

Bus4U: Mobile Application for Bus Ticket Reservation Comparison

by

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Abstract

In today's ever more technology-centric world, most of the business are now using online system. Online ticketing system is being used by many business and sectors. In this final year project, developing an integrated online bus ticketing system that integrates all bus operators in one mobile apps. The objectives of the project is to solve problems in current online ticketing system where all bus operators operates individually and create an apps that combine all bus operators in one system. Using this particular system, the apps can compare all bus operators in terms of time, date, price, availability and routes. The users will be given various alternatives and make the best choices before buy bus tickets. This system will reduce the time and increase efficiency of existing online bus ticketing system. This system can provides an easy, fast and smart reservation procedure to overcome existing systems. Users can perform online ticket reservation anytime and anywhere with less time consuming and energy. They can check availability of the ticket with their mobile phones rather than website. Bus Ticket Comparison apps aims to assist passengers such as tourist and student with their travelling by allowing them to search ticket easily with simple procedures rather than browsing from one website to another.

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1.0 Introduction

1.1 Background Study

Bus is the most common things for our community. Bus are the cheapest way to travel in Malaysia. Malaysia is served by an excellent transport system. There is always transport available even in rural areas. The popularity of the express bus service in Malaysia are based on the following factors. Bus is the fastest and easiest way to travel for a long distance journey. Most of the destination in Malaysia can be travel by bus. Bus ticket purchase has been over the counter in bus terminal for the past few years. The number of express bus in Malaysia has increase during past few years. All the bus operators in Malaysia compete with each other to give the best services to the customers.

Travelling by bus is more convenient than other types of public transportation. Express bus is much cheaper than travelling by flight. Bus travel is much preferable although Express bus companies in Malaysia are consists of 27 seats. Most of the buses have large seat space and equip with television. Most of the bus companies in Malaysia implemented with latest technologies. Technology is needed to offer more convenient journey to the passengers.

Most of the people are quite lazy to go to the bus terminal counter to buy ticket that can be done online. With the rapid expansion of e-commerce, online ticket bus mobile apps can speed up things. This online ticket bus reservation system will not only assist the passengers, but also to the bus operation for the efficient system. The main purpose for introducing online bus ticket is to withstand traffic condition at the bus terminal counter. Online bus ticket act as another alternative for the customer to buy ticket instead of bus terminal counter. The current online e-ticketing system by individual bus operators doesn't provide user with the best choices. Most of the bus operators doesn't offer some destination and sold out.

1.2 Problem statement

Nowadays people are most likely to use bus to travel for a long distance. If we analyse current apps and system for ticket bus reservation, the people need to surf one bus company to another company. Sometimes the users waste a long time to look out for a best price for their destination. The procedure for the current apps and website is quite long and complicated. Browsing through each bus operator quite time consuming and energy wasted.

By using the existing online bus ticketing system, the user need to choose from various types of bus operator such as NICE Executive Coach, Plusliner, Transnasiona and SS International. The user also doesn't know which bus operators cheaper than others. Based on the current mobile apps, it is harder for the customer to buy ticket for their perfect destination. Most of the customers need to browse one by one to choose the best bus ticket. Current online bus ticketing system is time consuming and complicated.

The choice of the bus ticket that the users wanted to buy also very limited in term of time and choice of the bus. There is no flexibility in term of time and route. The users need to stick on specific time and dates. Sometimes different bus operator travel using different routes. Information of the routes will let the users plan their travel and journey. By using existing online bus ticketing system, the users can't compare prices among all bus operators. Some of bus operators offer a higher price than other bus operators. There is no system and mobile apps that can compare prices for all bus operators in Malaysia.

1.3 Objectives

Create an apps or website that can compare price, date and time with various bus operators in our database. The apps will filter out our databases which consists of various bus operators related to the ticket price and destination. After the information is gathered, the apps compare all price with special algorithm. The apps can help customers to get an ideal ticket bus at the best price. As an example if the user want to go to Kota Bharu from Kuala Lumpur, the apps will display information about it various bus operators rather than one bus only and compare the prices to the users.

By doing this, the user can save time from browsing through all bus company website. There is one mobile apps that have a same function with my apps. The apps is about online hotel reservation. The name of the apps is Trivago. We want to bring the algorithm into ticket bus section. The algorithm can be useful for the users to save time.

