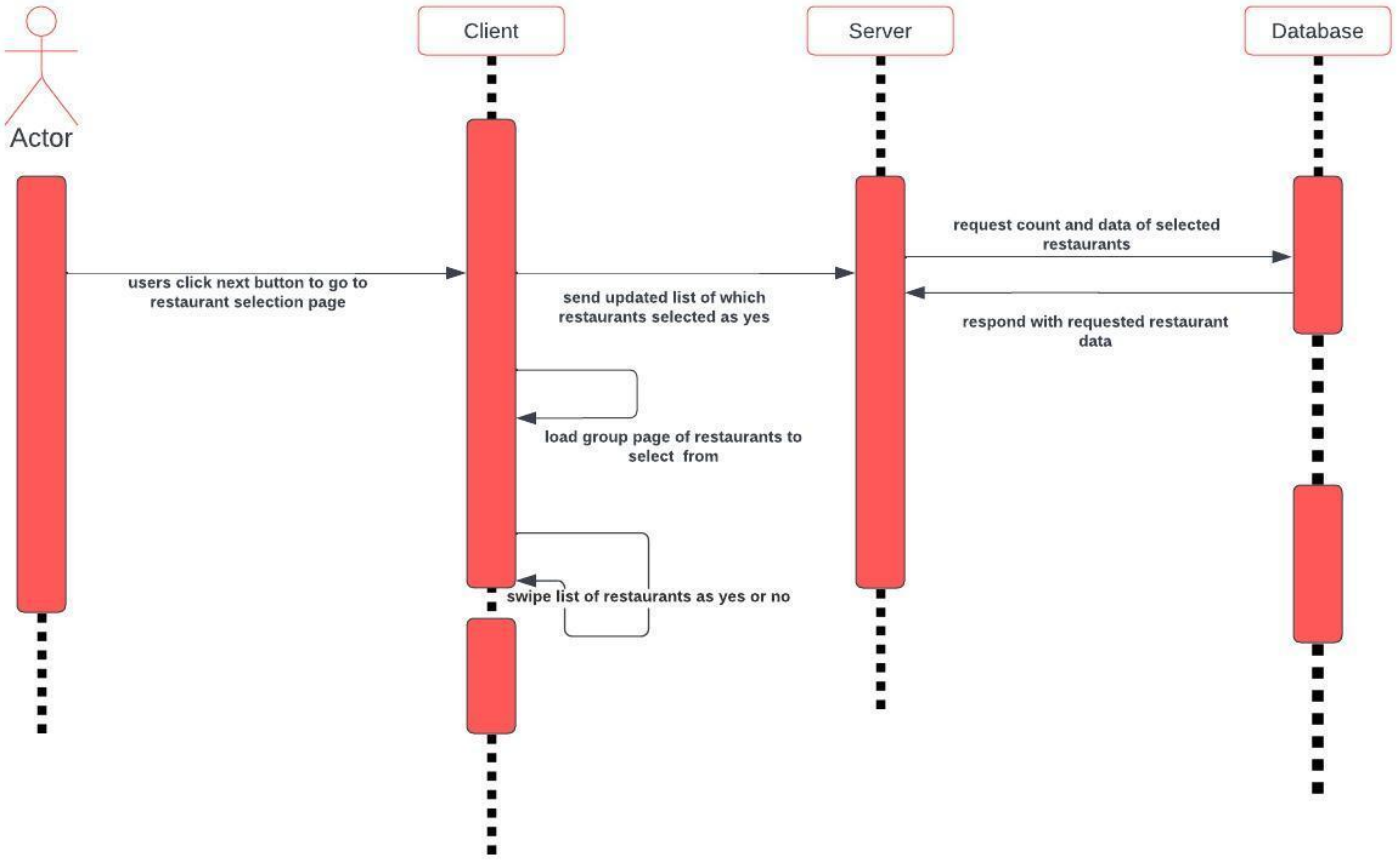
2. Sequence of Events when the Users reaches the Tables page



