**ASSIGNMENT 01 FRONT SHEET**

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| **Student declaration**  I certify that the assignment submission is entirely my own work and I fully understand the consequences of plagiarism. I understand that making a false declaration is a form of malpractice. | | | |
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Contents

[I. Introduction 5](#_Toc107968094)

[II. Analysis 5](#_Toc107968095)

[1. Requirement definition 5](#_Toc107968096)

[2. Stakeholders who can make functional and non-functional requirements and their interests 6](#_Toc107968097)

[3. Functional and non-functional requirements of the project 6](#_Toc107968098)

[4. Techniques used to gather requirements 9](#_Toc107968099)

[4.1. Interviews 9](#_Toc107968100)

[4.2. Join Application Development 9](#_Toc107968101)

[4.3. Questionnaires 10](#_Toc107968102)

[4.4. Document Analysis 10](#_Toc107968103)

[4.5. Observation 10](#_Toc107968104)

[4.6. Technique chosen 10](#_Toc107968105)

[5. Interview questions 11](#_Toc107968106)

[6. Use-case 12](#_Toc107968107)

[6.1. Signs up for a subscription 12](#_Toc107968108)

[6.2. Buys a gift card 13](#_Toc107968109)

[7. Data flow diagram 14](#_Toc107968110)

[7.1. DFD 0 14](#_Toc107968111)

[7.2. DFD 1 15](#_Toc107968112)

[8. Entity relationship diagram 19](#_Toc107968113)

[9. Flowchart 20](#_Toc107968114)

[10. Class diagram and activity diagram 21](#_Toc107968115)

[10.1. Class diagram 21](#_Toc107968116)

[10.2. Activity diagrams 22](#_Toc107968117)

[III. Design 24](#_Toc107968118)

[1. Pseudocode 24](#_Toc107968119)

[2. Actual code 26](#_Toc107968120)

[3. Wireframes 28](#_Toc107968121)

[3.1. Log in 28](#_Toc107968122)

[3.2. Register 29](#_Toc107968123)

[3.3. Browsing song 30](#_Toc107968124)

[3.4. Cart 30](#_Toc107968125)

[3.5. Checkout/invoice 31](#_Toc107968126)

[4. Test case 31](#_Toc107968127)

[5. Architecture used 32](#_Toc107968128)

[References 33](#_Toc107968129)

# Introduction

The SDLC model utilized for Tune Source has been illustrated in earlier sections, and some of the hazards that the Tune Source project may encounter have been studied, handled, and explained. And the feasibility analysis demonstrated that this idea is possible. The stakeholders and their interests in the case study are then identified in this part. The requirements description is evaluated, and it is demonstrated how stakeholders deliver the needs for this project. Finally, the connection between FRs and NFRs is examined. And in this section, the TS project's Requirement Definition (with explanations of the need/purpose) is stated, as well as what requirements the relevant party(s) supply.

# Analysis

## Requirement definition

A requirement is a physical or functional necessity that is defined in product development and process optimization that a certain design, product, or process tries to meet. It is often used in formal engineering design, such as systems engineering, software engineering, or enterprise engineering. It is a wide notion that can refer to any required (or sometimes desirable) function, attribute, capacity, trait, or quality of a system in order for it to be valuable and useful to a customer, company, internal user, or other stakeholders.

A Functional Requirement (FR) describes the service that the program must provide. It refers to a software system or a component of one. A function is nothing more than the software system's inputs, behavior, and outputs. It might be a computation, data manipulation, business process, user interaction, or any other specialized activity that defines the function of a system. In software engineering, functional requirements are also known as functional specifications. (Martin, 2022)

Non-Functional Requirement (NFR) describes a software system's quality attribute. They evaluate the software system based on its responsiveness, usability, security, portability, and other non-functional characteristics that are crucial to its success. "How quickly does the website load?" is an example of a non-functional requirement. Non-functional requirements that are not met can lead to systems that do not meet the demands of the users. (Martin, 2022)

## Stakeholders who can make functional and non-functional requirements and their interests

|  |  |  |
| --- | --- | --- |
| Stakeholder | Position | Interests |
| Carly Edwards | Assistant Vice president of the Marketing department, Sponsor of the project | When this project is finished, they will own stock in the firm and earn a part of the money generated by the newly established system. |
| John Margolis | Founder of Tune Source | When the project is finished, their income will grow dramatically due to additional clients and market share, and they will earn more when the project is put on the market. |
| Trinh Duc Anh | Business Analyst | A Business Analyst's goal is to develop a complete business analysis that defines a company's issues, prospects, and solutions. Forecasting and budgeting. From there, planning and monitoring will assist the firm to always rise and be rewarded by the corporation. |
| Customers | Customers, the source of revenue for the company | The customers want a quick, cheap, and convenient way to listen to music. Implementing an online music subscription would satisfy that want fully. |
| Development team | Implement an online store for Tune Source | Should the project be successful, they would earn tangible benefits in the form of bonuses along with intangible ones which are increased reputation and referral from Tune Source. |

Table 1 Stakeholders who can create requirements and their interests

## Functional and non-functional requirements of the project

|  |  |  |  |
| --- | --- | --- | --- |
| ID | User stories | F/NF | Explanation |
| 1 | As a customer, I want to be able to browse Tune Source on my phone and make purchases on the device | F | This is a requirement that involves user interaction; thus, it is a functional requirement. As smartphones are the dominant internet device, a mobile-friendly online store will be able to bring and keep more customers, making the company prosper further. It is an essential aspect for an online store to have |
| 2 | As the chief accountant, I want Tune Source to be able to connect and work with payment services like PayPal, Momo, bank apps | F | The implementation of this feature would allow the user to have more choices in how they pay for the items from the store, positively affecting the user interaction, and making this a functional process. Furthermore, shaking hands with third-party payment systems would eliminate the need for an in-house solution, keeping the development cost and time lower while giving the customer peace of mind and ease of use due to how simple it is to use these services and how famously secure they are. |
| 3 | As the warehouse manager, I want Tune Source to integrate third-party shipping services, allowing the customers to choose what shipping service provider they want when checking out | F | This is a requirement for the user's experience along with the business process, making this a functional one. Traditionally, the company has already worked with shipment services to deliver the products to the customers' hands so it is natural that the online store would also shake hands with them. Furthermore, integrating these services into the store would automate the information handling between the store, the shipping service, and the customers, reducing time and cost along with mitigating any error in the process. |
| 4 | As the operation director, I want the Tune Source website to be aesthetically pleasing | F | This is a functional requirement due to the fact that it revolves around the experience of the users. Aesthetics is important as the website needs to show the store's uniqueness in design, attracting more customers. |
| 5 | As a customer, I want to be able to create a Tune Source account | F | This is a functional requirement because it is about user interaction. Allowing the customer to create an account would let them more easily track the orders that they've made, manage their cart should they switch devices, set up default information so they do not have to manually fill their billing and delivery information every time they want to make a purchase. |
| 6 | As a user, I want to be taken to the login page when I try to play a song before being logged in | F | This is a requirement that is about user interaction, making this a functional requirement. Redirecting the user to the login page when they try to play a song without logging in would save them the time of finding a log-in button, thus improving the user experience and satisfaction |
| 7 | As a customer, I saw this cool song and think that my friends would enjoy it, I want a short link to share it and the preview thumbnail should show concise information about the product | F | This is a user interaction requirement; therefore, it is functional. The product's URL should be short so that social media platforms do not automatically flag it as spam. When a URL is shared on social media, a thumbnail of the page would also be provided. This thumbnail should be designed so that a high definition of the product should be displayed when the URL is shared so that the visitor will have a more positive impression of the website before visiting it. |
| 8 | As the operation director, I want the website to load as quickly as possible | NF | This is the requirement regarding the performance of the website. A fast-loading website improves the customer's user experience. Long loading time frustrates the customers and makes them leave the store. To make sure that the customers stay in the store as long as possible, a fast-loading time is essential to the system's performance |
| 9 | As the Managing Director, I need the system to protect the customers' information along with all the data to be protected as tightly as possible | NF | This requirement regards the security of the system, making it non-functional. Security is an essential feature of every online store; Lizzie's is not an exception. When a customer creates an account, they have entrusted us with their personal information, we need to do our best to protect it. Other data such as employee accounts should also be secured to protect our hard workers. |
| 10 | As the operating director, I want the website to be as accessible as possible | NF | This is a requirement for the usability of the website, making it non-functional.  Accessibility is important as the customers should be able to perform actions with ease on the website, this factor would keep the customer on the website for longer and increase sales for the company. |
| 11 | As the Managing Director, I need the system's maintenance to be as easy as possible | NF | This is a requirement for the effectiveness of the website, making it non-functional. Every time the system needs to be maintained; the website would be down. Downtime is bad for every online business, and developing good maintainability minimizes the downtime of the system, making the practice an important aspect of the project. |
| 12 | As the Managing Director, I need the system's expansion to be as easy as possible | NF | This is a requirement for the effectiveness of the system, making it non-functional. The website will grow over time, and when it is time to scale up, a scalable system will allow the development time and labor to be shorter, thus saving cost while giving the website more features in a shorter time. |

