**Module: Requirements Analysis (B9BA101_2122_TMD1S)**

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# Overview:

## Introduction:

This website aims to provide a platform for struggling musicians or singers to upload their songs and also there will be several songs of famous musicians and singers available to listen to for the users.

The songs are arranged as per search requirements if the user wants to search songs of a specific singer or from a specific movie it will be available to the user. It makes it easier for the user to find the song that he/she wants to listen to. The songs are also categorized according to mood i.e., Romantic, sad, happy, motivational, etc.

This music platform is also providing the option to view the lyrics of the songs. Users can also make his/her list to listen to their favourite songs at any time instead of searching it again and again. It is also allowing users to download songs offline but to activate this feature users need to buy a monthly/yearly subscription. Users can pay for subscriptions via net banking, credit/debit card, UPI and after the payment is done, they will receive mail with membership details.

## Scope:

The scope of this music platform is that users can listen to the song anywhere and at any time and it is not restricted to any age group of people. Anyone can listen to the songs there are all types of songs on the platform.

To avoid the use of the internet continuously for listening to the song user can download it to listen to the song offline without any internet connection but first, he/she has to take a subscription on their account, and then they can activate this feature.

This platform also gives chance to struggling singers or musicians to release their song and promote it freely through this platform.

## Advantages of music platform:

1. The main advantage of this platform is that users can listen to any song at any time.
2. It is easier to search the song as it is arranged based on the mood, singers, movies, and also users can create his/her song list based on their favourite songs.
3. Users can download the song to listen to it offline.
4. New creators can present the work on this platform.

## How visitor can use the website/platform?

For the user who is going to only listen to the songs:

1. User has to log in by creating their account on the platform as an only listener.

2. After login website will ask the user about recommended language for songs and recommended songs categories such as romantic, sad, happy, motivational, etc. so that after login website can recommend appropriate songs to the user.
3. User can play the songs that he/she wants to listen to.
4. User can create their list to quickly access their favourite songs. Users can download the songs to listen to offline by taking the subscription.
5. Users can take subscription by using the following steps:
    I. There will be an option to take a subscription.
    II. After selecting that it will ask for a payment method i.e., UPI, Debit/Credit card, or Net Banking.
    III. After successful payment user will receive mail about subscription details.
    IV. Download option will be available for the user.

For the user who is going to upload their songs:

1. User has to log in by creating an account on the platform as a creator.
2. After login user has a different dashboard than the listener.
3. User can see his/her song's reach and also can see likes on his/her songs.
4. User has an upload option to upload his/her song and it is automatically gets promoted by the platform based on reach and likes.
5. Creator can also listen to songs the same as a normal user.

# Methodology:

## V-Shaped Model

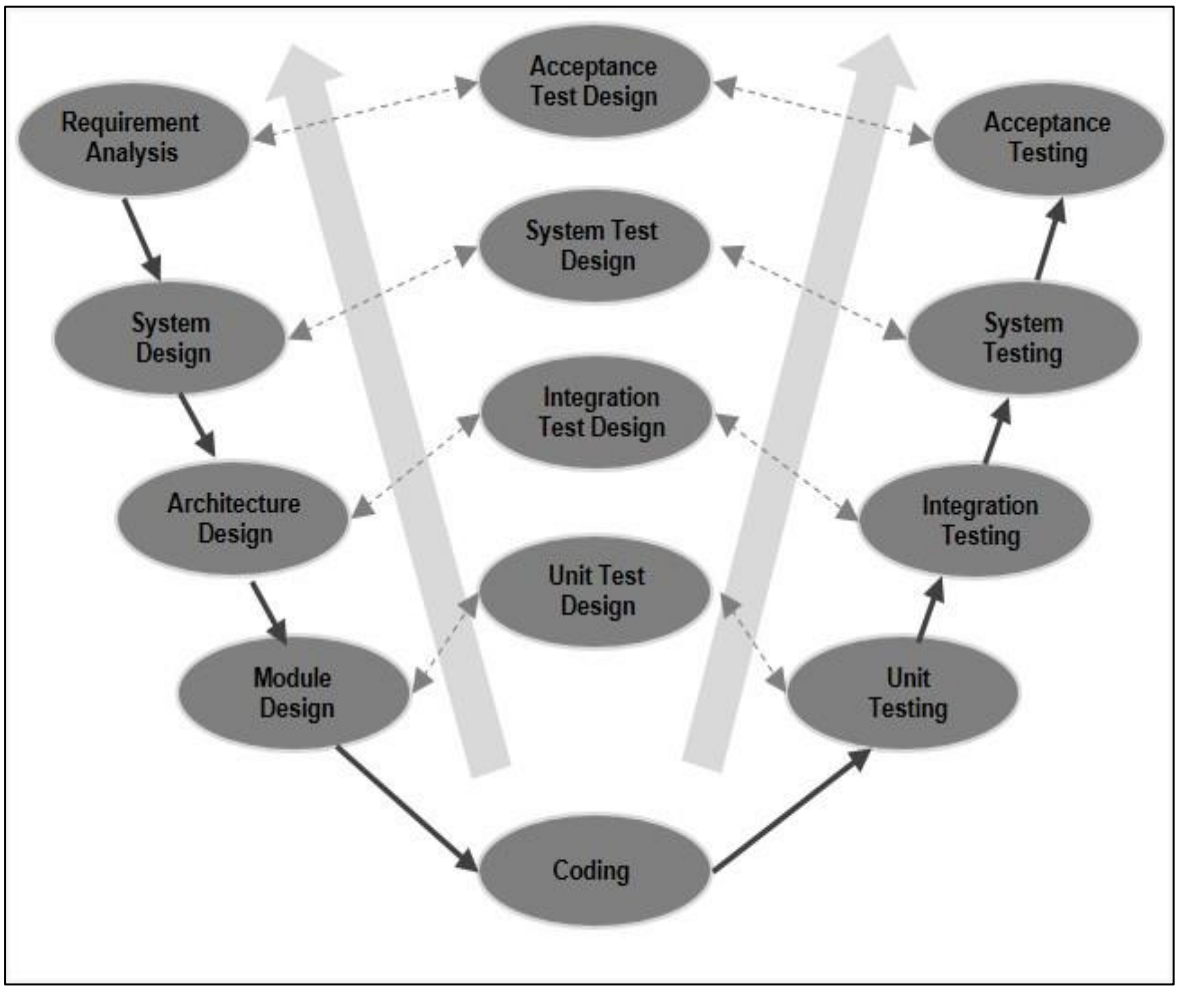



**Figure 1: V-model diagram**

V-Shaped model is a further version of the waterfall model both processes work sequentially. V model contains two-phase that are verification and validation. In the V model, there is the testing phase for each development stage in the process. One side of the V model consists of verification and the other side with validation and both are joined by the coding phase.