3. Sequence of Events when Users select Preference

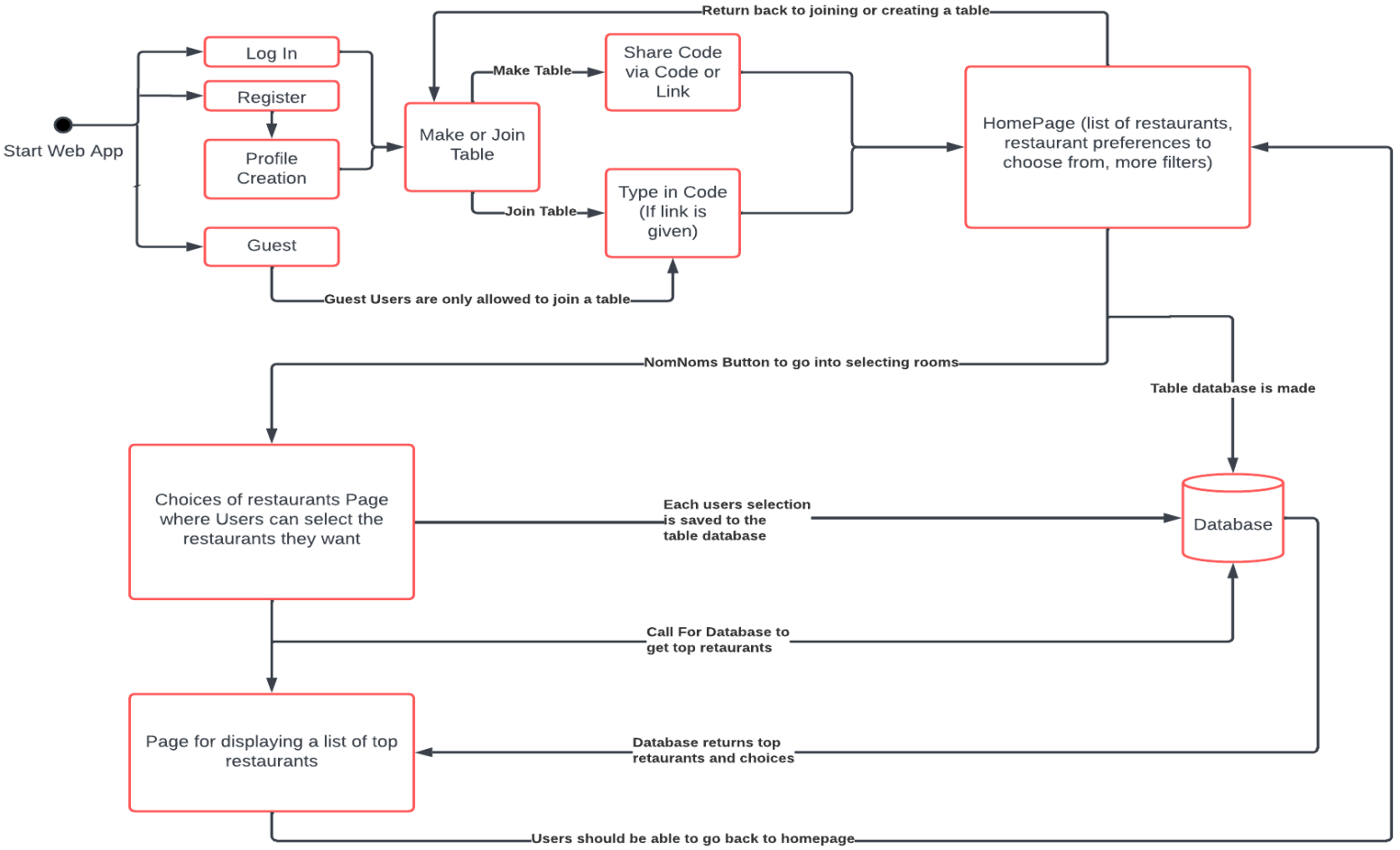


4. Sequence of Events when users select restaurants



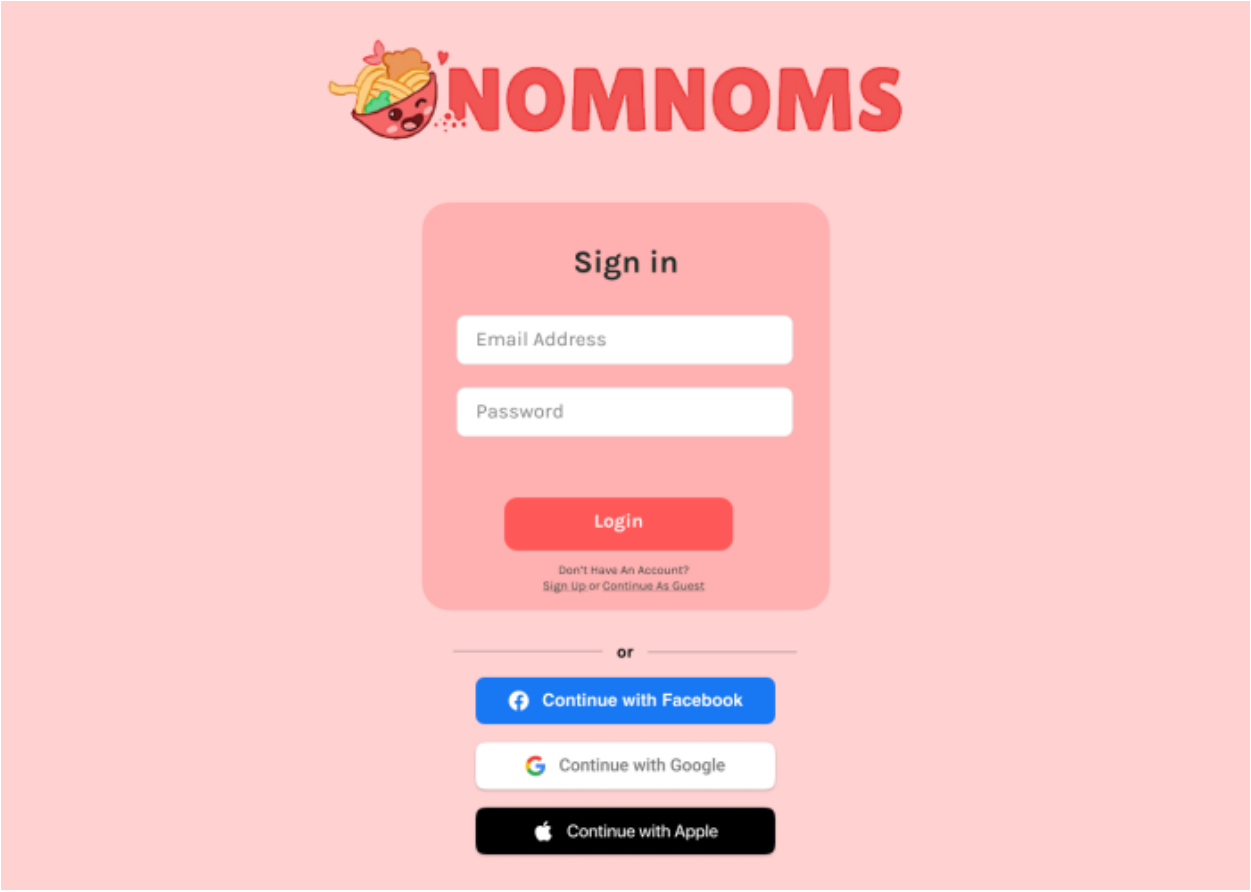
Navigation Flow

This is a high-level overview of the navigation that a user will go through while utilizing our app. In the beginning, the user will see a login page where they can either log in to their existing account, register a new account, or join as a guest. Joining as a guest is restricted to only joining a table. However, for the other users, Nomsters are allowed to either make or join tables. After doing so, they are sent to the homepage where they are shown a list of restaurants, and parameters/filters can be changed to view restaurants differently. After this, a table database is made where all the user's choices are saved when they swipe. Once everyone is done swiping, the top restaurants will be returned from the database and users will be allowed to return to the homepage.