Table 2 Functional and non-functional requirement

## Techniques used to gather requirements

Requirements elicitation, also known as requirements collecting, is one of the most complex, error-prone, and communication-intensive phases of software development. It can only be successful with strong customer-developer cooperation. It is necessary to understand what the users truly require. (Lunalovegood, 2021)

### Interviews

Interviews with stakeholders and users are essential for developing effective software. We are unlikely to satisfy users and stakeholders unless we grasp their aims and expectations. We must also identify each interviewee's point of view in order to appropriately assess and handle their contributions. Listening is the talent that allows a great analyst to extract more value from an interview than an average analyst. (tutorialspoint, 2022)

There are five basic steps to doing an interview:

1. Selecting interviewees
2. Designing interview questions
3. Preparing for the interview
4. Conducting the interview
5. Post-interview follow-up

### Join Application Development

The process of starting a new project is known as joint application development. The JAD approach is utilized for technology projects with Application Management that may be implemented for internal organizational operations or for external commercialization. (Avendano, 2021 )

This necessitates workshops or meetings with stakeholders, both IT professionals and business users, in order for them to participate and improve the system in the best way possible. Having both views that might generate inventive ideation for technology is a critical success component. (Avendano, 2021 )

* IBM created the JAD methodology in the late 1970s, and it is frequently the most effective method for gathering information from consumers.
* JAD is an organized procedure in which 10 to 20 users gather under the supervision of a JAD facilitator.
* A facilitator is someone who creates the meeting agenda and conducts the discussion but does not participate in it.
* The facilitator should be knowledgeable about both group process approaches and system analysis and design methodologies.
* A scribe or two assists the facilitator by taking notes, producing copies, and so forth.
* The JAD group meets for numerous hours, days, or weeks until all topics have been explored and all necessary information has been gathered.
* The majority of JAD meetings are held in a specially equipped conference room.
* The conference space is frequently set up in a U form so that all attendees can see each other easily.

Steps to conduct a JAD are:

1. Select participants
2. Design the JAD session
3. Prepare for the JAD session
4. Conduct the JAD session
5. Post-JAD follow-up

### Questionnaires

* A questionnaire is a collection of written questions designed to elicit information from persons.
* Questionnaires are frequently employed when a significant number of people's information and views are required.
* When compared to paper questionnaire distribution, electronic dissemination can save a large amount of money.

### Document Analysis

* Document analysis is frequently used by project teams to understand the current system.
* Unfortunately, most systems are not thoroughly documented because project teams fail to record their projects as they progress, and once the projects are completed, there is no time to go back and document them.
* There are several useful papers in the organization:
* Reports, memorandums, policy guides, user training manuals, organizational charts, and forms on paper

### Observation

* Observation, or the act of observing processes take place, is a strong technique for gaining insight into the current system.
* Observation is an excellent technique to validate information obtained from other sources such as interviews and surveys.
* The idea is to keep a low profile, not disrupt those who are working, and not affect those who are being monitored.

### Technique chosen

For Tune Source, the technique chosen to gather requirements is Interview. With this method of requirements gathering, the member of the development team is able to work with each stakeholder individually, helping them focus more well on the process of communicating the requirements they need from the system.

## Interview questions

|  |  |  |
| --- | --- | --- |
| No | Stakeholder | Question |
| 1 | Customer | What do you want to happen when you want to share a song to your friends through social media? |
| 2 | Customer | What do you want to happen when you try to listen to a song but you are not logged into the website yet? |
| 3 | Operation director | How do you want the website to be like appearance-wise? |
| 4 | Warehouse manager | What feature do you want to system to have relating to your job at the company? |
| 5 | Customer | On what device do you plan on using Tune Source's services? |
| 6 | Operation director | What is your expectation of the performance of the to-be-implemented system? |
| 7 | Managing Director | What do you expect of the system regarding maintainability? |
| 8 | Managing Director | What do you expect of the system regarding expandability? |

