ASSIGNMENT 2 FRONT SHEET

Qualification	**BTEC Level 5 HND Diploma in Computing**		
Unit number and title	Unit 9: Software Development Life Cycle		
Submission date	22/03/2021	**Date Received 1st submission**	
Re-submission Date		**Date Received 2nd submission**	
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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.			
		Student's signature	CAONGUYEN

Grading grid

P5	P6	P7	M3	M4	M5	M6	D3	D4

❒ Summative Feedback:	❒ Resubmission Feedback:

Grade:	Assessor Signature:	Date:

Internal Verifier's Comments:
Signature & Date:

ASSIGNMENT 2 BRIEF

Qualification	**BTEC Level 5 HND Diploma in Computing**		
Unit number	Unit 9: Software Development Life Cycle		
Assignment title	Undertake a software development lifecycle		
Academic Year	2019 – 2020		
Unit Tutor	LE Minh Duc		
Issue date		**Submission date**	
Name and date			

Submission Format:	
Format:	The submission is in the form of 1 document. You **must** use the *Times font* with *12pt size*, turn on *page numbering*; set *line spacing to 1.3* and *margins* to be as follows: left = 1.25cm, right = 1cm, top = 1cm, bottom = 1cm. Citation and references must follow the Harvard referencing style. **Word limit**: 3000 words (excluding figures and references). Submissions that exceed this limit will be rejected.
Submission:	You **must** submit the assignment **by the due date** and follow the submission method specified by the Tutor. The submission form is **soft copy**, which is to be uploaded to the following URL: http://cms.greenwich.edu.vn.
Note:	Your assignment *must* be your own work, and not copied by or from another student or from other sources, such as book etc. If you use ideas, quotes or data (such as diagrams) from books, journals or other sources, you must reference the sources, using the Harvard style. Make sure that you know how to reference properly and that you understand the plagiarism guidelines. **Plagiarism is a very serious offence**, which will result in a failing grade.
Unit Learning Outcomes:	
LO3 Undertake a software development lifecycle. **LO4** Discuss the suitability of software behavioural design techniques.	
Assignment Brief and Guidance:	

Tasks

At this stage, you have convinced Tune Source to select your project for development. Complete the following tasks to analyse and design the software.

Task 1 – Analysis (1)

1. (P5.a) Identify the stakeholders, their roles and interests in the case study.

   Review the requirement definition of the project. Clearly indicate which stakeholder(s) provide what requirements.

   Word limit: 150 - 200

   Identify FRs and NFRs of TuneSource Project

   Discuss the relationships between the FRs and NFRs.

   Word limit: 300 – 400 words

2. (P5.b) Discuss the technique(s) you would use to obtain the requirements.

   If needed, you may state suitable additional assumptions about the project in order to justify the technique(s) that you choose.

   Techniques: JAD, Interview, Observation, etc …

   Demonstrate how to collect requirements based on chosen technique

   Word limit: 700 - 1000

3. (M3) Discuss how you would trace these requirements throughout the project.

   Word limit: 400 – 500 words

Task 2 – Analysis (2)

(P6) Analyse the requirements that you identified in Task 1 using a combination of structural and behavioural modelling techniques that you have learnt.

Scope: you only need to construct following items for the system. You will have to include

- Use Case Diagram for the whole system
- Use Case specification for 2 Use cases
- Context Diagram for the whole system
- Data Flow Diagram – Level 0 for the whole system
- ERD for the whole system

Worl limit: 1000 – 1200 words

Task 3 – Design

Based on the analysis result, discuss how you would conduct the design phase:

1. (P7) Discuss how the user and software requirements are addressed in the design phase.

- You will explain how Mockup and Wireframe are used in the project. You should include some of the mockup or wireframe (at least 5) design of the TuneSource project to justify that it matches users' requirements
- You will explain which architecture (client – server, n-tier, microservices, etc.) is suitable for the project with clear illustrations and why
- Then you will address which solution stack could be suitable to implement the project with clear explanations

2. (M5) Discuss how activity diagram and pseudocode are used to specify the software behaviour.
3. (M6) Discuss how UML state machine can be used to specify the software behaviour. Differentiate between FSM And extended FSM using the case study.
4. (D4) Discuss how the data-driven approach improves the reliability and effectiveness of software.

Word limit: 400 - 1500

Task 4 – Software quality management

1. (M4.a) Discuss two software quality attributes that are applicable to the project.
2. (M4.b) Discuss two quality assurance techniques that can help improve the software quality in the project.
3. (D3) Discuss how the design techniques and approaches that you have used can help improve the software quality.

Word limit: 400 - 1500

Learning Outcomes and Assessment Criteria		
Pass	**Merit**	**Distinction**
LO3 Undertake a software development lifecycle		**D3** Critically evaluate how the use of the function design paradigm in the software development lifecycle can improve software quality.
P5 Undertake a software investigation to meet a business need. **P6** Use appropriate software analysis tools/techniques to carry out a software investigation and create supporting documentation.	**M3** Analyse how software requirements can be traced throughout the software lifecycle. **M4** Discuss two approaches to improving software quality.	
LO4 Discuss the suitability of software behavioural design techniques		**D4** Present justifications of how data driven software can improve the reliability and effectiveness of software.
P7 Explain how user and software requirements have been addressed.	**M5** Suggest two software behavioural specification methods and illustrate their use with an example. **M6** Differentiate between a finite state machine (FSM) and an extended-FSM, providing an application for both.	

