INFO 6210 - Database Design Document

Music Streaming Database - NU Music

Team 2				
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Table of Contents

1. REVISED ENTITY RELATIONSHIP DIAGRAM

When it comes to designing a database, Entity Relationship (ER) diagrams play a big role. Based on the business idea, we have drafted a representation of the ER model for our application containing entities with relations.
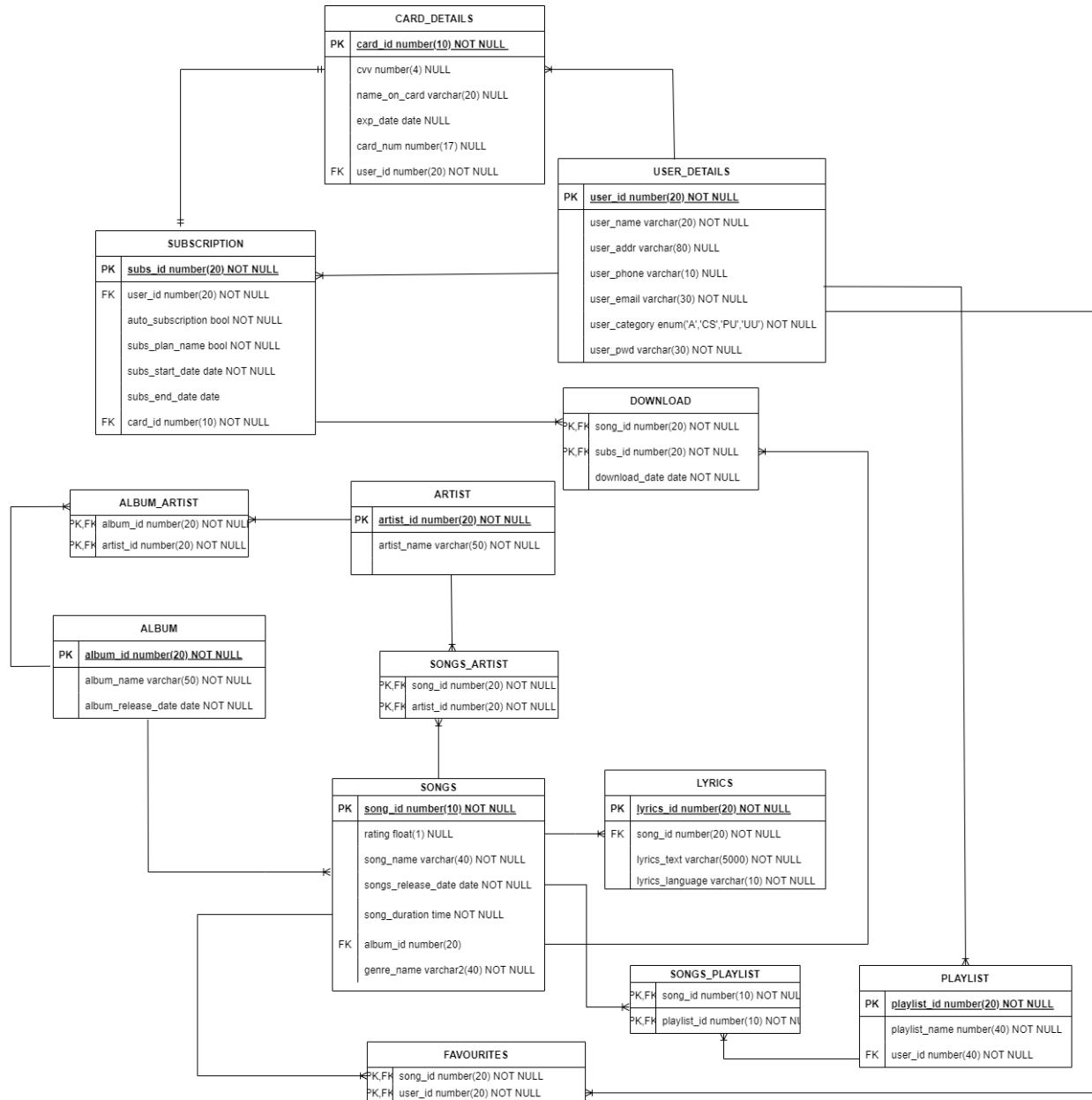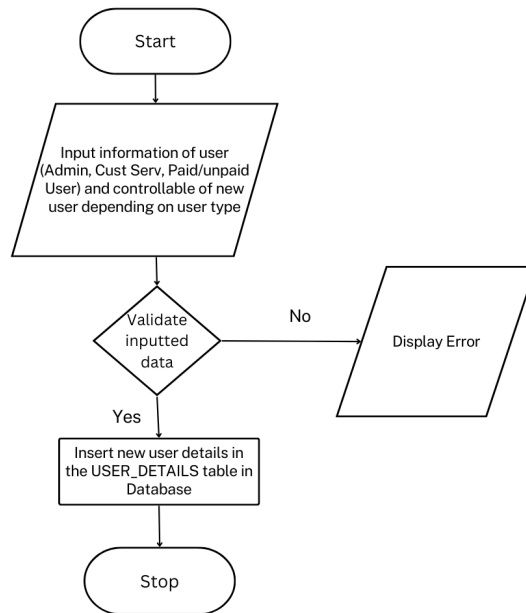
2. BUSINESS RULES