Table 3 Interview questions

## Use-case

### Signs up for a subscription

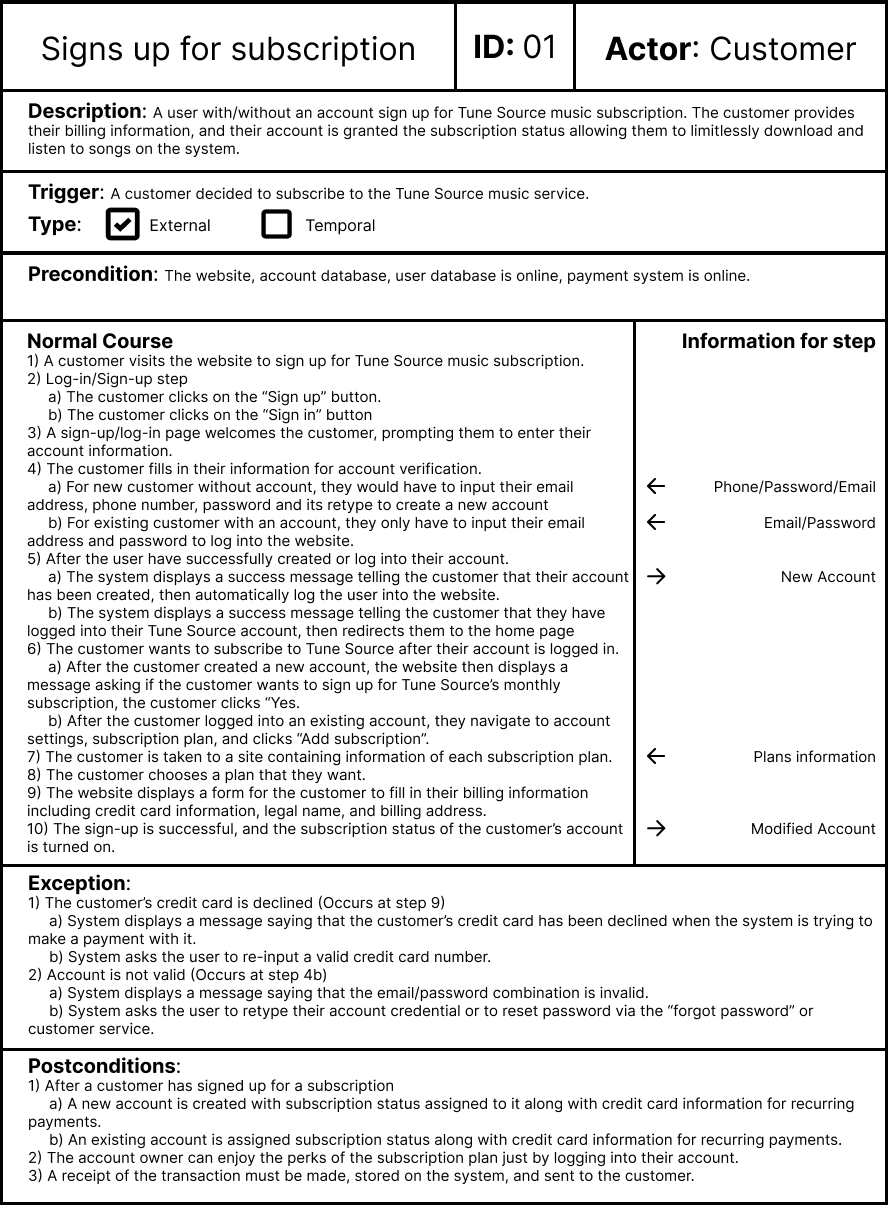


Figure 1 Use case: Signs up for subscription

### Buys a gift card

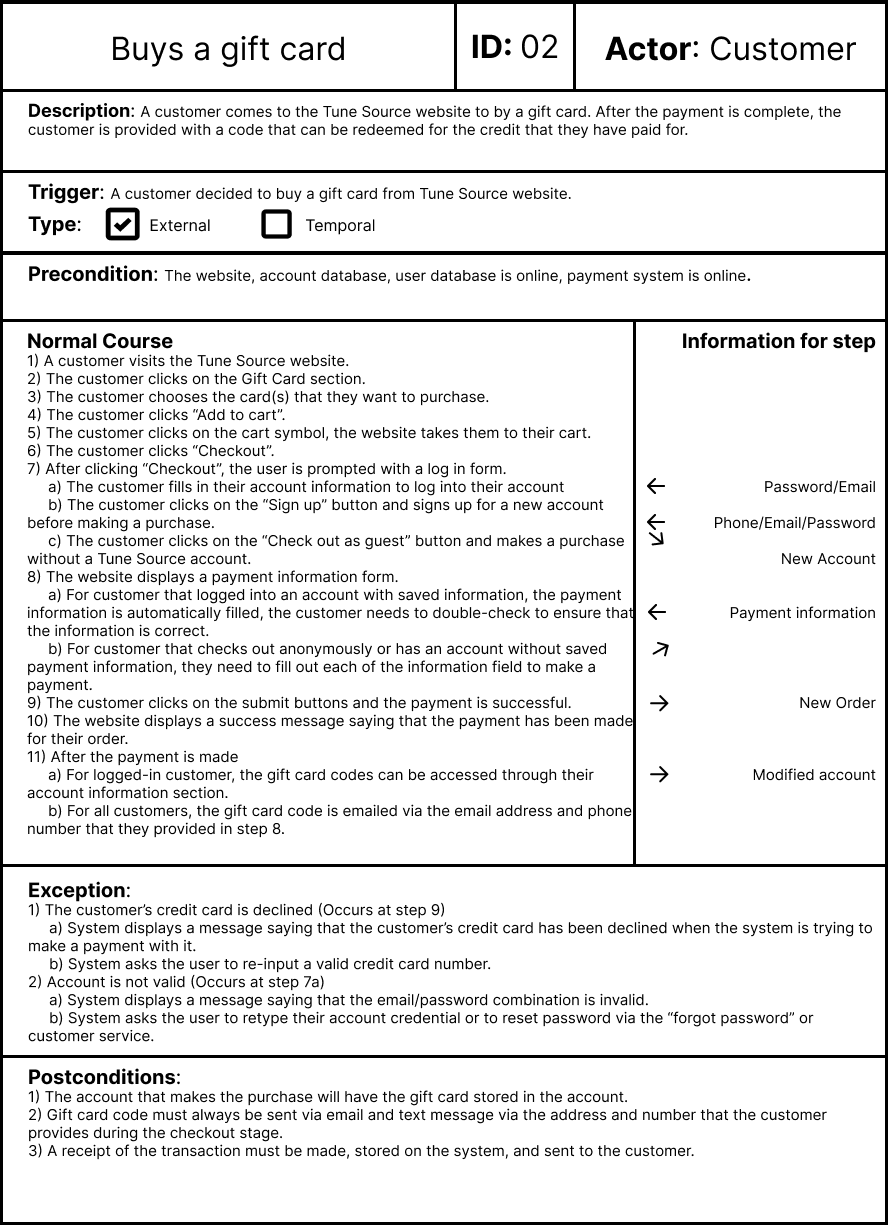


Figure 2 User case: Buys a gift card

## Data flow diagram

### DFD 0

Diagram

Description automatically generated

Figure 3 Context diagram (DFD 0)

