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I confirm that I understand my coursework needs to be submitted online via Google Classroom under the relevant module page before the deadline in order for my assignment to be accepted and marked. I am fully aware that late submissions will be treated as non-submission and a mark of zero will be awarded.

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1. Introduction

This project is a web-based app through which users can request a vehicle for a ride and driver arrives to take the specific users to their destinations. This web app provides on-demand ride-sharing services through several modes of transportation such as cars, bikes and tuk-tuks. This web app provides services to the users and drivers as well. This web app uses GPS module to interconnect users and drivers.

Initially, the passenger must register their personal information as requested by the app, and then they must login to the app to request a vehicle for a ride. A passenger can detect the vehicles nearby to his/her location and can request a vehicle for a ride to the specific destinations. A passenger can also bargain over the fare of a ride. If a driver accepts the fare offered by the passenger then the server will send the message of confirmation to the passenger. This web application manages user bookings in the fastest and easiest way possible. With a single click, passenger can request or cancel a vehicle for a ride and a driver can accept or cancel passengers request for a ride with a single click.

The admin has entire authority over this web application. The admin authenticates the passenger's and driver's personal information as requested by the application. The admin has the authority to add, delete, and update passenger and driver information. When registering a driver for the application, the admin verifies to see if the driver has a valid driver's license. A driver can't work as a driver in the application if he/she doesn't have a valid driver's license. Payment transactions in this web application is digitalized. All the payment transactions are monitored by the admin.

1.1. Problem Scenario

In most urban areas, two modes of transportation are frequently used for day-to-day travel: private/personal vehicle and public/mass vehicle transportation.

Private vehicles provide a convenient and pleasurable trip, however, due to increased population and increased vehicle usage, transportation networks are experiencing capacity issues, traffic issues due to the high demand during busy hours, and environmental issues. Individual transportation adds considerably to global emissions, increases oil dependency, and hence increases the country's economic reliance on shifting price of oil.

Public transportation is one of the popular and cost-effective means of transportation. Although public transportation can reduce some of the negative consequences of private vehicles, it lacks flexibility and dependability. This transportation also has the drawback of having a lower capacity per vehicle, with most buses moving empty seats during off-peak hours and regularly becoming overloaded during peak hours. People who seek a comfortable ride generally don't favor public transportation. Nowadays, the traveling fare of public transportation is not fixed as their fare fluctuates day-to-day.

1.2. Project as a Solution

This project executes a straight solution for dealing with and getting over all the problems and challenges specified in the above problem scenarios. This project is an online vehicle booking web application which will help the passengers to request a ride with just a single click. This web application seems to have a quite impressive impact on physically impaired people and people who are new to a place. The payment process does not necessitate passengers to use cash. The inconvenience of gathering and depositing cash is removed because payment transactions are handled digitally. This web application allows the passengers to set the intended fare for their selected route and can bargain in fare for a better price.

1.3. Aims and Objectives

The main aim of the project is to promote sustainable transportation service and mitigate the problems generated from public and private transportations by developing ride sharing web app which helps the passenger to request a vehicle for a ride with just a single click.

In order to achieve this aim, the following objectives have been set up which are listed below:

- To conduct an extensive and comprehensive analysis of the major terms and resources required for the development of the web app.
- To develop a complete web application.
- To create proper format for the project documentation.
- To build a web application using the agile methodology's development process.
- To detect various items required to create wireframes and GUI.
- To facilitate convenient way to request a vehicle ride for the users.
- To determine whether the web app is impactful for the users or not.
- To develop a better understanding of web platforms.
- To learn how to use various tools necessary for the development of the project.
- To record the precise details of this web app's development and execution.

1.4. Web Application Features

1. Admin

- Admin can login into the web app.
- Admin can view all the details of passengers and drivers.
- Admin can add, update and delete passengers and drivers.
- Admin can verify the driver based on their driver KYC details which includes driving license as a necessary credential
- Admin can manage the overall payment transaction.
- Admin can logout of the system.
- Admin can update their password if necessary.

2. Passenger

- Passenger can register and login into the web app.
- Passenger can request and cancel a vehicle for a ride.
- Passenger can detect the available nearby drivers from his/her location.
- Passenger can offer their fare for a ride.
- Passenger can select a modes of services like car, motorcycle, and tuk-tuks.
- Passenger can view their ride history.
- Passenger can give review and rating to the driver after completion of a ride.
- Passenger can pay their ride fares digitally.
- Passenger can update his/her profile and password if necessary.
- Passenger can logout of the web app.

3. Driver

- Driver can register and login into the web app.
- Driver who are verified can only work as a driver.
- Driver can accept and cancel a request of a passenger for a ride.
- Driver can confirm the completion of a ride and can view their ride history.
- Driver can update his/her profile and password if necessary.
- Driver can logout of the web app.

