SW Engineering CSC648/848 Spring 2021

SYNC

Team 06

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Milestone 2

04/01/2021

History Table

Version	Date	Notes
M2V1	04/01/2021	
M1V2	03/09/2021	
M1V1	03/05/2021	

Table of Contents

1. Data Definitions V2

1. User: a person who has a spotify account that would like to listen to music with others in real time on web application named ‘SYNC’
    a. user_id: Unique number given to each registered user on SYNC
    b. spotify_id: A number given to registered user having spotify account
    c. profile_pic: A display picture of every registered user and they have the option to post a picture of themselves or not.
    d. display_name: Name of the user with which they wants to be identified as on SYNC
2. Profile: It has the information describing the registered user.
    a. user_id: Unique number given to each registered user on SYNC
    b. activity : It will show if the registered user is currently using SYNC or available online or not.
    c. profile_photo: A display picture of every registered user for which they have the option to post a picture of themselves or not.
    d. status : It defines if the person is listening to songs in the room as a participant who joined the room or as a host who created the room for others to join.
3. Participant: Any registered user who is using the SYNC for listening to songs in the real time and is present in the room but did not create the room.
    a. user_id: Unique number given to each registered user on SYNC
4. Host: The registered user who either created a private or a public room and sends invites to others to join the room. Also, this user has more control of the room than other participants.
    a. user_id: Unique number given to each registered user on SYNC
5. spotify_info: The information of the users imported from the spotify.
    a. auth_token:
    b. spotify_id:
    c. user_name: Name of the Spotify user.
    d. user_id: Unique number given to each registered user on SYNC
    e. playlist_list_id: Every playlist on spotify has a number attached to it

6. spotify_API
    a. Player
        i. connectivity (Online, disconnected, or error) : If the player is properly connected to the internet and is able to play songs as per the request of registered users.
        ii. current_song_title : The title of the song currently being played in the player.

iii. progress : The minute at which the song in the player is playing.

b. song
   i. song_title : The title of the song that can be searched or in queue.
   ii. artist : The creator of the song associated with song_title.
   iii. image_url : The image that is associated with the album.
   iv. genre : The category at which the song is considered in.
   v. album : The album name and which the song belongs in.

c. artists
   i. artist_name : The artist that is associated with the song.
   ii. songs : The songs that are created by the artist.
   iii. album : The album created by the artist.

d. genres
   i. image_url : Image that represents the genre.
   ii. genre_name : The name of the genre in which a song belongs to.
   iii. description : Describes what the genre is and gives a summary of what will be expected.
   iv. top_playlist : Shows the top playlist in the genre.

7. rooms
   a. room_type : It determines the kind of room the created room is.
      i. Public - available for all users through search and recommended results
      ii. Private - only available to other users through the sharing of the room id
      iii. Communal - A perpetual room.
   b. room_id : This is the unique room identifier.
   c. room_name : This is the room name in which the user set the room name to be.
   d. description : A description of the room in which the user decides to put.
   e. current_song : It shows what the current song is playing in the room. This is also shown in the previews of the rooms.
   f. room_host : It shows who created the room.
      i. user_id : This is the unique identifier of the user.
   g. password : This is the password set by the room_host for private rooms.
   h. status : Room status can either be Open or Closed, depending on the activity of the room.
   i. max_members : This is the max limit number of users that can join in a room, which is specified by the room_host.
   j. current_number : This is the current number of users that are in the room.
8. queue : The songs that are in queue in the room to be played and voted on.
   a. room_id : Identifies where that song queue belongs in.

    b. song_list_id : This is the unique queue list identifier.
9. song_list : This shows the
    a. song_title : This shows the title of the songs in the song_list
    b. song_id : This is the unique identifier of the songs in song_list.
    c. votes_id : This is the unique identifier for the votes in the song_list.
10. votes : This identifies what songs the users voted for to be played next in the room.
    a. user_id : This is the unique identifier for the user who voted for songs.
11. chat_section : This is the portion of the web application where it shows the users where a user can chat with.
    a. tab_id : This is the unique identifier for the chat_section to identify who the user is talking to, or what the current active tab is.
    b. tab_status : This identifies the current, active, or inactive chat tabs per user.
    c. server : This will be the server that will handle all realtime chat interactions.

2. Functional Requirements V2

Priority 1:

Unregistered Users

1. Unregistered Users shall be able to log into their Spotify Premium.
2. Unregistered Users shall be able to access the homepage of the website.
3. Unregistered Users shall be able to access the About Us of the website.
4. Unregistered Users shall be able to access the FAQ of the website.
5. Unregistered Users shall be able to access the Contact page of the website.

Registered Users

General

7. Registered Users shall have a premium Spotify account.
8. Registered Users shall be able to login into their Spotify Premium.
9. Registered Users shall be able to listen to music in real time.
10. Registered Users shall be able to access the Homepage of the website.
11. Registered Users shall be able to access the About Us of the website.
12. Registered Users shall be able to access the FAQ of the website.
13. Registered Users shall be able to access the Contact page of the website.
26. Registered Users shall be able to logout.

Host

27. Registered Users that create a room shall have the status of host.
28. Registered Users as hosts shall be able to name the room.
29. Registered Users as hosts shall be able to generate playlists.
30. Registered Users as hosts shall be able to control the music queue.
31. Registered Users as hosts shall be able to pause currently playing songs.

Rooms

35. Registered Users shall be able to create a “room” public
36. Registered Users shall be able to create a “room” private.
37. Registered Users shall be able to search a public room.
38. Registered Users shall be able to search a private room.

39. Registered Users shall be able to join a public room.
40. Registered Users shall be able to join a private room.
41. Registered Users shall be able to join a random public room.
42. Registered Users shall be able to invite people to their room.
43. Registered Users who created a room shall be able to choose what song to play.
44. Registered Users shall be able to search for songs.
45. Registered Users shall be able to choose the next song to play in the room.
47. Registered Users that create a room shall be able to close the room.

Chat

48. Registered Users shall be able to chat in all room types.
49. Registered Users shall be able to chat with people who joined in their created room.

Rooms

69. Rooms shall display the room name.
70. Rooms shall display if they are public or private.
71. Rooms shall display the hostname.
72. Rooms shall display a description of the room.
73. Rooms shall be up during its dedicated time set.
74. Rooms shall display the number of users in the room.
75. Rooms shall list all users in the room.
76. Rooms shall display the current song.
77. Rooms shall display the song queue.
78. Rooms shall display genre.
79. Rooms shall display chat.
80. Rooms shall display who commented in the chat.

Website

88. Website shall display username.
89. Website shall display the user's account information.
90. Website shall show how we can be contacted.
91. Website shall show invites.
93. Website shall show the user's most preferred genres/artists.

94. Website shall give the option to continue or cancel creation of the room.
95. Website shall allow user to send invitation link to rooms
99. Website shall show available public rooms.

Priority 2:

Unregistered Users

6. Unregistered Users shall be able to get access to technical support.
14. Registered Users shall be able to get access to technical support.

Registered Users

Host

32. Registered Users as hosts of a room shall be able to disable sharing
33. Registered Users as hosts shall be able to set a limit to the number of users in the room.
34. Registered Users as host of a room shall be able to kick a user out of the room.

Room

46. Registered Users shall be able to change the background theme of the room.

Friends

52. Registered Users shall be able to add friends.
53. Registered Users shall be able to DM a friend.
54. Registered Users shall be able to see their friends list.
55. Registered Users shall be able to remove friends.
56. Registered Users shall be able to block friends.

Chat

50. Registered Users shall be able to create group chat.
51. Registered Users shall be able to text in group chat.

Rooms

81. Rooms shall prompt the voting system.

Website

96. Website shall display DMs
97. Website shall show the list of added friends.
98. Website shall display the number of SYNC friends the user has
100. Website shall show the history of rooms the users have been in.
101. Website shall show exported playlists.
102. Website shall be able to allow users to like playlists.
103. Website shall be able to allow users to add to the list of favorite playlists.