Another function that we want to develop is notification to the registered user when the ticket for favourite destination are running low and sold out. Most of the user doesn't even know when the ticket running low. By doing this notification, the user can act and buy the ticket as soon as possible. Most probably happen during festive periods such as Hari Raya, Deepavali and Chinese New Year. The ticket bus most probably sold out 1 month before the festive day.

- To develop a better online ticket bus that user friendly
- To develop a comparison based apps.
- To solve problems in current online ticket bus faced by customers
- To encourage people to use public transportation rather than car.

1.4 Scope of the project

The scope of the project is narrow to online bus ticketing system which integrates database that consists of 2 bus operators in mobile apps. This apps is targeted for university students which most probably owning a smartphone and having a hard time to browse one bus to another to buy bus tickets. This mobile apps can greatly enhance the efficiency of current online bus ticketing system in Malaysia.

1.5 Significant of the project

Author has chosen this project based on his personal experience with the existing bus ticketing system. Many problems and difficulties has been faced by him. The author always travel from Johor to Perak. He faced many problems regarding the system of online bus ticketing. All the problems are related to complicated procedure, hard to find destination and inefficient system. It encourage him to develop system to solve all issue for better use for community in Malaysia. In this project, the author replaces existing system which integrates all bus operators in one system and compare in term of price, routes, availability, times and specialty. The project would probability help the community in Malaysia and promotes people in Malaysia to use public transportation.

1.6 Beneficiaries

Bus Ticket Comparison would be beneficial to community

- **Integrates various bus operators information in one apps**

By using existing online ticket bus system, the user will have a hard time to choose the right ticket price and bus operator in Malaysia. The user need to browse from one website to another website to choose the best price, time and route for their destination. All bus operators act individually in Malaysia.

- **Save money for cheaper ticket bus**

The user can save their money for much cheaper ticket bus. Sometimes user doesn't know there are much cheaper price for selected day.

- **Provide various alternative to the customers**

All bus operators are integrated in Ticket Bus Comparison apps. The users can have many alternatives rather than stick to one bus operators only. They can choose from various bus operators in term of time, price and routes.

2.0 Literature Review

2.1 Mobile apps

According to Journal of Interaction Science (2013), advances in mobile technology promotes variety of application to be used by people in current technological era. Many people use mobile phone these days. It is a trend now to use mobile phone. Mobile apps are software programs that you can download using your mobile devices such as mobile phone and tablet. Mobile apps is easy to use and download. Most of the mobile app are free. They took profit from advertising, upgrade features and promotion. The usefulness of mobile devices has increased tremendously in a past few years that can allow people to perform task in a mobile context.

Mobile apps ease the people in daily life and problem. Mobile apps are internet application designed to operate on smartphones and tablets. Mobile apps can be categorized by many categories including entertainment, communication, education, transport, travel, lifestyle, medical and finance. Mobile basically means portable and flexible like a mobile phone. According to WebWise Team, apps is abbreviated for application software. Mobile apps usually helps user by connecting them to the internet services without using a common device like laptop and desktop for much easier usage.

Based on Wikipedia, mobile apps were created basically for general productivity and information retrieval, including email, calendar, contacts, stock market and weather information. However, demand from the people enhance high expansion into other categories, such automation, GPS mapping and location-based services, banking, networking and file transfer, education, video streaming, order tracking, ticket purchases and recently mobile medical apps. According to Daniel Walters, approximately over five billion of mobile subscribers that consists of 77% of the world's population are online.

2.2 Online booking reservation

Nowadays, a lot of people are busy with their work. Most of the time they spend In front the computer. Computer is a most important thing in our life. Every family in the world have their own internet because it will be more easier for them to do some research, e-payment, e-banking, e-shop or any online booking to do a ticket reservation or an accommodation reservation. Online ticket booking is one of the largest and fastest growing of electronic commerce (e-commerce). They might be in scope of travel reservation, hotel, movies and flight.