V model works in sequential flow so every new stage begins after the completion of the previous stage. It is not recommended to return to the previous stage after it is completed.

Verification: In the verification phase we evaluate the development stages without executing any code it can also be called a static analysis technique to analyze if requirements can meet or not.

Validation: In the validation phase testing of the product is done by running the code it is also called a dynamic analysis technique to check if the software is meeting the requirements of the customer.

## Why V model methodology for music platform?

Music platform websites have stable requirements and there is no change in the requirements as they will be only used to listen to songs and music without storing songs on the device. Music platform is a small project and the reason to choose this model as V model process is best for the small project. Compared to others, the V model is incredibly straightforward. It has a user-friendly interface and provides a solid platform for software development for small projects.

With the V model, you can design, plan, develop, and perform all test activities of the music website before you code it, which saves a lot of turn-off time for developers. V model can perform the rapid design and well iteration system can increase in the success rate of developing the music platform.

A proactive error tracking system in the V Model environment enables engineers to fix bugs and other system errors in less time than expected, thus helping to deliver the software within the established timeframe.

V model makes sure there are no loopholes in the V Model framework design, as it does not allow downward or unidirectional data flow during the development process.

By considering all the advantages of the V model it can be used to develop a music website. The music website is a small project and the basic requirements of the music website are stable so it is easy for the model to develop it quickly and there is less chance to fail as it can detect the defect at the earlier stages due to proactive error tracking.

After coding the website will be tested through multiple testing phases on the validation side. By all the features of the V model, it is considered a suitable software process model to build a music website.

# Implementation:

### Implementation of music platform according to the V-shaped model

### Requirement Analysis:

Requirement analysis is the most important step in the software development process. In this process requirements of a client are collected. The project team and client set the meeting to discuss the requirements once the requirements are clear it easier for the developer to develop a website according to the client's requirement.

Gathered requirements should fulfill the aim of the project. Following are the requirements of a music platform:

1. User should be able to register and login properly and it should access as the normal user.
2. Creator (Upload own songs) should be able to log in and register properly and it should access as the creator who can upload his/her songs.
3. Users can easily search the song via keywords such as the name of a singer, name of a movie, according to the mood.
4. Users can simply create their playlist for quick access to favourite songs.
5. Users which have taken the subscription should be able to access extra features/benefits compared to normal users.
6. Websites should be able to take payment by any method i.e., UPI, Debit or Credit card, and net banking.
7. Admin panel should be able to manage all the songs and can verify the songs of creators before upload.
8. Users should receive mail for the purchase of the subscription.

### Survey:

There were 42 participants from different age groups in the survey.

According to the survey it is observed that many people would like to listen to songs in their free time and while listing the song they want to view the lyrics to know the song's means because sometimes it is little to recognize some part of the song due to music. A lot of people think that it is a good idea to download songs on their devices. Many people think that if there are multiple options for searching the song it is an easy and quick way to find a song. Must of people voted for creating their own playlist as it contains favourite song and can be quickly accessible. Many new creators want a platform to upload their created songs. Taking all these user requirements in the website so that it can also satisfy the users.

Refer to the appendix section, which contains all of the pie charts and results from the survey.

**Design:**

## System Design:

In the system design phase, system engineers analyze the user requirements document to understand the proposed system. Then, they determine how to implement the user requirements through possible options and techniques. Any requirement that cannot be met is communicated to the user. A solution is found, and the document is amended as a result.

Entity Relation (ER) diagram is created in this phase and also document for the system test is created in the system design phase.

System design for the music platform is below:

1. Authorized users can access as per assigned limitations on the website.
2. Arrangements of songs should be proper so it can save the user's time in finding them.
3. Website must be able to differentiate between the normal user, creators, and admin.
4. Domain Name: It is necessary to allocate a suitable domain name to the music platform to be recognized by a large number of users.
5. Servers: It is necessary to configure the servers accordingly, so the website does not hang if it receives a large amount of traffic, and the delay in response can be reduced.

## Architecture Design:

Architecture refers to the detailed design of computer and software architecture. The project team makes decisions regarding the technical work, which can also be called high-level design. In this phase, it is decided which software and language will be used for development, and also systems configuration is designed according to the project requirement. The document is created for integration testing in this phase.

Architecture design for the music platform is below:

1. IDE is decided on which the developer will work – VS Studio is supported by Microsoft and can be a suitable environment for project development.
2. Programming language is been selected with a compatible version for end-user – Python3 as language and Django for the framework of a website.
3. Database creation and database connectivity with the website.
4. Systems requirement: We need to provide work-suited machines for software developers and testers so that they can work smoothly and bring the project to a successful conclusion.

## Module Design:

In module design, the whole system is divided into smaller units or modules and each is described in detail so that the programmer can begin coding. The module design is also called a low-level design.

The document is created which explains the functionality and logic of the program. The unit testing document is developed in this phase.

Module design for music platform is as follows:

1. Database tables are created by including all the columns of tables.
2. Proposed system divided into below small modules:
    i. Payment system.
    ii. Registration process.
    iii. Login validation.
    iv. Authorize access to the authorized user.
    v. Accurate search.
    vi. Record the history of the users.
    vii. User-friendly GUI.
    viii. Subscription module.
    ix. Confirmation email to the user.
3. Module design with input and output.