2. Background

2.1. Technology used

This section of the report describes the overall analysis of the technologies used or will be using for the development of the **Sawar - Ride Sharing Web App**.

2.1.1. Web Browser

- i. **Google Chrome:** Google Chrome is a free web browser created by Google that can be used to browse web pages on the internet. It is also a cross-platform browser, which means that various versions of the browser work on different computers, mobile devices, and operating systems. It is fast, secure, and easy to use (Moreau, 2022).
- ii. **Microsoft Edge:** Microsoft Edge is the official name for the new and updated Web browser that was released in Microsoft's Windows 10 operating system to replace the ancient Internet Explorer Web browser. It shares several functionalities and menu options with Chrome while having a distinct overall design and structure. It provides more security features (Stroud, 2021).

2.1.2. Server Side Scripting Language – PHP

PHP is a server-side programming language used to create static, dynamic, and web-based applications. PHP is an abbreviation for Hypertext Preprocessor, which was previously known as Personal Home Pages. PHP code can be integrated into HTML code or used in conjunction with a wide range of web template systems, content management systems, and online frameworks (Jackson, 2022).

2.1.3. IDE – Visual Studio Code

Microsoft's Visual Studio Code (often known as VS Code) is a free, open-source text editor. VS Code is compatible with Windows, Linux, and macOS. Although the editor is lightweight, it contains several powerful capabilities that have helped VS Code become one of the most popular development environment tools in recent years (Mustafeez, 2022).

2.1.4. Web Design

- i. **HTML:** HTML stands for Hyper Text Markup Language. HTML is a markup language that is used to create appealing web pages that seem nice on a web browser with the help of styling. An HTML document is comprised of several HTML tags, each of which includes unique content. It is simple to understand and modify (javatpoint, 2022).
- ii. **CSS:** CSS stands for Cascading Style Sheet. CSS is simple to comprehend and understand, but it offers users a great deal of control over how an HTML document appear. CSS is most typically used in conjunction with the markup languages HTML or XHTML. CSS allows developers to isolate content from visual components, giving them more website flexibility and control (techopedia, 2018).
- iii. **JavaScript:** JavaScript is a text-based programming language that can be used on both the client and server sides to render web pages dynamically. It is a lightweight object-oriented programming language. JavaScript is a translated language, not a compiled language. The JavaScript Translator is in responsible of interpreting JavaScript code for web browsers (javatpoint, 2022).
- iv. **React JS:** React JS is a JavaScript library used to create user interfaces. React JS is an extremely powerful library that allows for efficient front-end development by dividing the page into several building elements known as components. The Model View Controller (MVC) architecture is used by React JS, and the view layer is in charge of dealing with mobile and web apps (tutorialspoint, 2022).

2.1.5. Framework – Laravel

Laravel is a PHP framework for web applications with powerful, attractive syntax. Laravel aims to make development easier by simplifying typical tasks seen in the majority of online projects, such as authentication, routing, sessions, and caching. Laravel promises to make the development process more enjoyable for developers while maintaining application functionality (Laravel, 2022).

2.1.6. Web Server – XAMPP

XAMPP is a popular cross-platform web server that enables programmers to write and test their programs on a local webserver. It was created by Apache Friends, and the audience can update or modify its native source code. It includes the Apache HTTP Server, MariaDB, and interpreters for many programming languages such as PHP and Perl (javatpoint, 2022).