According to Simon Lenoir (2013) from , online book reservation makes customers life easier. When the company is available for 24/7, they will never miss a customers. Most of the travel companies are operating limited within their business hours. It provides a flexibility to the customers to book their ticket without any restriction and problem. Customers can instantly check availability of the ticket through computer or smartphones rather than check over the ticket counter and phone. The customers also can check without having a staff to confirm the tickets. They can still make reservation anytime and anywhere.

Online booking reservation allows customers to see availability of the ticket in brief time. It will make them easier to plan their trip and schedule. According to Simon Lenoir, more than 60 percent of travelers and passengers book their entire trip online. Online booking system can minimize workload of customers and bus operators. Online booking system can reduce the amount of paperwork by doing manually. Automatic system is more efficient and systematic than manual system.

2.3 E-commerce

E-commerce is also known as electronic commerce is trading of product or services using computer networks. E-commerce refers to the purchase of goods and services via electronic medium such as Internet and mobile phone. According to Katherine Arline, E-commerce was introduced in 1960's through electronic data interchange (EDI) on value-added networks (VANs). E-commerce start to grow in the 1990s and early 2000s with the availability of internet access on that years. E-commerce is conducted using a variety of applications, such as email, fax, online catalogs and shopping carts, File Transfer Protocol (FTP), and Web services. Most of this is business-to-business, with some companies attempting to use email and fax for unsolicited ads to consumers and other business prospects, as well as to send out e-newsletters to subscribers. Ticket bus system using the same concept of e-commerce.

The user pays the services by using online transaction exchange with the online ticket boarding pass to use bus services. Electronic commerce has expanded rapidly over the past five years and is predicted to continue at this rate, or even accelerate. In the near future the boundaries between conventional and electronic commerce will become increasingly blurred as more and more businesses move sections of their operations onto the Internet. Based on Wikipedia.org, there are three types of e-commerce.

1. Business to consumers (B2C)
2. Business to business (B2B)
3. Consumers to business (C2B)
4. Consumers to consumers (C2C)

Business to business (B2B) e-commerce is simply defined as ecommerce between companies. About 80% of e-commerce is of this type. As an example when Intel selling microprocessor to Dell and Asus. They are both dealing with business to business. Business-to-consumer e-commerce, or commerce between companies and consumers, involves customers gathering information; purchasing physical goods or receiving products over an electronic network.

When the customers buy things from online shop, it is a business-to-consumer. Business which sells through online shopping cart without human interaction. As an example when the customers buy laptop from Asus online store Consumer-to-consumer e-commerce or C2C is simply commerce between private individuals or consumers. The auctioneers needs only his to advertise his products at the e-commerce portals such as E-bay or Mudah.my before selling the product to the highest bidder. In consumer-to-business e-commerce, consumers sells a project to companies. Consumers post their project online with their prices and companies bid on their project.

The usage of e-commerce has been benefit for both consumers and companies. For the consumers, online shopping can be done faster than physically going to the shop with having a long queue. E-commerce save a lot of time to the people because they can buy things from their house without going outside. E-commerce is an efficient method for business transactions.

2.4 E-ticket

Electronic ticket is a digital ticket that use as a boarding pass for online customers. It is also used in ticketing in the entertainment industry. An electronic ticket system is an efficient method of ticket entry for cinema, flight and bus. An e-ticket allows your entire travel experience to be easy and safe because all of your booking and ticket details are held electronically. E-ticket give more benefits than paper style ticket.

Users retrieve the e-tickets by purchasing them from a web server, or simply receiving from a vendor, or from another user who previously acquired them. E-tickets can be stored in desktop computers or personal digital assistants for future use. For some cases, like e-tickets nontransferable example e-ticket airline, it has to be validated to prevent duplication, and ensure authenticity and integrity. The validation process of e-ticket is the most important thing in online booking system. The validation process is to avoid duplication of e-ticket by the same or different users. There is a possibility of failure when server crashed during the transaction.

2.5 Online ticket brokering

Broker is an individual or firm that arranges transaction between a buyer and a seller for a commission when the deal is executed. A broker's job is to bring sellers and buyers together and thus a broker is the third person facilitator between. As an example when people wanted to buy property. This is a real estate broker who facilitates the sale of a property. Online ticket brokering is the resale of tickets through a web-based ticket brokering service.