### DFD 1

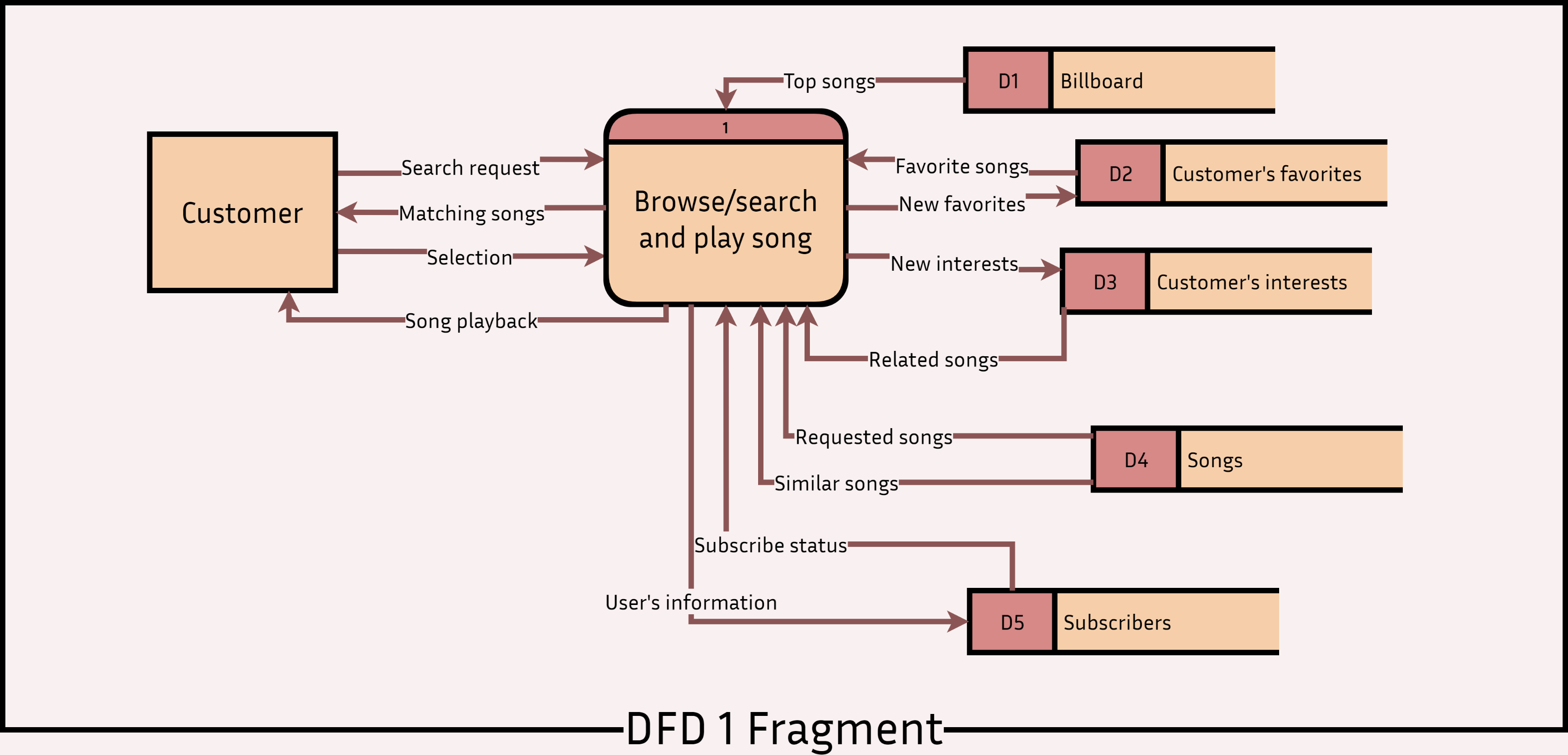


Figure 4 DFD 1 Fragment - Browse/search and play song

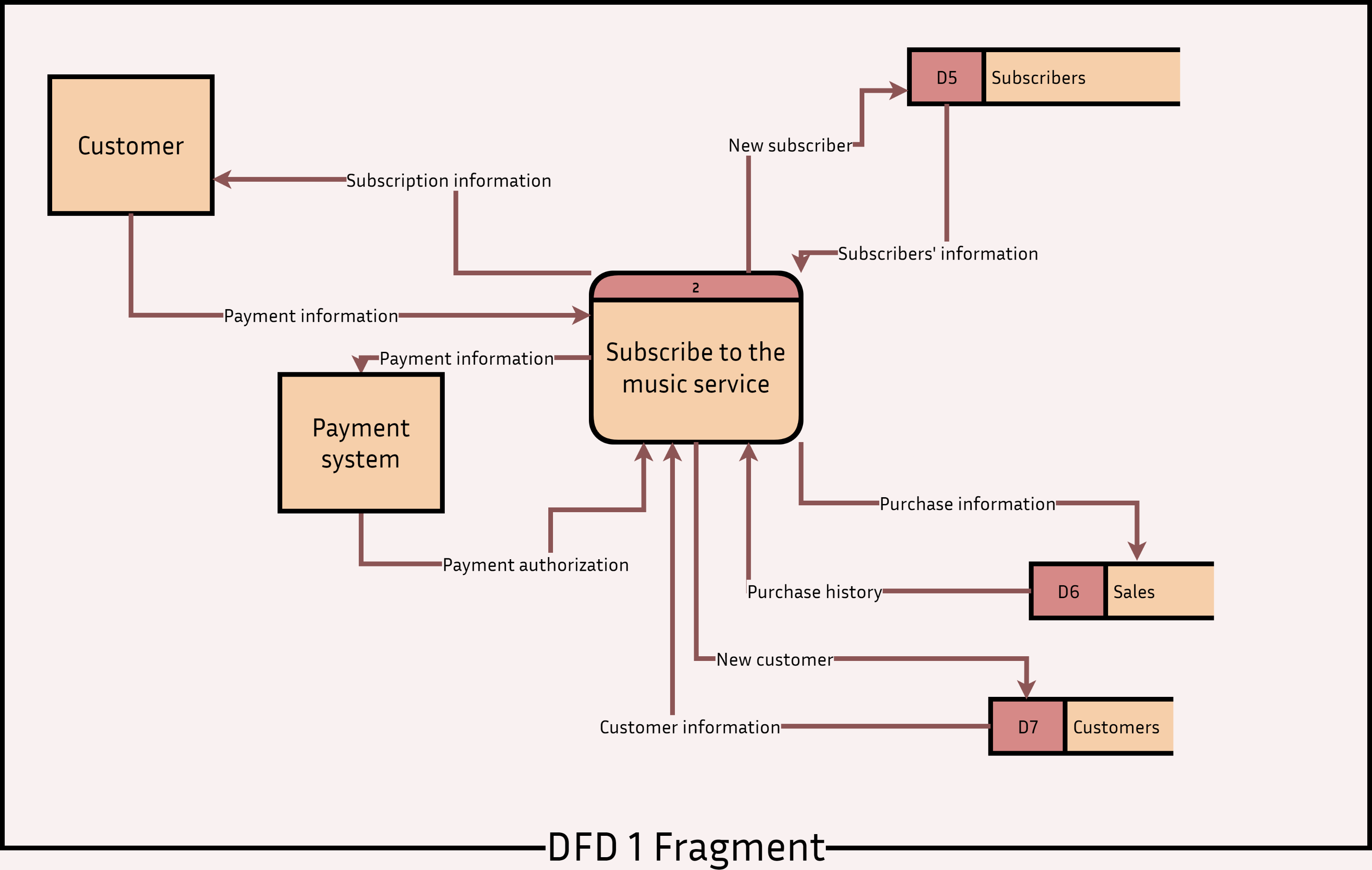


Figure 5 DFD Fragment 1 - Subscribe to the music service

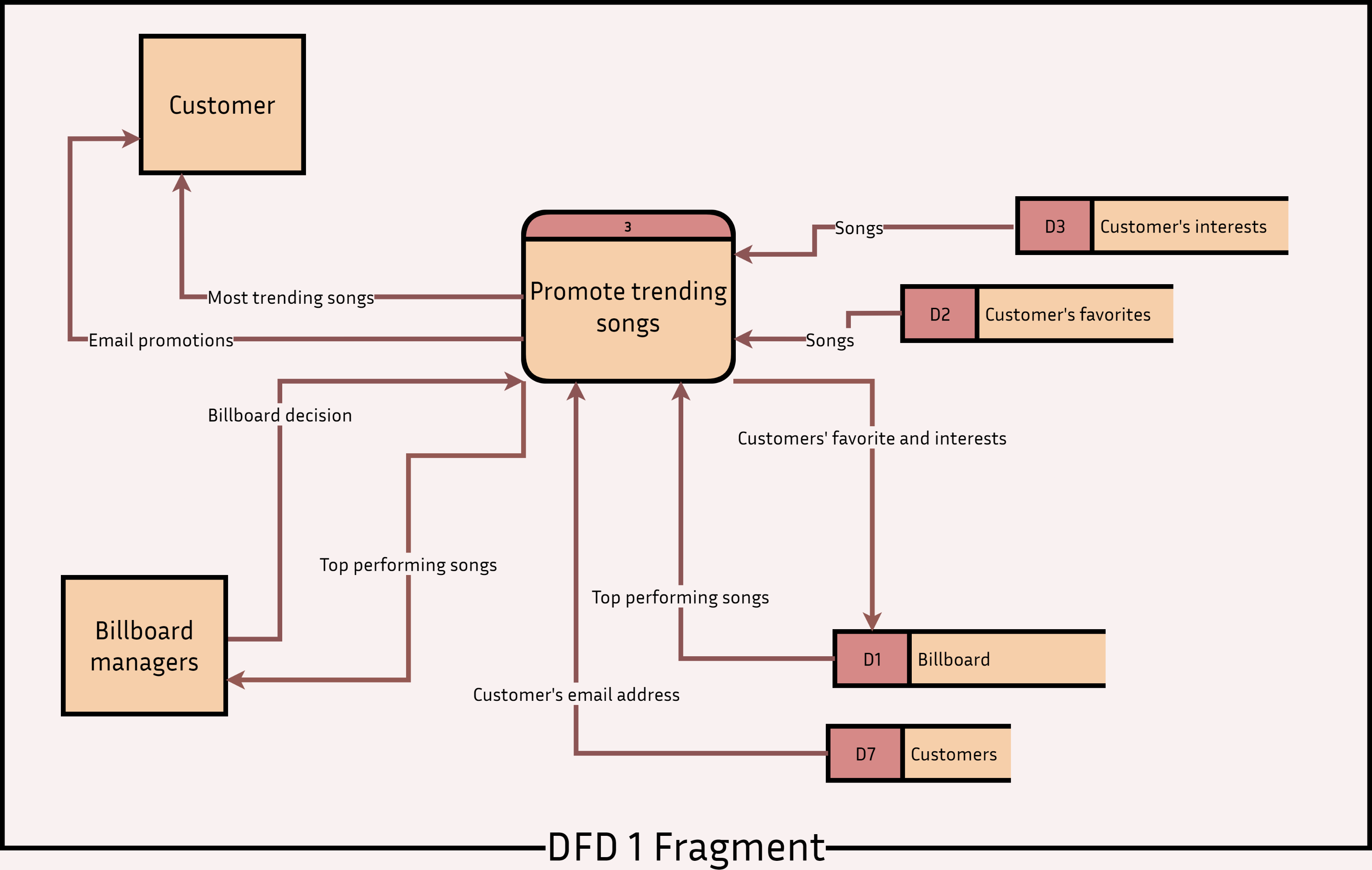


Figure 6 DFD 1 Fragment - Promote trending songs

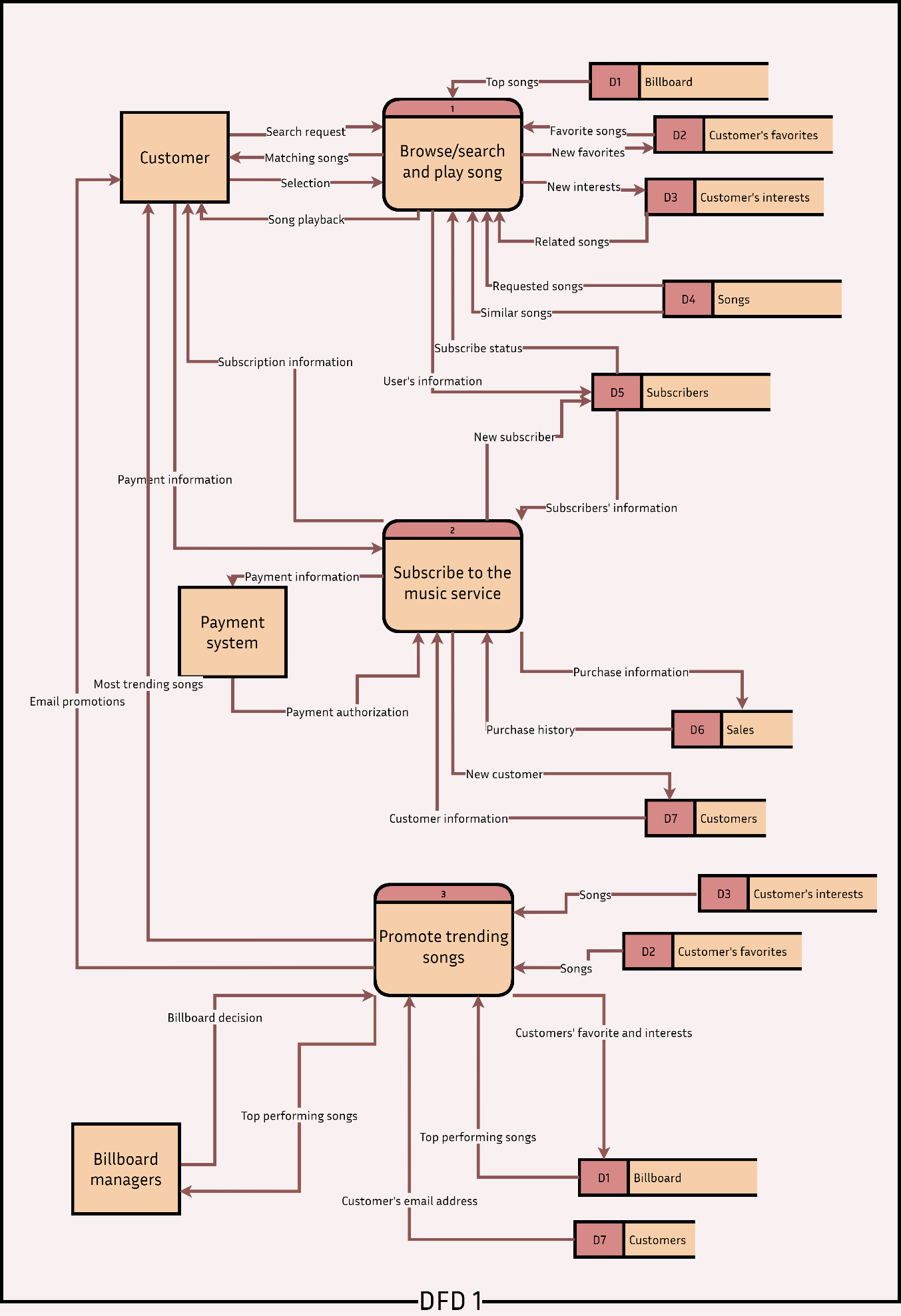


Figure 7 DFD 1

## Entity relationship diagram

Diagram

Description automatically generated

Figure 8 Entity-relationship diagram

## Flowchart

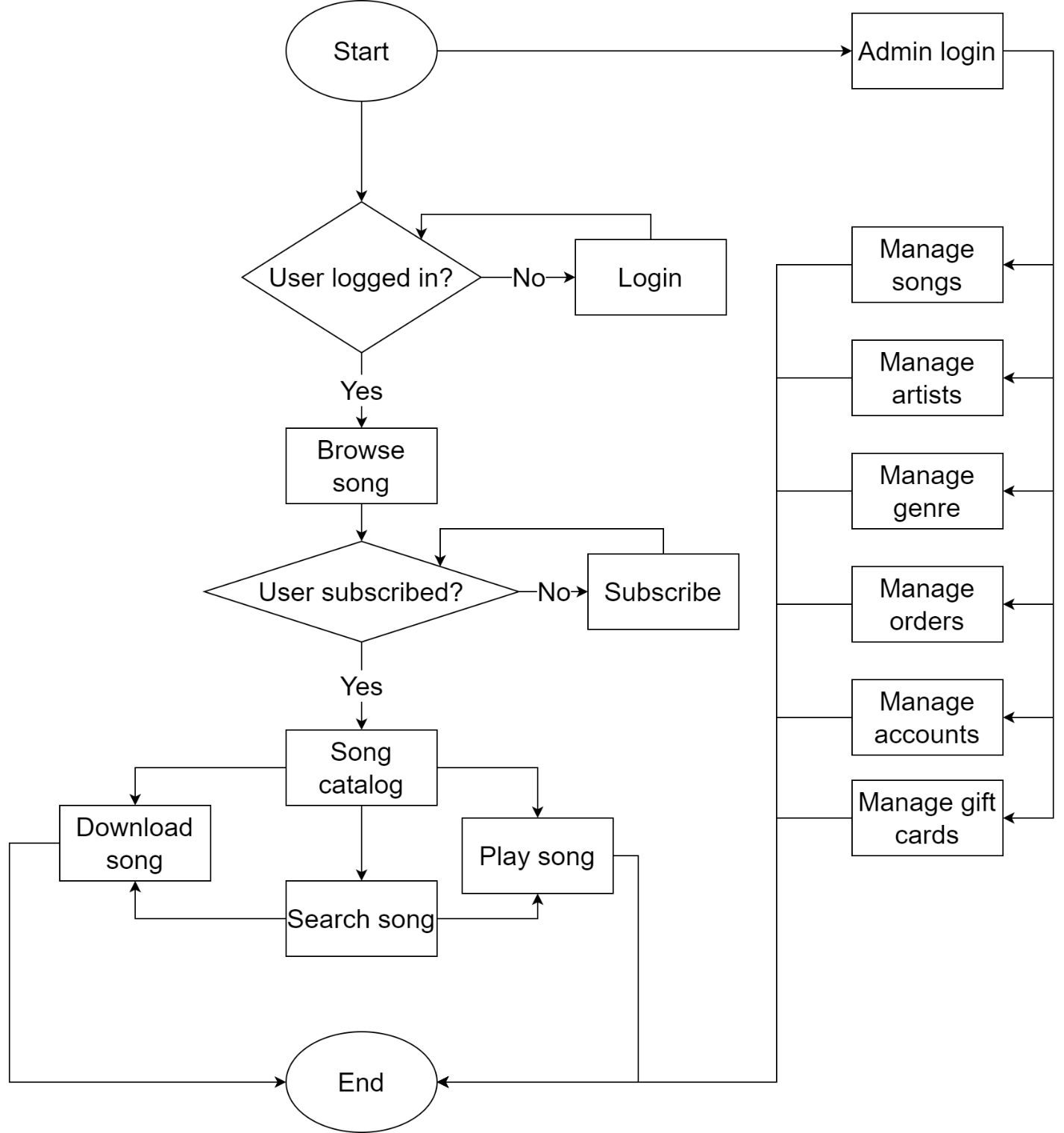


Figure 9 Flowchart

## Class diagram and activity diagram

### Class diagram

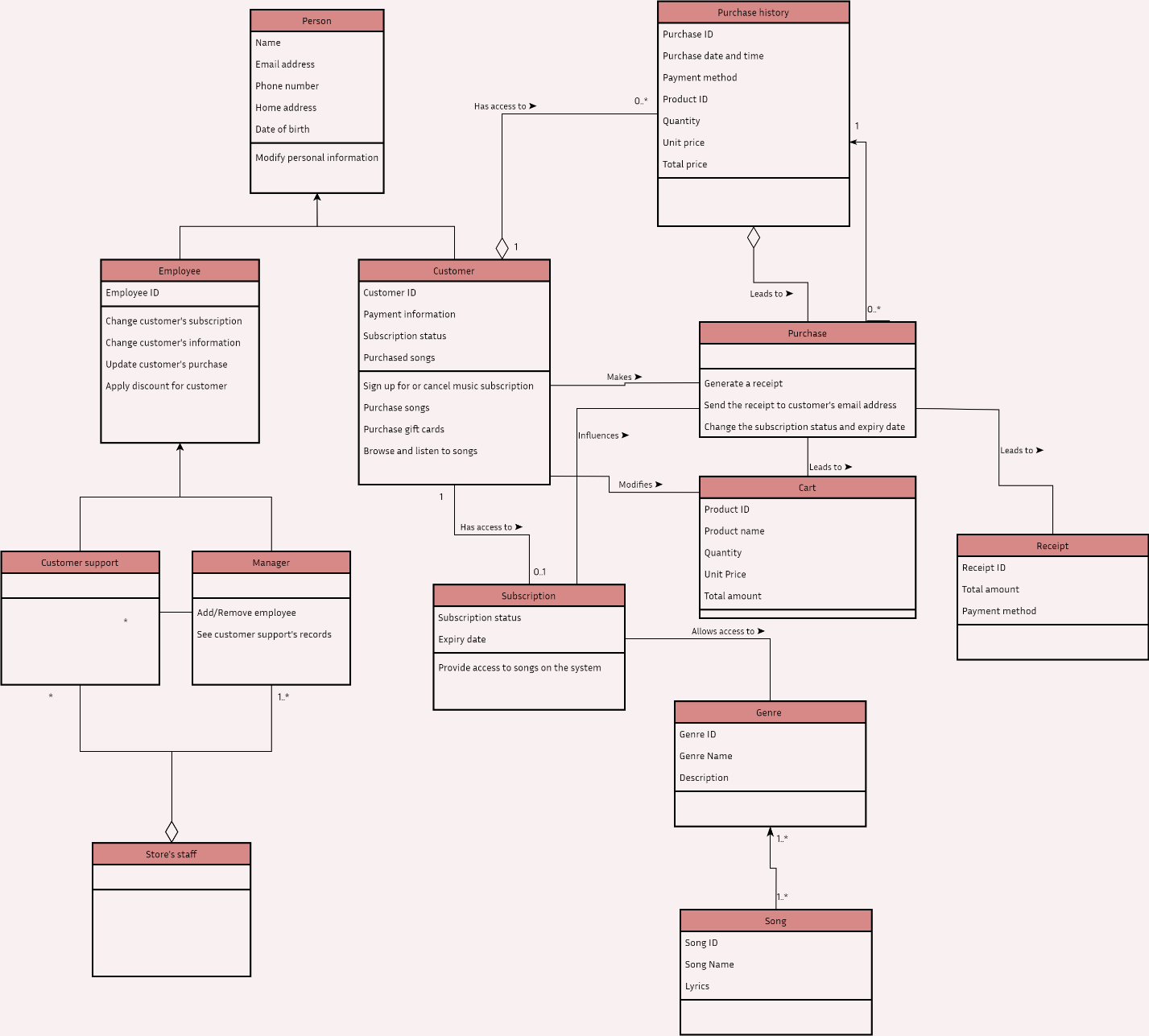


Figure 10 Class diagram

### Activity diagrams

#### Subscribing to the music streaming service

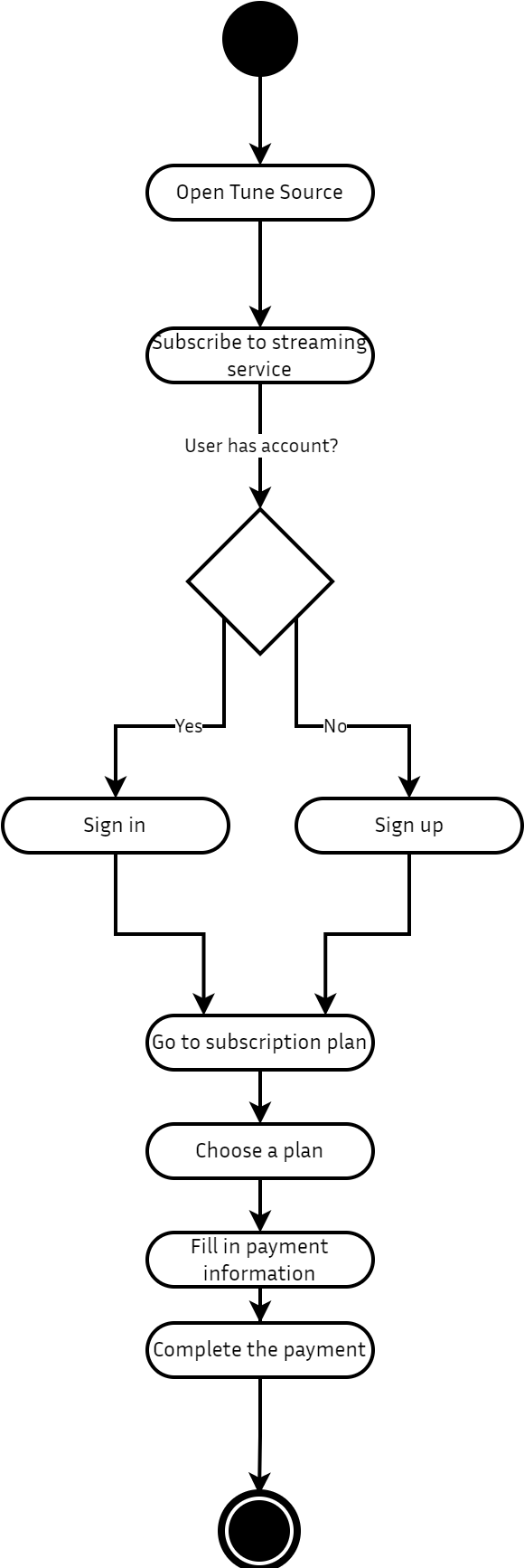


Figure 11 Activity diagram of signing up for subscription

#### Buying gift card

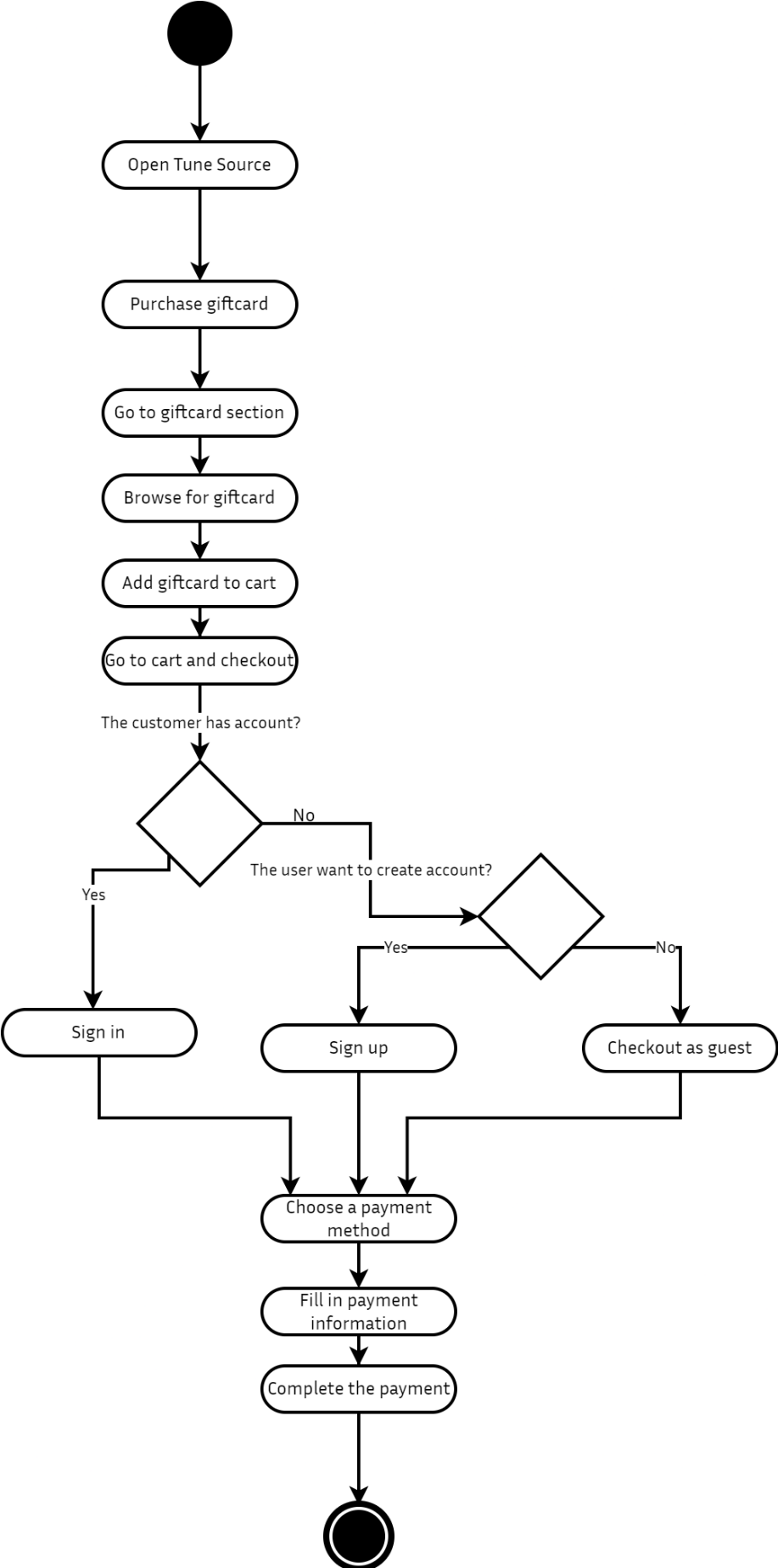


Figure 12 Activity diagram for buying a gift card

# Design

## Pseudocode

// Login Pseudocode

begin

valid input\_password:=false