2.1.7. Database Management System – MYSQL

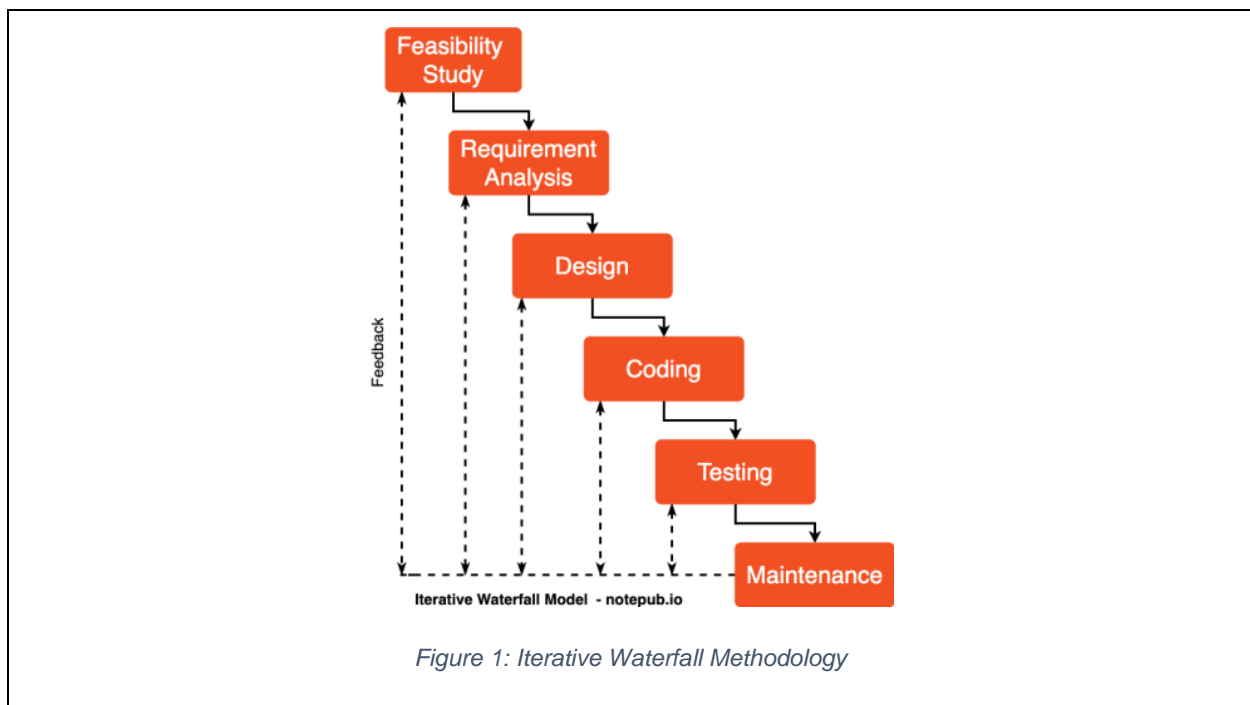
MySQL is a relational database management system that is free and open source. MySQL, like other relational databases, stores data in tables comprised of rows and columns. MySQL operates on almost every platform, including Linux, UNIX, and Windows. Although it can be used for a variety of purposes, MySQL is most commonly linked with web applications and online publishing (Moore, 2022).

2.2. Methodology

A software development methodology is a procedure or set of procedures used in the development of software. Basically, it is pretty wide, but it includes things like a design phase and a development phase. The purpose of software development methodology is to offer a methodical approach to software development (Alliance Software, 2022). Every day, a massive chunk of software is planned, designed, built, and deployed, and each of these activities needs intense concentration and teamwork. Software businesses contemplate software development approaches to examine client requirements and construct a strong business solution on time (Positiwise, 2022).

2.2.1. Methodology Consideration

i. Iterative Waterfall Methodology



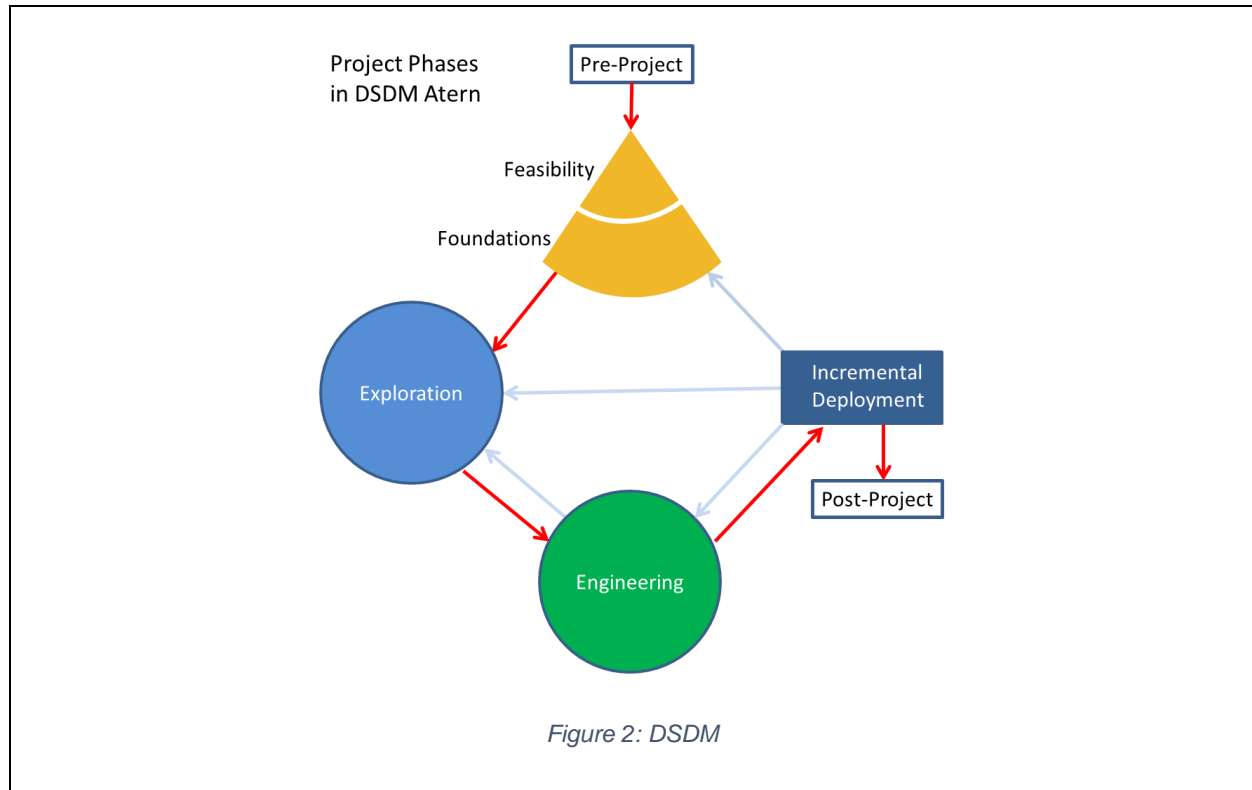
The iterative waterfall model is quite similar to the traditional waterfall model, but it includes feedback channels, which make the model more realistic. The fundamental distinction between the iterative waterfall model and the classical waterfall model is that the iterative waterfall model provides feedback channels from each phase to its preceding phases. Applying the waterfall model methodology to a real-world software development