Contents

Chapter 3 Undertake a software development lifecycle

Tune Source is a company headquartered in southern California. Tune Source is the brainchild of three entrepreneurs with ties to the music industry: John Margolis, Megan Taylor, and Phil Cooper. Originally, John and Phil partnered to open a number of brick and mortar stores in southern California specialising in hard-to-find and classic jazz, rock, country, and folk recordings. Megan soon was invited to join the partnership because of her contacts and knowledge of classical music. Tune Source quickly became known as the place to go to find rare audio recordings. Annual sales last year were $40 million with annual growth at about 3%–5% per year. Tune Source currently has a website that enables customers to search for and purchase CDs. This site was initially developed by an Internet consulting firm and is hosted by a prominent local Internet Service Provider (ISP) in Los Angeles. The IT department at Tune Source has become experienced with Internet technology as it has worked with the ISP to maintain the site.

V. Undertake a software investigation to meet a business need.

a. Stakeholders, their roles, and interests.

- **The stakeholders include:**
  - Partner: Tune Source
  - An on-demand music supplier: Providing music genres at the request of customers.
  - Requirements for system security (when making a website listening to music, the security of the website is high)
  - Customer: Provide functional requirements, useful features on the system.
- **Tune Source Project**
  - We are carried out in accordance with the needs of our partners. An on-demand music provider and a partner for whom we build streaming music systems are among the stakeholders. Throughout the operation, we implement security and accessibility specifications.
- **Benefits:**
  - Free access to the website under admin.
  - Download all genres of music for free.
  - Free access and customization as well as listening to music.
  - Enjoy commissions and benefits from the project.
- **Roles:**
  - Not to leak information and to publicize to outside unreleased tracks, and to ensure that no customer information is stolen.
- **FRs and NFRs of Tune Source Project**
  - ✓ **Functional requirement**

- Log in / Log out / Register
- Listen to Music
- Order
- Manage product
- Manage Music
- Manage Account
- Manage Order Details
- Note: All of the management function has included CRUD.

✓ Non-Functional requirement

- Non-functional specifications define system characteristics such as security, reliability, efficiency, maintainability, scalability, and usability (NFRs). They act as constraints or limits to the system architecture on different backlog profiles. We guarantee the system's compatibility and efficiency. Failure to satisfy any of these criteria results in the device failing to meet the company's, customer's, or market's internal demands, or regulatory agencies or consumers failing to meet the mandatory requirements. Norms have been imposed. In certain circumstances, failure to comply will result in serious legal consequences (privacy, security, safety, some issues).
- Our systems are operated and hosted on Cloud Computing. We recommend for partners to use the cloud systems of Microsoft Azure. It ensures the security and operability of the system.

○ Relationships between the FRs and NFRs.

- Software requirements are divided into two parts, FRs and NFRs. FRs determine the functionality, while, NFRs determine how a system is supposed to be. In the literature, we have identified that most of the work is related to FRs. NFRs have received less attention from the goal-oriented requirements engineering community. The aim of this paper is to present a taxonomy of non-functional requirements so that the requirements analyst can easily identify different types of NFRs according to their needs in the early phase of requirements engineering.
- Non-Functional Requirements (NFRs) have been increasingly accepted as crucial to the success of software projects.
- However, the current state of industrial practice is still focusing mainly on functional requirements (FRs) using UML use cases as the main tool for requirements elicitation and modeling. In order to encourage practitioners to focus more on much deserved NFRs, there is a need for frameworks to provide a smooth transition from the use case modeling. This paper proposes such a framework for integrating NFRs with FRs in the use case model. It proposes that key use case model elements, specifically, actor, use case, actor-use case association, and system boundary, be used as association points to provide intuitive context for the NFRs. The framework specifies the scope of each type of NFR association through the formalization of NFR scope propagation rules that take advantage of relationships between use case model elements (specialization, generalization, extends, includes). A process and illustration are presented to demonstrate how to apply the method to a simplified pricing system.

b. In Tune Source, I chose JAD because:

○ Definition of JAD

- Joint Application Development (JAD) is a process that accelerates the design of information technology solutions. JAD uses customer involvement and group dynamics to accurately depict the user's view of the business need and to jointly develop a solution. Before the advent of JAD, requirements were identified by interviewing stakeholders individually. The ineffectiveness of this interviewing technique, which focused on individual input rather than group consensus, led to the development of the JAD approach.

○ When to use JAD

✓ Project Types

- JAD can be successfully applied to a wide range of projects, including the following:
- New systems
- Enhancements to existing systems
- System conversions
- Purchase of a system

✓ Project Characteristics

- Not all projects, however, are good candidates for JAD. An appropriate project exhibits at least some of the following characteristics:
- Involves many groups of users whose responsibilities cross traditional department or division boundaries
- Is considered critical to the future success of the organization
- Involves willing users
- Is a first-time project for the organization
- Has a troubled project history or relationship between the systems and user organizations
- Although the characteristics above describe a good JAD candidate project, all the characteristics should not be present in your first JAD projects. As the development team and the customer become more comfortable with the JAD approach, more complex projects can be undertaken.

○ In Tune Source

- JAD makes it easier to solve problems and develop better, error-free applications.
- Mutual cooperation between the organization and consumers eliminates all risks.
- JAD reduces the costs and time taken to design the project.
- Well-defined demands increase the efficiency of the system
- Change is quicker because of close contact.
- JAD helps the team to drive each other to work harder and deliver on time.

○ Interview

- Interviewing customer help eliminate guesswork. It removes opinions from your marketing strategy and replaces them with facts.
    - It may be appropriate to find undiscovered requests
    - Convergence in a few common requirements will create a repository of usage requirements
    - Throughout the project
    - Doubt will not be substituted for an interview.
- How to avoid prejudice of users when meeting their requirements question? We use questions about user natural problems without regard to any scope.
    - Who is the user?
    - Who is the customer?
    - Do they need a change?
    - Where else can I find a solution to this problem?