1. Every song will have lyrics. One song can have lyrics in multiple languages.
2. Every song doesn't have to be part of an album. There can be singles which aren't associated with any albums.
3. There will only be two types of subscriptions- Paid and Free. We will distinguish between them using subs_plan_name which is a bool value with 1 meaning paid subscription and 0 meaning free subscription.
4. Every new user making an account will automatically be considered to have a free subscription model.
5. One user account can have multiple cards associated with it. Each card can only belong to one user account.
6. Users will only be able to download songs if they have a paid subscription model.
7. Every user account (paid and free) will have only one favorite playlist.
8. If auto subscription is marked true for a user, the subscription model for the user presently will automatically be renewed for the next billing cycle. If the user is on a free model, and he doesnt change to a paid subscription, the same subscription type continues.
9. Each user account can create multiple custom playlists, but each playlist belongs to only one user.
10. Each playlist can have multiple songs, and each song can belong to multiple playlists.
11. Each user can have multiple favorite songs, and each song can be put into favorites by multiple users.
12. Each artist can have multiple albums, and each album can have multiple artists.
13. Each artist can have multiple songs, and each song can have multiple artists.
14. Each album can have multiple songs, but each song belongs to only one album.
15. One User can only download a particular song once but one song can be downloaded by multiple users.
16. The users (paid and unpaid) don't have the functionality to upload music. Music upload will be done by the backend team.

3. VIEWS

1. vw_Song_artist- A view to show all the songs details and their corresponding artist names
2. vw_Popular_songs- A view to show the most popular songs based on the number of times they've been downloaded
3. vw_Playlist_songs - A view to show all the songs in a specific playlist
4. vw_Album_details- A view to show album details
5. vw_Songs_by_album- A view to show songs in a particular album
6. vw_user_favourite_songs- A view to show a user's favorite songs
7. vw_auto_subs- A view to show all the users who have auto-renewal on
8. vw_songs_with_lyrics_in_language- A view to show songs with lyrics in a specific language
9. vw_user_subscription_with_card_details- A view to show the user's card details and their associated subscription
10. vw_popular_artists- A view to show the most popular artists

4. DFD (Data Flow Diagrams)

- **User Registration:** The user provides their personal details, including email address, and password to register for an account.

```
                    ┌──────────┐
                    │   Start  │
                    └────┬─────┘
                         │
              ┌──────────▼──────────┐
             /  Input information of  \
            /  user (Admin, Cust Serv, \
            \  Paid/unpaid User) and   /
             \ controllable of new    /
              \ user depending on    /
               \ user type          /
                └────────┬─────────┘
                         │
                    ◇ Validate ◇       No
                    ◇ inputted ◇ ──────────►  [Display Error]
                    ◇   data   ◇
                         │ Yes
              ┌──────────▼──────────┐
              │ Insert new user      │
              │ details in the       │
              │ USER_DETAILS table   │
              │ in Database          │
              └──────────┬──────────┘
                         │
                    ┌────▼─────┐
                    │   Stop   │
                    └──────────┘
```