project is challenging. Thus, the iterative waterfall model may be seen as incorporating the crucial adjustments to the traditional waterfall model to make it useful in actual software development projects. With a few adjustments to increase the productivity of software development, it is essentially the same as the conventional waterfall approach. The iterative waterfall model differs fundamentally from the conventional waterfall model in that it offers feedback paths from each step to the phases that came before it (Saira, 2022).

Why didn't I choose this methodology?

Despite its positive qualities, this methodology could not be implemented in my project because client feedback is only expected after developing a functional prototype and the project's final requirements are uncertain. So, this methodology may not be appropriate.

ii. DSDM

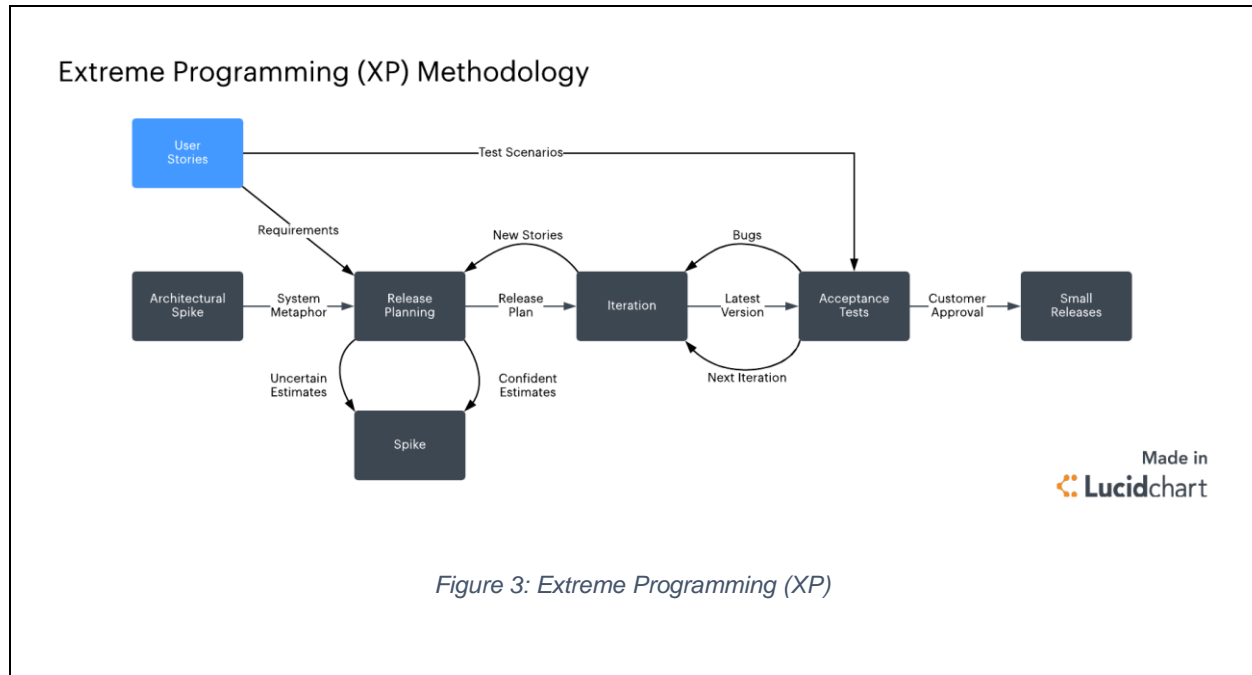


The Dynamic Systems Development methodology (DSDM) is an agile code development process that provides a framework for developing and managing systems. It was intended to be a step forward from Rapid Application Development (RAD), which emphasized rapid prototyping and iteration based on user feedback. The DSDM Agile Project Framework, like several other agile project delivery methodologies, progressed from a software-specific approach to a more general project management tool (QA LEAD, 2022).