○ With question:

- Develop a list of customer interview questions you will need to develop a list of interview questions before you conduct customer interviews and you should seek to understand all stages of how a customer makes a purchasing decision.
- There are a few questions I need to apply to my survey to improve the results, but I'll start with these:
- Needs, pain points, and goals - What motivates the user to look for a solution?
- Research methods, findings, and frustrations How does the user go about gathering all information necessary to start weighing options? What roadblocks do they encounter?
- Selection criteria (including who influenced them and how) - How do they go about making the decision?
- Decision process and outcome - What decision was made and how does the user feel about the process and the outcome?
- To you, how much does a normal song cost?
    - People think about price first when they choose to purchase or pay for something, so this query will help us properly value our product and tailor it to the vast majority of users.
- Would you like to listen to music sample?
    - Based on the requirement of the brief, this question is to make sure that the function we are going to make it necessary for the user
- Do you listen to music online often?
    - The aim is to determine whether or not this person is familiar with online music software and possesses the necessary skills to use online music software to detect website feature errors.
- Should the Tune Source website have a music product review function?
    - The wrong goal is to allow users the right to experience and rate themselves so that if this app is bad, we can both fix the bug and develop the benefits if it is good.
- When using the website to buy music online, what requirements do you need to meet your needs?

- The goal is to learn the requisite web functions, to listen to music online. To be able to build the most full web for users.

- Do you accept that the app should have the ability to save your favorite song to your account?
  - They want to listen to their favorite song and listen again and again without searching many times. With this additional function, the online music website attracts more customers
- I assume that if the survey were conducted on a bigger scale, we would have discovered a much stronger and higher-quality usage criterion. Because of my sample method, there are just too few people and examiners.

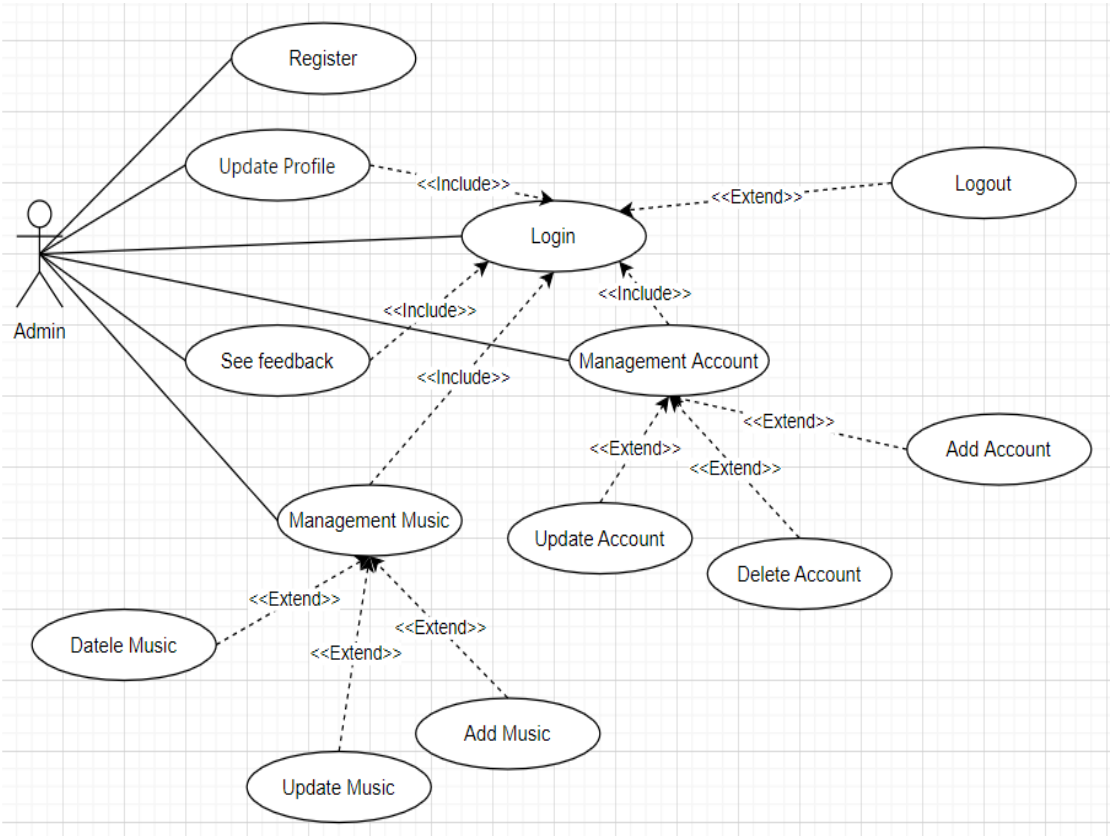
Observation

- Several outlets from trending music blogs, including Zing MP3 were consulted. We received this feedback from real-world humans. These comparative reviews just tell us what needs to be changed and made better observations by our method.