## UML Diagrams for the music platform:

Entity-Relationship (ER) diagram:

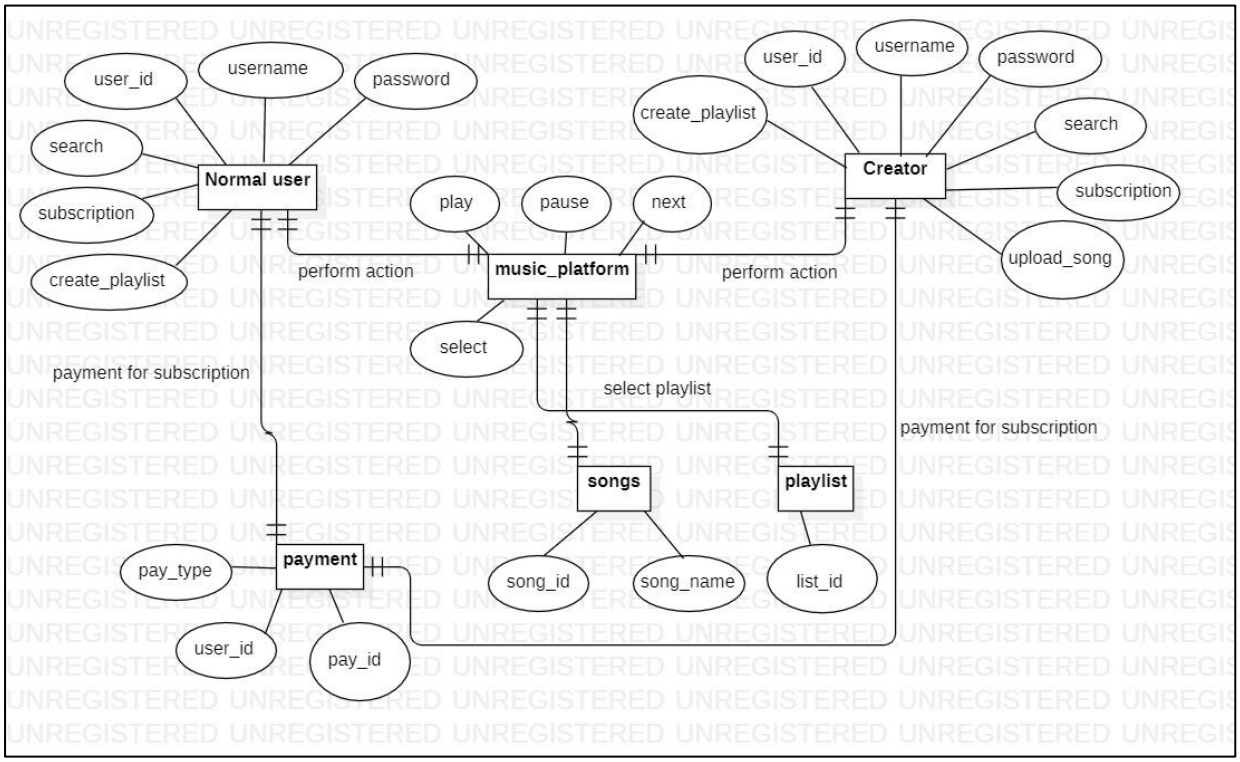



**Figure 2: Entity-Relationship of music platform(self-design)**

Class Diagram:

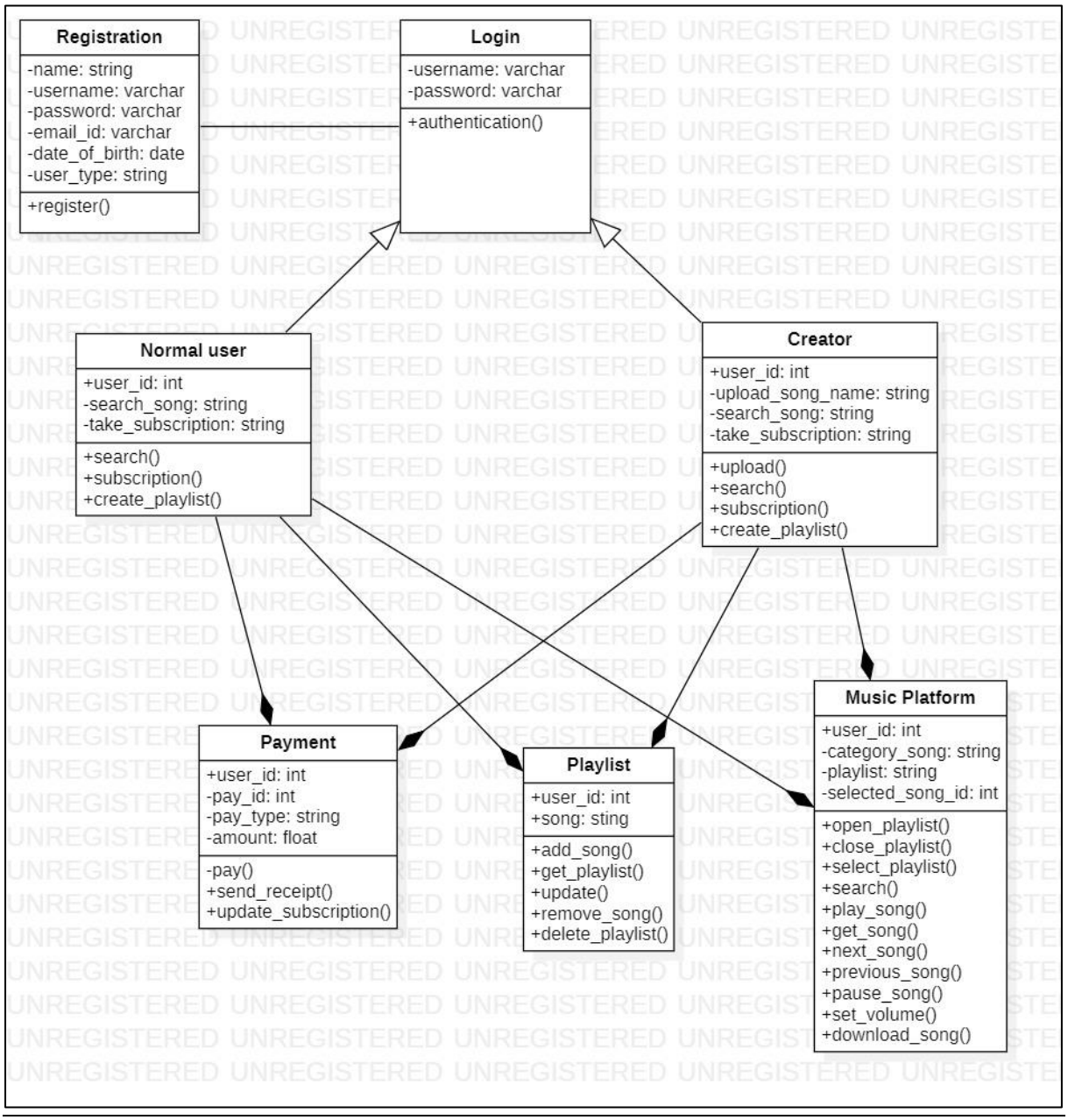



**Figure 3: Class diagram of music platform(self-design)**

Activity Diagram:

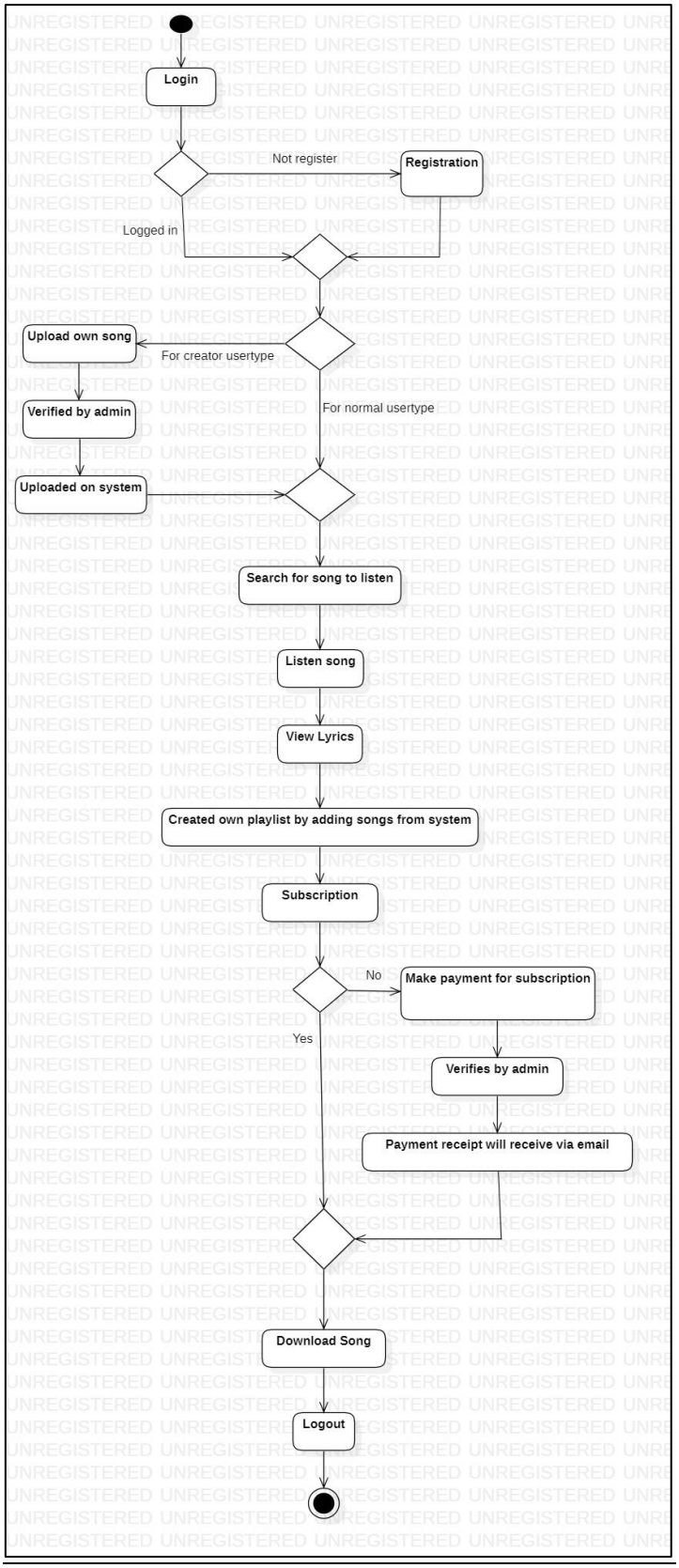



**Figure 4: Activity diagram of music platform(self-design)**

Sequential Diagram:

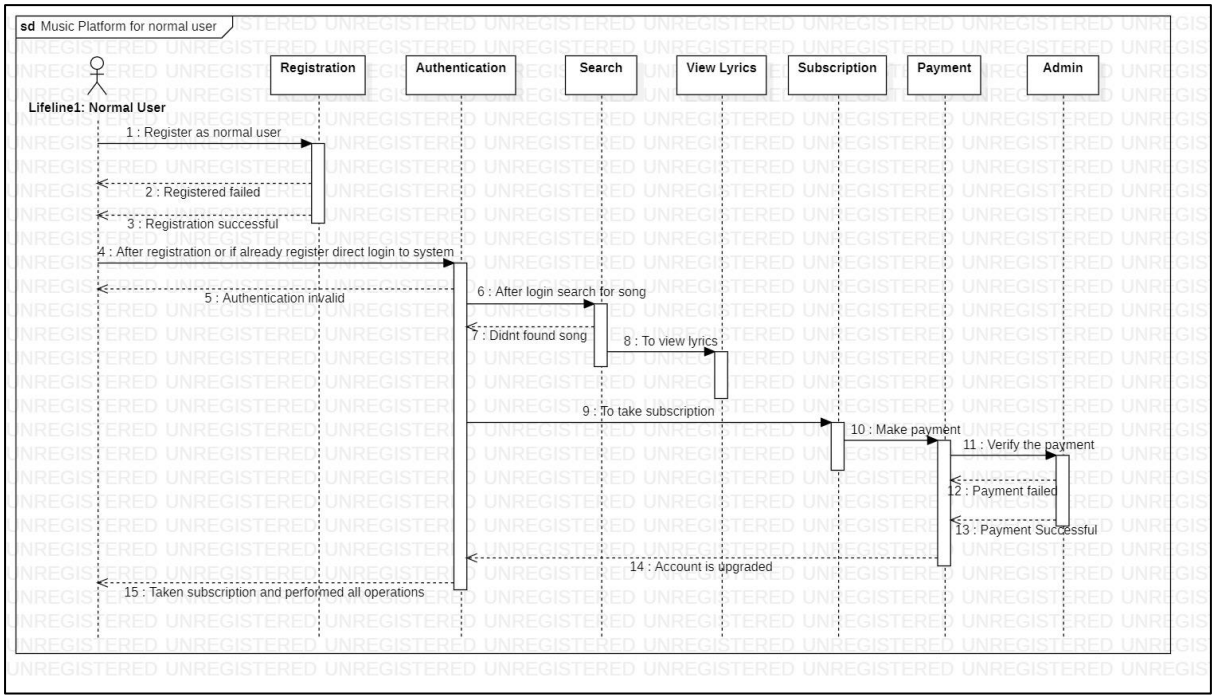



**Figure 5: Sequential diagram of music platform for a normal user(self-design)**

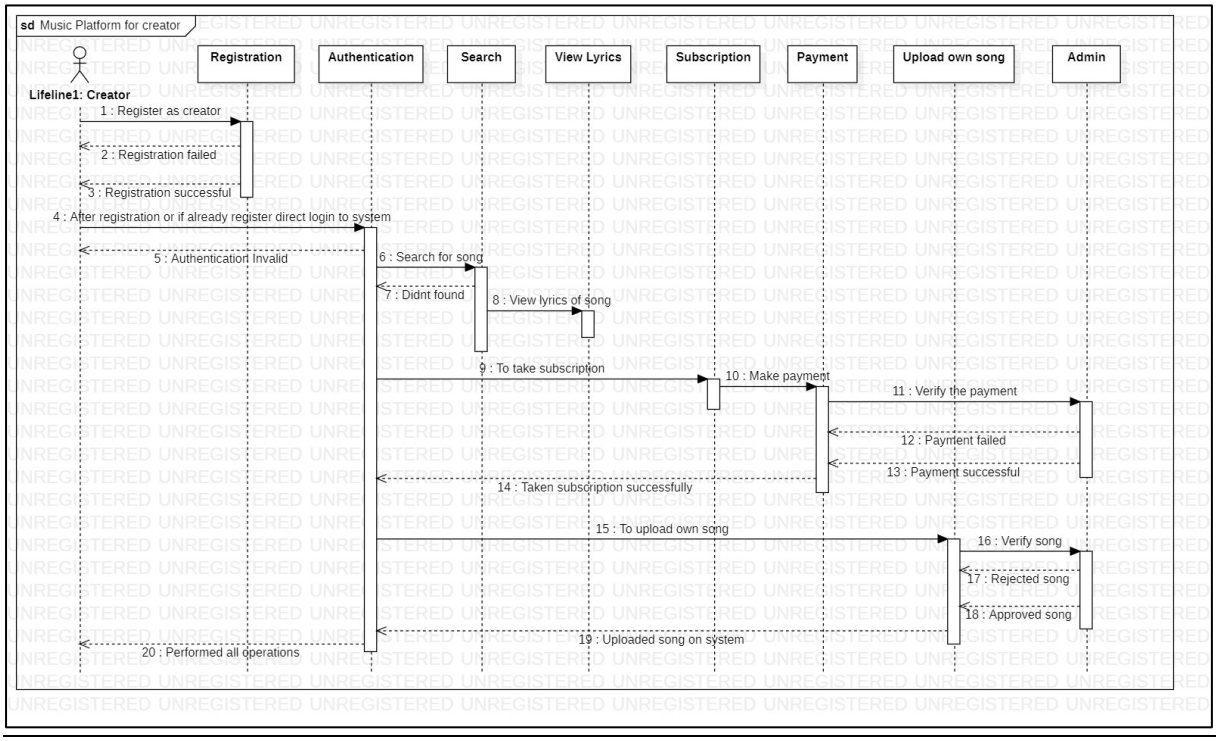



**Figure 6: Sequential diagram of music platform for a creator(self-design)**

Use Case Diagram:

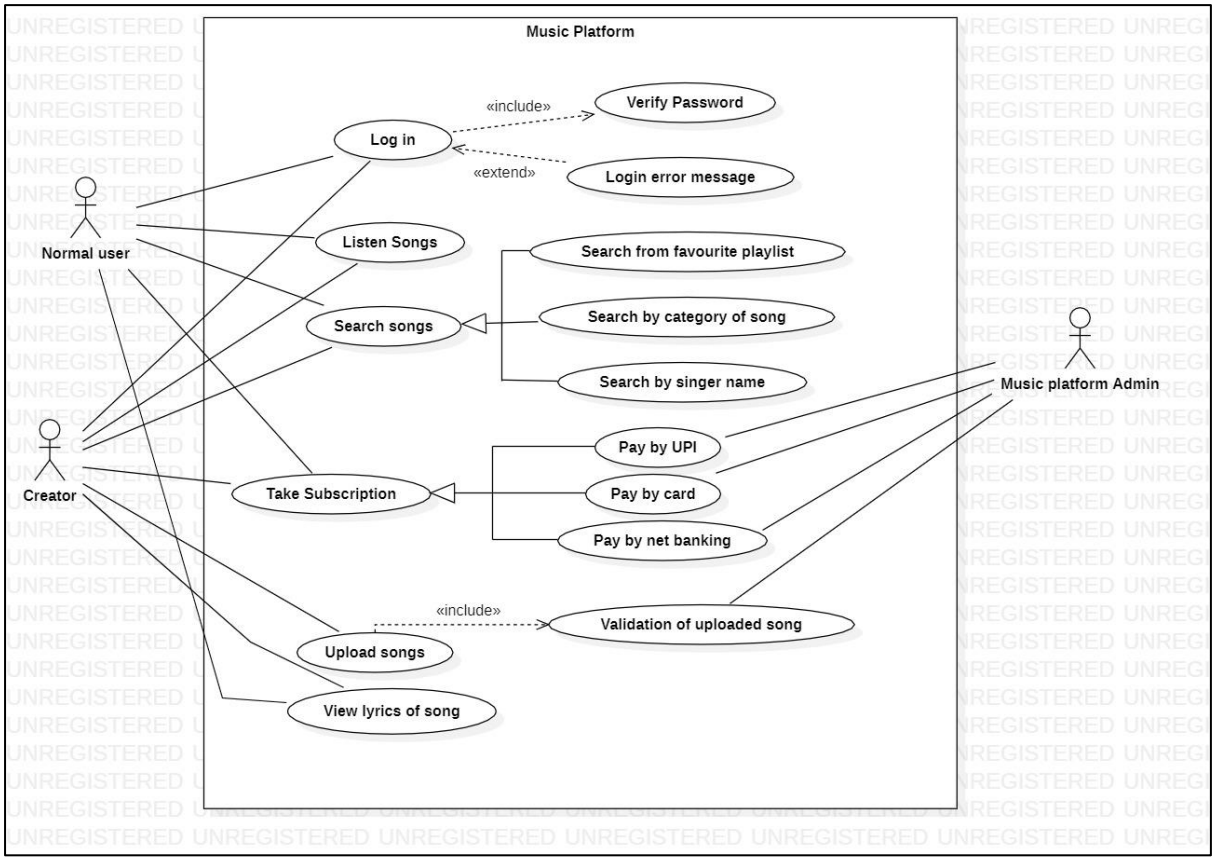



**Figure 7: Use case diagram of music platform(self-design)**

**High fidelity Wireframe:**

To demonstrate the graphical user interface, a high-fidelity wireframe is used. This is only a demo interface, and many changes will take place until it's complete.