Why didn't I choose this methodology?

Despite the positive qualities of this methodology, it could not be used in my project. This methodology is newer than others, so it necessitates a specially skilled client to organize and manage the project's characteristics. It is necessary to obtain feedback and reviews from the client on a regular basis in order to proceed with the development process. As a result, delays in customer involvement cause disruptions in project delivery.

iii. Extreme Programming (XP)



Extreme Programming (XP) is an agile software development paradigm that seeks to deliver software of a better quality while also improving the team's quality of life. Of the agile frameworks, XP is the most precise in terms of the proper engineering methods for software development. Teamwork is important in extreme programming. Managers, customers, and developers are all equal partners in a collaborative team. Teams can become very productive because to the environment that Extreme Programming offers in a basic but effective way. To solve the issue as quickly as feasible, the team self-organizes around it (AgileAlliance, 2022).

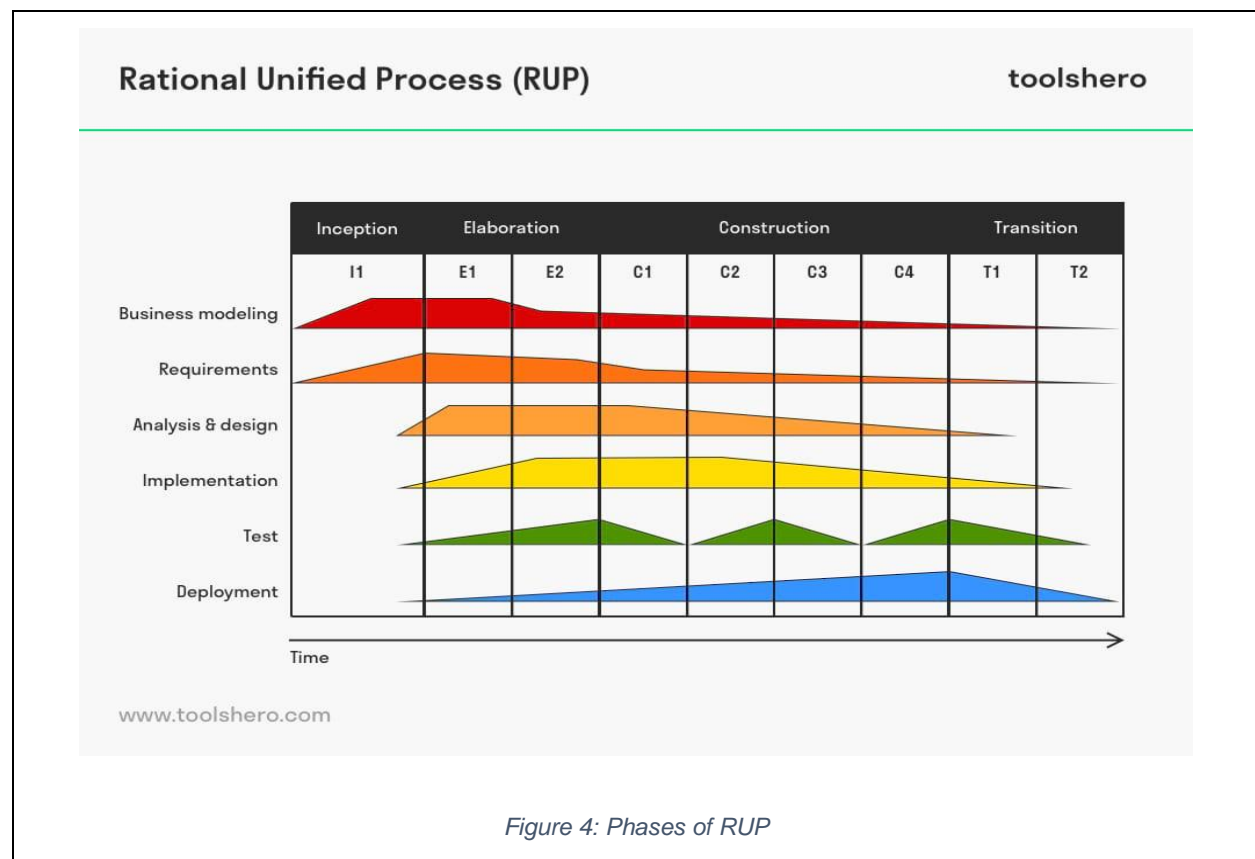
Why didn't I choose this methodology?