Priority 3:

Registered users

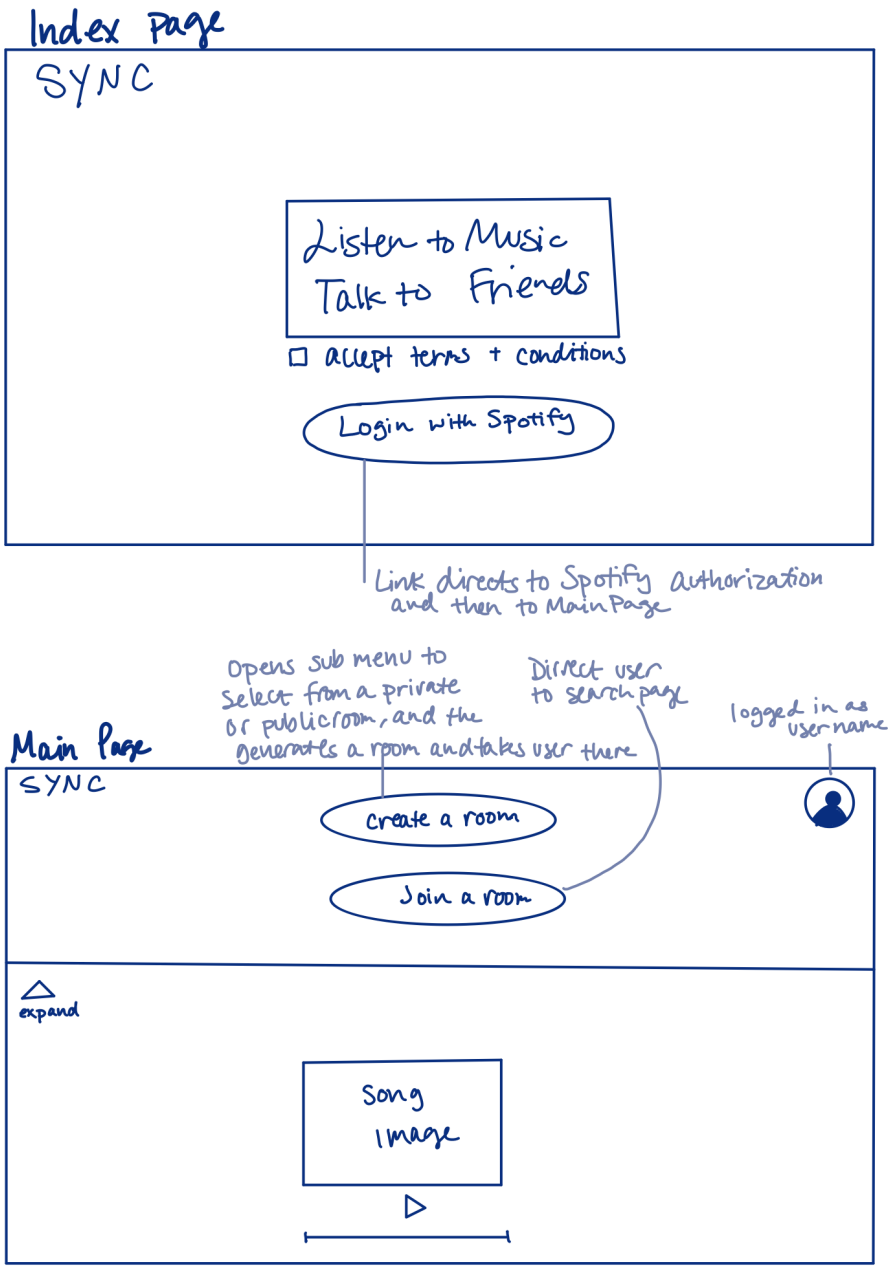
General

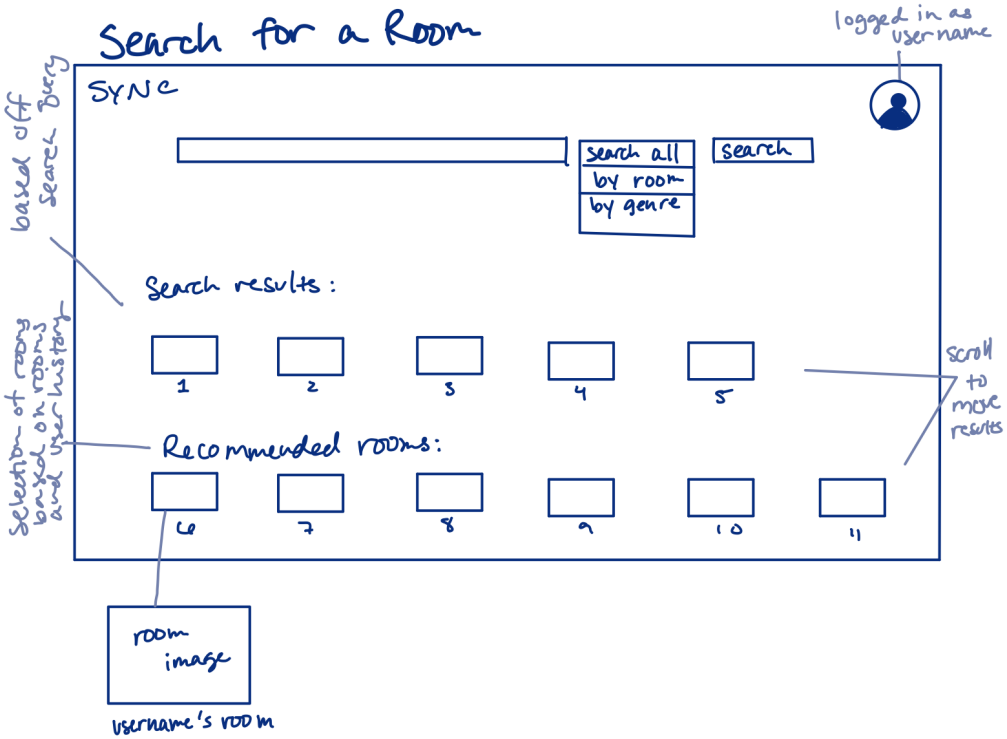
15. Registered Users shall be able to export the playlist of the room.
16. Registered Users shall be able to edit their SYNC profile.
17. Registered Users shall be able to change their SYNC usernames.
18. Registered Users shall be able to change their SYNC profile picture.
19. Registered Users shall be able to change any information under the Profile page.
20. Registered Users shall be able to change status offline.
21. Registered Users shall be able to change status online.
22. Registered Users shall be able to report other users for misconduct.
23. Registered Users shall be able to share a room link though social media.
24. Registered Users shall be able to share link through Direct Message
25. Registered Users shall be able to share link through email

