Department of Computer Science and Engineering

Islamic University of Technology (IUT)

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Musify: Bangla Music Streaming Platform

SWE 4602: Software Design And Architecture

Submitted By	Submitted To
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Introduction

The music industry has been rapidly evolving with the rise of digital platforms, making it easier for musicians to share their talent and for music lovers to discover new artists. However, there is still a gap in the market for a music streaming platform that exclusively caters to the Bangla music industry in Bangladesh. This is where our platform, Musify, comes in. Musify is a music streaming platform that allows artists to showcase their music and listeners to access their favorite Bangla music. Our platform aims to solve the problem of limited access to Bangla music and provide a seamless and user-friendly experience for music lovers and artists alike.

Usage Scenario

The overall system would be used for music artists and listeners to collaborate to allow listeners to listen to music and artists to display their artistic talents. Here the end-users are 1) Artists 2) Listeners 3) Advertisers, 4) Admin and 5) Payment Processing Partners.

Music Artists

Music artists can sell their music through this platform to music listeners.
Music artists have to sign up first to create an artist profile by either using their google account, facebook account or sign up by filling up information separately. In the sign up phase they would have to fill up some basic information such as : name ,username, email ID, phone no , region etc.Upon providing registration information they will receive a confirmation email in their emails or get an otp in their phone number. After clicking on the confirmation email they will be redirected to a payment portal. In the case of OTP they will get the option to activate the account using the OTP code and then will be redirected to the payment portal. In the payment portal the artist would have to pay a subscription fee to be registered to the system. After completing payment, the artist can log in. To log they will have to provide only email-id and password. In their profile they will be able to change any of their previously added basic information such as password, address except their email-id. They can add any additional email-id if needed.

After going into their profile they will have an option to upload their music. They can only upload the audio version in any valid audio format. After uploading a song, it will be

available for listeners to listen. Artists can see how many times their songs have been listened to or replayed, i.e. stream count.

The artist would be paid based on the stream count. If any payment request, i.e. subscription fee at the term of registration is received, then he/she can pay through an external system (e.g. SSLCOMMERZ, VISA, MasterCard or PayPal). Response from the external system will be recorded in the database. He/She can also store information about how he/she would like to get paid and accordingly based on a monthly stream count he/she would be paid. They can also change the way of payment anytime from their profile.The latest saved method for payment will be used for any sort of payment.

Music Listeners

Music listeners have to sign up first by either using their google account, facebook account or sign up by filling up information separately. In the sign up phase they would have to fill up some basic information such as : name ,username, email ID , phone no , region. Initially they will have a free account which doesn't need any subscription fee.After signing up for the platform they will receive a confirmation email in their emails or get an otp in their phone number. After clicking on the confirmation email they will be redirected to our platform where their account will be activated . In the case of OTP they will get the option to activate the account using the OTP code.
After signing up they will be able to log in again using their email address / username and password. After logging in they will be able to access their profile where they can view or change basic information which they provided. They can change any information and while changing the information they will have to enter their password to confirm the change.
In the profile section there will also be a subscription menu.
Here , for an unsubscribed user there will be an option to subscribe to the platform. Subscription can be monthly or annual. For both sections the user can pay through an external system such as SSLCOMMERZ , card or bank. Response from the external system will be recorded in the database.
For a subscribed user , they will be able to see the duration of their subscription and they can also extend their subscription if they want.
After the signup process a listener will get the option for giving their preferences on song category in the home page. A listener can select many options as their preferred music category.

In their home page the user will get suggestions to their types of songs based on their preferred music category for new users and previous listening experience for old users. They will also get notifications from their favorite artists if they release new content.
There will be options to choose from different kinds of genres.
A listener can search for music by name of the song and the artist. After finding a song, the listener will click on it and go to the music player.
The music player provides the skip current song and go back to previous song option, forward and backward option, and a seek bar. The subscribed user will be able to skip as many songs they want but unsubscribed users cannot skip more than three songs daily.
There will be a ‘add to favorites’ button from where the user can add the current song in their favorites list automatically.
As the song plays, the name of the corresponding album and artist will be shown on the screen. By clicking on the name of the album or artist a listener can browse the album and the artist's other songs.
There will be a ‘share’ option available for the listener. Using this option a listener can share the link of a song to social media. A lyrics option will be available where the song and lyrics will be synced together and shown which part of the song is playing.
Also there will be an option called ‘add to playlist’. Listeners will be able to create new playlists or add songs to existing playlists. Listeners can add different songs in different playlists by their own choice. Subscribers can create more than 5 playlists in their account but unsubscribed users can not do that. A ‘save’ option will also appear where songs can be saved in offline mode for the listener. This feature will only be available for the subscribed listener, an unsubscribed listener can only listen to music in online mode. A playlist can be public or private. Subscribed listeners can have both a public and private playlist but an unsubscribed user can only create a public playlist. A listener can save a public playlist (offline/online) of another listener and share the link on their social media.
A listener can report a specific artist if they find any content from that artist offensive. For further query they will be able to contact the admin panel using the ‘contact us’ option in their corresponding profiles.

Advertisers

The advertisement policy works for the freemium music listeners as they will be subject to different ads, which will generate the revenue from the freemium users. So for the advertisement purpose, we choose google adsense.

Payment Processing Partners

For the payment, we use an external system (e.g. SSLCOMMERZ, Visa Card, Mastercard, PayPal). And they have to pay according to the agreement signed between them and the admins.

Admin

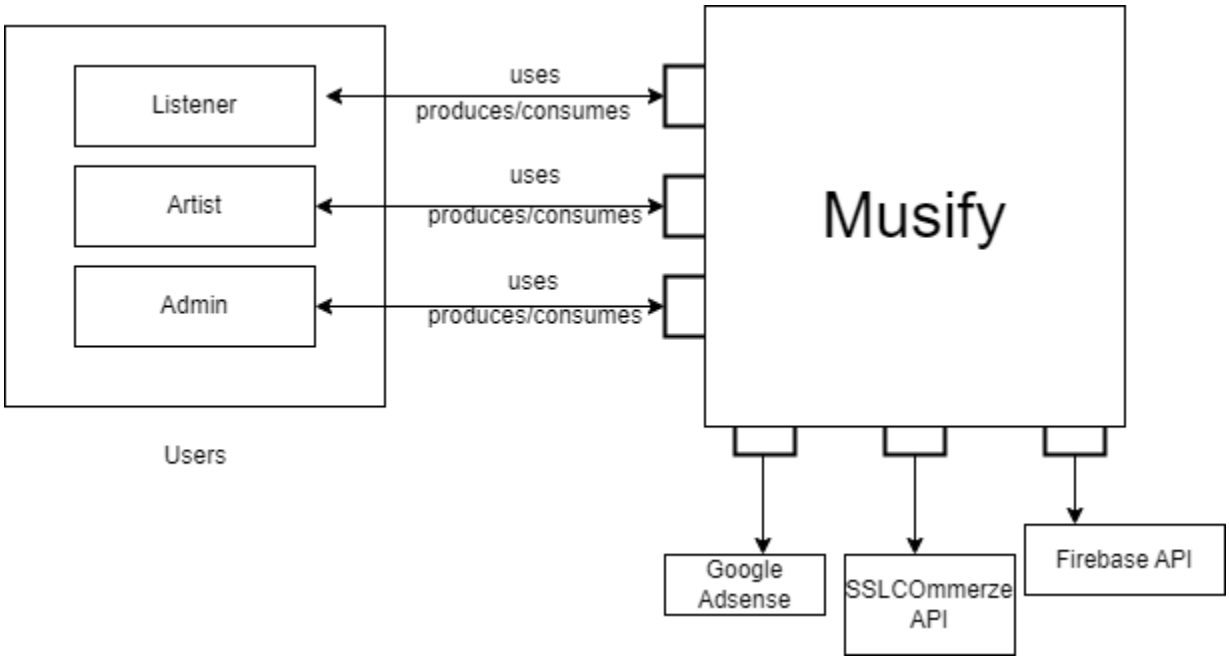
Admin users would be registered in the system. The advertisement would have to be approved by the admin initially so that they can be displayed to the users to deal with inappropriate ads. Furthermore, they would also have the option to deal with ads accordingly by the number of reports to ensure better social integrity.

The admin will also have the authority to ban or remove any artist on the basis of reports from listeners to avoid any sort of inappropriate content. Before completely removing or banning an artist, notifications will be sent to artists to warn them beforehand. After a significant amount of reports are filed against an artist, he/she will be banned from Musify.
The admin can also be contacted by listeners and upon these reports they can notify the respective authorities to act accordingly. The reports to be dealt with include bugs, inappropriate contents etc.

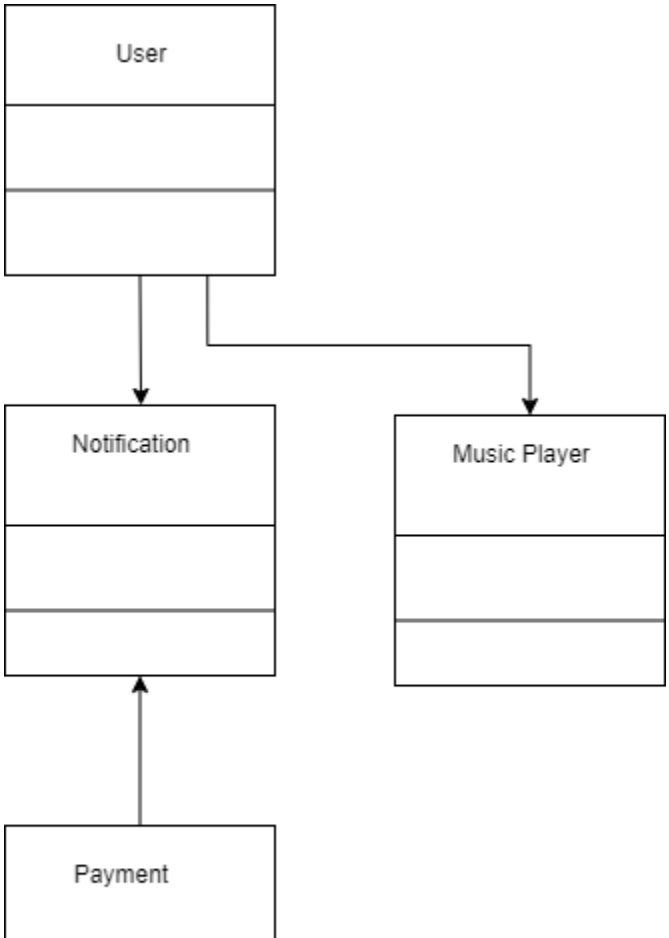
Architectural design:

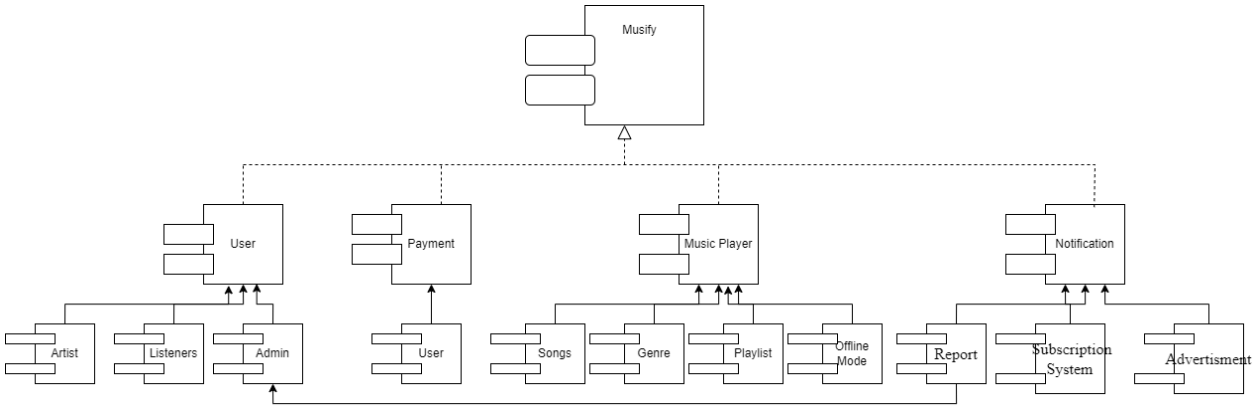
Architectural design represents the structure of data and program components that are required to build a computer-based system. It considers the architectural style that the system will take, the structure and properties of the components that constitute the system, and the interrelationships that occur among all architectural components of a system.
Architectural design is the preliminary blueprint from which software is constructed. To develop the architectural design for Musify app, we have followed the steps given below:
1. Representing the System in Context
2. Defining Archetypes
3. Refining the Architecture into Components