Despite its great features and qualities, this methodology could not be used in my project. This methodology focuses mostly on coding rather than design, which may lead to user dissatisfaction if the design is unsatisfactory. It has a strict timeline with continuous feedback from end users, frequent interaction with clients, and a short iteration workflow where mistakes are more likely to arise when working on a tight schedule.

2.2.2. Methodology Section Justification

In this project, I have decided to implement RUP methodology. Rational Unified Process is a methodology for agile software development. It is also known as the "Unified Process Model." It is a well-known and reliable object-oriented method for software development. RUP methodology can range from a simple procedure that satisfies the needs of particular projects to a more extensive process that meets the demands of huge projects (educba, n.d.). This methodology's role is to guarantee the timely and cost-efficient production of effective software that meets the needs of its end users (GeeksforGeeks, 2022).

Phases of the life cycle of RUP



i. Inception: It is the preliminary or first stage of the development process. During this phase, the team will pinpoint the project's core ideas and structure in order to prepare a business suite, which will include information such as the project's goal, success criteria,

estimated cost, risk assessment, scheduled time, and resources needed to execute it, and so on. It is similar to a project evaluation. If the project fails to accomplish the following, it may be cancelled or re-evaluated (GeeksforGeeks, 2022).

The process of this phase are:

- Project Idea
- Project Finalization
- Research about project related topics in depth
- Requirement Gathering
- Research about the technology used

ii. Elaboration: It is the second stage of the development process. The primary purpose of this phase is to eliminate the major risks discovered throughout the research. The issue domain study is completed during this phase, and the project architecture takes shape. Developers investigate the software's possible applications as well as the development expenses (GeeksforGeeks, 2022).

The process of this phase are:

- Identify project tasks and its completion date
- Project Architecture
- Project UML Diagrams
- Risk Analyzation
- Proposal Confirmation

iii. Construction: It represents the third stage of the development process. The project is created and finalized during this phase. This is the stage at which all of the features are developed and integrated into the product, indicating that the program has been well-planned, written, and tested. As a result, the development product will be available. It assesses the product's completeness. (GeeksforGeeks, 2022).

The process of this phase are:

- Development
 - ❖ Database Design

- ❖ Frontend Development
- ❖ Backend Development
- Testing
- Prepare Documentation

iv. Transition: It is the last of final phase of the development process. The program is introduced and rendered available to the general public or customers during this phase. The product will be updated or changed in response to client feedback. It is the deployment procedure (GeeksforGeeks, 2022).

The process of this phase are:

- Supervisor Reviews and Feedbacks
- Updates and Upgrades
- Update Project Documentation
- Project Submission

2.3. Similar Systems

2.3.1. Similar System Consideration

i. System 1

System Name: Uber

URL: <https://www.uber.com/>

Uber is a ride-hailing service that uses a smartphone app to connect drivers and passengers. The company was founded in 2009 and is based in San Francisco, California. Uber Technologies Inc. (UBER) is one of the most exciting businesses to arise in the last decade, due to its tremendous expansion and continual controversy. One can order a ride with Uber by using the app and a driver will pick up and transport to the set location. One can pay for the ride using the app, rate the driver, and leave feedback about the riding experience. Uber is a transportation service that is accessible in many locations across the world and is well-known for its ease and convenience of usage (BLYSTONE, 2022).