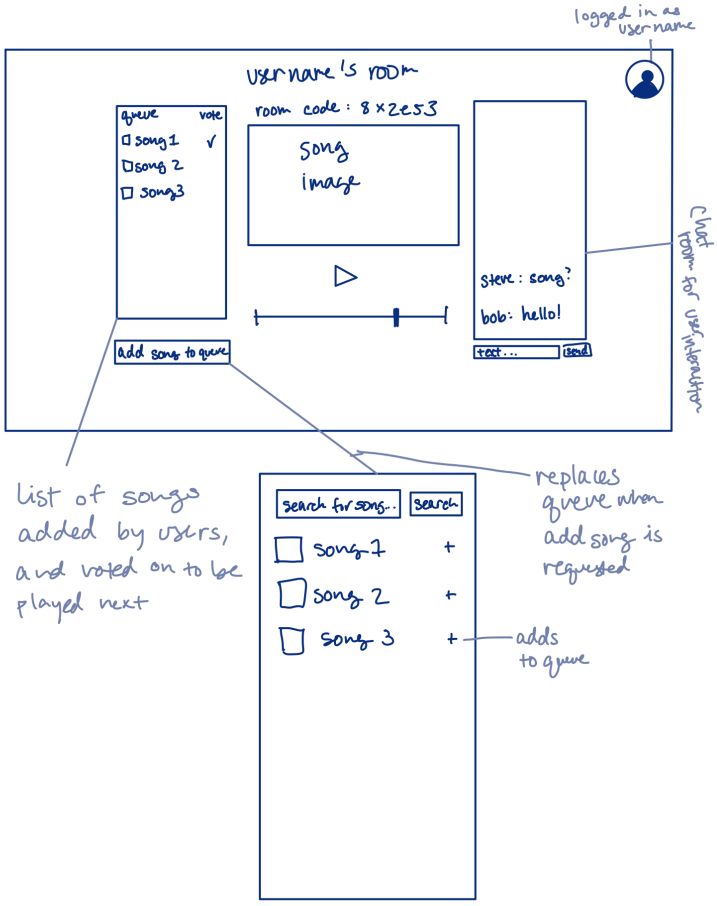
Website

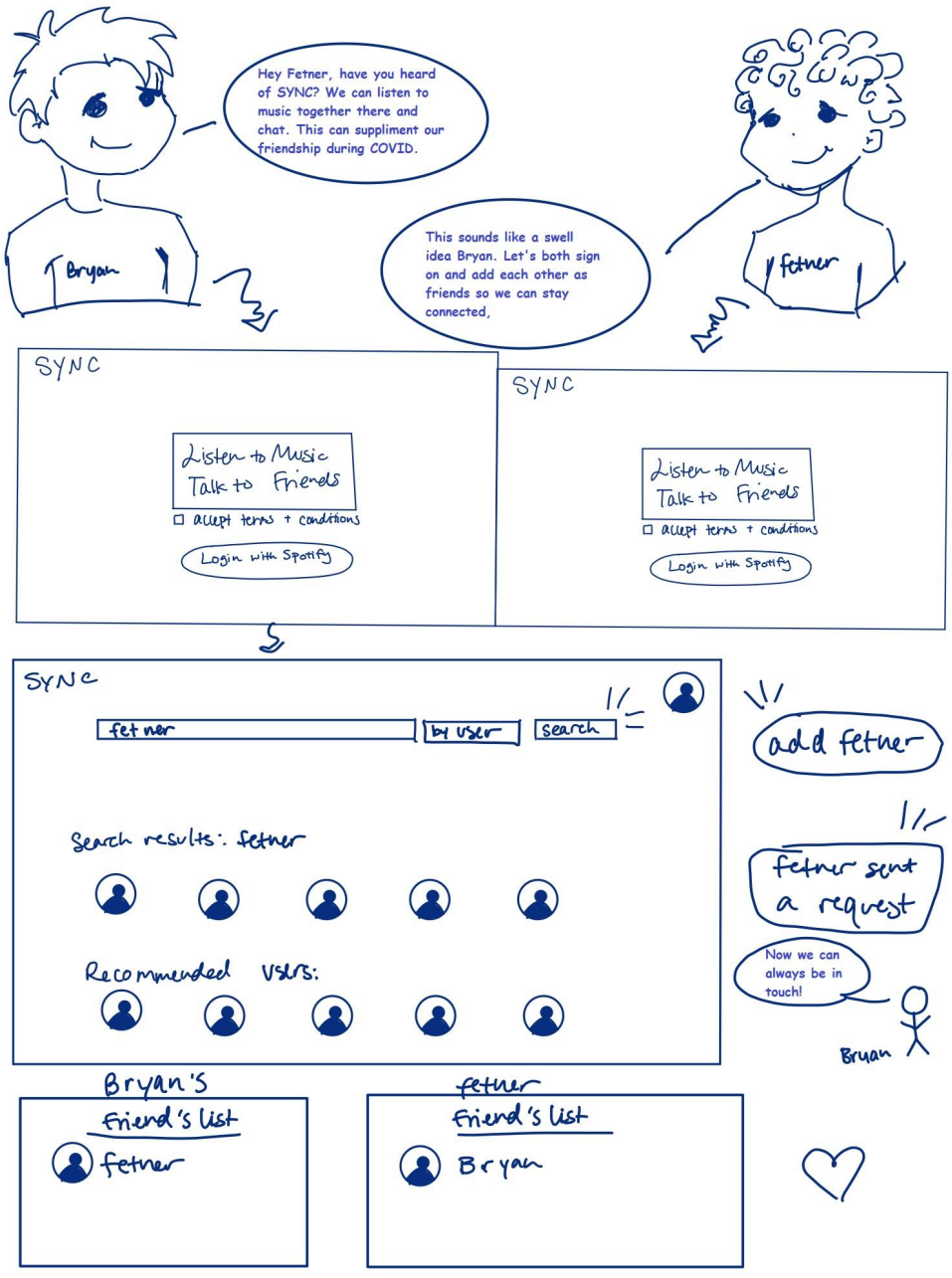
87. Website shall have a technical support page.
92. Website shall send notifications
104. Website shall have premiers of podcast
105. Website shall have premiers of song drops
106. Website shall have premiers on album drops

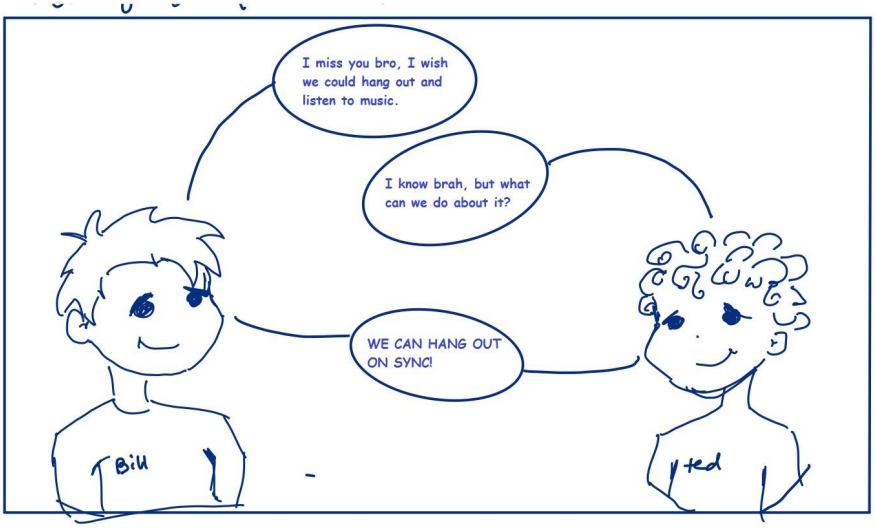
3. UI Mockups and Storyboards

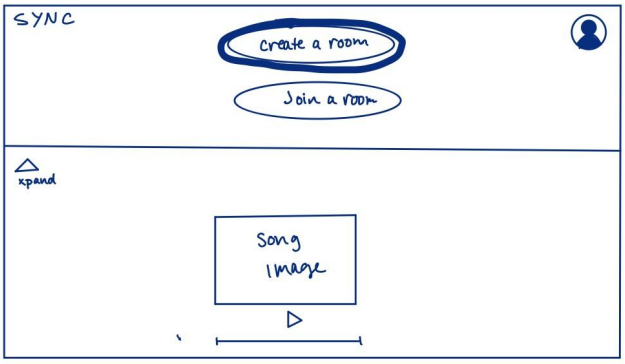


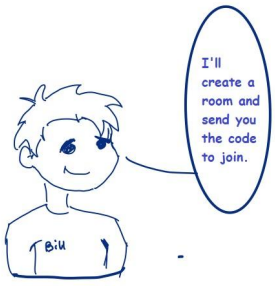

Search for a Room
logged in as username
SYNC
search all
by room
by genre
search
based off search query
Search results:
1
2
3
4
5
scroll to more results
selection of rooms based on rooms and user history
Recommended rooms:
6
7
8
9
10
11
room image
username's room


logged in as username
username's room
room code: 8x2e53
queue
vote
song1
song 2
song3
song image
steve: song?
bob: hello!
text...
send
add song to queue
chat room for user interaction
list of songs added by users, and voted on to be played next
search for song...
search
song 1
song 2
song 3
replaces queue when add song is requested
adds to queue

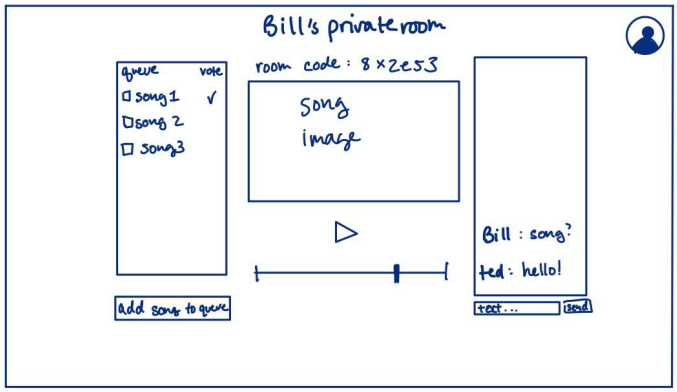

Hey Fetner, have you heard of SYNC? We can listen to music together there and chat. This can suppliment our friendship during COVID.
Bryan
This sounds like a swell idea Bryan. Let's both sign on and add each other as friends so we can stay connected,
fetner
SYNC
Listen to Music
Talk to Friends
accept terms + conditions
Login with Spotify
SYNC
Listen to Music
Talk to Friends
accept terms + conditions
Login with Spotify
SYNC
fetner
by user
search
Search results: fetner
Recommended users:
add fetner
fetner sent a request
Now we can always be in touch!
Bryan
Bryan's
Friend's list
fetner
fetner
Friend's list
Bryan