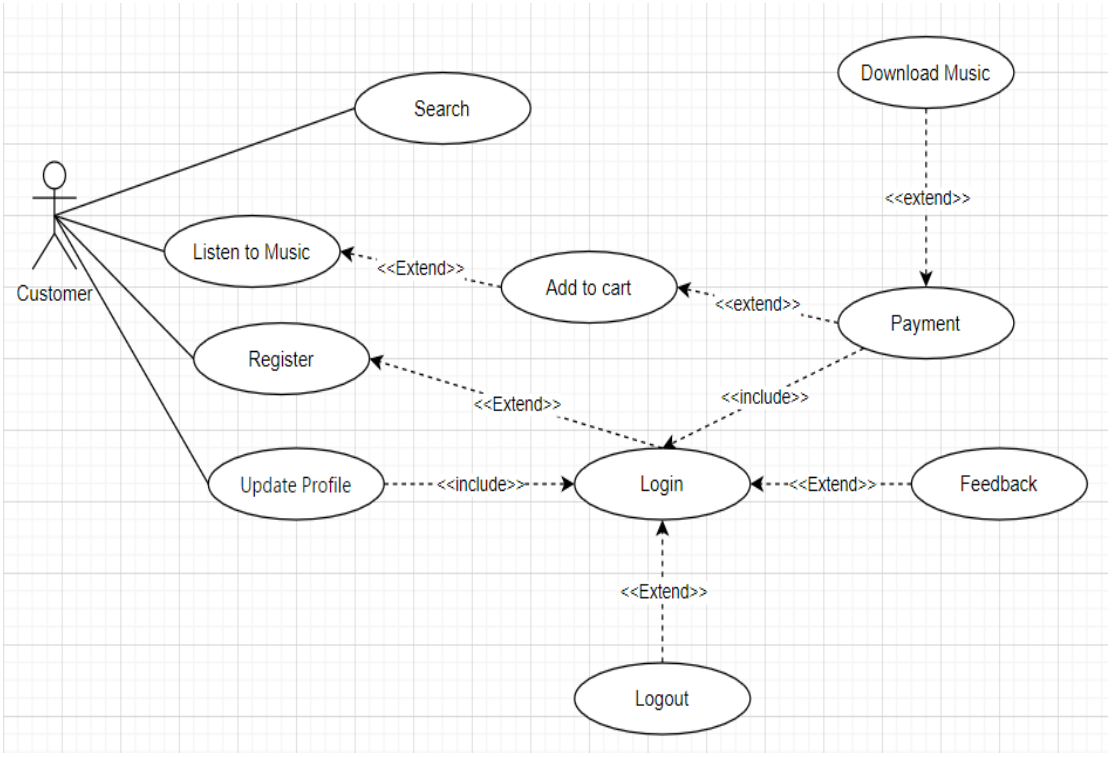
Product	Zing mp3	Out Product
Cost	Medium	Medium
Quality (Song)	Low	High
Playlist	Yes	Yes
Music preview	Yes	Yes
Management	No	Yes
User Experience	Normal	Good

VI. Use appropriate software analysis tools/techniques to carry out a software investigation and create supporting documentation.

User Admin



- **User Customer**



- **UC - Login**

Use Case Name: Login	ID: UC1	Priority: High
Actor: Admin		
Description: An administrator gets login through login page.		
Trigger: Admin use their account to get login Tune Source		
Type: External		
Precondition: ○ required exist data account. ○ Internet connection is required.		
Normal Course: 1. Log in at Tune Source page. 2. Input data account (Username and Password) and click "login". 3. The system authorizes login and allows the administrator to use update delete add information, see the feedback of customer the site. 4. The system records the login activity into a log.		
Post condition: ○ Account online. ○ Admin logins successfully. ○ Admin can get other functions when they are logged in. ○ The system records the login activity successfully.		
Exceptions: ○ The administrator forgot the account. ○ The administrator decides to disable the account. ○ The system authorizes login unsuccessfully and displays a message.		

○ UC - Register

Use Case Name: Register	ID: UC2	Priority: High
Actor: Customer		
Description: Users can register membership accounts through the page "Register" on the website.		
Trigger: Customer registers for an account. Upon successful registration, the customer can log in through the login page and can purchase music.		
Type: External		
Precondition: ○ Customer access the website and choose to register ○ Internet connection is required		
Normal Course: ○ Access to the Register page on the website. ○ Customer access the website and choose to register ○ Customer enter personal information (name, email, phone number, gender, address, password, date of birth) ○ Click the button to submit. ○ The system will store the customer information ○ After successfully register, the customer return to the homepage.		
Post condition: Customer information is stored in the database.		
Exceptions: ○ If the customer's information is inappropriate, the system refuses to create an account and display a message. • Customer cancels the register • Customer re-enter the information ○ If the customer's information is identical to the information already saved, the system refuses to create an account and display a message. • Customer cancels the register • Customer re-enters the information		

- **UC - Logout**

Use Case Name: Logout	ID: UC3	Priority: High
Actor: Admin, Customer		
Description: Admin and User can get log out when they were logged in before.		
Trigger: Admin and customers can log out of the website when they are not in use.		
Type: External		
Precondition: Required logging into the system.		
Normal Course: o Click on the "logout" icon in the toolbar of the website to log out if the customer has logged in before. o Otherwise, use case end.		
Post condition:		
Exceptions: Obligatory the admin and customer login to the website before.		