Context Diagram



Archetypes Diagram





Refining Archetype into top-level Component

Component-level design

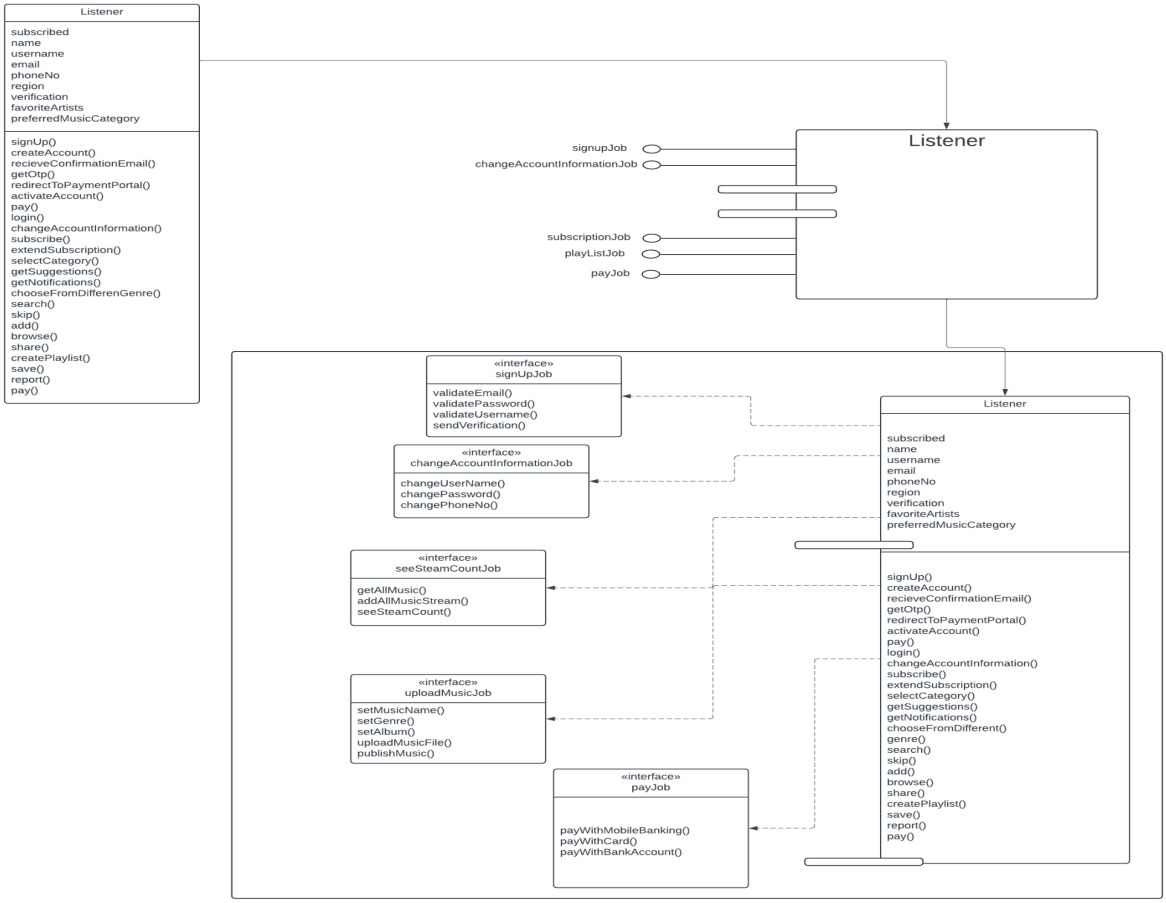
Component-level design occurs after the first iteration of architectural design has been completed. At this stage, the overall data and program structure of the software has been established.

A complete set of software components is defined during architectural design. But the internal data structures and processing details of each component are not represented at a level of abstraction that is close to code. Component-level design defines the data structures, algorithms, interface characteristics, and communication mechanisms allocated to each software component.
The design for each component, represented in graphical, tabular, or text-based notation, is the primary work product produced during component-level design.

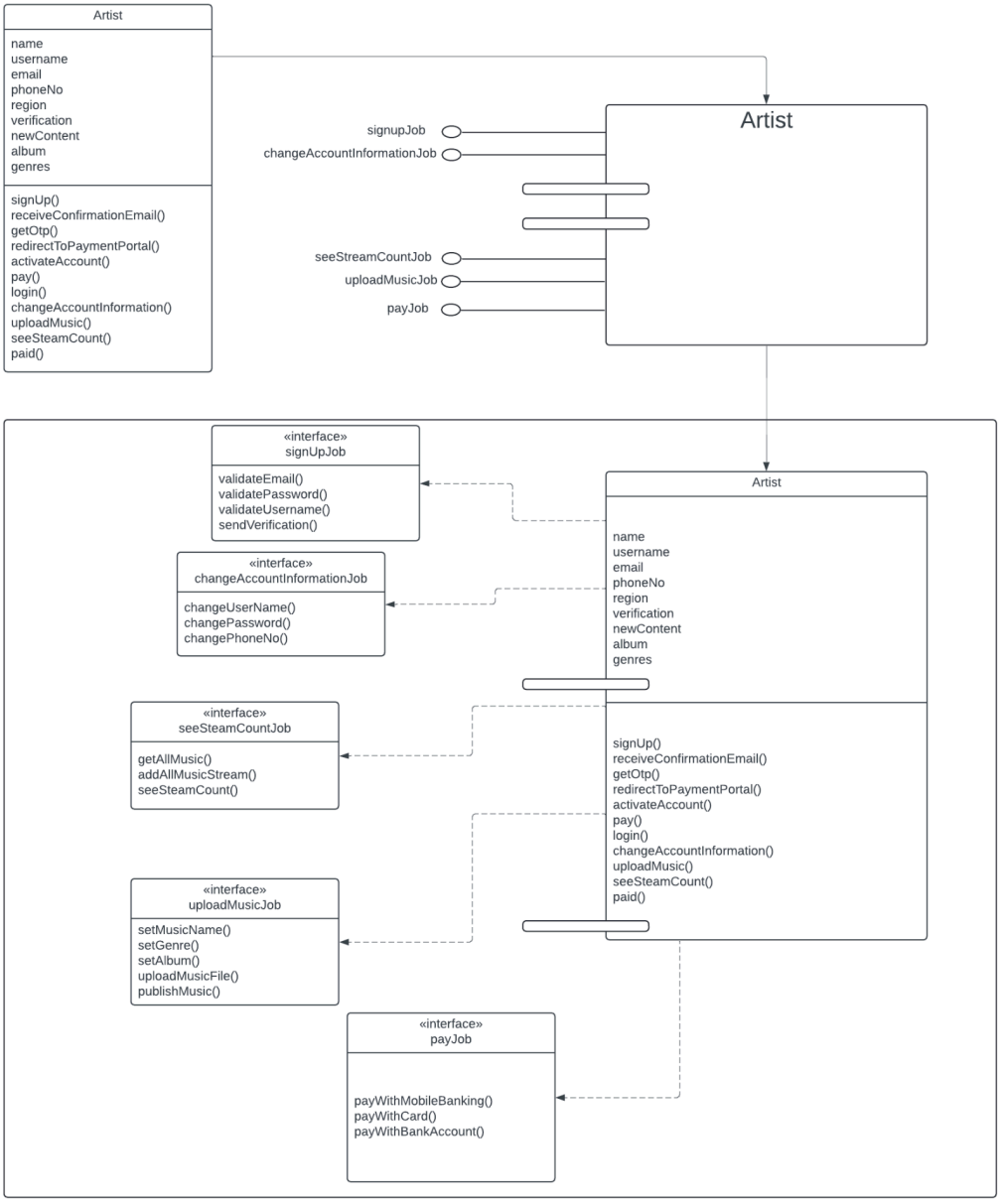
For conducting component level design, we have followed the following steps:
1. Transforming Analysis Class into Design Class
2. Specify message details when classes or components collaborate.
3. Describe processing flow within each operation in detail
4. Develop and elaborate behavioral representations for a class or component.
5. Elaborate deployment diagrams to provide additional implementation details.
6. Refactor every component-level design representation and always consider Alternatives.