- **User Login:** The different users logs into their account using their credentials
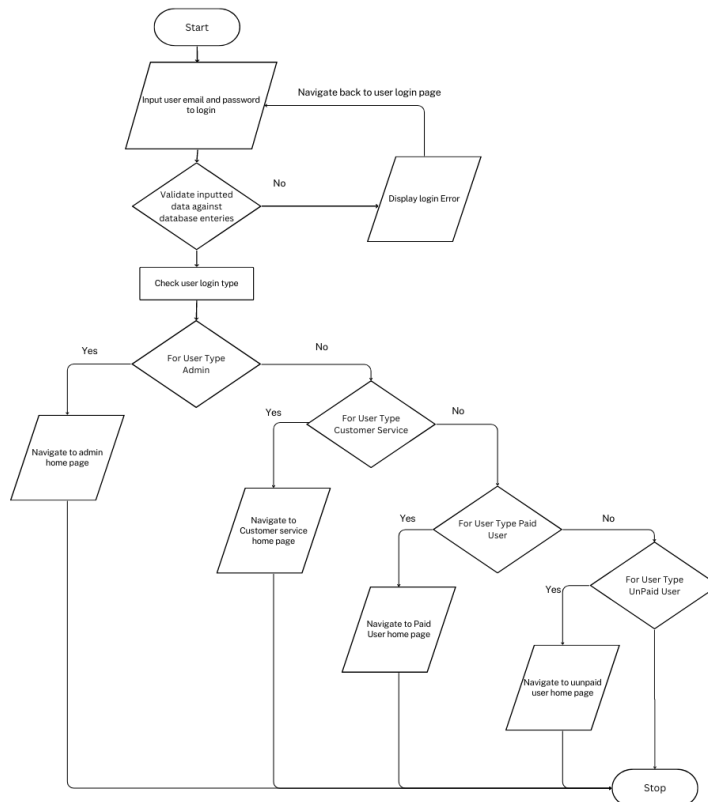
- **Music Discovery:** Users can search for music based on genre, artist name, album name, or song title.

```
                      ┌─────────┐
                      │  Start  │
                      └─────────┘
                           │
                           ▼
               ╱────────────────────────╲
              ╱  User Search for Music    ╲
             ╱  (Genre, album, artist or   ╲
              ╲     song_title)            ╱
               ╲──────────────────────────╱
                           │
                           ▼
                        ◇─────◇                  No      ┌──────────────┐
                       ╱   If  ╲ ──────────────────────▶ │ Display error│
                       ╲ Found ╱                         └──────────────┘
                        ◇─────◇                                  │
                           │  Yes                                │
                           ▼                                     │
               ╱────────────────────────╲                       │
              ╱  Platform displays the    ╲                      │
               ╲    matching results      ╱                      │
                ╲────────────────────────╱                       │
                           │                                     │
                           ▼                                     │
               ╱────────────────────────╲                       │
              ╱     User selects the      ╲                      │
               ╲        results           ╱                      │
                ╲────────────────────────╱                       │
                           │                                     │
                           ▼                                     │
              ┌──────────────────────────┐                      │
              │  Platform displays details│                      │
              │    about the result       │                      │
              └──────────────────────────┘                      │
                           │                                     │
                           ▼                                     ▼
               ╱────────────────────────╲          ┌─────────┐
              ╱    User add song to       ╲────────▶│  Stop   │