valid input\_username:=false

logged\_in:false

while(logged\_in=false)do

begin

print("Please enter Username:")// input Username

readln(inputted\_username)

writeln("Please enter Password:")// input Password

readln(inputted\_password)

// begin matching process if inputtted\_username is in Login\_Dictionary then

// match inputted login details with eache#isting valid set of Login letails fromthe Login Dictionary

valid input\_username:=true

if

else

end if else

then

        inputted\_password is in Login\_Dictionary then

        valid input\_password:true // Username and Password are both matched

        logged\_in:=true

        writeln("Logins letails have been validated)

else

        valid input\_password:=false // If username was matched but password wasnt

        logged\_in:false

        writeln("Error your username or password was invalid")

end if

end while

if

end

        valid input\_username=false // If username wasn't matched.

        logged\_in:=falsewriteln("Error your username or password was invalid")

        logged\_in=true

        writeln("You have been logged in")

        writeln("You could not be logged on due to false Login details")

        end if

end

## Actual code

public static void loginUser(String userName, String userPassword) {

        String fileName = "user.csv";

        readUserFromFile(fileName, userList);

        isLogin = false;

        for (UserModel user : userList) {

            if (user.getUserName().equals(userName) && user.getUserPassword().equals(userPassword)) {

                isLogin = true;

                break;

            }

        }

        if (isLogin) {

            JOptionPane.showMessageDialog(null, "Login successfully");

            // go to StudenListGUI

            StudentListGUI studentListGUI = new StudentListGUI();

            studentListGUI.setVisible(true);

        } else {

            JOptionPane.showMessageDialog(null, "Login failed");

            // reopen LoginGUI

            LoginGUI loginGUI = new LoginGUI();

            loginGUI.setVisible(true);

        }

    }

    // Check if the input userName and userPassword is correct

    public void checkLogin(String userName, String userPassword) {

        String fileName = "user.csv";

        readUserFromFile(fileName, userList);

        isLogin = false;

        for (UserModel user : userList) {

            if (user.getUserName().equals(userName) && user.getUserPassword().equals(userPassword)) {

                isLogin = true;

                break;

            }

        }

        if (isLogin) {

            JOptionPane.showMessageDialog(null, "Login successfully");

        } else {

            JOptionPane.showMessageDialog(null, "Login failed");

        }

    }

This is a piece of code for the login function. The system first would load the file that contains all the Tune Source’s accounts. Then it takes the login credentials that the user has input, matches it with the data in the file. If the system is able to find a match, the user would be logged into Tune Source. Otherwise, the user is stuck on the login page with an error message asking the user to re-enter valid account credentials.