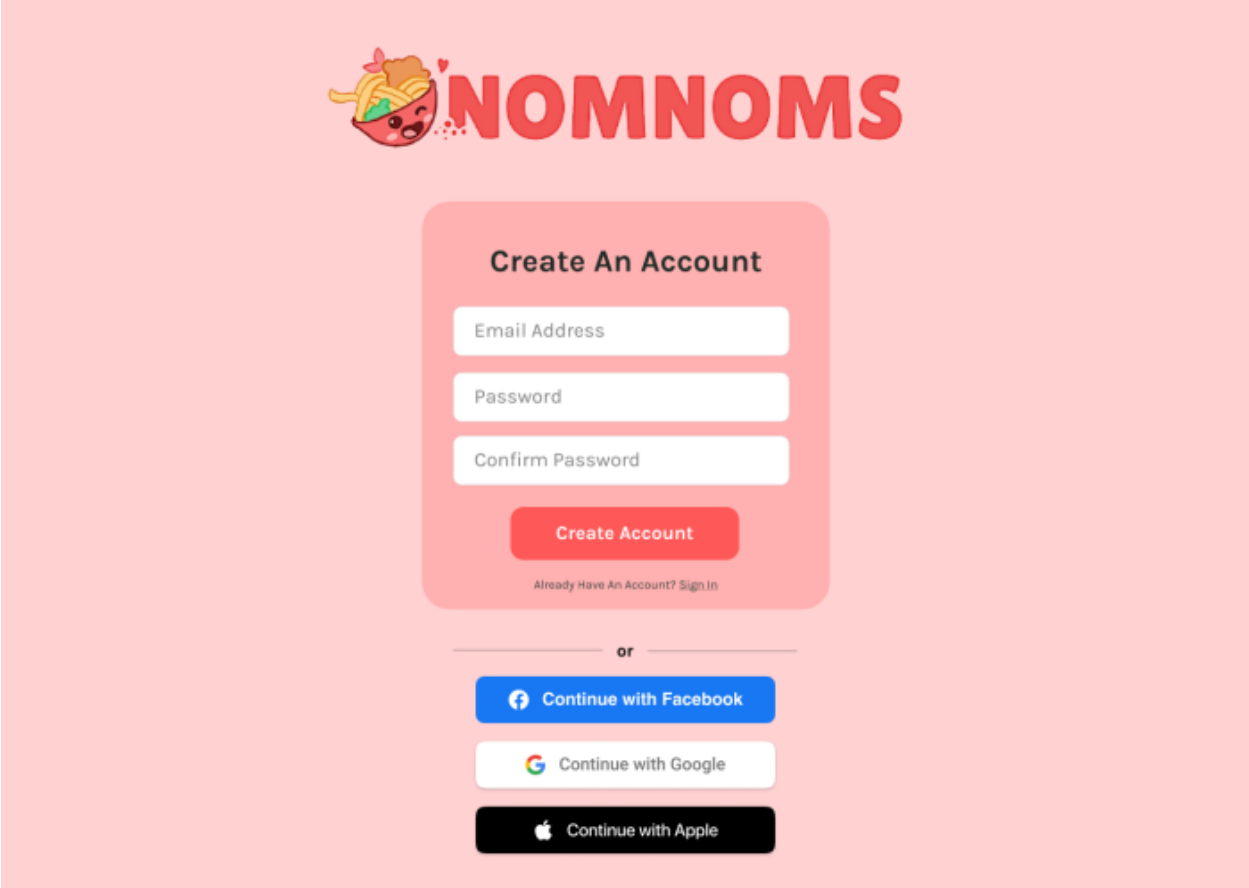


UI Mock-Up

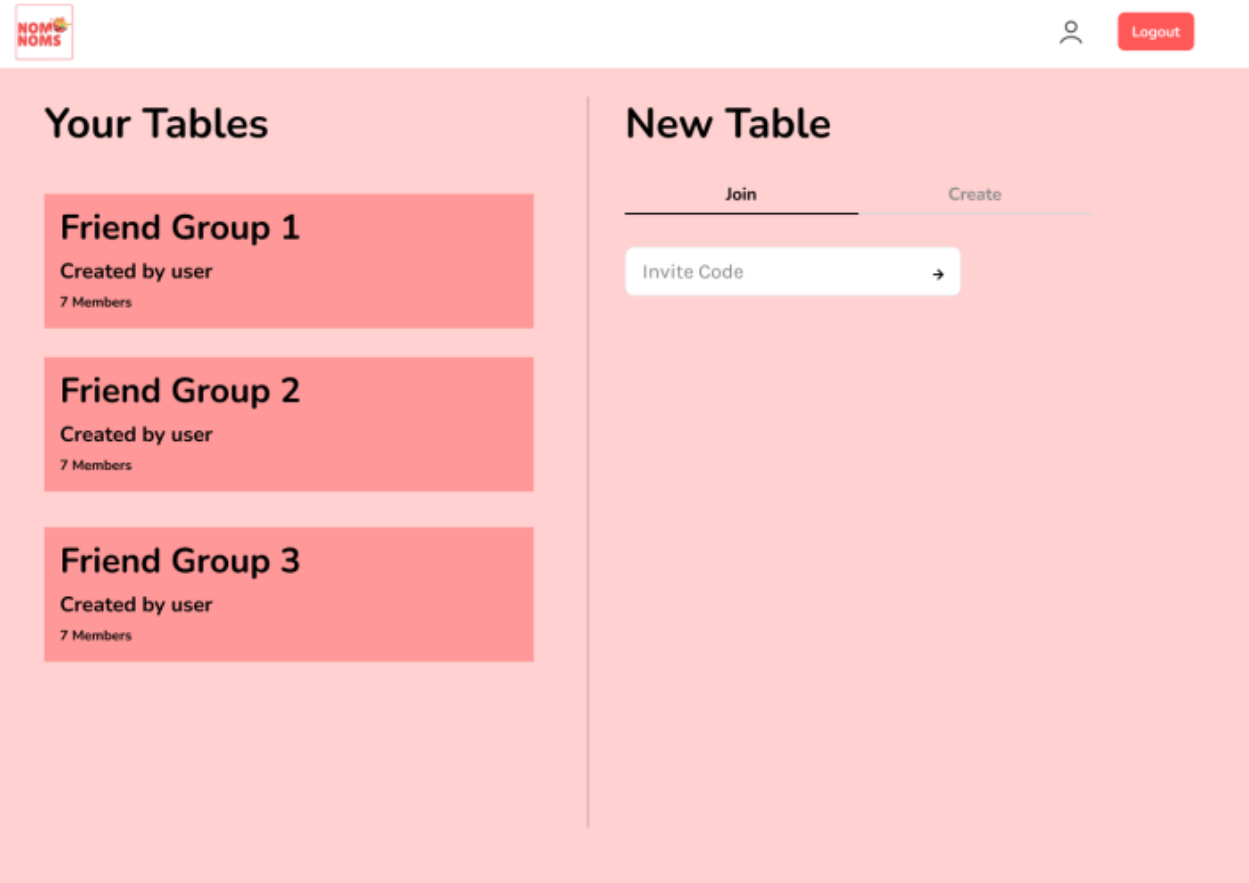
We designed a UI that is simple, modern, and minimalistic but still appeals to the audience of people who enjoy eating food. Our first screen shows up as the login in. The top will have a basic URL. Users can enter their email and password to log in, create an account, or continue as a guest if they do not want an account. We also allow users the option to log in via their Facebook, google, apple account, or any other social media platform in this mockup.