               ╲    created playlists     ╱          └─────────┘
                ╲────────────────────────╱
```
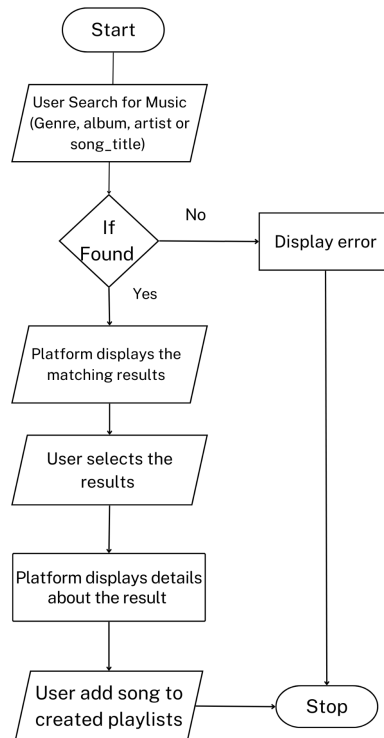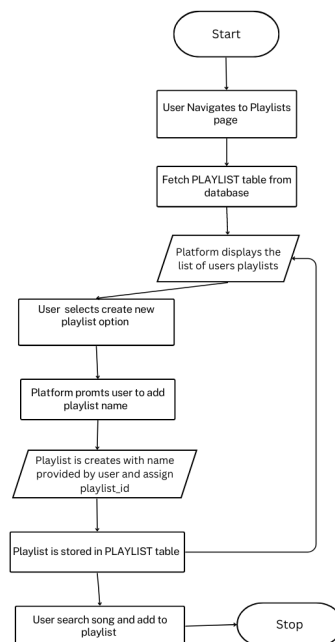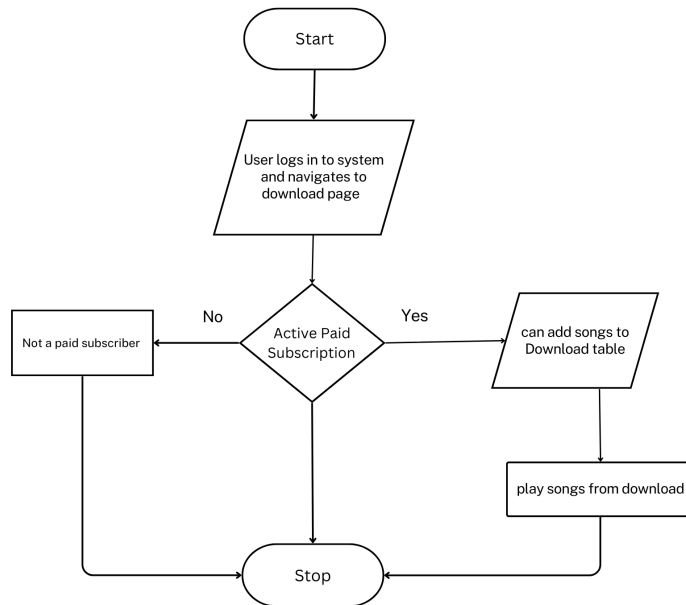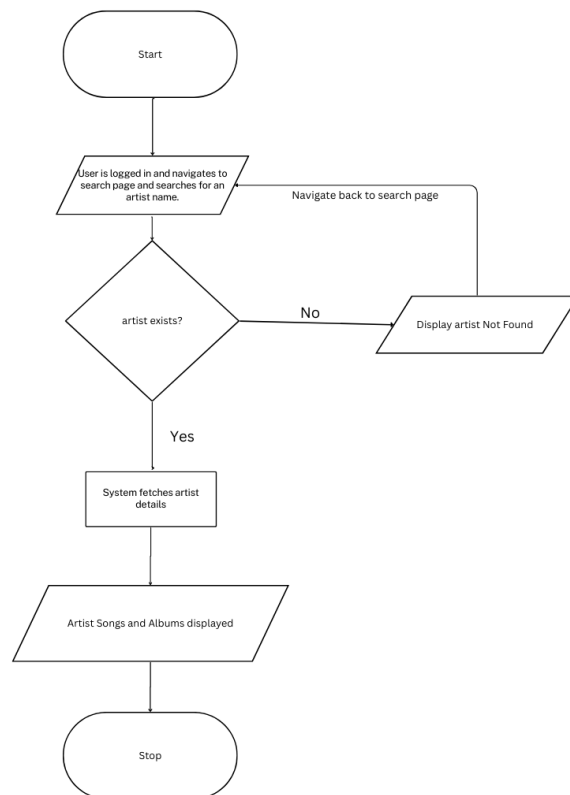
- **Create Playlist:** Users can create and manage their own playlists.

```
                      ┌─────────┐
                      │  Start  │
                      └─────────┘
                           │
                           ▼
               ┌──────────────────────────┐
               │ User Navigates to Playlists│
               │          page             │
               └──────────────────────────┘
                           │
                           ▼
               ┌──────────────────────────┐
               │  Fetch PLAYLIST table from │
               │        database           │
               └──────────────────────────┘
                           │
                           ▼
               ╱────────────────────────╲
              ╱   Platform displays the   ╲
               ╲  list of users playlists ╱
                ╲────────────────────────╱
                           │
                           ▼
               ┌──────────────────────────┐
               │ User selects create new   │
               │    playlist option        │
               └──────────────────────────┘
                           │
                           ▼
               ┌──────────────────────────┐
               │ Platform promts user to add│
               │     playlist name         │
               └──────────────────────────┘
                           │
                           ▼
               ╱────────────────────────╲
              ╱  Playlist is creates with ╲
             ╱  name provided by user and  ╲
              ╲    assign playlist_id      ╱
               ╲────────────────────────╱
                           │
                           ▼
               ┌──────────────────────────┐
               │ Playlist is stored in     │
               │      PLAYLIST table       │
               └──────────────────────────┘
                           │
                           ▼
               ┌──────────────────────────┐        ┌─────────┐
               │ User search song and add to│──────▶│  Stop   │
               │        playlist           │        └─────────┘
               └──────────────────────────┘
```