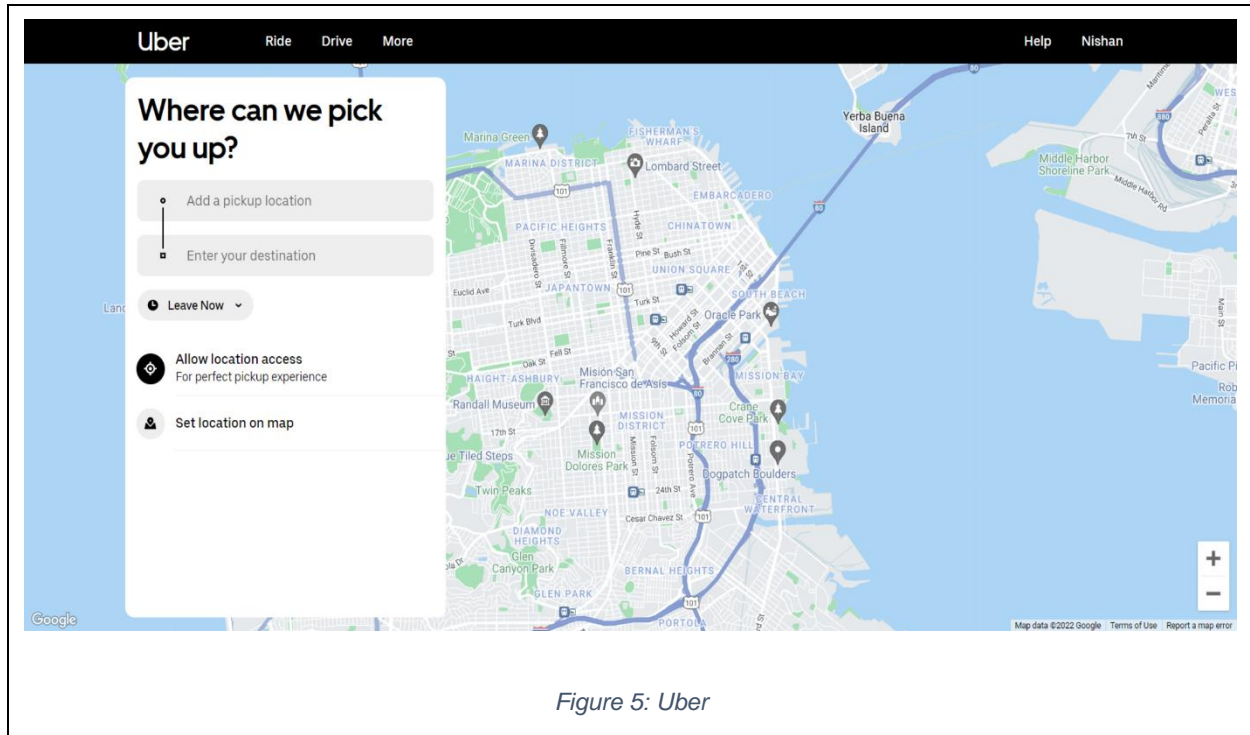


Figure 5: Uber

ii. System 2

System Name: OLA

URL: <https://www.olacabs.com/>

Ola is an Indian ride- hailing service. It was founded in 2011 and is now available in over 100 cities worldwide, including India, Australia, New Zealand, and the United Kingdom. Ola's mobile app, which is accessible on iOS and Android devices, allows users to request rides. The software connects drivers and passengers, and users may use it to monitor the progress of their rides and make payments. Ola provides a number of services, including automobile trips, auto rickshaw rides, and, in some areas, boat rides. Customers are promised low pricing and an easy-to-use solution, according to the corporation (engineeringforchange, 2022).