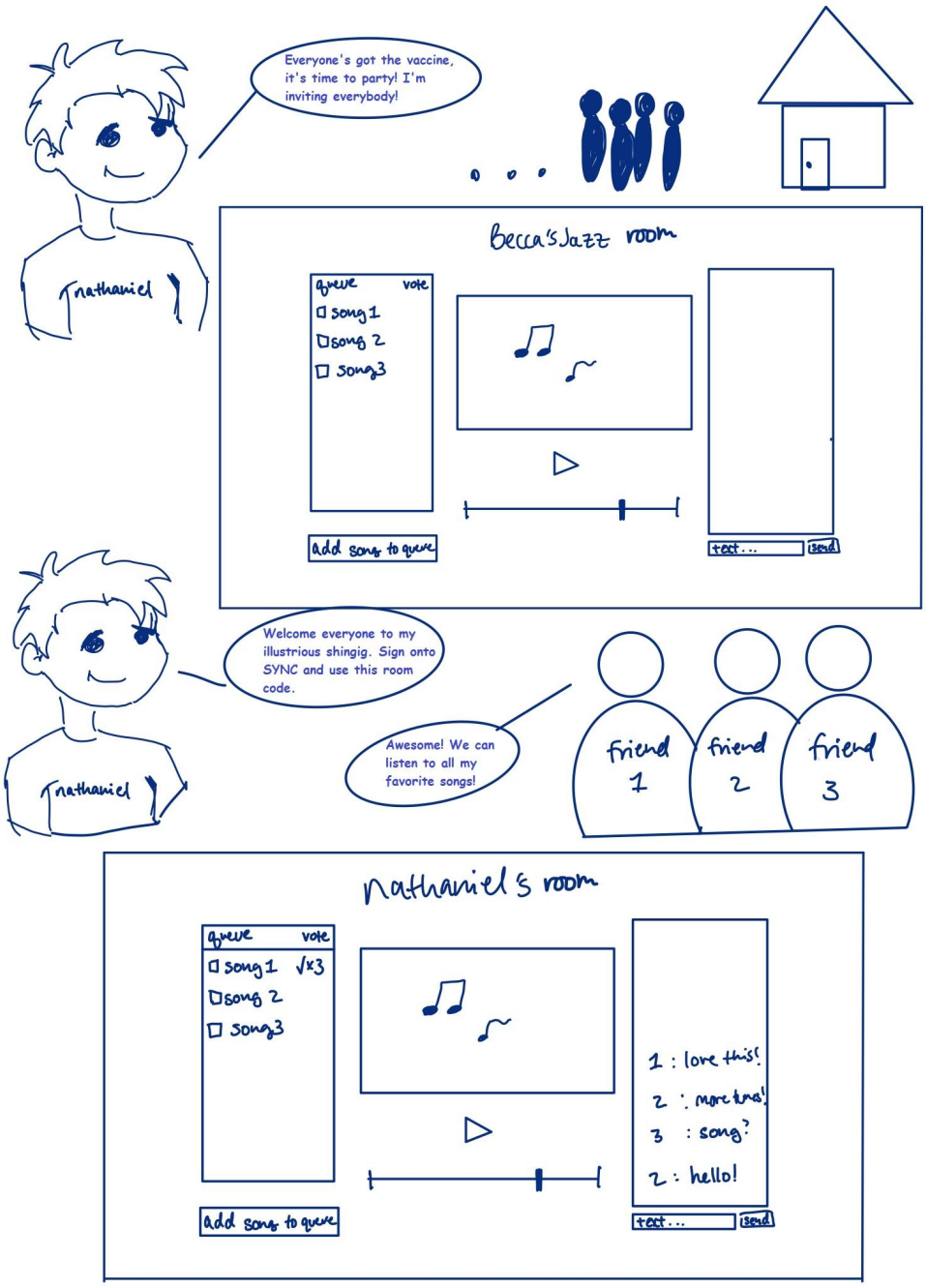

I miss you bro, I wish we could hang out and listen to music.
I know brah, but what can we do about it?
WE CAN HANG OUT ON SYNC!
Bill
ted