Transforming Analysis Class into Design Class

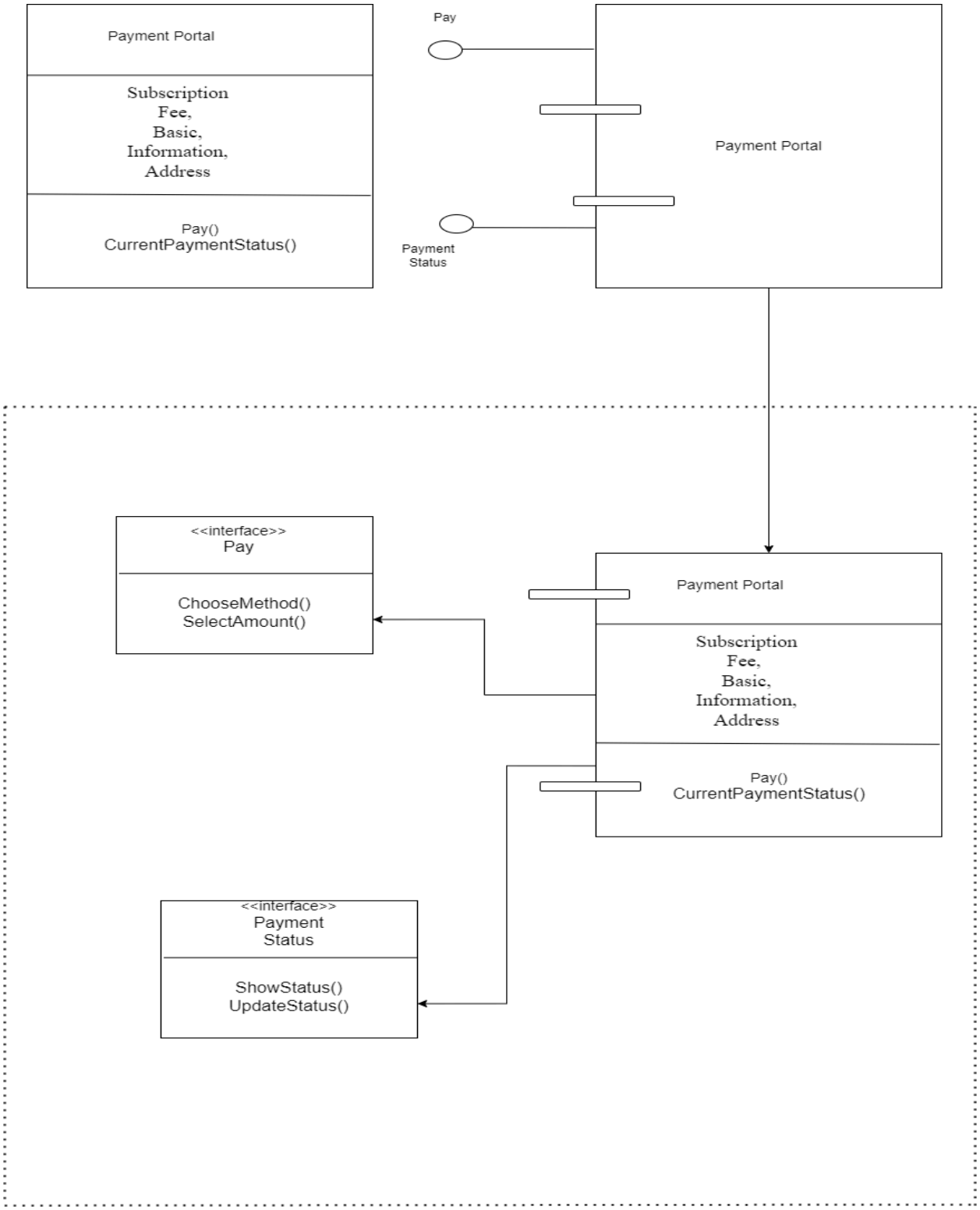
Listener



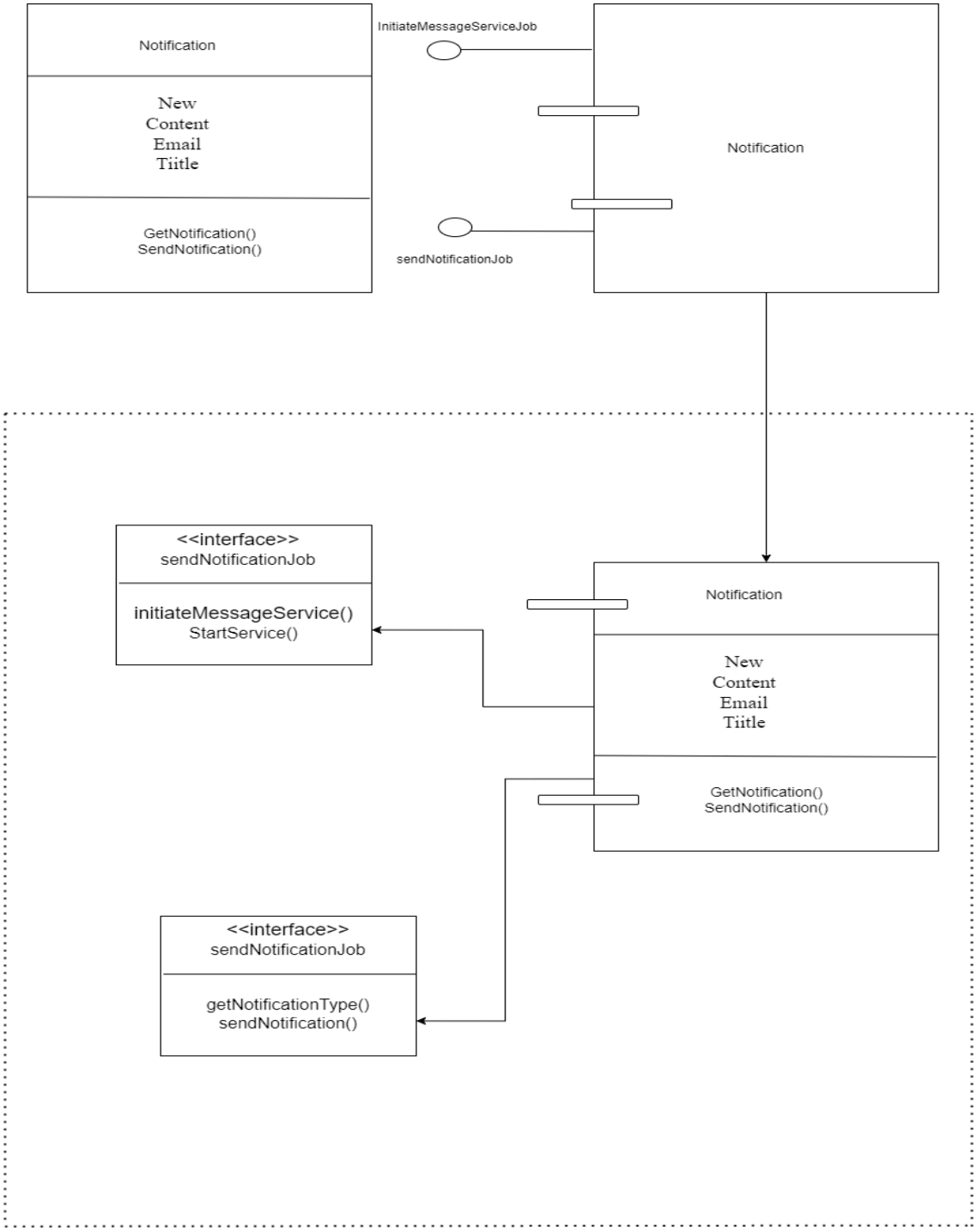
Artist


Artist
name
username
email
phoneNo
region
verification
newContent
album
genres
signUp()
receiveConfirmationEmail()
getOtp()
redirectToPaymentPortal()
activateAccount()
pay()
login()
changeAccountInformation()
uploadMusic()
seeSteamCount()
paid()
Artist
signupJob
changeAccountInformationJob
seeStreamCountJob
uploadMusicJob
payJob
«interface»
signUpJob
validateEmail()
validatePassword()
validateUsername()
sendVerification()
«interface»
changeAccountInformationJob
changeUserName()
changePassword()
changePhoneNo()
«interface»
seeSteamCountJob
getAllMusic()
addAllMusicStream()
seeSteamCount()
«interface»
uploadMusicJob
setMusicName()
setGenre()
setAlbum()
uploadMusicFile()
publishMusic()
«interface»
payJob
payWithMobileBanking()
payWithCard()
payWithBankAccount()
Artist
name
username
email
phoneNo
region
verification
newContent
album
genres
signUp()
receiveConfirmationEmail()
getOtp()
redirectToPaymentPortal()
activateAccount()
pay()
login()
changeAccountInformation()
uploadMusic()
seeSteamCount()
paid()

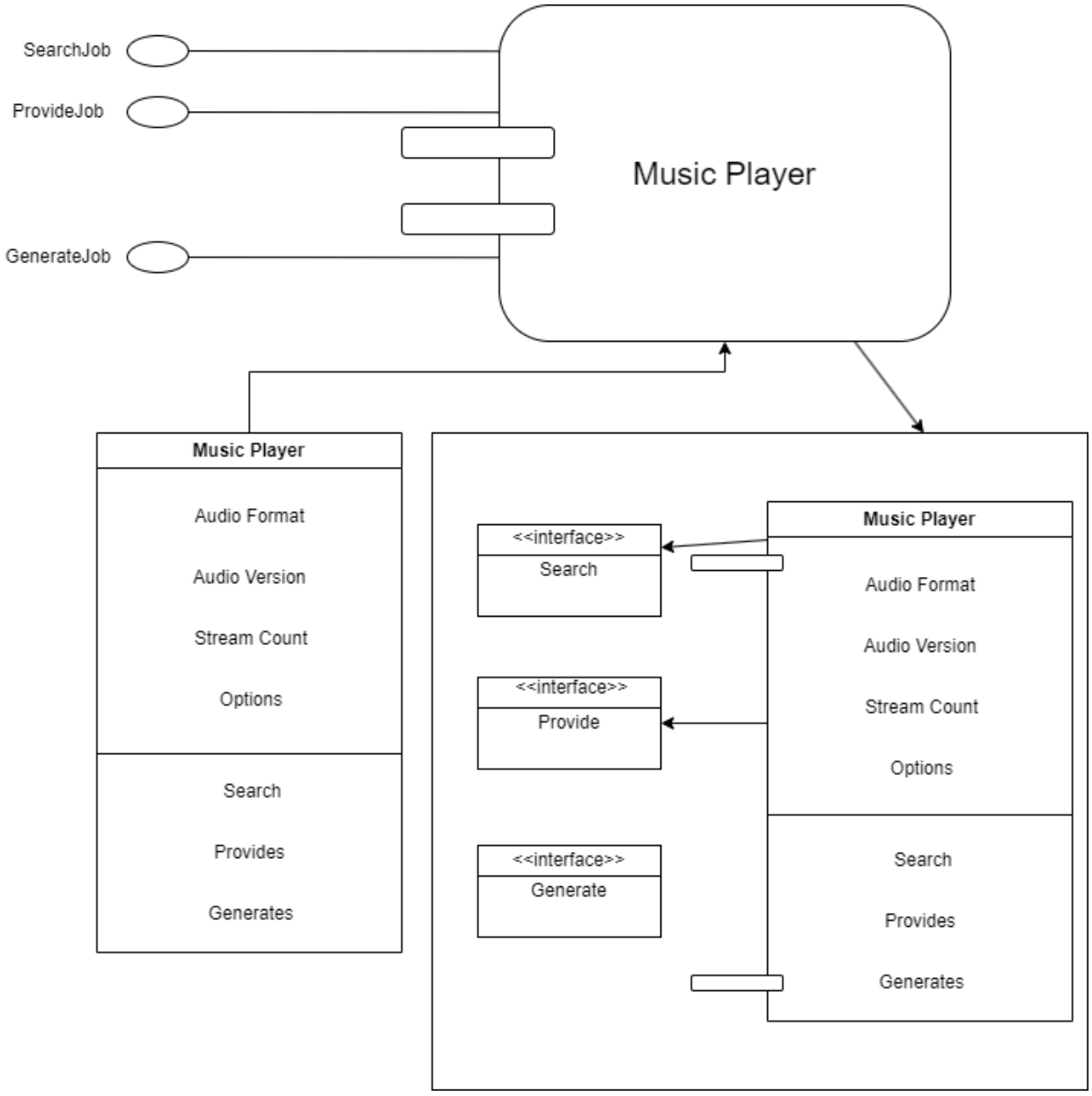
Payment


Payment Portal
Subscription
Fee,
Basic,
Information,
Address
Pay()
CurrentPaymentStatus()
Pay
Payment
Status
Payment Portal
<<interface>>
Pay
ChooseMethod()
SelectAmount()
Payment Portal
Subscription
Fee,
Basic,
Information,
Address
Pay()
CurrentPaymentStatus()
<<interface>>
Payment
Status
ShowStatus()
UpdateStatus()