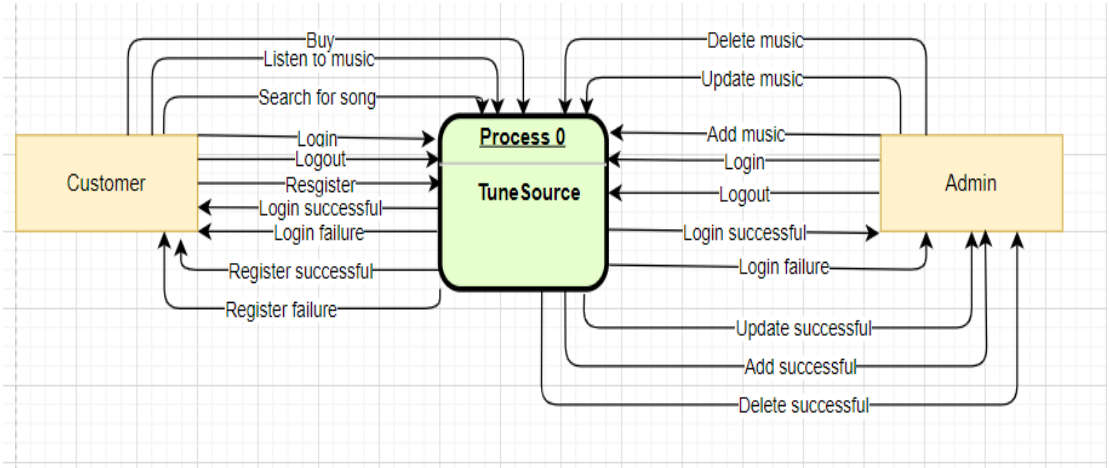
- **UC - Feedback**

Use Case Name: Feedback	ID: UC4	Priority: High
Actor: Customer		
Description: This function allows the customer to send feedback for products		
Trigger: Customer gives feedback for the product.		
Type: External		
Precondition: o The customer logged in successfully. o The customer's device is connected to the internet.		
Normal Course: o Customers choose the feedback tab. o The customer enters content to feedback. o Customer click "post" button. o The system will save feedback into the database.		
Post condition: Customer give feedback successfully		
Exceptions: o The feedback content is below 1000 characters. o If customers enter the feedback content over 1000 characters. The system will display customers to shorten the content feedback. • The system will notify customers to enter more than 1000 characters and request customers to re-enter. • Customer cancel feedback		

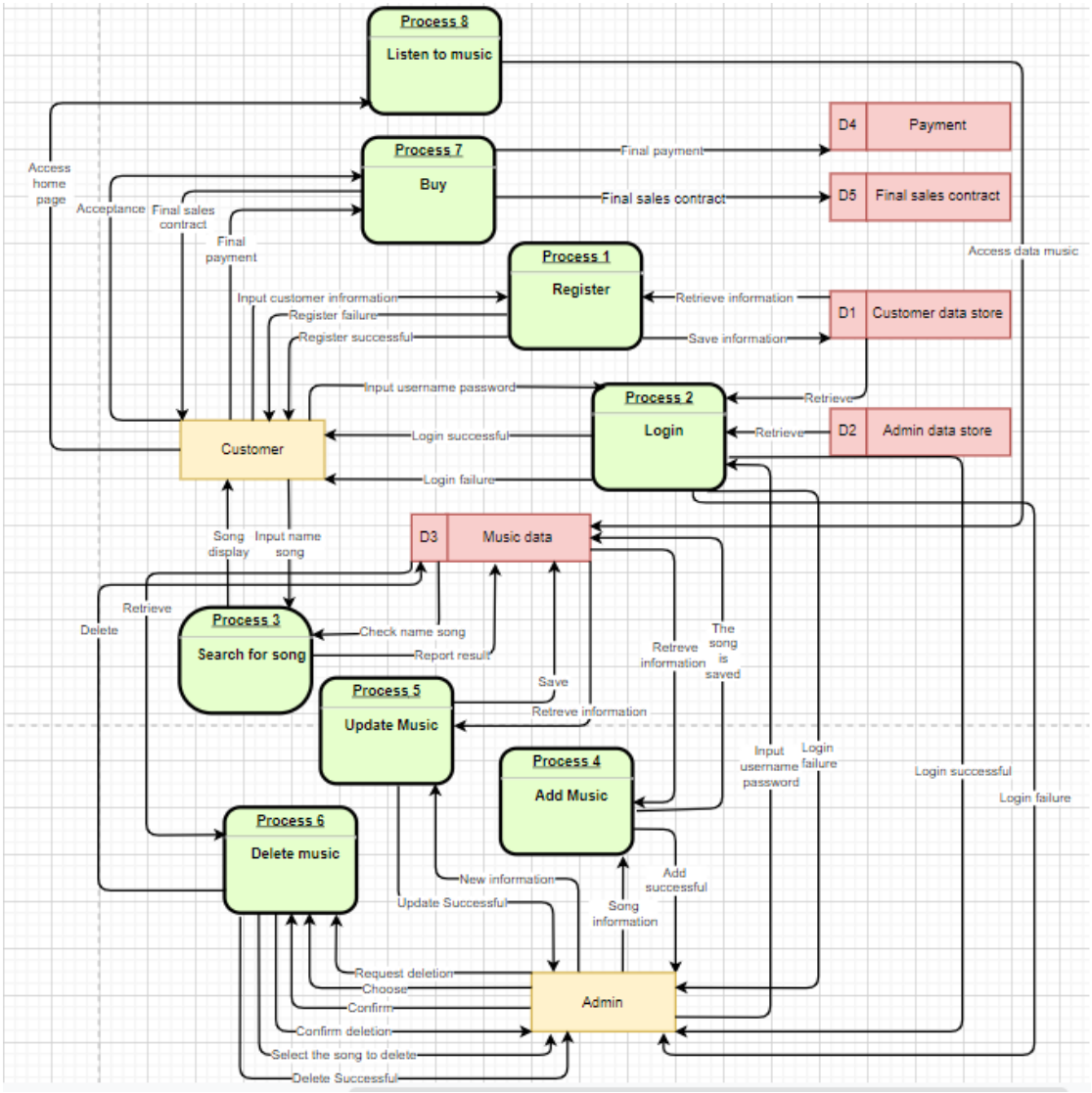
- **UC - Order**

Use Case Name: Order	ID: UC5	Priority: High
Actor: Customer		
Description: Customer that have previously logged into the system will be able to buy music songs.		
Trigger: Customers can buy any song they like in the Order.		
Type: External		
Precondition: ○ Required logging into the system. ○ Internet connection is required.		
Normal Course: ○ Logged into the system with a Customer account. ○ Customer can listen to music before choosing Order		
Post condition: Online account required		
Exceptions: ○ Ask the customer to provide the age when ordering, there may be age-restricted music genres. ○ The system will display a message. when the customer provides the age • The customer has successfully ordered. • Customer order failed (cancel).		