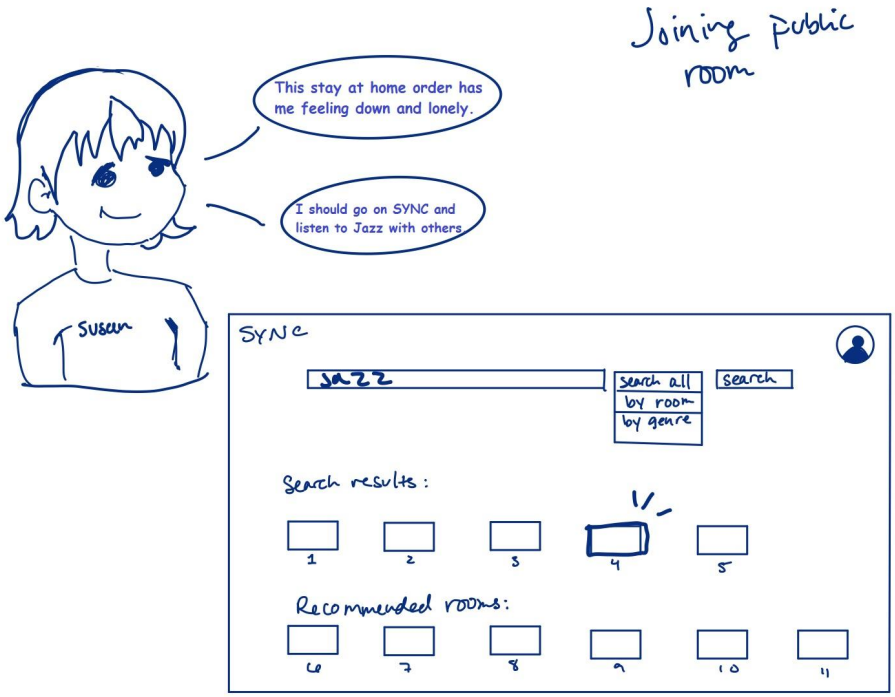

SYNC
create a room
Join a room
xpand
Song image

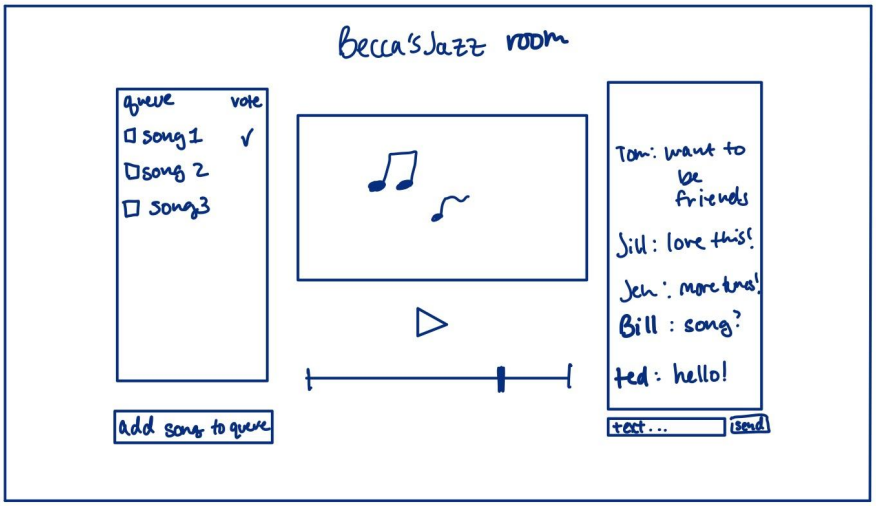

I'll create a room and send you the code to join.
Bill

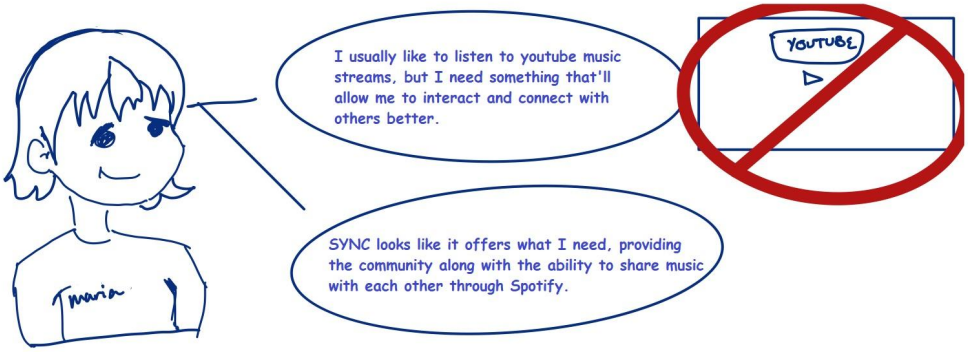

Bill: ~~~
Sweet, now we can hang!
ted

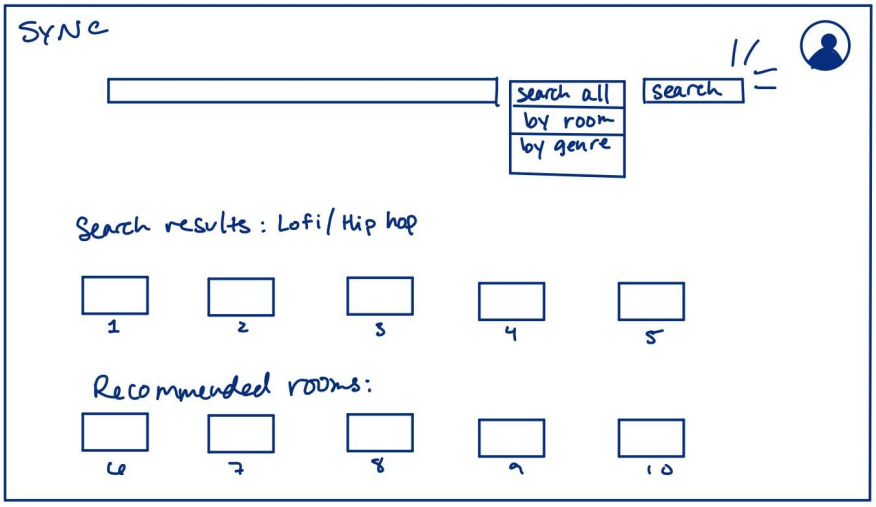

Bill's private room
queue
vote
song 1
song 2
song 3
room code: 8x2e53
Song image
Bill: song?
ted: hello!
text...
send
Add song to queue

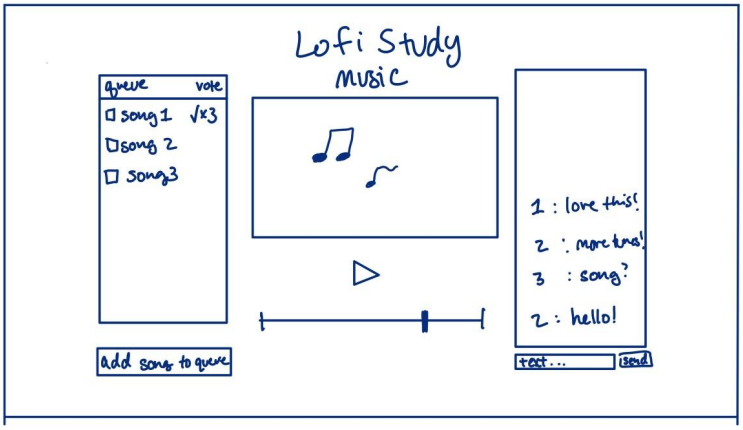

Everyone's got the vaccine, it's time to party! I'm inviting everybody!
nathaniel
Becca's Jazz room
queue
vote
song 1
song 2
song 3
Add song to queue
text...
send
Welcome everyone to my illustrious shingig. Sign onto SYNC and use this room code.
Awesome! We can listen to all my favorite songs!
friend 1
friend 2
friend 3
nathaniel's room
queue
vote
song 1 √x3
song 2
song 3
Add song to queue
1 : love this!
2 : more tmrs!
3 : song?
2 : hello!
text...
send


Joining public room
This stay at home order has me feeling down and lonely.
I should go on SYNC and listen to Jazz with others.
Susan
SYNC
Jazz
Search all
by room
by genre
Search
Search results:
1
2
3
4
5
Recommended rooms:
6
7
8
9
10
11


Becca's Jazz room
queue
vote
song 1
song 2
song 3
add song to queue
Tom: want to be friends
Jill: love this!
Jen: more tea!
Bill: song?
ted: hello!
text...
send


I usually like to listen to youtube music streams, but I need something that'll allow me to interact and connect with others better.
YOUTUBE
SYNC looks like it offers what I need, providing the community along with the ability to share music with each other through Spotify.
Maria


SYNC
search all
by room
by genre
search
Search results : Lofi / Hip hop
1
2
3
4
5
Recommended rooms:
6
7
8
9
10


Lofi Study
music
queue
vote
song 1 √x3
song 2
song 3
add song to queue
1 : love this!
2 : more lofi!
3 : song?
2 : hello!
text...
send

4. High level database architecture and organization

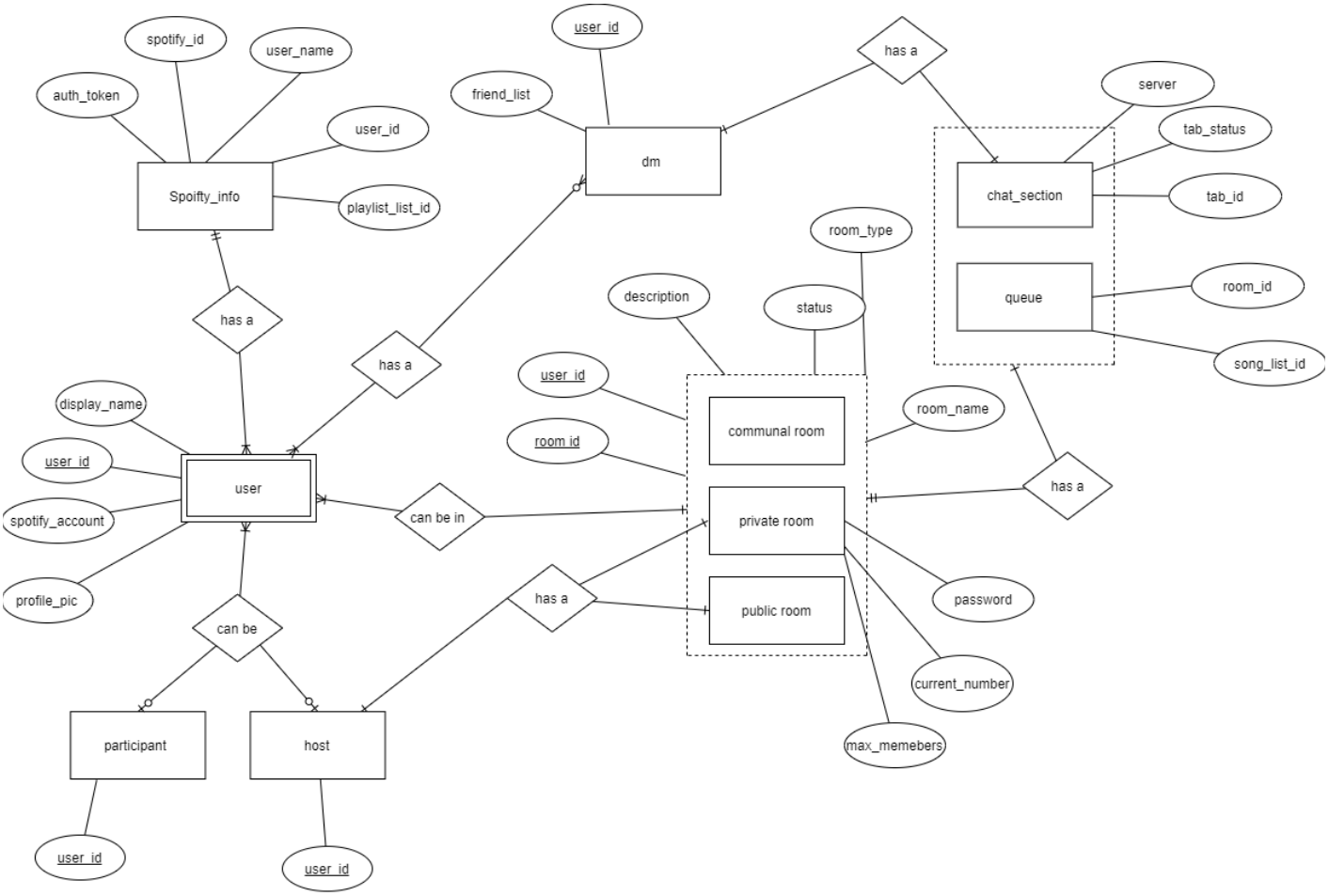
The DBMS we chose to create our database is MySQL because it is easy to understand and some of us have experience with it; it is an organized and widely used DBMS.