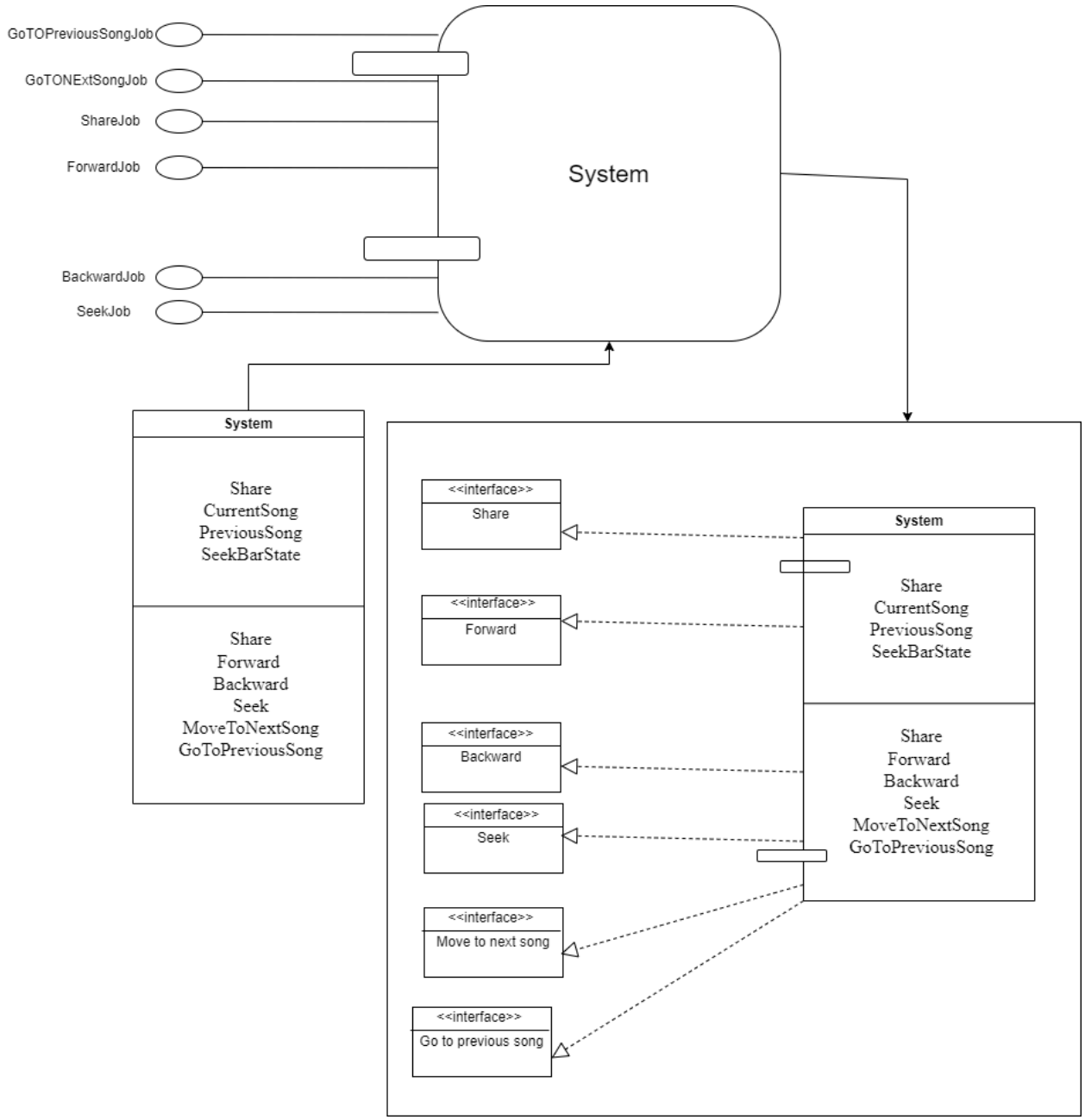
Notification



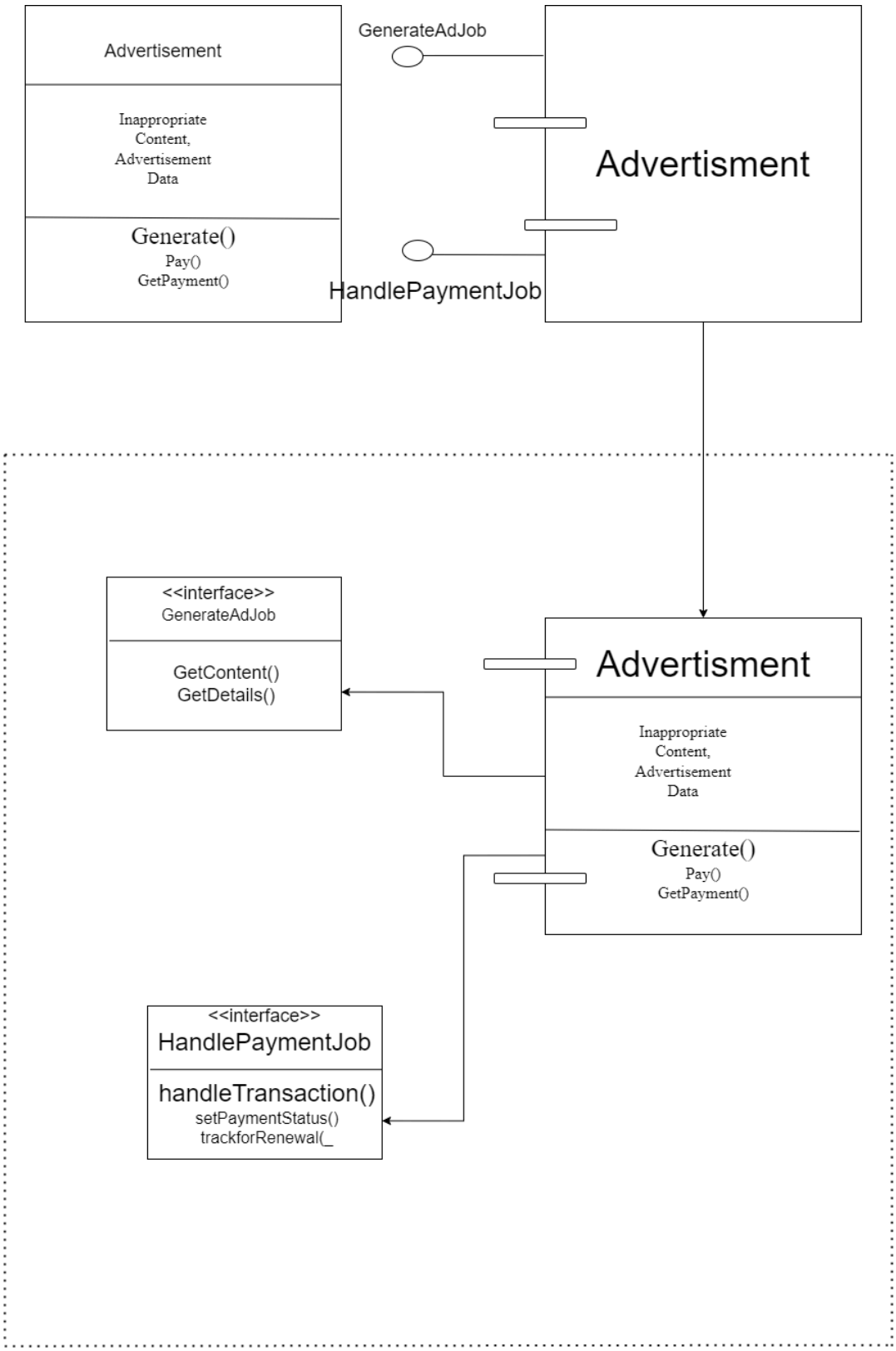
Music Player



System

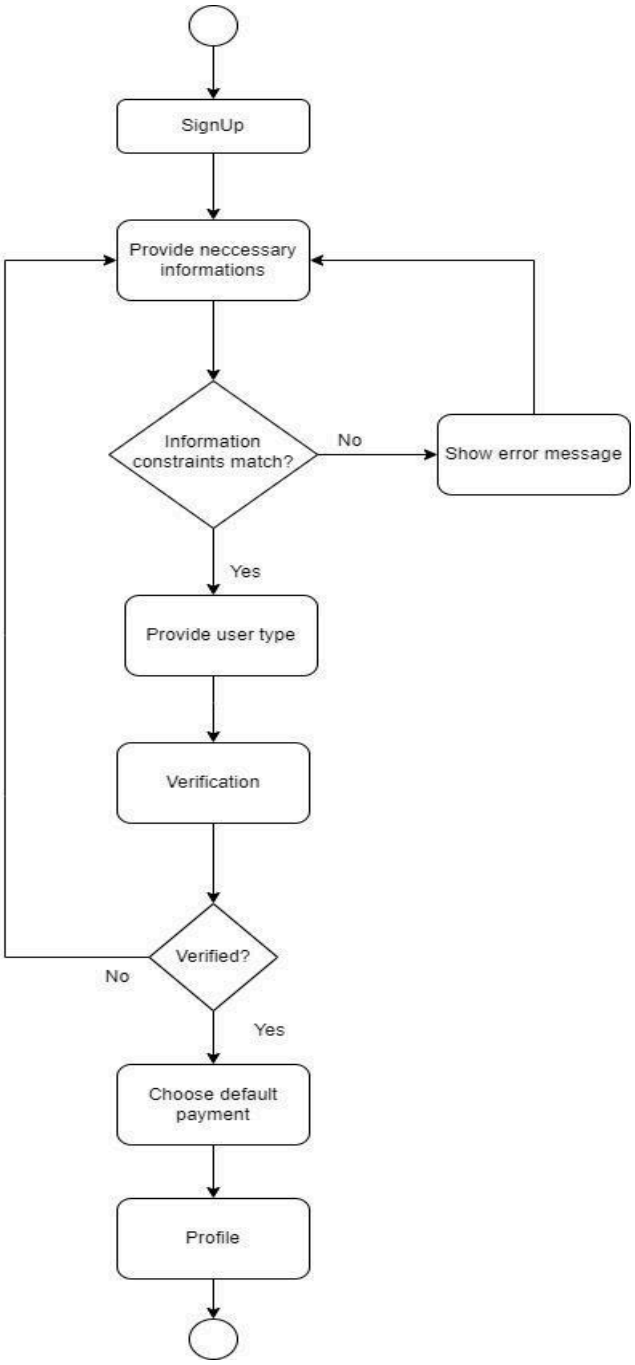

GoTOPreviousSongJob
GoTONExtSongJob
ShareJob
ForwardJob
BackwardJob
SeekJob
System
System
Share
CurrentSong
PreviousSong
SeekBarState
Share
Forward
Backward
Seek
MoveToNextSong
GoToPreviousSong
<<interface>>
Share
<<interface>>
Forward
<<interface>>
Backward
<<interface>>
Seek
<<interface>>
Move to next song
<<interface>>
Go to previous song
System
Share
CurrentSong
PreviousSong
SeekBarState
Share
Forward
Backward
Seek
MoveToNextSong
GoToPreviousSong