Observing the design of homepage, it becomes apparent that the search bar is larger on the homepage, so that the user can easily use the search bar while searching for music. Refer many music platforms and came on conclusion for below design.

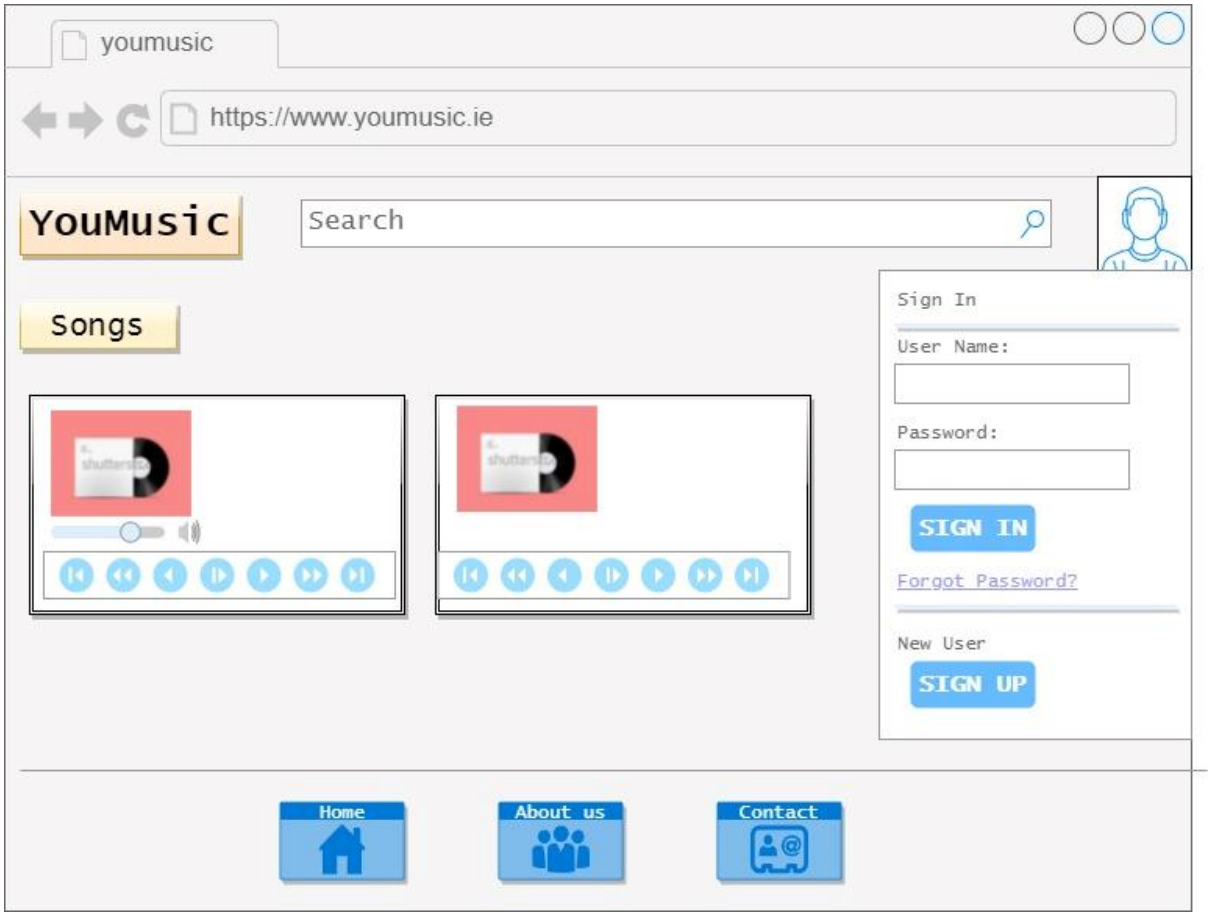



*Figure 8: Homepage of music platform(self-design)*

**Coding:**

In this phase, developers will start with the coding of the website by using the low-level design document for the expected output. The language that is used to develop the website is python and Django framework and SQL database.

## Testing:

In the V model after completion of the verification phase immediately starts with the validation phase which consists of testing of the proposed system which is designed parallel with each phase. Below are the types of testing done on the created website:

### Unit Testing:

Unit testing involves analyzing the written code to eliminate errors as well as verifying that it adheres to the applicable coding standards. It is typically white box testing. This can be performed by software developers and by the use of documents created in the module design phase.

Unit testing on music platform as follows:

1. White box testing is done on the below modules:
    i. Payment system.
    ii. Registration process.
    iii. Login validation.
    iv. Authorize access to the authorized user.
    v. Accurate search.
    vi. Record the history of the users.
    vii. User-friendly GUI.
    viii. Subscription module
    ix. Confirmation email to the user.

### Integration Testing:

Integration testing is a type of testing where the modules are tested together to detect errors in the interfaces. Integration testing is usually black-box testing, in which the code is not directly inspected for errors. Integration testing is done with the help of a document that is created in the architecture design phase. All the modules that are tested in the unit test are combined and tested as per the requirement.

### System Testing:

In system testing, the process of testing configured system specifications with the actual system so that it will detect if a website can execute/access the actual system without any error. The system testing document is created in the system design phase.

System testing on music platform as follows:

1. Testing website on an actual system configured as specified in the document.
2. Testing using server, systems so that it can handle traffic without hanging.

## Acceptance Testing:

Acceptance testing is done to verify if it satisfies the aim of the project. It is designed from the requirement document and testing is performed directly by users. It helps to identify whether it needs to increase the configuration of systems or it can satisfy the needs of the users. The music platform will be hosted in the public domain and needed multiple users to test it. Once the system passes the acceptance test and performs according to the requirement gathering. The V model development process is completed.