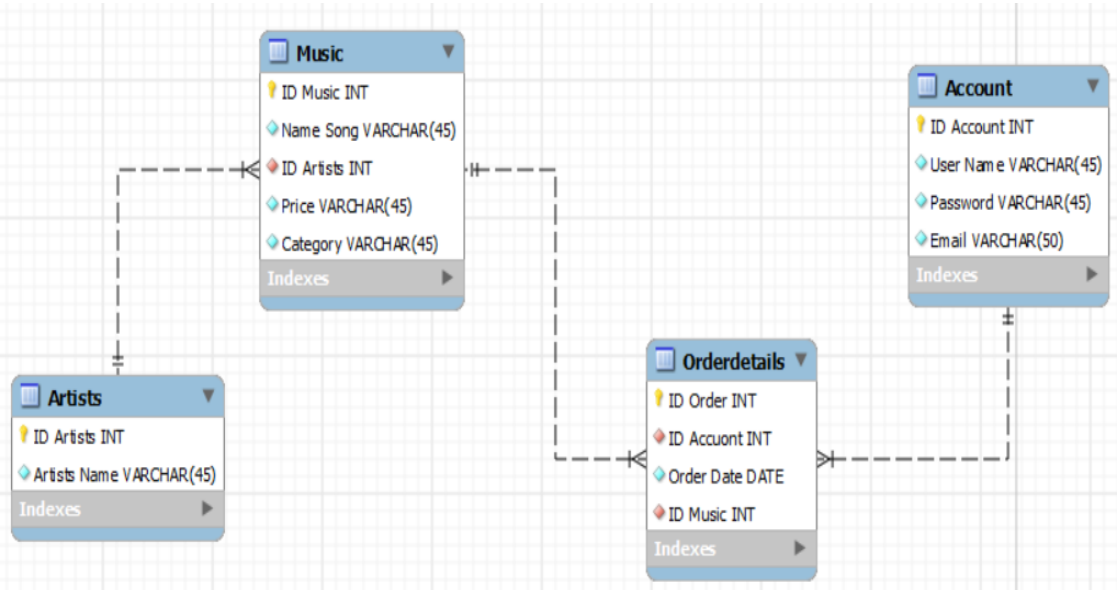
- **Context Diagram for the whole system**



- **Data Flow Diagram - Level 0 for the whole system**



- **ERD for the whole system**

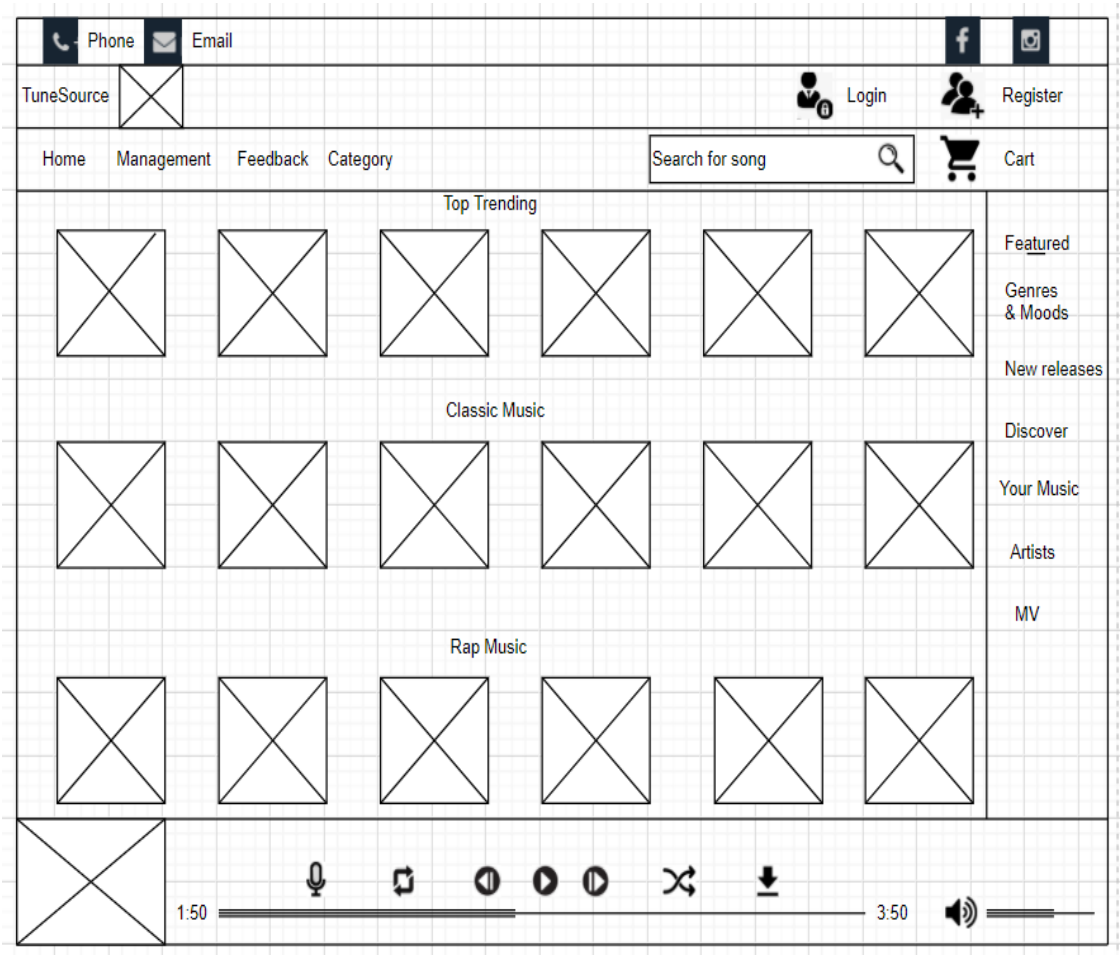


VII. Explain how user and software requirements have been addressed.

- In the Tune Source system, there are functions that can satisfy the user's requirements.
    - Register
    - Login
    - Logout
    - Update Profile
    - Search for song
    - Listen to music
    - Payment/ Download