Advertisement

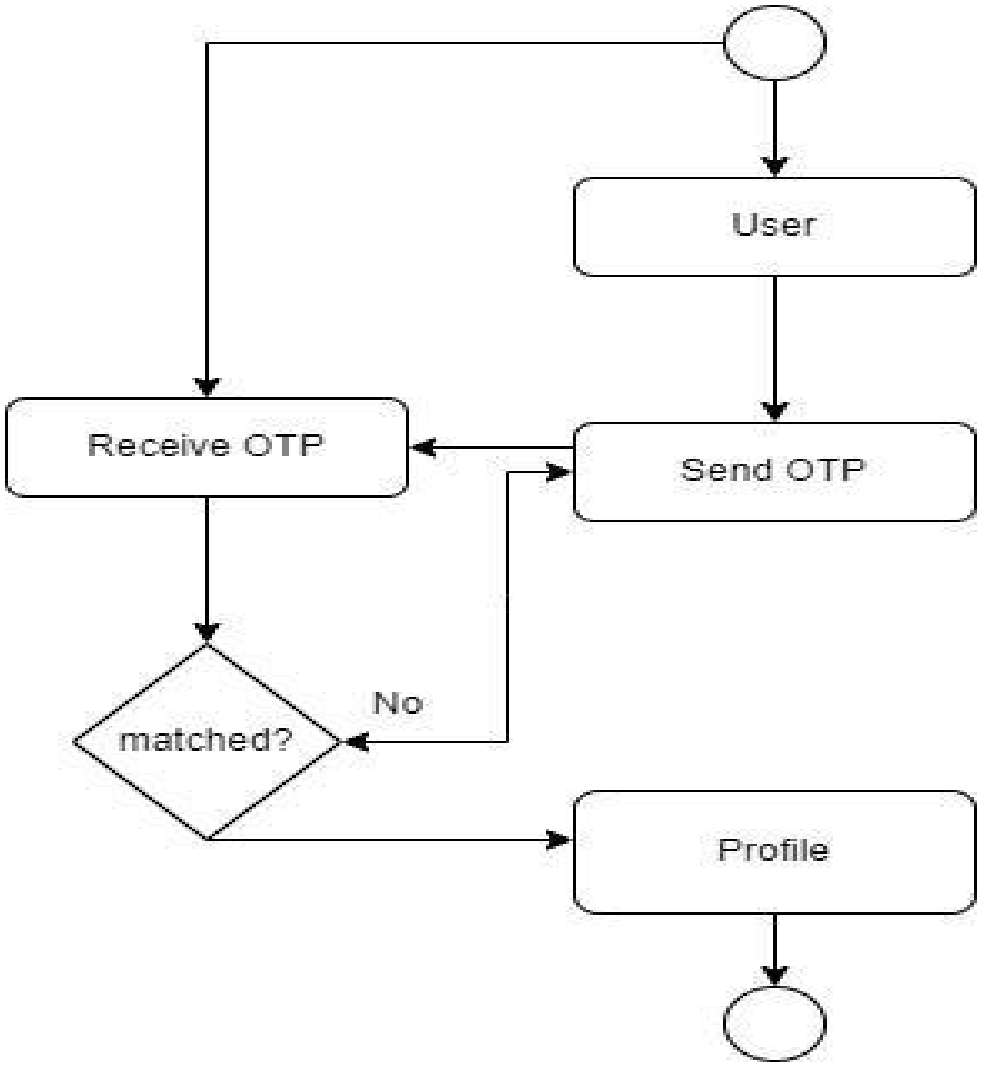


Activity Diagrams

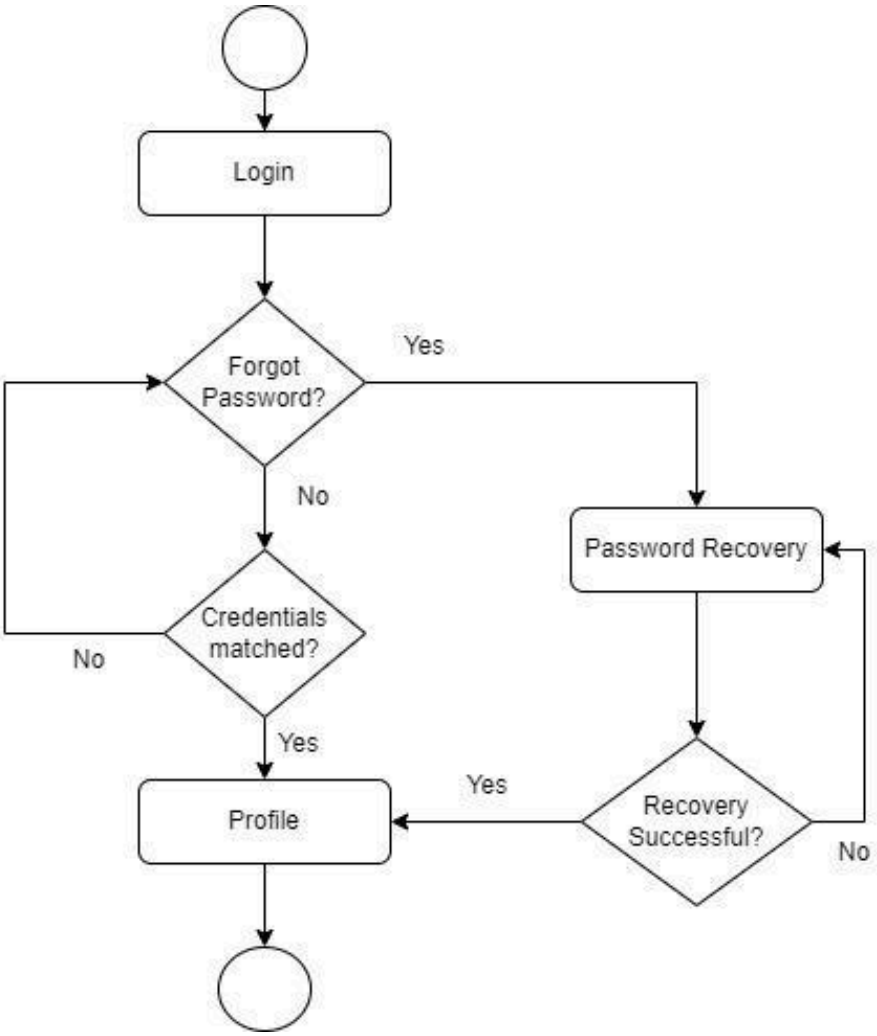
1. SignUp



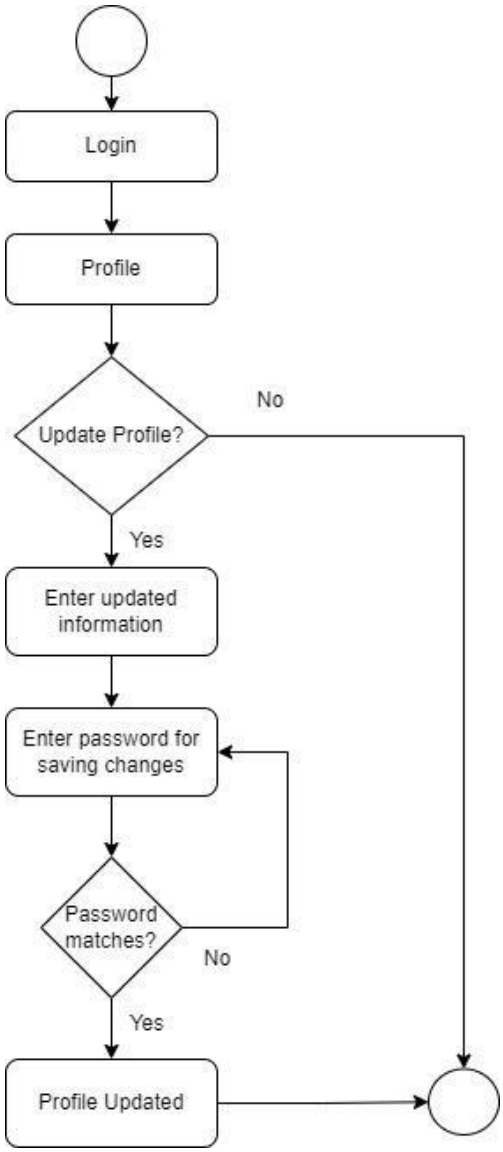
2. User Verification



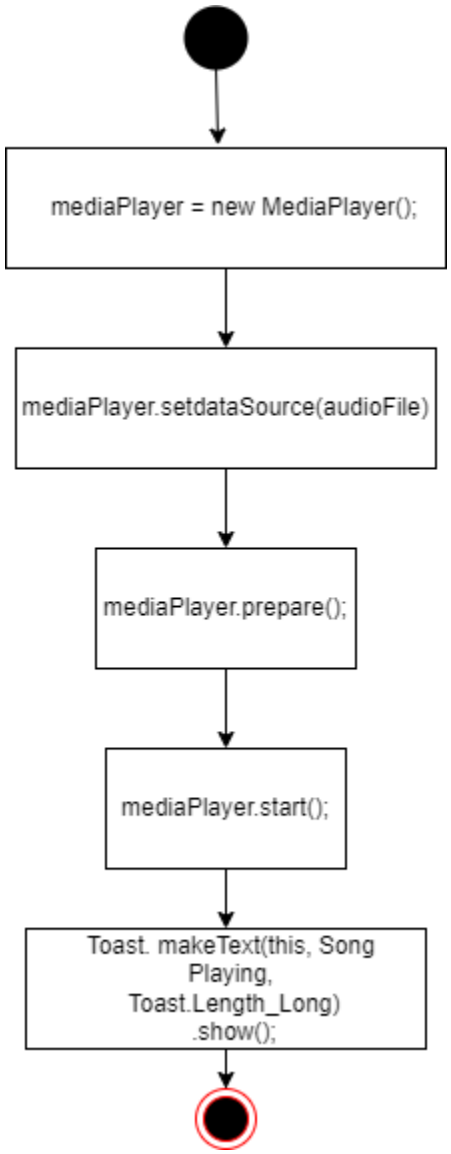
3. Login


Login
Forgot Password?
Yes
No
Password Recovery
Credentials matched?
No
Yes
Yes
Profile
Recovery Successful?
No