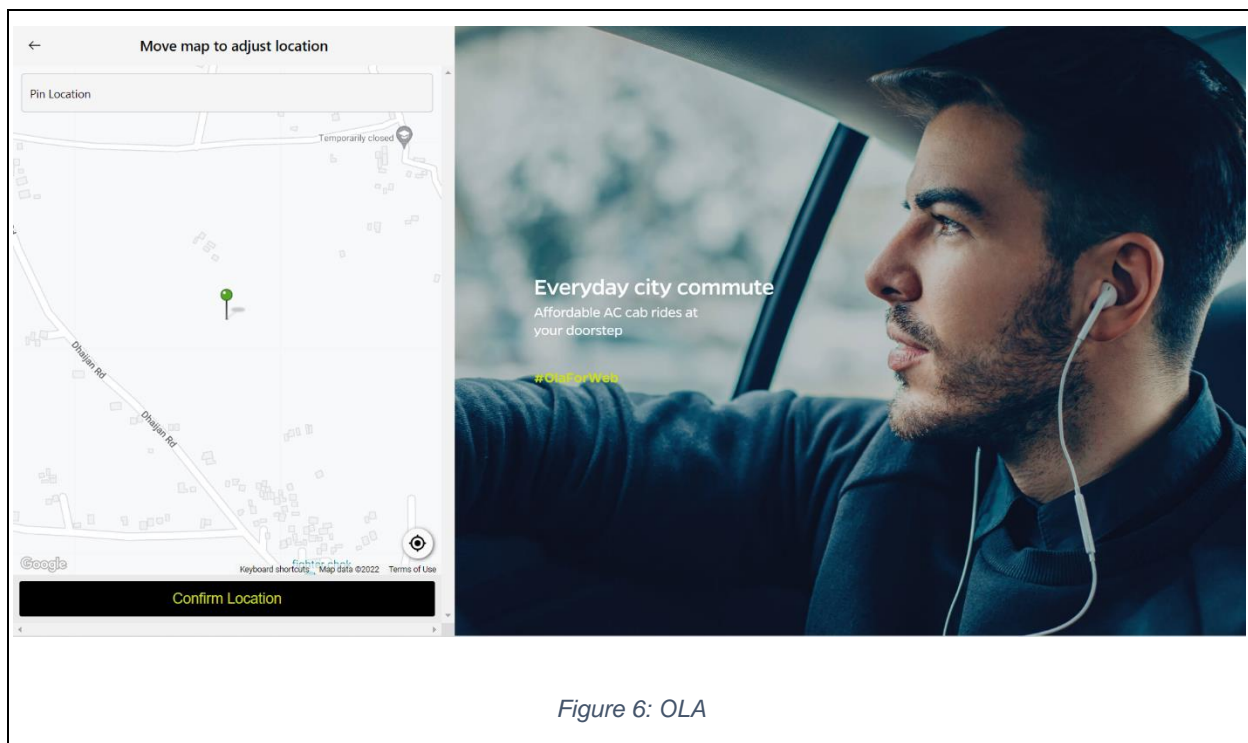


Figure 6: OLA

iii. System 3

System Name: Lyft

URL: <https://www.lyft.com/>

Lyft is a transportation company that allows users to request rides from drivers using a smartphone app. It is a popular alternative to traditional taxi services and is distinguished by the pink mustaches that drivers wear on the front of their vehicles. Lyft provides a variety of services, including shared rides, in which passengers share a car with others traveling in the same area, and luxury rides, which provide higher-end automobiles for a more premium experience. The company was founded in 2012 and is headquartered in San Francisco, California. General Motors invested \$500 million in Lyft in early 2016 to encourage the development of self-driving taxis and a car rental programs for Lyft drivers (DAVIS, 2022).

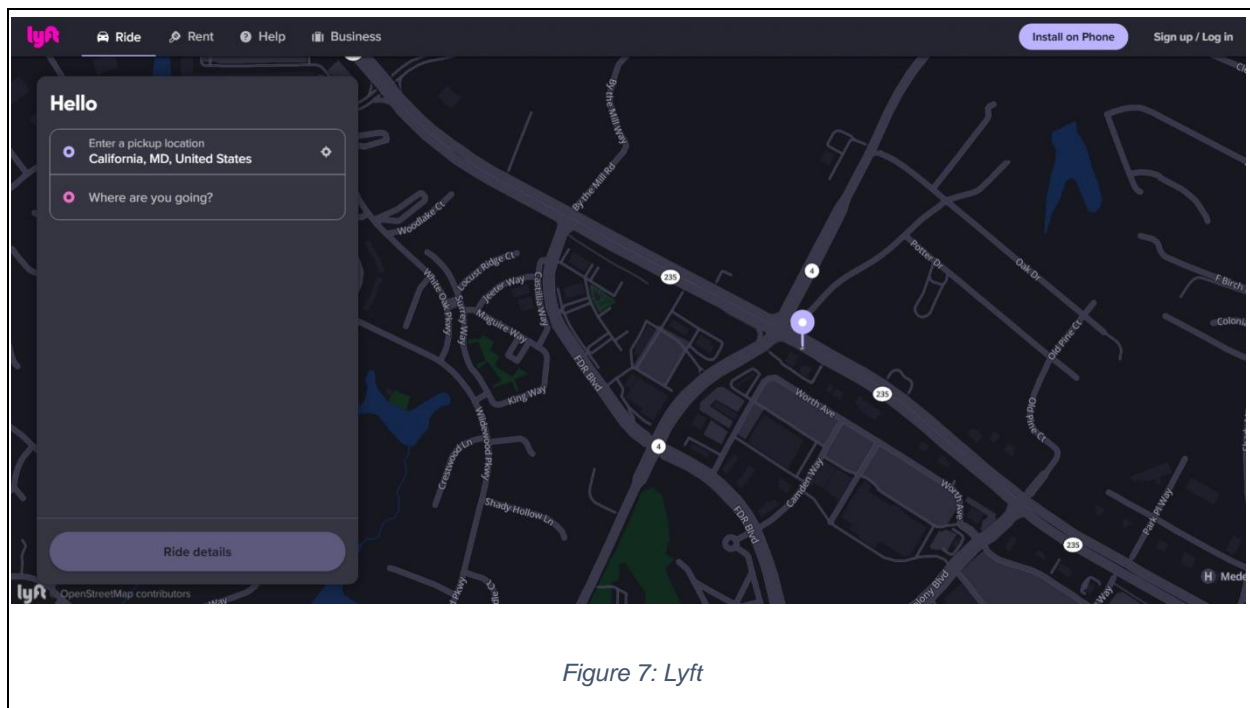


Figure 7: Lyft

2.3.2. Similar System Comparison

A tabular comparison of my system's features to those of other similar systems are presented below:

Table 1: Comparison between similar projects

S.N	Features	My project	Uber	Ola	Lyft
1	Registration and login	✓	✓	✓	✓
2	Tuk-tuk service	✓	✗	✗	✗
3	Online payment	✓	✓	✓	✓
4	Offline payment	✓	✓	✓	✓
5	Rating and feedback	✓	✓	✓	✓
6	Bargain option	✓	✗	✗	✗

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