- **Download Songs** : User can download songs if they have a paid subscription.

Start

User logs in to system and navigates to download page

Active Paid Subscription

No — Not a paid subscriber

Yes — can add songs to Download table

play songs from download

Stop

- **Artist Management:** The user can view artists and their associated songs/albums.

Start

User is logged in and navigates to search page and searches for an artist name.

Navigate back to search page

artist exists?

No — Display artist Not Found

Yes

System fetches artist details

Artist Songs and Albums displayed

Stop

- **User Management:** The admin can view and manage user accounts, including their personal information, subscription plans, and payment details.
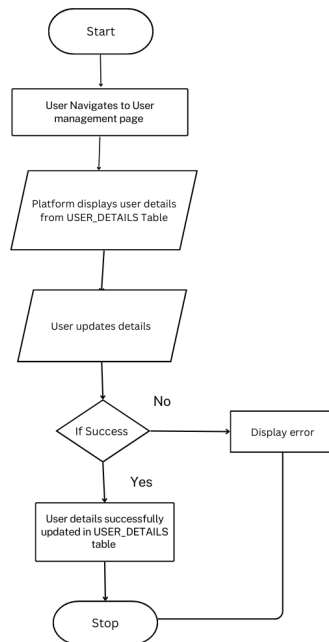

- **Music Management:** The admin can view and manage music files, including their metadata, upload dates, and statistics.
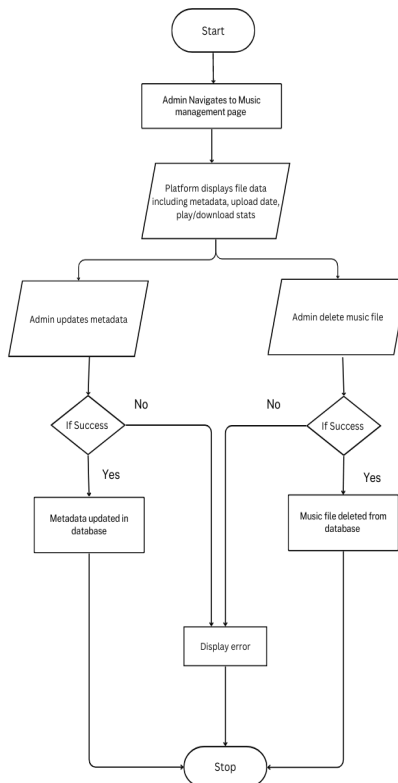
- **Favorite Management:** The logged in user can search for songs and add to favorites.