## Test Cases:

| Sr. No. | Test Case | Excepted Output |
|---|---|---|
| 1 | Register user | The system would register user information in a database after taking input from the user. |
| 2 | Login | The login information of a user needs to be verified. |
| 3 | Upload song | To check user type and allow the user to upload song. |
| 4 | Verify uploaded song | Admin can verify the song that is uploaded by the user. |
| 5 | Search song | Songs can be searched by movie title, singer name, and mood. |
| 6 | Listen to song | Users will be able to listen to the song that is selected by them. |
| 7 | Pause song | Currently playing songs can be paused by the user. |
| 8 | Next song | Currently playing songs can be changed to the next song. |
| 9 | Create playlist | Users will be able to create their own playlist with their favourite songs. |
| 10 | Subscription | By taking a subscription users should able to download the song in their device. |
| 11 | Logout | User should able to exit from music system. |

# Documentation:

### For normal users:

In documentation will provide information about the below features:

1. How to register as a normal user and create an account?
2. How to log in to the platform?
3. How to use the platform?
4. How take the subscription if a user wishes for extra features?
5. How to create favourite playlist?
6. Terms and conditions of the subscription model.

### For Creator:

In documentation will provide information about the below features:

1. How to register as a creator and create an account?
2. How to log in to the platform?
3. How to use the platform as a creator?
4. Terms and conditions of uploading the song.
5. How to view the reach of the uploaded song?

# Conclusion:

The music platform aims to provide users with a free way to listen to a number of songs, but for extra features, such as downloading songs, they will need to subscribe. A new singer can upload their song, but it has to be approved and then uploaded to the platform. After approval, the song can be viewed by creators, who can also see how far the song has reached. This was the overview of the platform.

Using the V model can quickly and effectively develop the platform, as it works on verification and validation simultaneously. This can reduce defects and can help to produce a platform with fewer errors. Due to the small size of the music platform and its fixed requirements, the V model is most suitable for the development process.

The V model can confirm that each phase is useful and focuses on each part of the requirement and also can test each part of the requirement. By properly designing a system, it is able to handle heavy amounts of traffic as it was tested while the development process was underway.

Ultimately, I would like to conclude that the V model is the best model when developing a small project because it has a stable requirement, as we can observe that music platforms are able to successfully implement the model by focusing on one specific aspect and testing it appropriately. Once a music platform is built based on requirements, it will be improved in the future based on user feedback.

# Future Scope:

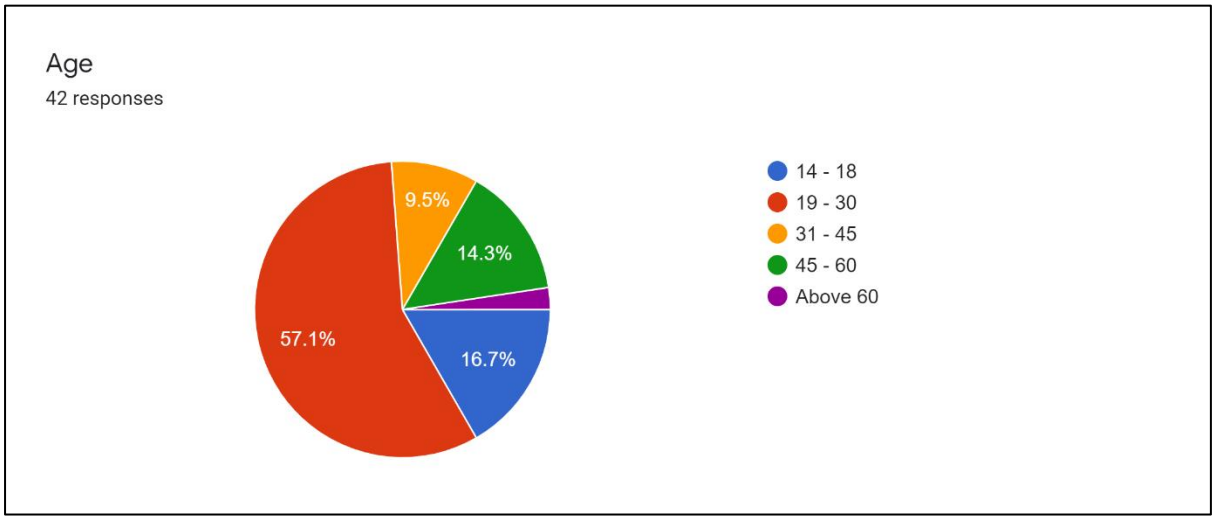
In future scope it is recommended to add below new models and that is achievable and it can help in growth on the platform:

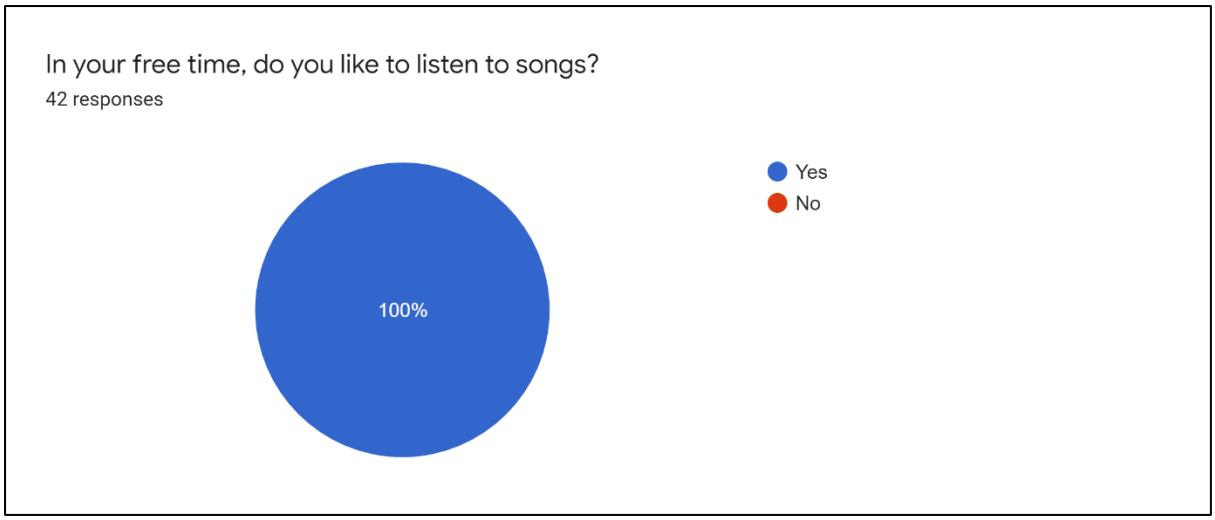
1. Recommendation system: In this model, the platform will recommend the songs according to the previous data of users.
2. Adding podcast category on the platform.