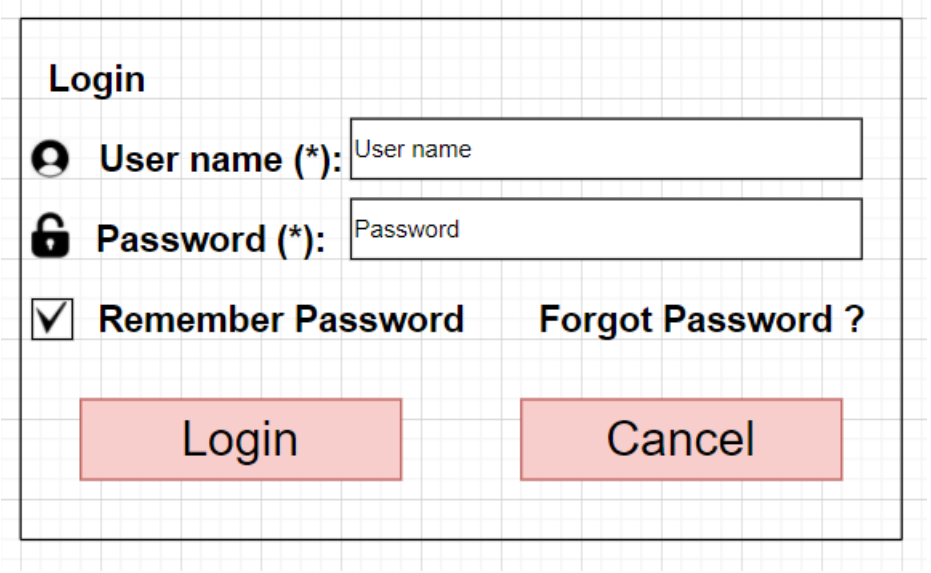
Home Page

- Customer and admin can log in here, users can view products and register their accounts, listen to music, search for a song, Feedback and update information, but administrators can perform the function as add, edit, see feedback and delete music, account, and may perform the function as add, edit, and delete in "Management Music", "Management Account".

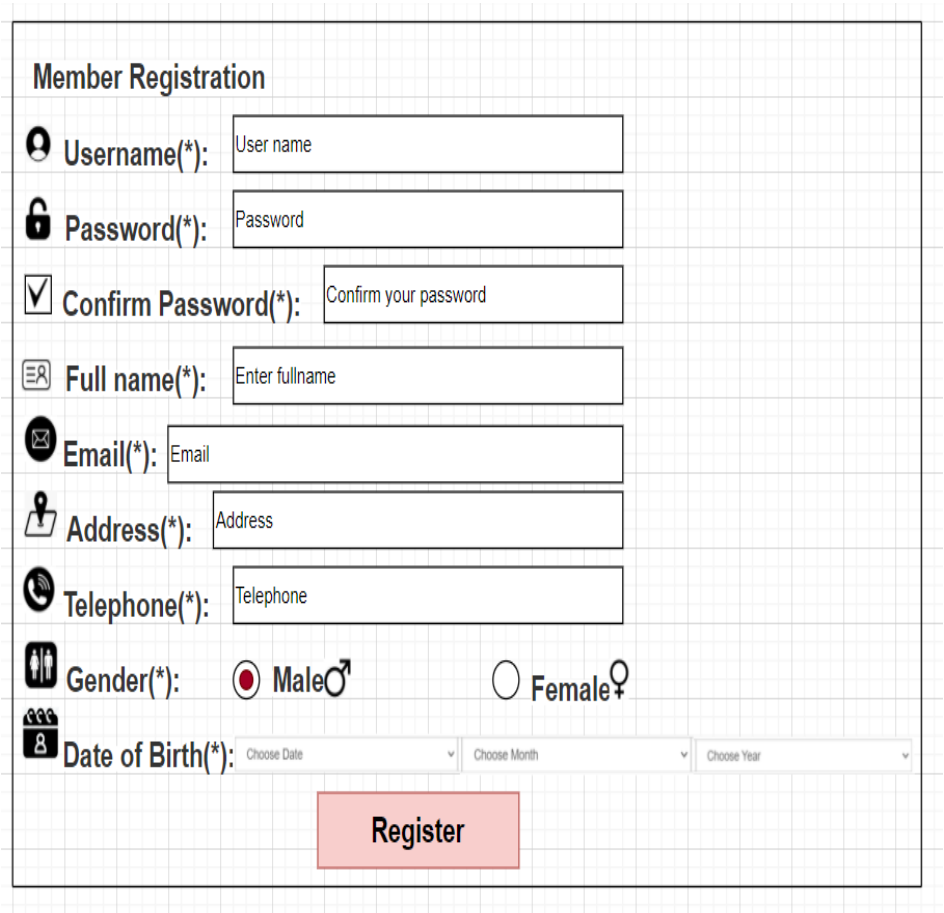


Login page

- The login page created for the purpose of accessing the web for both customers and administrators to access the site carry out the necessary issues.