Start

User is logged in and navigates to search page and searches for a song name.

Navigate back to search page

song exists?

No → Display Song Not Found

Yes

Song displayed

User can add the song to favourites playlist

System updates favourites tables

Stop
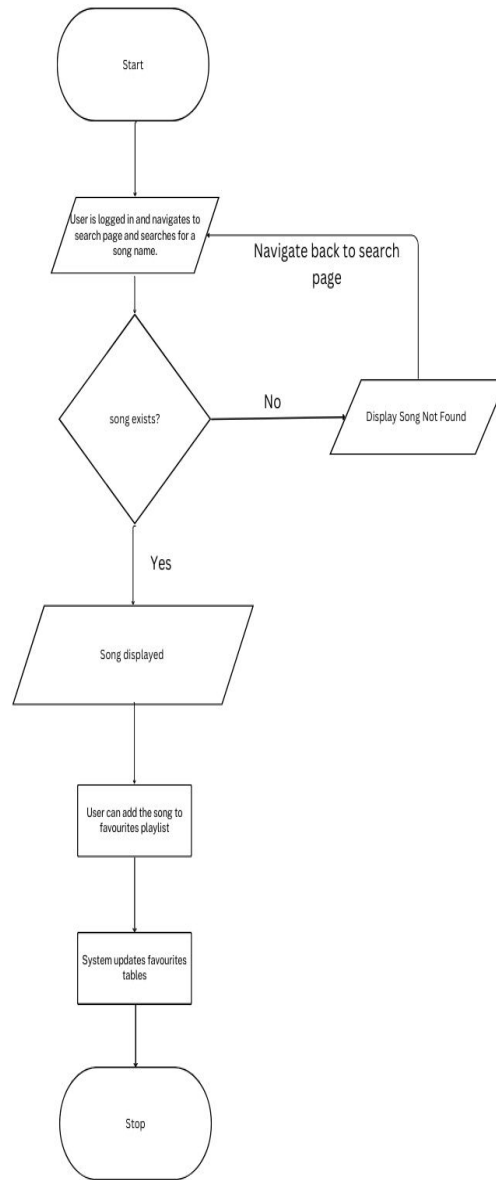
- **Subscription Management:** The logged in user can choose from different subscription plans to update or not update the subscription plan and manage which card to use for the payment.
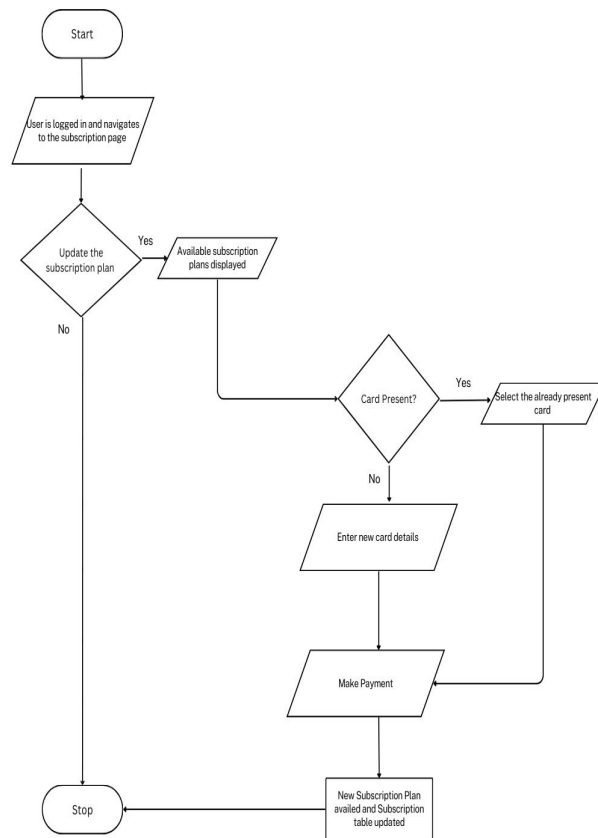
5. SECURITY (User level access, permissions)
Please refer to the sheet below for security roles

⊞ SECURITY ROLES- ASSIGNMENT 2