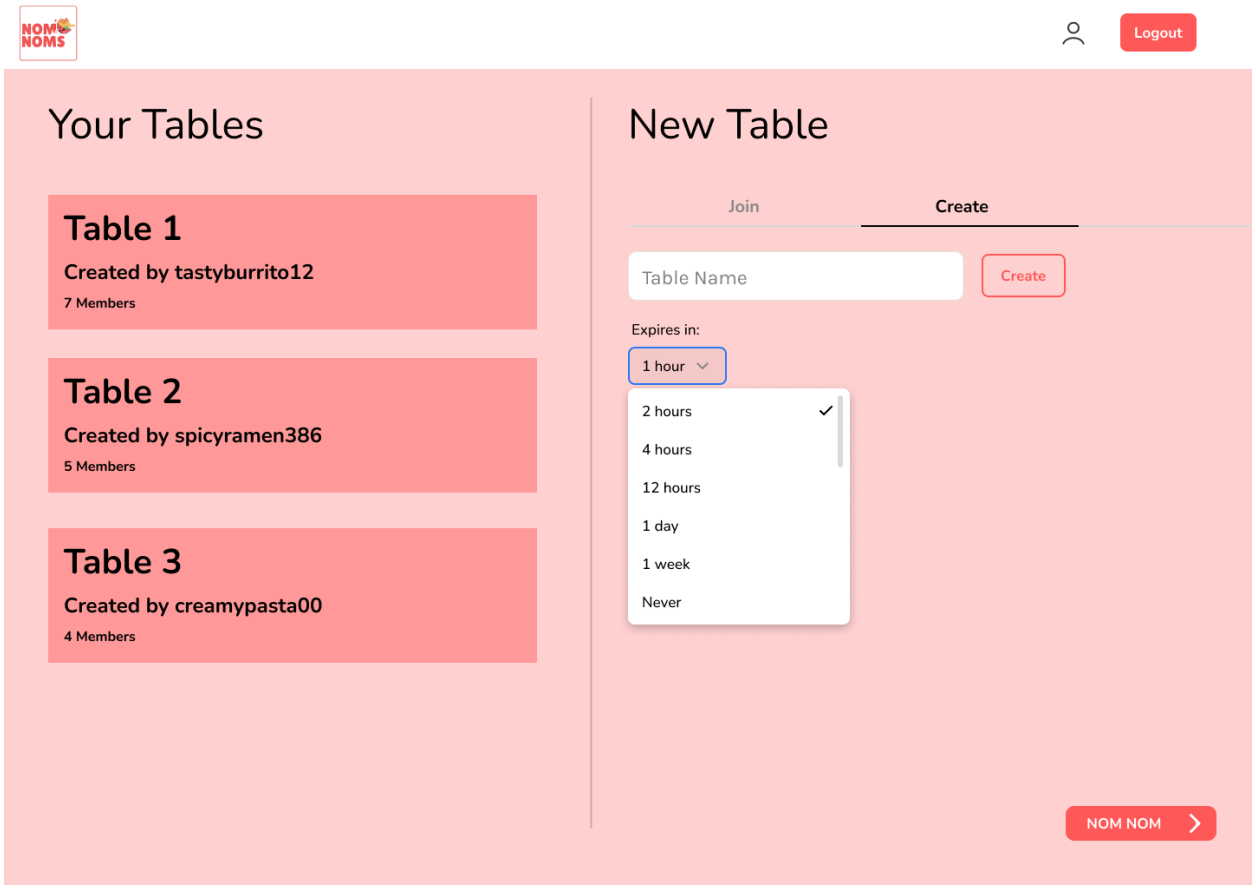
This is the screen that shows up if the User decides that they want to create an account. They can type in their email address and password, confirm their password, go back to the login screen if they need, or continue with their socials again.