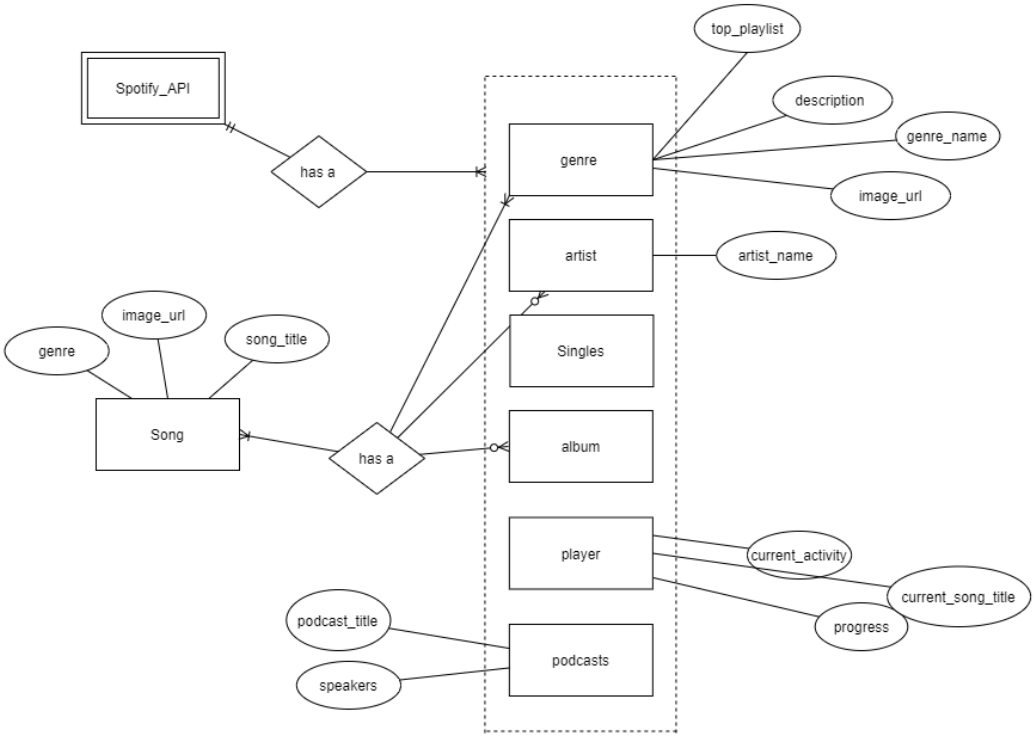
1. **User (strong)**
    a. Unregistered Users can log into their Spotify Premium.
    b. Unregistered Users can access the homepage of the website.
    c. Registered Users can listen to music in real time in the rooms
    d. Registered User can be a participant
    e. Registered User can be a host
    f. Registered Users have a profile with their name
    g. Registered Users have a profile with their profile picture
    h. Registered Users have a profile with their spotify account.
    i. Registered Users shall be able to change status offline.
    j. Registered Users shall be able to change status online.
    k. Registered User has spotify information stating authorization token
    l. Registered User has spotify information stating a spotify id
    m. Registered User has spotify information stating a user name
    n. Registered User has spotify information stating a user id
    o. Registered User has spotify information stating a playlist id
    p. Registered Users shall be able to share link through Direct Message
    q. Registered Users shall be able to share link through email
    r. Registered Users shall be able to logout.
    s. Registered Users can create a public room
    t. Registered Users can create a private room
    u. Registered Users will be provided with a communal room after they first log in.
    v. Registered Users can join public
    w. Registered Users can join private
    x. Registered Users shall be able to search a public room.
    y. Registered Users shall be able to search a private room.
    z. Registered Users shall be able to invite people to their room.
    aa. Registered Users who created a room shall be able to choose what song to play.
    bb. Registered Users in a room shall be able to choose the next song to play in the room.
    cc. Registered Users that create a room shall be able to close the room.
    dd.

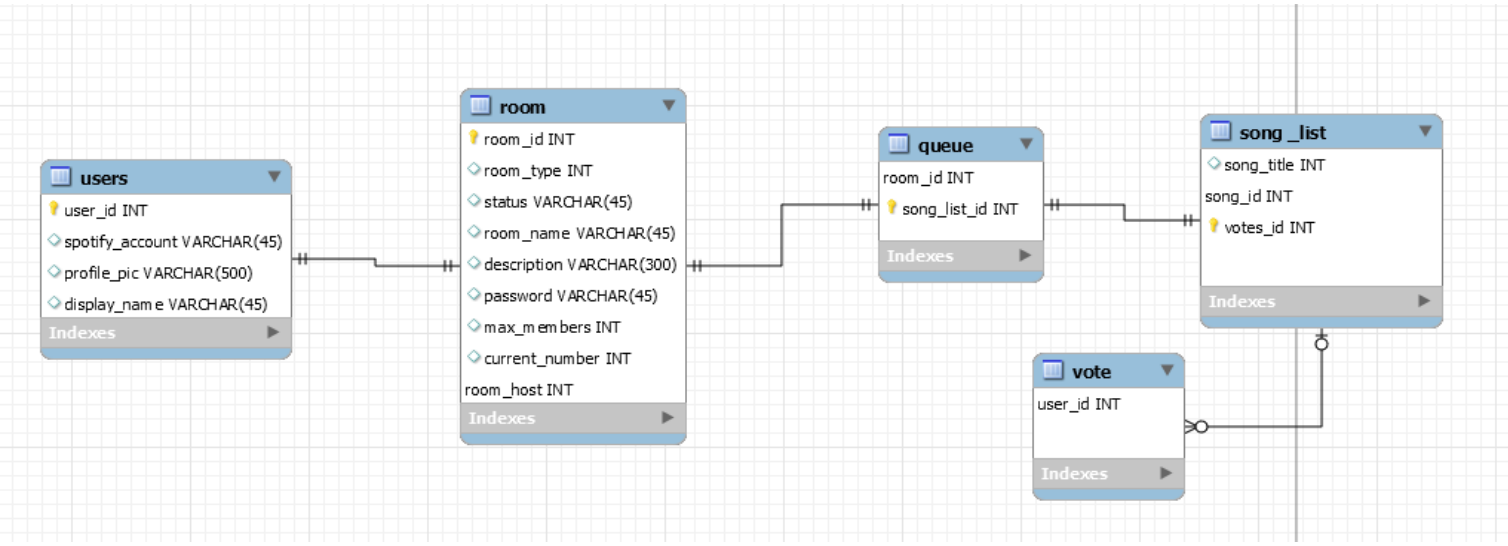
2. **Rooms (weak)**
    a. Rooms shall display the room name.
    b. Rooms shall display if they are public or private.
    c. Rooms shall display the hostname.
    d. Rooms shall display the current song.
    e. Rooms shall display the song queue.
    f. Rooms shall display genre.
    g. Rooms shall display chat.
    h. Rooms shall display who commented in the chat.
    i. Rooms shall prompt the voting system.
3. **Host (weak)**
    a. Registered Users that creates a room will be the host of the room
    b. Registered Users as hosts have control of the room like generating playlists, naming the room etc.
4. **Friends (weak)**
    a. Registered Users shall be able to add friends.
    b. Registered Users shall be able to remove friends.
    c. Registered Users shall be able to block friends.
    d. Registered Users can chat with friend through direct message option
5. **Chat (weak)**
    a. Registered Users can chat in all room types.
    b. Registered Users can chat with people who joined in their created room.
    c. Registered Users shall be able to text in group chat.

1. **User (strong)**
    - User_id: strong key, numeric
    - spotify_id: weak key, numeric
    - profile_pic: weak
    - Display_name: alphanumeric
2. **Rooms (weak)**
    - room_type : alphanumeric
    - room_id : strong key, numeric
    - room_name : multivalue, alphanumeric
    - description : multivalue, alphanumeric
    - current_song :alphanumeric
    - room_host : alphanumeric
    - password : weak key, numeric
    - status : key, numeric
    - max_members : key, numeric
    - Current_number: key, numeric

3. **Host (weak)**
    - Host_id: strong key, numeric
4. **Chat (weak)**
    - tab_id : strong key, numeric
    - tab_status : key, numeric
    - server : key, numeric
5. **Profile:** It has the information describing the registered user.
    - user_id: strong key, numeric
    - activity : key, numeric
    - profile_photo:
    - status :key, numeric
6. **Spotify_API**
    - connectivity : key, numeric
    - current_song_title : alphanumeric
    - progress : key, numeric
    - song_title : multivalue, alphanumeric
    - artist : multivalue, alphanumeric
    - image_url : multivalue, alphanumeric
    - genre : multivalue, alphanumeric
    - album : multivalue, alphanumeric
    - artist_name : multivalue, alphanumeric
    - songs : multivalue, alphanumeric
    - album : multivalue, alphanumeric
    - image_url :multivalue, alphanumeric
    - genre_name : multivalue, alphanumeric
    - description : multivalue, alphanumeric
    - top_playlist : multivalue, alphanumeric


spotify_id
user_name
auth_token
user_id
Spoifty_info
playlist_list_id
has a
user_id
friend_list
dm
has a
server
tab_status
chat_section
tab_id
room_type
queue
room_id
song_list_id
description
status
has a
user_id
room_name
communal room
room id
display_name
user_id
user
spotify_account
can be in
private room
has a
profile_pic
has a
public room
password
can be
current_number
max_memebers
participant
host
user_id
user_id


top_playlist
Spotify_API
description
genre_name
has a
genre
image_url
artist
artist_name
image_url
genre
song_title
Singles
Song
has a
album
player
current_activity
current_song_title
progress
podcast_title
podcasts
speakers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Indexes
song _list
song_title INT
song_id INT
votes_id INT
Indexes
vote
user_id INT
Indexes

5. High Level API and Main Algorithms

Requirement:

React -> Next.js + Django -> Firebase -> Vercel or Amplify

With Vercel, you can deploy Serverless Functions, which are pieces of code written with backend languages that take an HTTP request and provide a response. You can use Serverless Functions to handle user authentication, form submission, database queries, custom slack commands, and more.