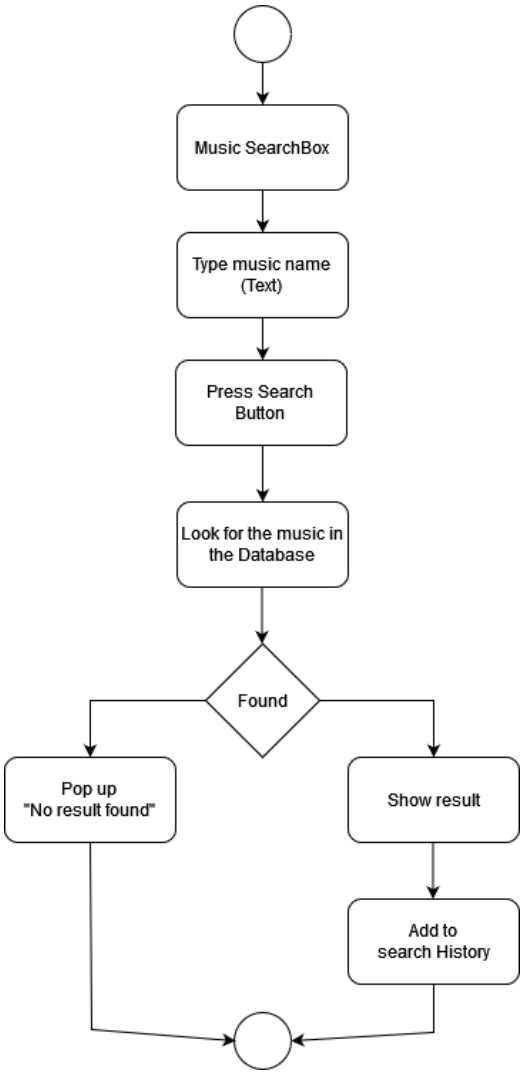
4. Update profile



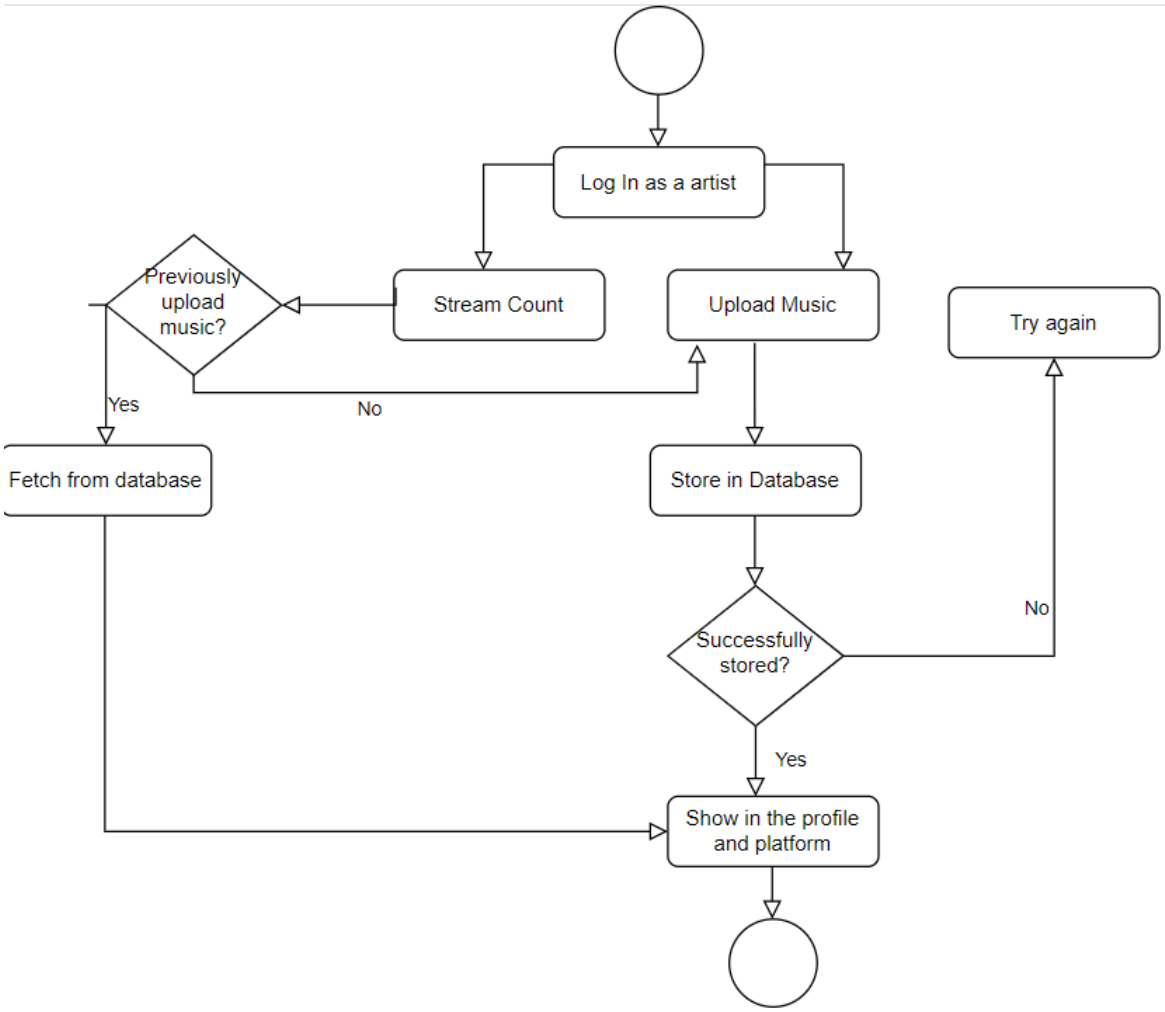
5. Playing music



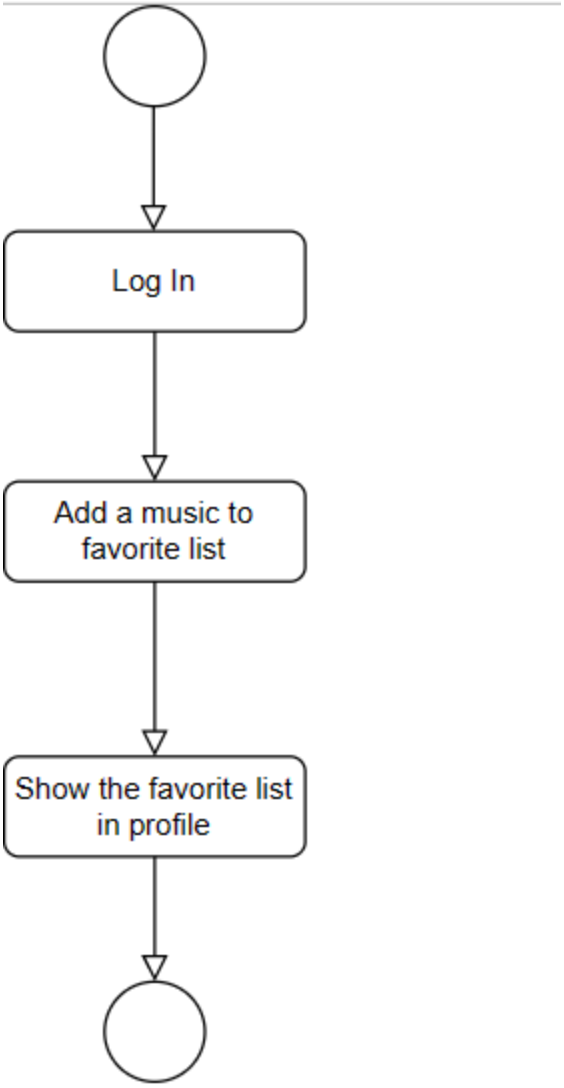
6. Searching Music



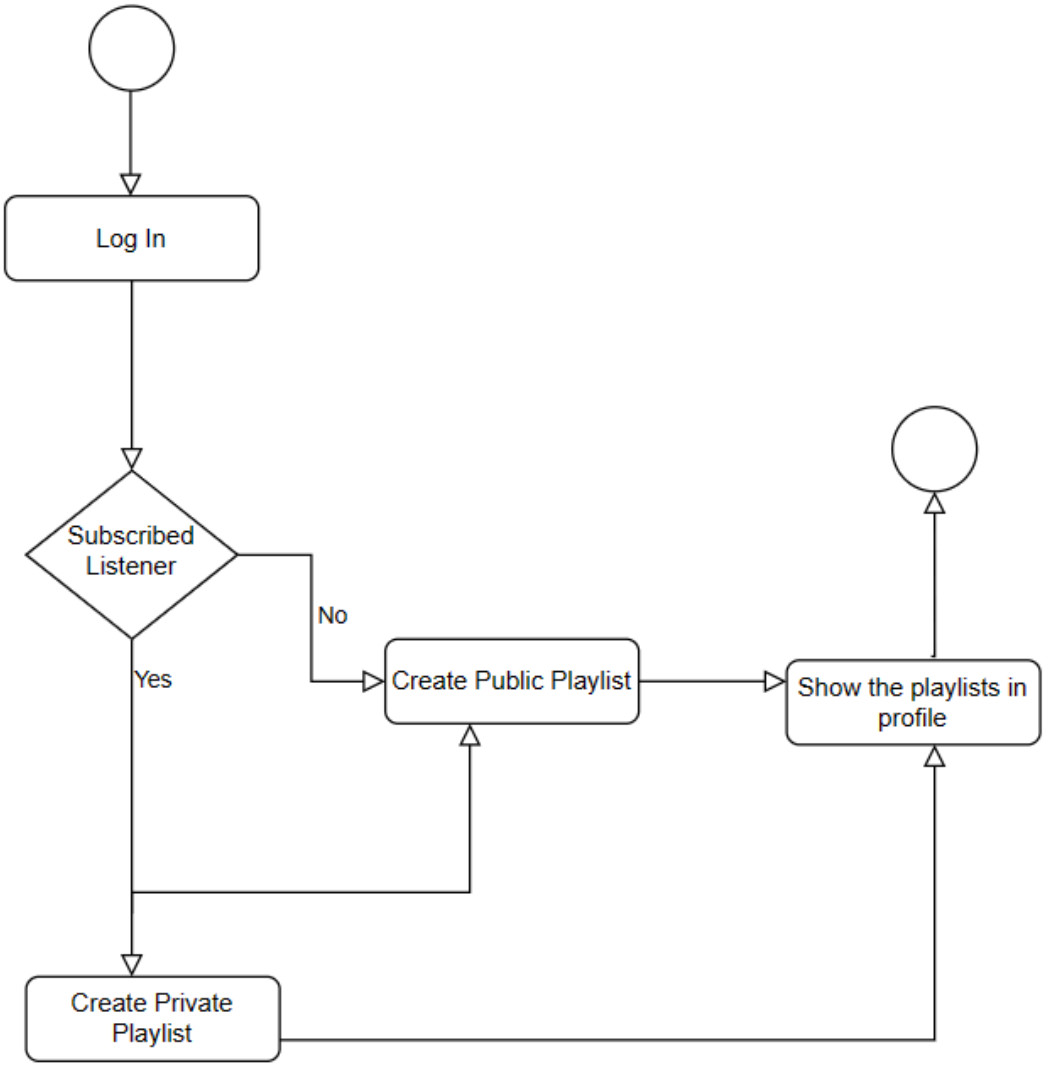
7. Upload Music



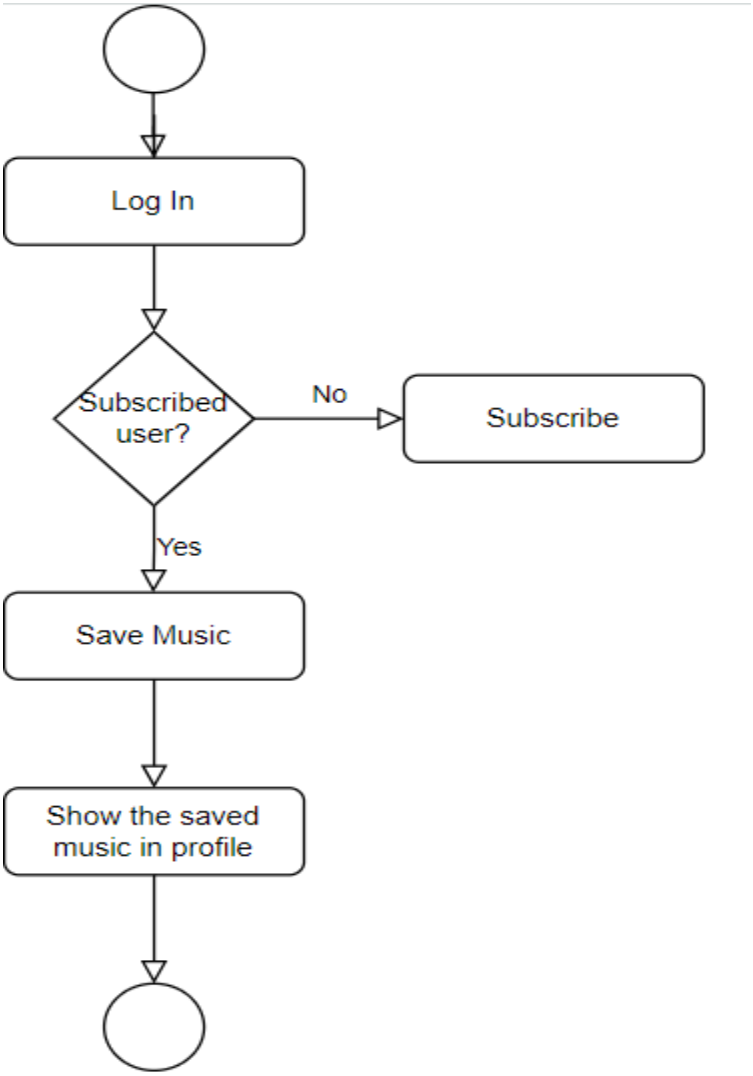
8. 8. Add to favorites


Log In
Add a music to favorite list
Show the favorite list in profile

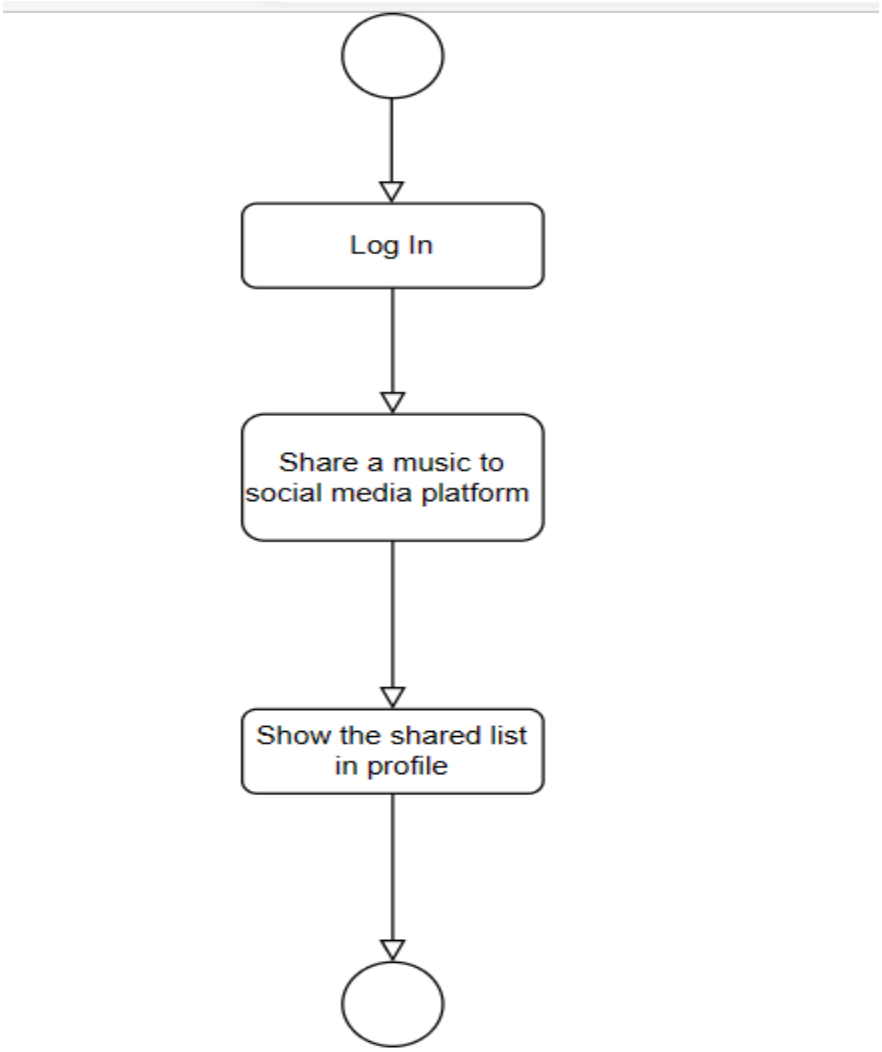
9. Create Playlist



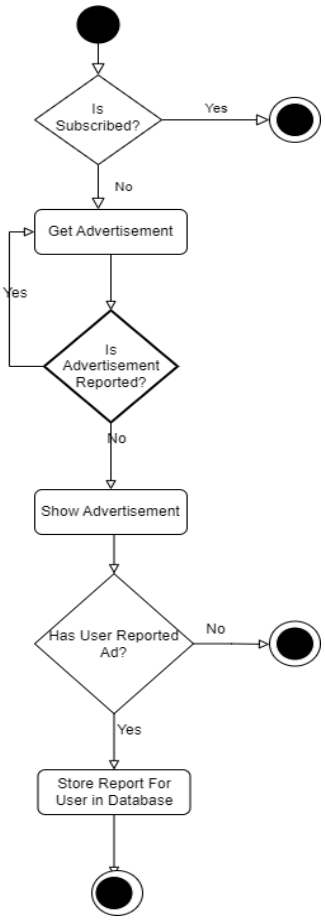
10. Save Music



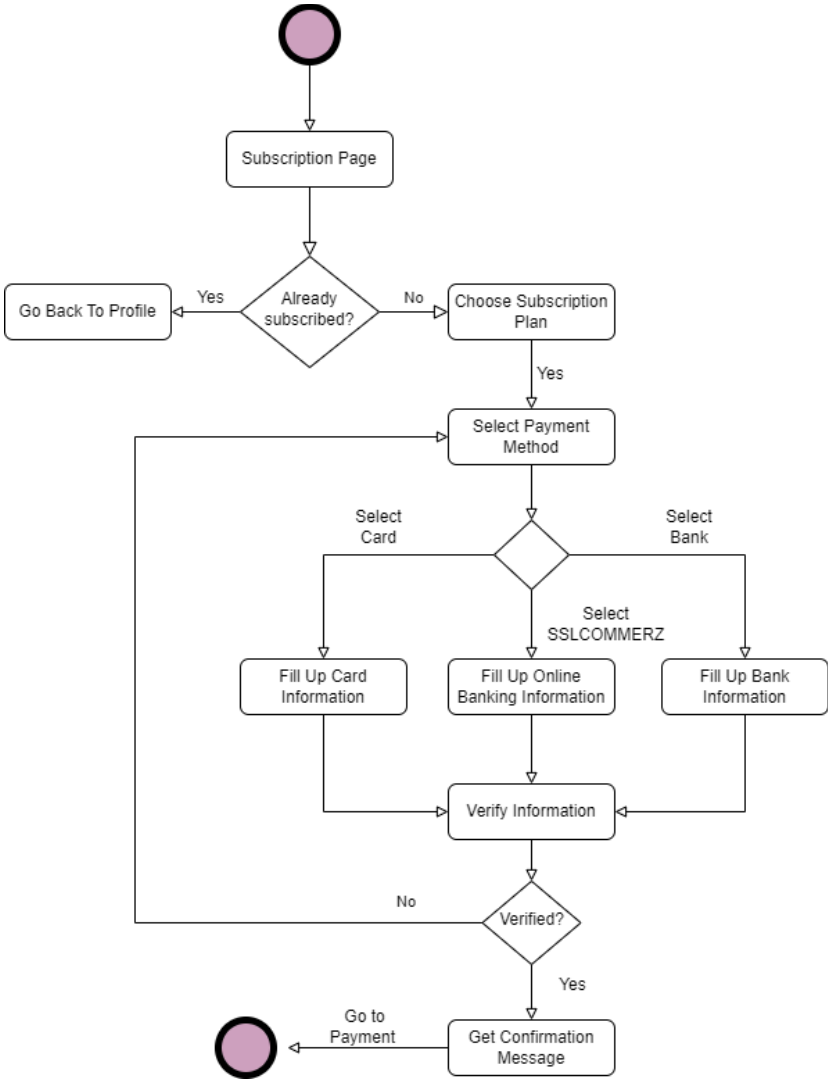
11. Share music



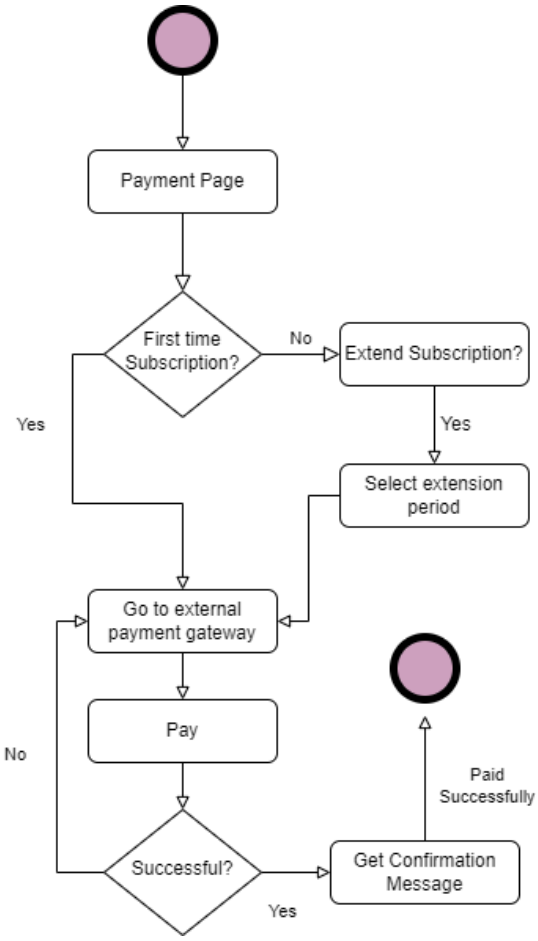