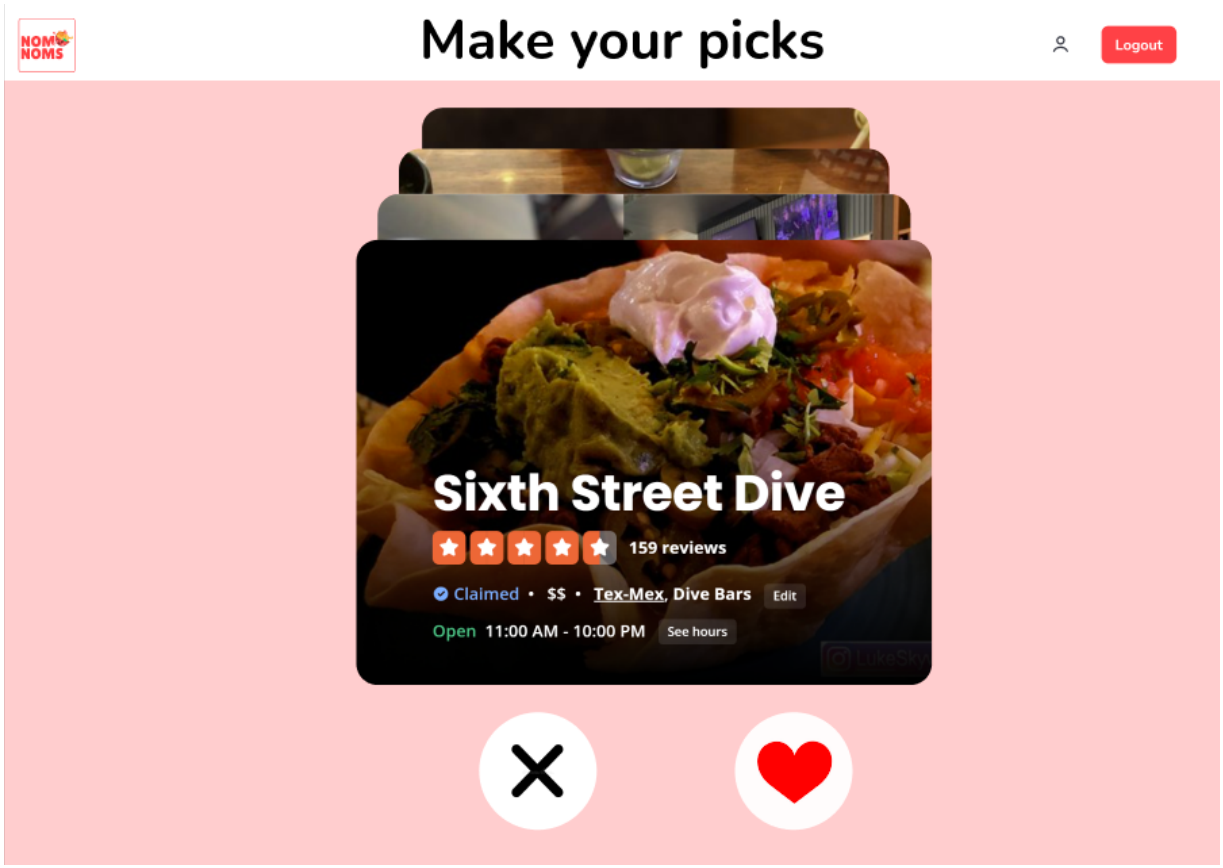
Once the user has logged in, this option allows users to join new tables via an invite code. The other side of the screen is tables that the user is already a part of and these tables are temporarily enabled for 24 hours. There is a logout option and the user can also view their profile on the top right. The NomNoms at the top left essentially allow the user to enter tables.



Once the user has logged in, this option allows users to join and create new tables with a table name. The other side of the screen is tables that the user is already a part of and these tables are temporarily enabled for 24 hours. There is a logout option and the user can also view their profile on the top right. The NomNoms at the top left essentially allow the user to enter tables. The user can also select how long they want this room active.



This is the page that essentially allows the user to pick their restaurants between yes and no. This will essentially add the selections they like to the database and wait till everyone also has finished choosing their restaurants.



This is the final page that essentially shows the top choices of restaurants that is an aggregate of all the user's selections from the previous screen. They can choose to randomly select one from the top choices, or go back to choosing restaurants again.