Next.js is a framework from Vercel for React, which makes deployment easy. It supports API Routes, which allow you to build your API without leaving your Next.js app.

APIs:

Spotify Web API endpoints return JSON metadata about music artists, albums, tracks, playlists and user's behavior. We will import these info to our mySQL database to process and improve using experience.

Firebase is an API that lets developers easily store data in realtime, which is essential for our app because we are creating a technology that would sync many Spotify's users. Developers can use the service(Firebase) to build their apps without having to manage servers or write server-side code. Firebase will help us manage users' interaction on the website in real time. Keep in mind we still use mySQL to store and query data that does not need to be in real time.

RoomManager is an API that helps users interact with the room they are in and everyone in that room. RoomManager takes authToken and returns the query from the database. RoomManager handles both room information and the room's chat section.

ChatManager is an API that helps users send messages to both the public(in a room) and private(direct message). ChatManager takes authToken and receiver address, then returns the query from the firebase database. ChatManager utilizes firebase's functions to exchange data with the database in real time.

NEW API(not on the original technology list):

Algolia is an API that offers Ai powered search engine. When utilizing this API, we will put extra effort into data's structure so that our website can be much better than with just a text search function. This will be the last important priority of the project.

Main Algorithms:

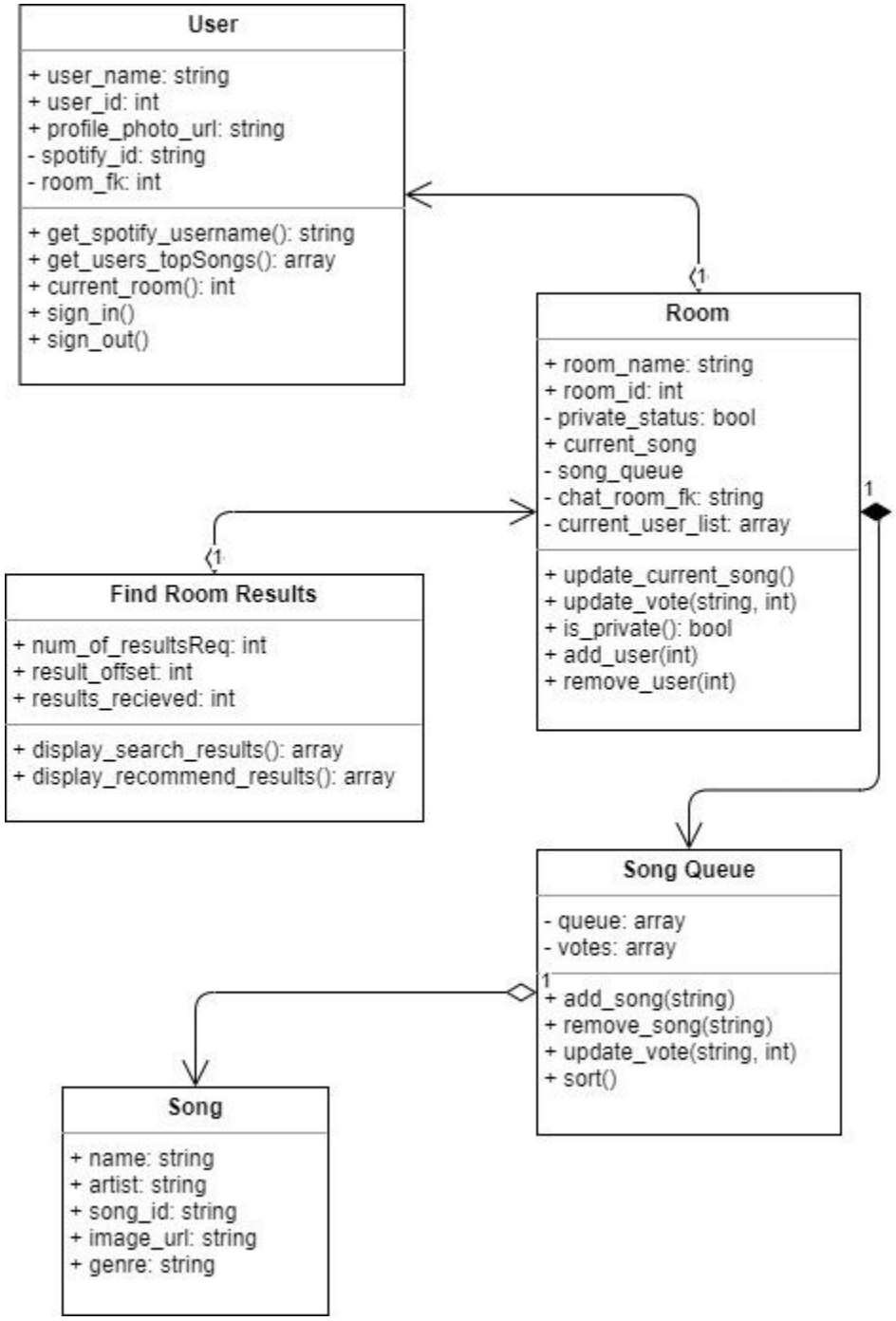
Authentication algorithm: Spotify Web API requires a developer's key which is provided and saved as an .env file on our server. When a user tries to login with a Spotify account, the request gets passed to the Spotify Web API, and the API returns an auth keylink which lasts only for one use section(meaning it will expire if the user goes inactive). Server will save the keylink under the authToken file, which will be a pass to interact on our site. Every function on the website will extract information from a personal authToken file to process.

Search Spotify Data: A Dashboard file will take input, make changes on a TrackSearchResult file every time input from user changes and render related results (from

TrackSearchResult) of current searching input. TrackSearchResult passes the data to Spotify API, returns results to Dashboard and handles selection if the user makes a choice.

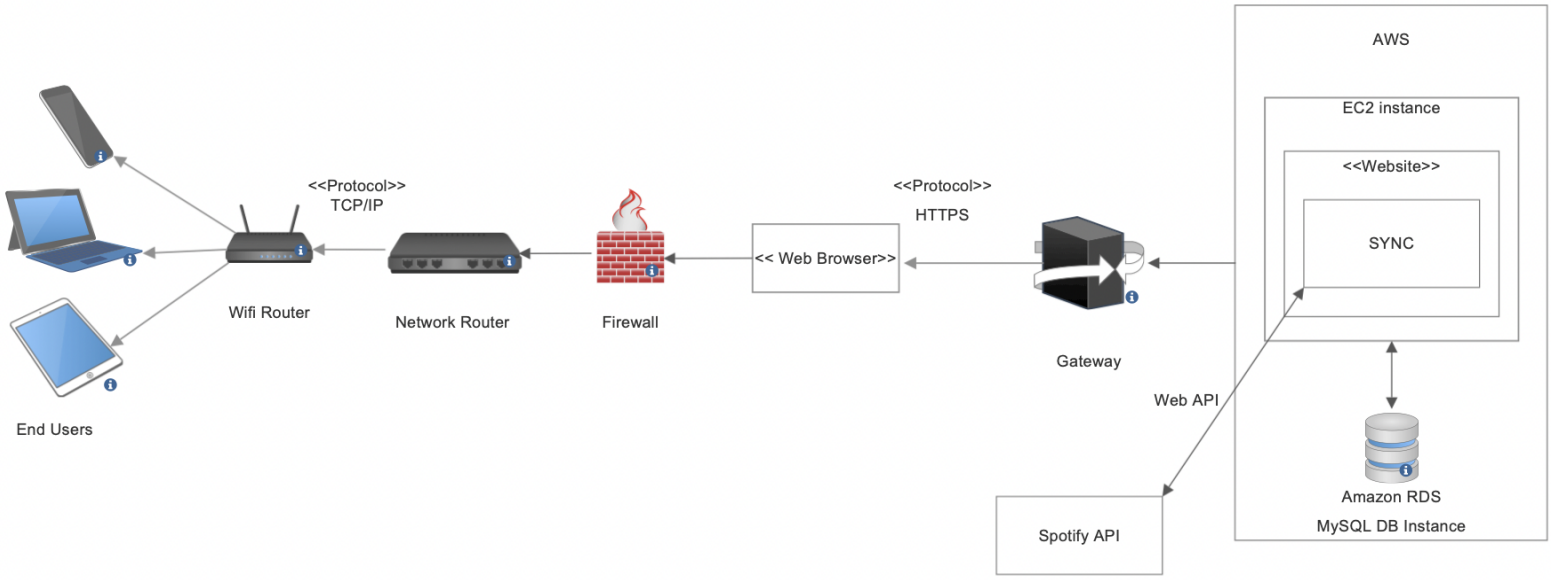
Spotify Web Playback SDK is a client-side JavaScript library which allows you to create a new player in Spotify Connect and play any audio track from Spotify in the browser via Encrypted Media Extensions. This Spotify player will be at the footer of the webpage and keep playing without interruption while users interact on the web.