12. Get advertisement



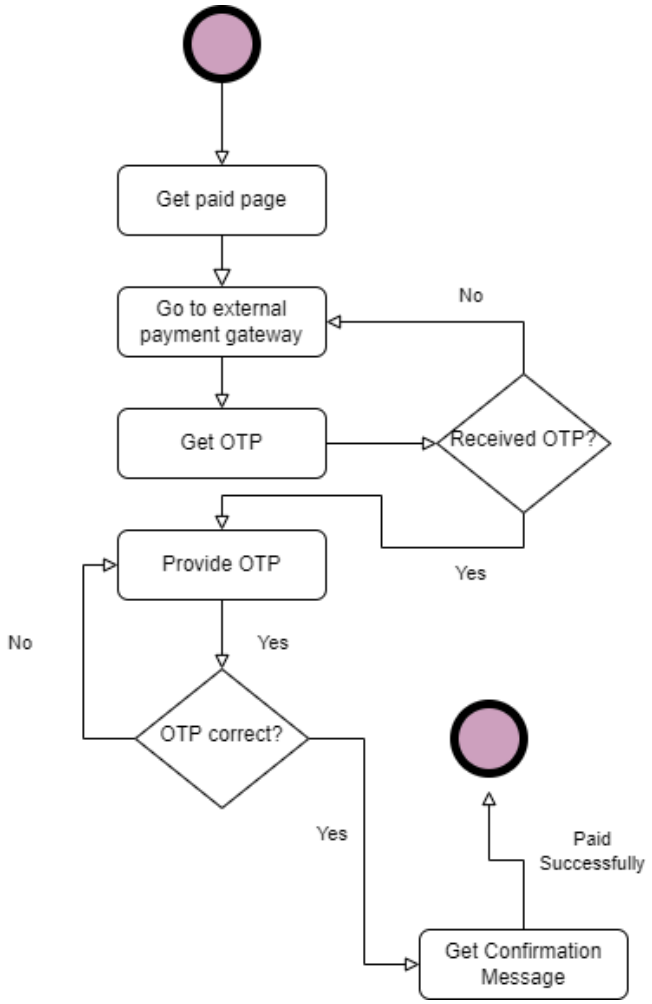
13. Subscription:



14. Pay subscription fees



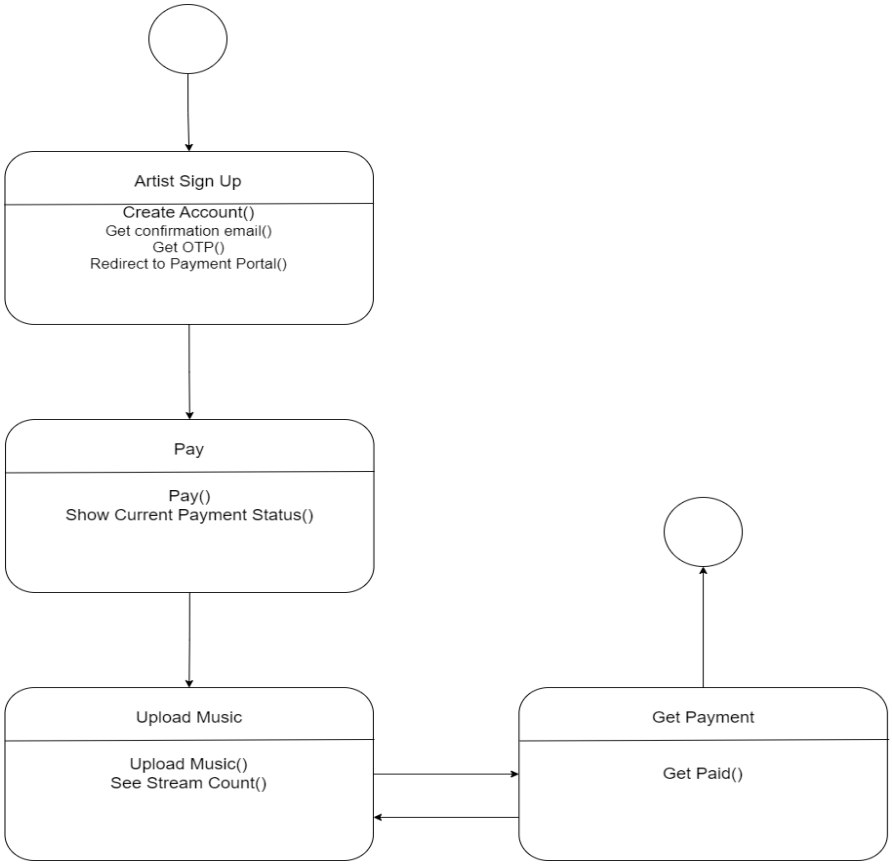
15. Get paid


Get paid page
Go to external payment gateway
No
Get OTP
Received OTP?
Provide OTP
Yes
No
Yes
OTP correct?
Yes
Paid Successfully
Get Confirmation Message

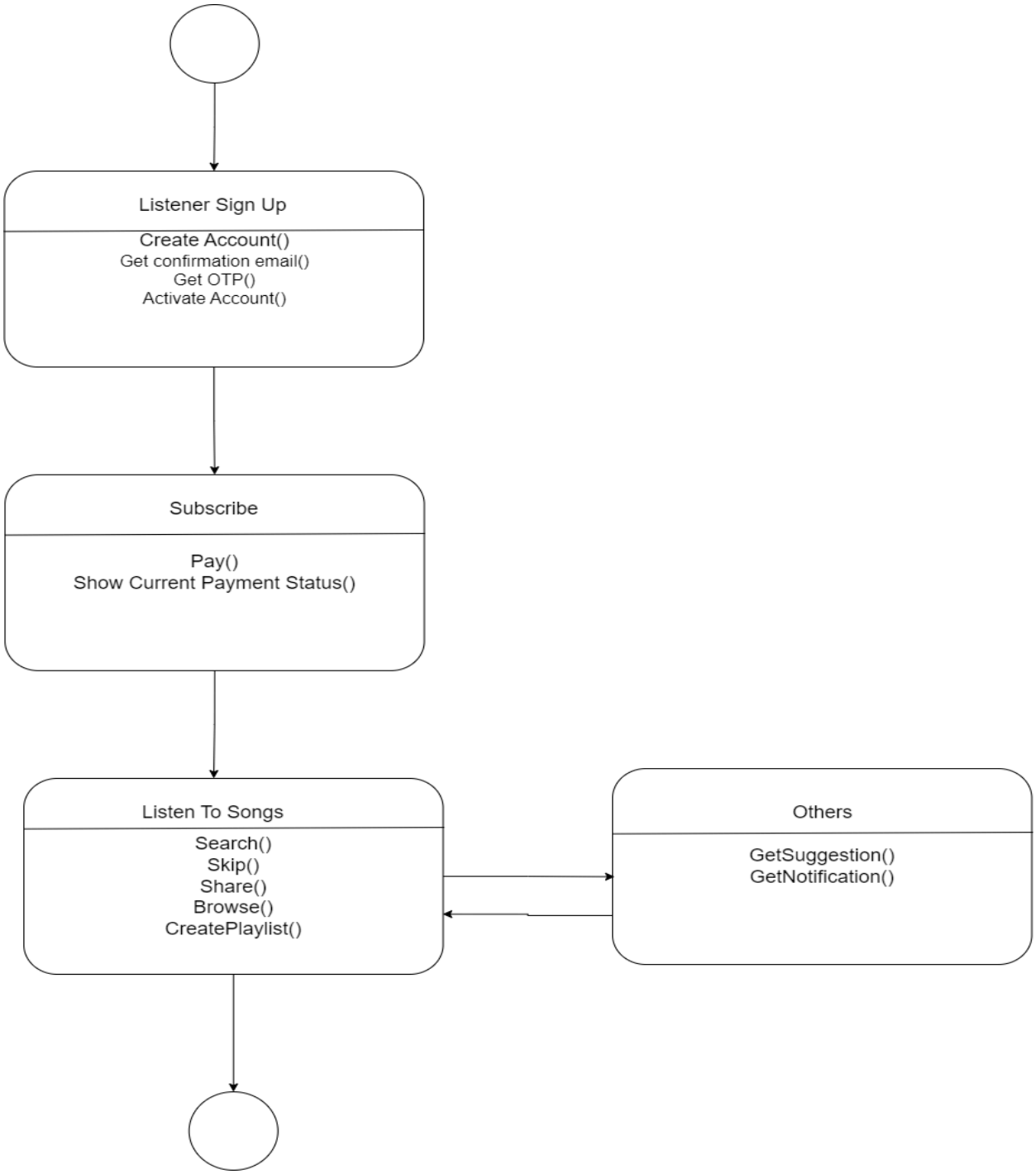
State Diagrams

UML statediagramsareusedaspart of the requirementsmodel to represent the externally observable behavior of the system and the more localized behavior of individual analysis classes.