## Wireframes

### Log in

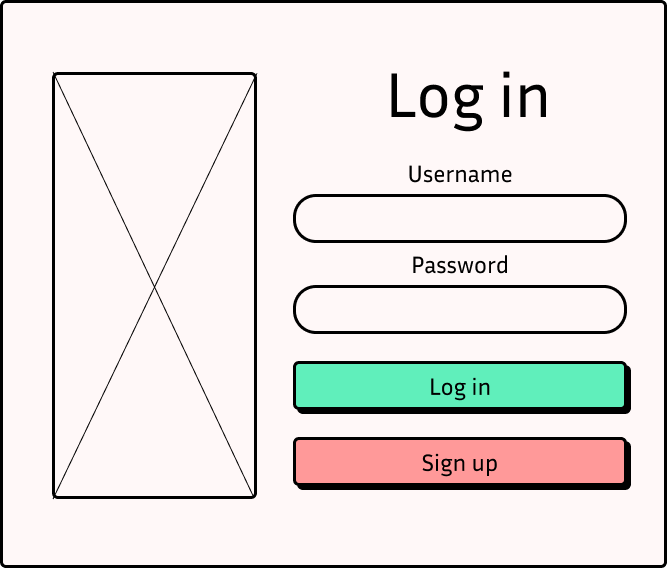


Figure 13 Wireframe for log in

### Register

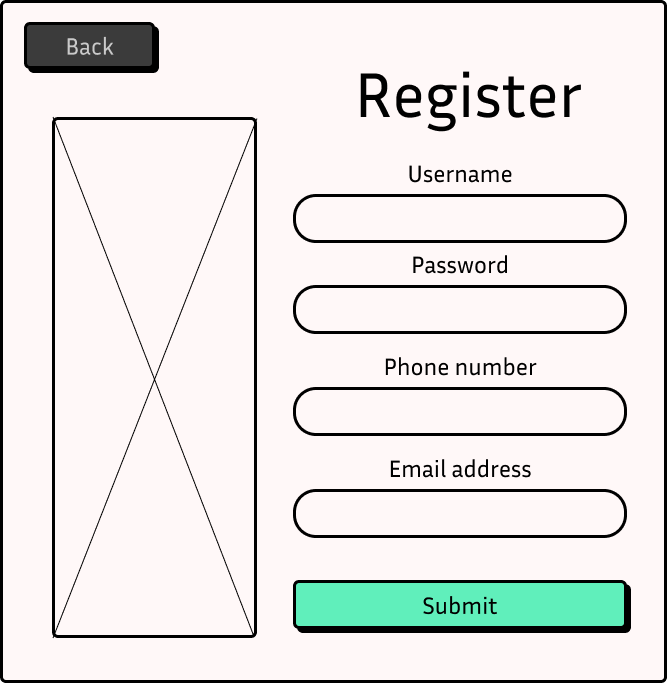


Figure 14 Wireframe for registration

### Browsing song

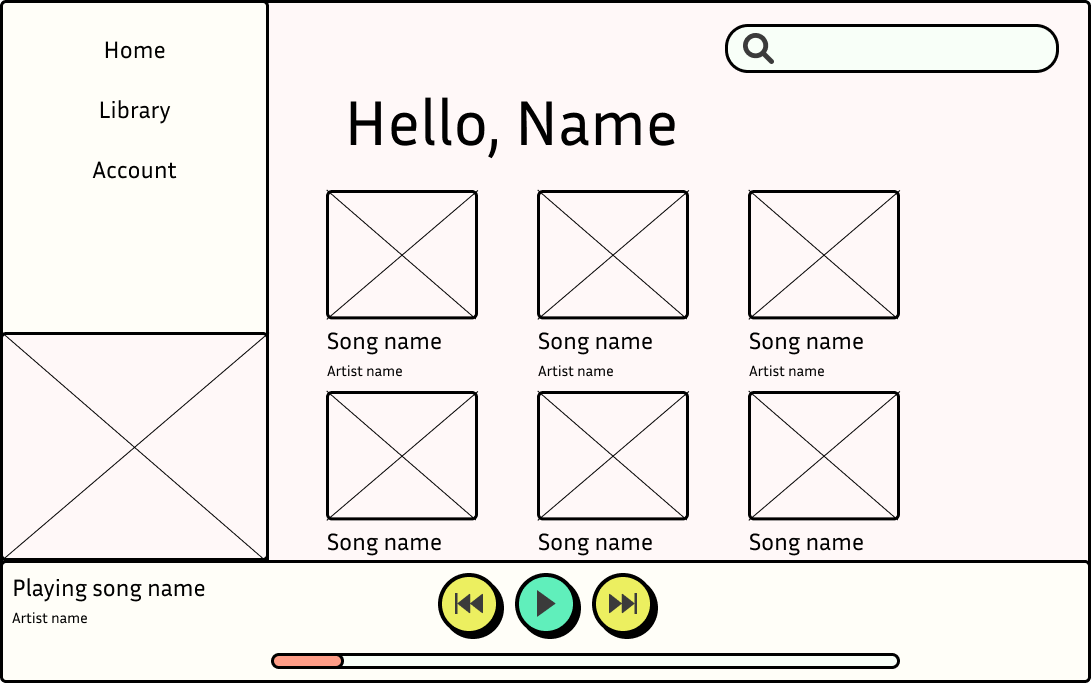


Figure 15 Wireframe for browsing songs

### Cart

Diagram

Description automatically generated

Figure 16 Wireframe for cart

### Checkout/invoice

Table

Description automatically generated

Figure 17 Wireframe for checkout/invoice

## Test case

|  |  |  |
| --- | --- | --- |
| No | Description | Expected result |
| 1 | Test login function with valid data | The user is logged in and able to access the account's information |
| Test login function with invalid data | The user is not logged into any account |
| 2 | Test playing a song with a subscribed account | The song plays |
| Test playing a song with an account that has not subscribed | The song does not play, and the user is redirected to a page where they can sign up for the subscription |
| 3 | Test buying a gift card with valid credit card information | The transaction goes through, a code for the gift card is sent to the customer's email address and is accessible through their account |
| Test buying a gift card with invalid credit card information | The transaction does not go through, the customer is prompted to re-enter a valid credit card information |

Table 6 Test case table

## Architecture used

For the Tune Source project, the thin client-server architecture would be used to develop the website. As Tune Source has a website for users to play, download music and buy gift card, a client-server architecture is needed to establish communication between Tune Source and the user to transfer back and forth the data that each party needs and wants such as music files or credit card information.

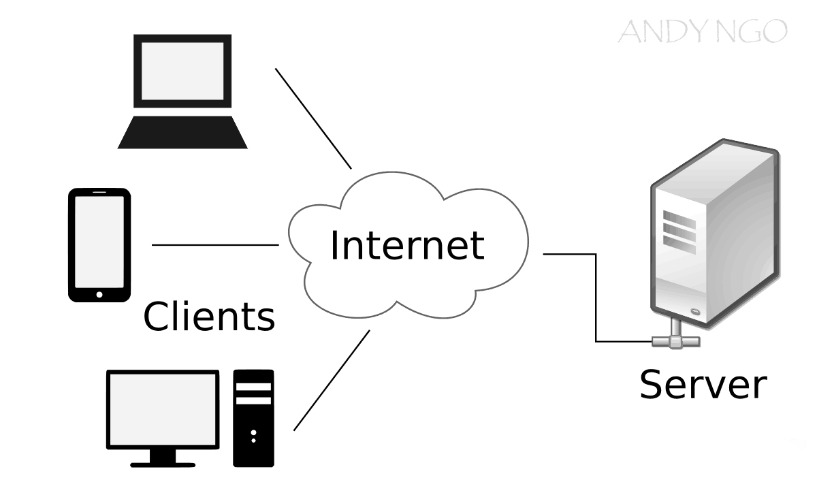


Figure 18 Client-server model

Thin client is a computer inside the server that handle a portion of the application before the data is finally sent to the user instead of the data being sent straight from the server’s storage. This way Tune Source website and application would take less resource on the user’s device, making it more accessible on lower performance devices such as low-end smartphones.

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