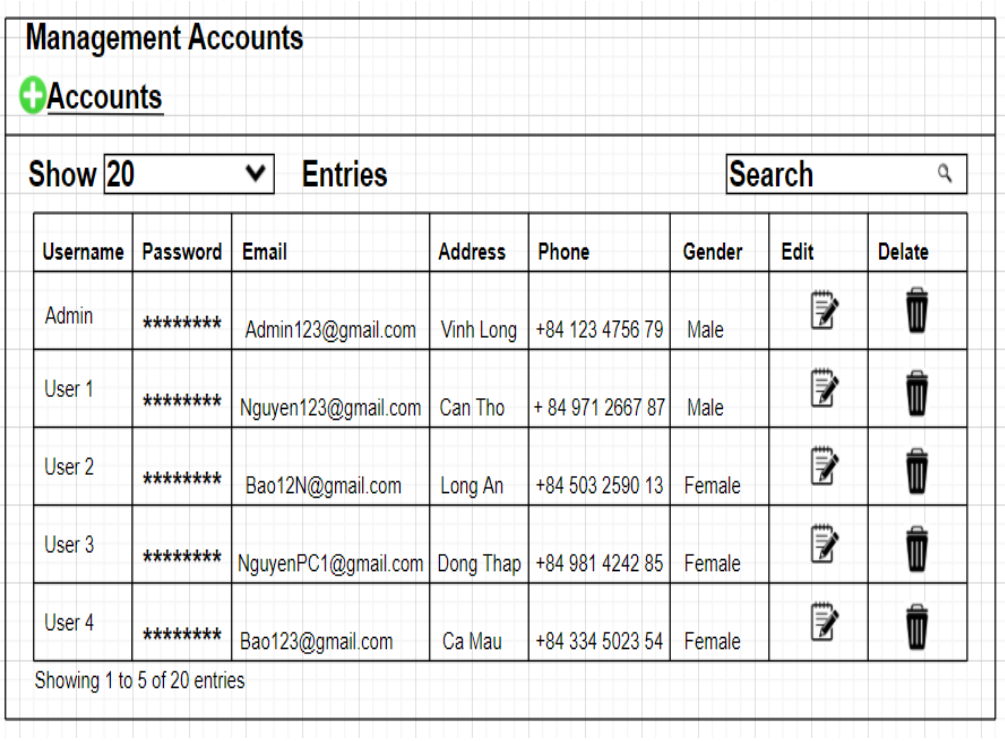


- **Register page**
  - In this register form, the customers must do input all personal information including Username, Password, Confirm Password, Full name, Address, Email, Telephone, Gender, and Date of birth.
  - When customers input not enough one of the requests then the system will be sent the notification on the screen report they know the information not enough or the password not match



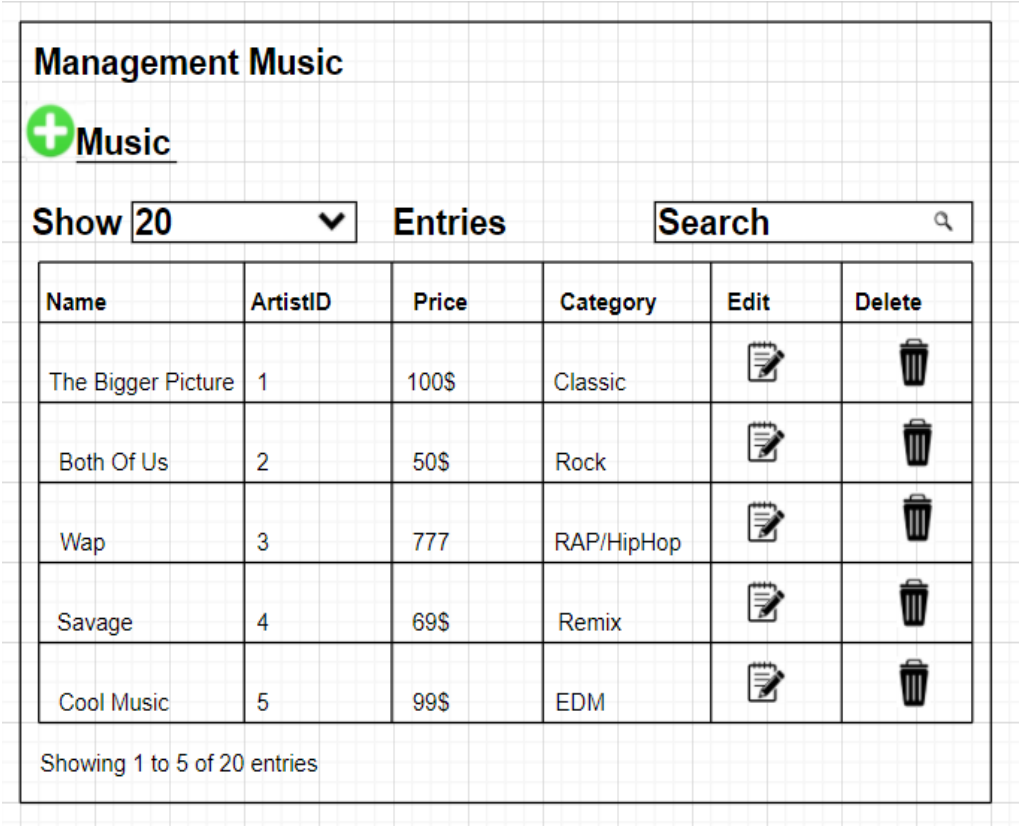
- **Management Accounts page**

- With this account management page, only the admin and new authorized accounts can access the "account management page" and perform additional information, update or delete the customer account.



○ Management Music page

- With this music management page, only the admin and new authorized accounts can access the "music management page" and perform additional information, update add edit delete all types of music.



References

Ragunath, P.K., Velmourougan, S., Davachelvan, P., Kayalvizhi, S. and Ravimohan, R., 2010. Evolving a new model (SDLC Model-2010) for software development life cycle (SDLC). *International Journal of Computer Science and Network Security*, *10*(1), pp.112-119.