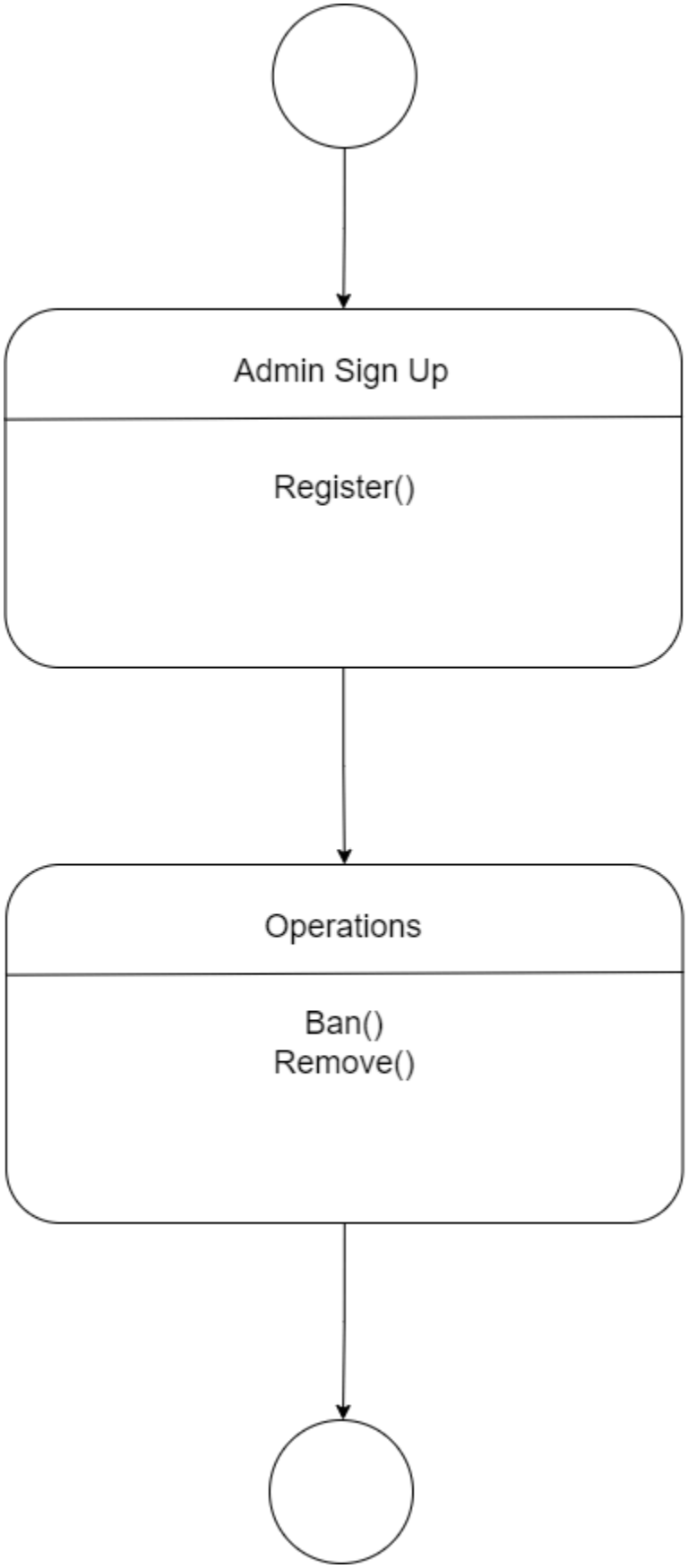
Artist State



Listener State

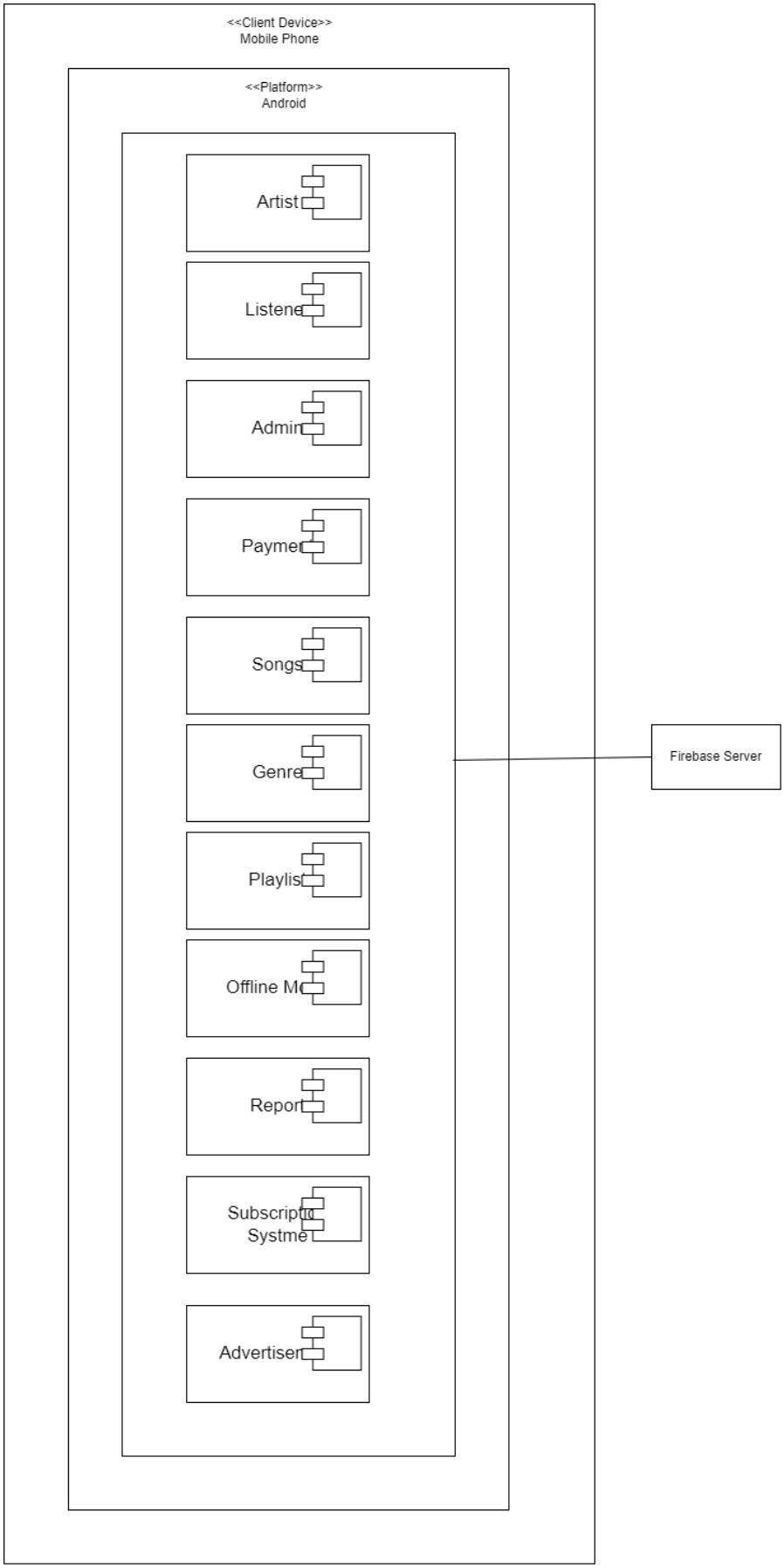


Admin State

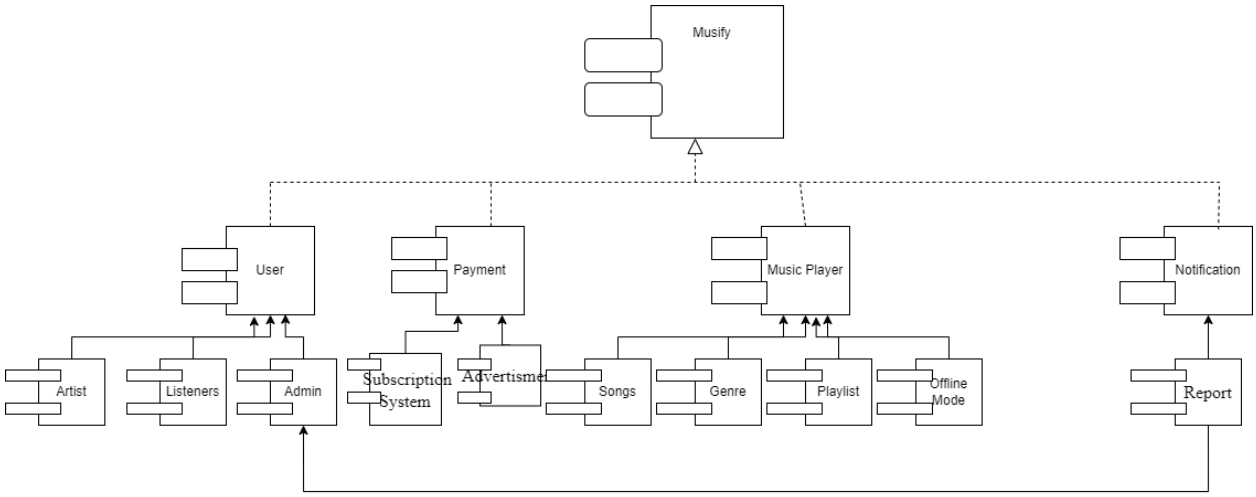


Deployment Diagram:

A deployment diagram is a UML diagram type that shows the execution architecture of a system, including nodes such as hardware or software execution environments, and the middleware connecting them.
Deployment diagrams are typically used to visualize the physical hardware and software of a system. Using it we can understand how the system will be physically deployed on the hardware.
Deployment diagrams help model the hardware topology of a system compared to other UML diagram types which mostly outline the logical components of a system.
Node is a computational resource upon which artifacts are deployed for execution. A node is a physical thing that can execute one or more artifacts. A node may vary in its size depending upon the size of the project.
Node is an essential UML element that describes the execution of code and the communication between various entities of a system. It is denoted by a 3D box with the node-name written inside of it. Nodes help to convey the hardware which is used to deploy the software.
An association between nodes represents a communication path from which information is exchanged in any direction.
Here is the deployment diagram for the Musify app. Here <<Client Device>> Mobile Phone is a node. It represents a physical machine where the app runs. <<Platform>> Android is also a node that represents the platform in which the app is going to be executed. Node: <<Platform>> Android is nested into Node: <<Client Device>> Mobile Phone. The 11 components are nested in the <<Client Device>> Mobile Phone node.


<<Client Device>>
Mobile Phone
<<Platform>>
Android
Artist
Listene
Admin
Paymer
Songs
Genre
Playlis
Offline M
Repor
Subscriptio
Systme
Advertiser
Firebase Server

Refactored Component Design



User Interface Design

User Analysis :

- **User Demographics**: The Musify app targets users who are smartphone owners, encompassing a broad demographic spectrum. This includes a diverse range of ages, from young listeners and aspiring artists to older generations who enjoy the nostalgia of Bangla music. The platform caters to all genders equally.
- **User Capabilities**: Users of Musify are expected to have basic literacy and the ability to understand instructions provided within the app. They are capable of learning how to navigate the app through intuitive UI/UX design and written materials such as help guides and FAQs.
- **Age Range:** The user base of Musify spans a wide age range, approximately from 15 to 70 years old, including younger audiences interested in contemporary Bangla music and older users who appreciate classic tunes.
- **Usage Context**: Users typically engage with the Musify app during leisure time, for relaxation, entertainment, or cultural exploration. The app is not used for professional or critical tasks and is accessed according to the user's personal preference and leisure.

- **Language Proficiency**: The primary language for Musify users is Bangla, reflecting the cultural and regional focus of the platform. The interface and customer support are optimized for Bangla speakers, though additional language support, like English.

Task Analysis :

- Task : Signup
    - Subtask : Provide Necessary Information
        - Name
        - Email
        - Password
        - Age
        - Gender
        - Date of Birth
        - Artist or Listener

- Task : Login
    - Subtask : Provide email password
        - Email
        - Password
- Update Profile
    - Subtask : Provide new information to be updated
    - Subtask : Provide password to save changes
- Search Music
    - Subtask : Provide music name / type / band
    - Subtask : Press search
- Upload Music (Artist)
    - Subtask : Provide necessary information
        - Music File
        - Genre
        - Title
        - Album Name
        - Tags
- Add to Favorites
    - Subtask : Press favorite button
- Create Playlist
    - Subtask : Press create playlist
    - Subtask : Search for music
    - Subtask : Add music to desired playlist
- Save Music
    - Subtask : Press save on a music
- Share Music
    - Subtask : Press share on a music
    - Subtask : Choose which platform to share on

    - Subtask : Share
- Subscribe
    - Subtask : Choose subscription plan
    - Subtask : Select payment method
    - Subtask : Fill up payment information
    - Subtask : Verify Information
- Pay Subscription
    - Subtask : Select extension Period
    - Subtask : Select payment gateway or pay with saved info
- Get paid
    - Subtask : Select get paid
    - Subtask : Select payment method
    - Subtask : Give payment information
    - Subtask : Verify payment information with otp

Demo Interfaces:

- **Music Player Screen**

- **Share music:**


Search more music...
Dummy Album Name
PROD BY ARTSY
Dummy Music Name
Dummy Artist Name
0:04
-2:49
Share to