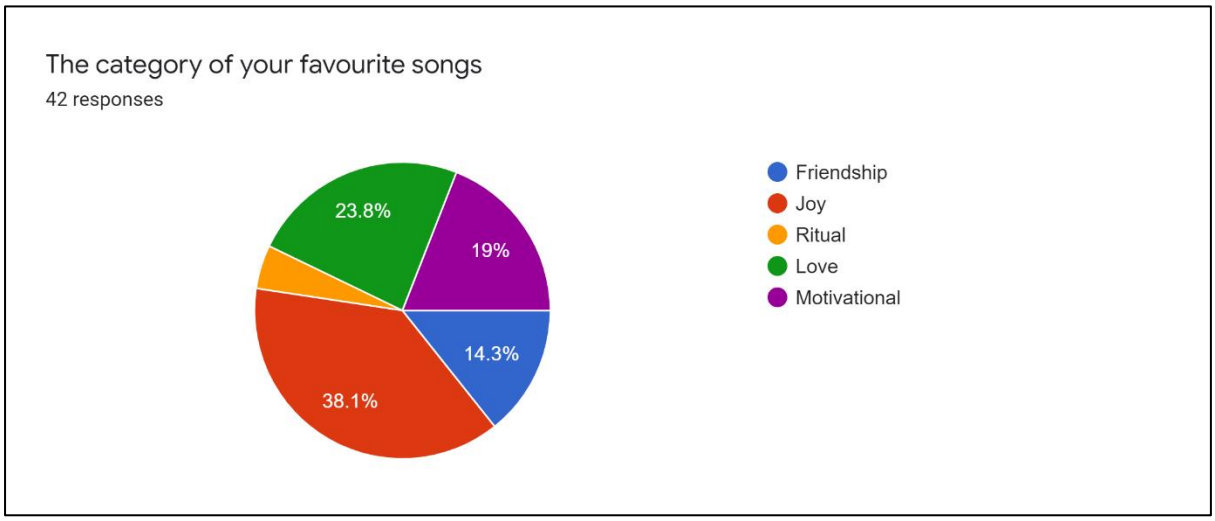
# References:


1. V-shaped model diagram [https://www.tutorialspoint.com/sdlc/sdlc_v_model.htm]
2. Referred advantage of V model from website [http://tryqa.com/what-is-v-model-advantages-disadvantages-and-when-to-use-it/]
3. Regulwar, Ganesh & Jawandhiya, Pradip & Gulhane, Vijay & Tugnayat, R. (2021). Variations in V Model for Software Development.

# Appendix:

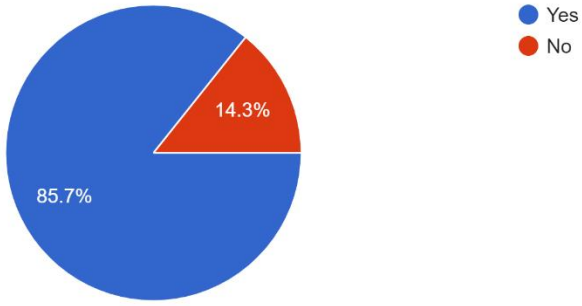

Age
42 responses
9.5%
14.3%
57.1%
16.7%
14 - 18
19 - 30
31 - 45
45 - 60
Above 60


In your free time, do you like to listen to songs?
42 responses
100%
Yes
No


The category of your favourite songs
42 responses
23.8%
19%
14.3%
38.1%
Friendship
Joy
Ritual
Love
Motivational

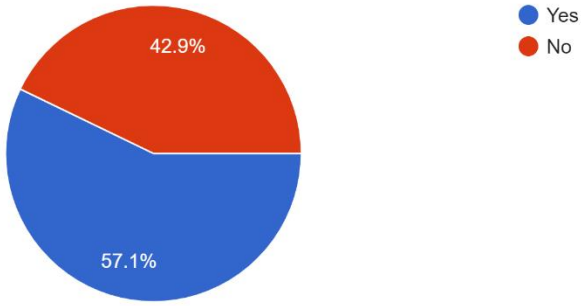
Do you like to view lyrics?

42 responses



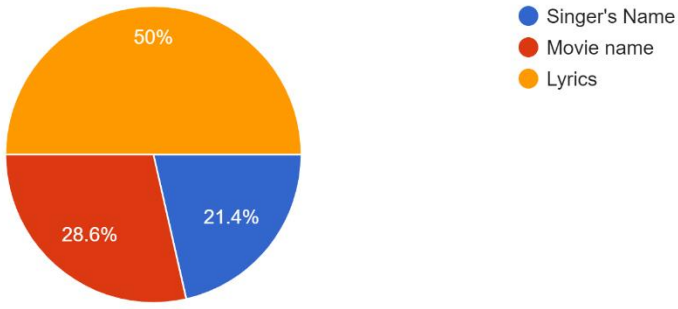

Do you want to upload the song you created on platform?

42 responses



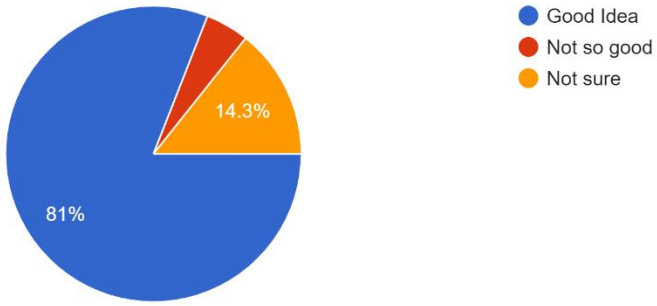

By which criteria are you searching for songs?

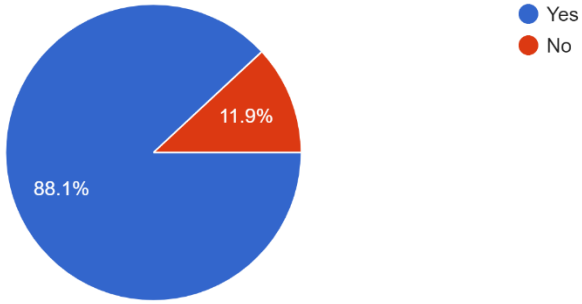
42 responses



How about downloading your favourite song from music platform?

42 responses




Are you interested in creating your own playlist in music platform?

42 responses