6. High Level UML Diagrams

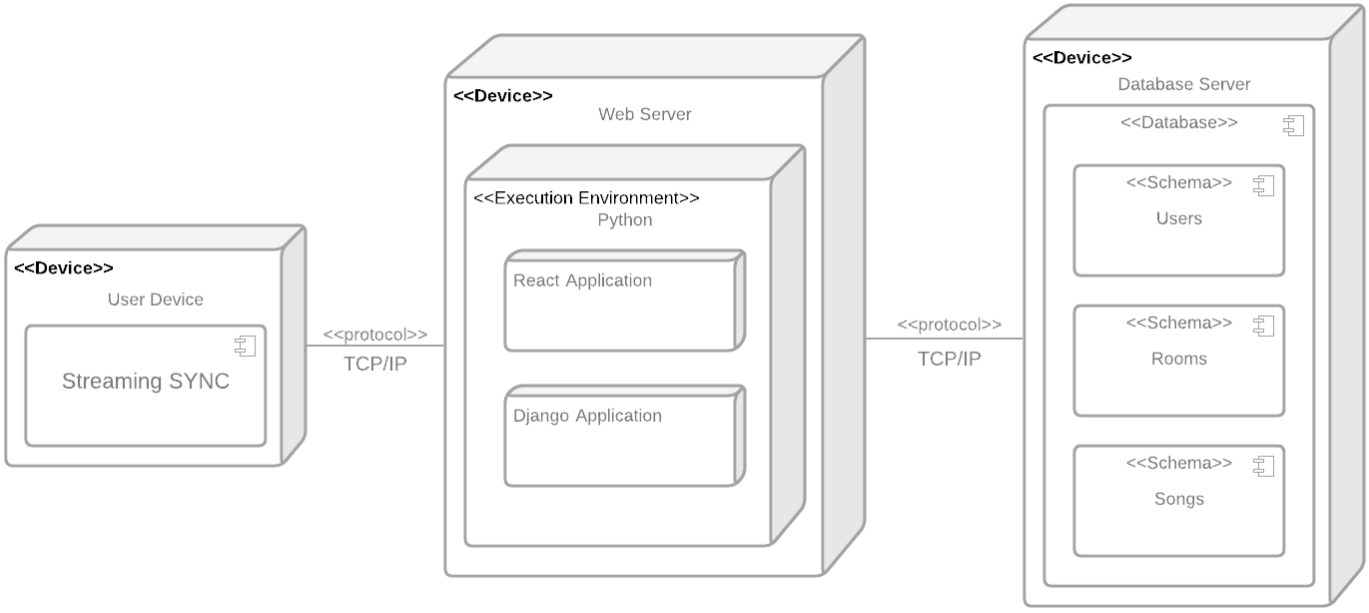


7. High Level Application Network and Deployment Diagrams

Application Network Diagram



Deployment diagram



8. Key Risks for your for project at this time

• Skills Risks - Some of us are new to creating a web application, and also new to the stack suggested by the team, which puts us risks on program development.
Solution: The team is working hard on studying and especially catching up on the stack suggested. Members also communicate most of the time if problems persist.

• Schedule Risks - While we are mostly available on our scheduled meeting times, the schedule risk we have is that some of us live from a different timezone, and some of us work during non-school days.

Solution: We find a common time slot that some of us are available in between the scheduled meeting time and day and work on development together. Moreover, we reach out if there are issues with scheduling, so we can plan ahead.

• Technical Risks - While we want to implement an integrated chat in our web application, we are running with problems on how to properly do a live synced chat, since we are not entirely sure if MySQL will be able to do it smoothly.

Solution: The team is currently working up a possible solution to how this should be implemented correctly. One thing we slightly agreed on is to use Firebase as the chat section's database to support real time messaging.

• Teamwork Risks - A lot of ideas were thrown in on what and how features need to be done, but no actual follow up for it, which adds to the confusion of the current setup.

Solution: We mostly agree on some technical things now and therefore get us focused on just the things required to be done.

• Legal/Content Risks- Since we will be implementing a chat portion in our application, one of the major risks is not being able to filter all messages sent, such as bots, viruses, malicious links, etc.

Solution: A possible solution we can do is filter external links, since that is where most risks will be coming from. Furthermore, we can add a mute chat option and/ or profanity filtering to prevent harassments.

9. Project management

Managing M2 should be done differently than with M1. It should be done with more structure and updates and even more teamwork. Team Lead should clearly state what is to be due and how it should and can be done. Team lead would give out high level tasks with pointers and ideas of how it should be done and divide the work to front and back end lead accordingly. Knowing that the front and back end leads have a better understanding of who is best at what in their respective teams, will assign roles to their members and report to the team lead. Throughout every step and every accomplishment even small should be reported to front and back end lead and then team lead. Zoom meetings would occur twice a week to have verbal affirmation, but side voice meetings though discord can and should be done with smaller teams periodically why teams needed to meet up for updates.

In theory this is a great way to keep everyone on track but it is now how it went. To improve for the next milestone, Team Lead plans to implement the steps above by enforcing with hard written deadlines to be checked off. This is going to be done through Trello with an integrated Trello bot on our discord server. I use trello in my other class team and it is quite unsuccessful. Members do not look at it including myself. I've noticed though that in both teams, people are quick to check discord. With the integration of a trello bot, I can see trello being successful and useful. Reading and understanding the milestone early with set tasks to be done accordingly can reduce time wasted and make our team more efficient for the next milestone.

10. Detailed list of contributions

Team Lead, Document Master	Rebecca Zumaeta	Assisted in writing various sections or documentation. Assigned tasks to members on team and became available when needing feedback/guidance. Guided member in tasks to be done for vertical prototype. Set and hosted all meetings, kept in contact with every member.
Front End Lead, Document Assistant, mediator	Bryan Fetner	Built a react front end with Malcom and Hirva. Also built a front in django, which is reflected on deployed sites. Built out and wrote sections 6 and 3 but assisted in many other sections such as 1 and 2. Attended all meetings for the entirety of the time and continuously held conversation. Spoke out when passionate but open to other ideas when conversing with the team.
Back End Lead, Document contributor	Luong Dang	Build working versions of sites using Spotify API and other functions we would use later in development. Entirely wrote out section 5.Attended all meeting and contributed to conversation when felt most knowledgeable of subject matter. When asked for suggestion gave great concepts and ideas for other members to bounce from.
Front End Member Document contributor	Malcolm Angelo De Villar	Assisted to part 8, 2 and 1 of the document. Assisted in designing and building the front end of the site that is deployed. Attended all meetings and gave input when he seemed best knowledgeable about the subject. Put out work when asked and continuously checked with the team when making decisions.
Front End Member	Hirva Patel	Build majority of Front end with Malcolm. Assisted in connecting front end to back with Ashwini. Attended all meetings and contributed to the conversation when she felt best fit and

		was passionate about the subject. Reported back to the team when she had updates on work and wanted feedback. Took constructive criticism well and worked off of it.
Github Master and back end member Document contributor	Vishakha Tyagi	Assisted Ashwini when possible, reflected back end work and deployment through document. Worked on document in sections 1, 2, and 7. Attended all meetings and gave input when she felt best knowledgeable upon subject and is passionate upon ideas. Checked with other members, especially with team lead, when it comes to making any decisions within documentation.
Back End Member	Ashwini Managuli	Connected back to a front end and was able to deploy. Built out back end using MYSQL workbench (tables and dummy data). Deployed site. Attended all scheduled meetings and contributed into conversation when wanting to share her thoughts and experiences. Adapted quickly to the tasks given to her and put out great work. Was open to feedback and implemented constructive criticism well.