Majority of trading on ticket brokering websites concerns itself with tickets to live entertainment events whereby the primary officially licensed seller's supply has been exhausted and the event has been declared sold-out. Online ticket brokering is legal in most countries, such as the UK and other European countries, and it is a profitable business venture. The most popular ticket broking services is www.viagogo.com. Most of the ticket are related to entertainment and sports.

2.6 Analysis on Existing System

Most of the existing online ticket bus system operated individually and separated with each other. They operated individually and offer different kinds of price and destination. Most of the bus operator have their own website and system to operate their business.

1. SS International Express

According to BusOnlineTicket (2015), SS International Express famous express bus company in Malaysia. The company is operating in almost all the cities in the west coast of Peninsular Malaysia. As part of the company expansion plan, S&S International Express has appointed Golden Coach Express & Tour Private Ltd to be the company sole agent in Singapore. The user need to login from the website before buy the ticket. After login, the user need to choose whether single trip or double trip. User need to choose their origin and destination. The origin and destination are limited to selected location. Most of the new users may have a hard time to find their exact location. Some of destination are not listed in the destination. The user will be move to another bus operator to check for their destination.



Figure 1. SS International website

Advantages	Disadvantages
<ul style="list-style-type: none"> • attractive website • show important information about ticket 	<ul style="list-style-type: none"> • slow responds • doesn't cover all destinations

Table 1. Advantages and Disadvantages of Transnasional

2. KKKL Express

According to KKKL Express website, KKKL Express started with 1 unit of 44 seats express bus and few units of factory buses before KKKL becomes one of the largest companies of public bus transportation in Malaysia today. KKKL Express have a limited range of destination and departure location. When the customers search for ticket, the website doesn't show the price of ticket before selecting position of seat. The customers might have a problem budgeting their money before pay. However, the website shown indicator on vacancy of tickets and time. It is quite useful to the customers. Their website is quite confusing and not user friendly.

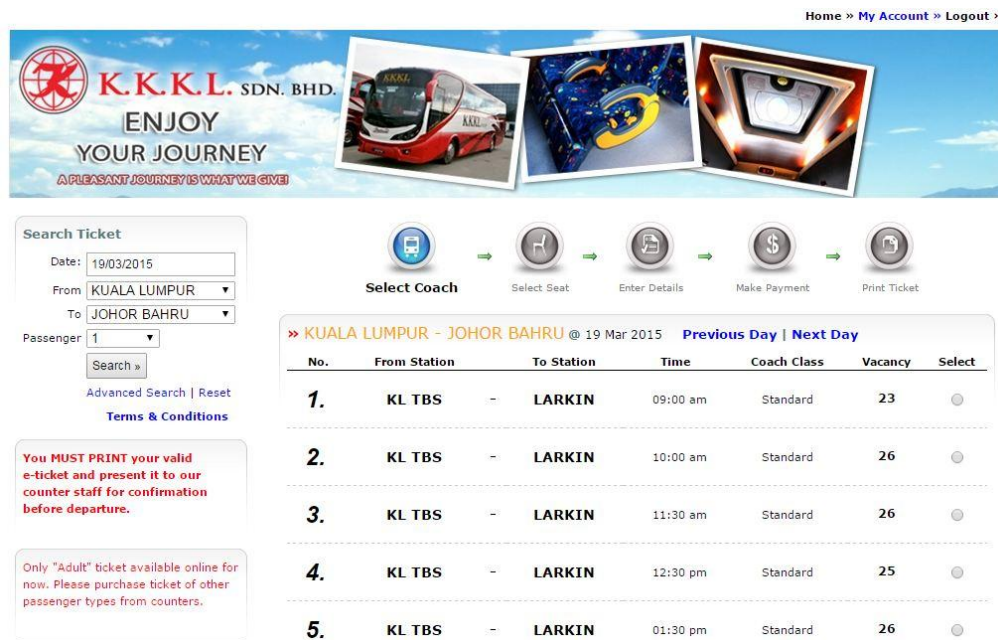


Figure 2. KKKL Express website

Advantages	Disadvantages
<ul style="list-style-type: none"> • Shown vacancy availability of the ticket • Show time 	<ul style="list-style-type: none"> • Doesn't show price • Limited range of destination • Complicated procedure

Table 2. Advantages and Disadvantages of KKKL Express

3. Transnasional

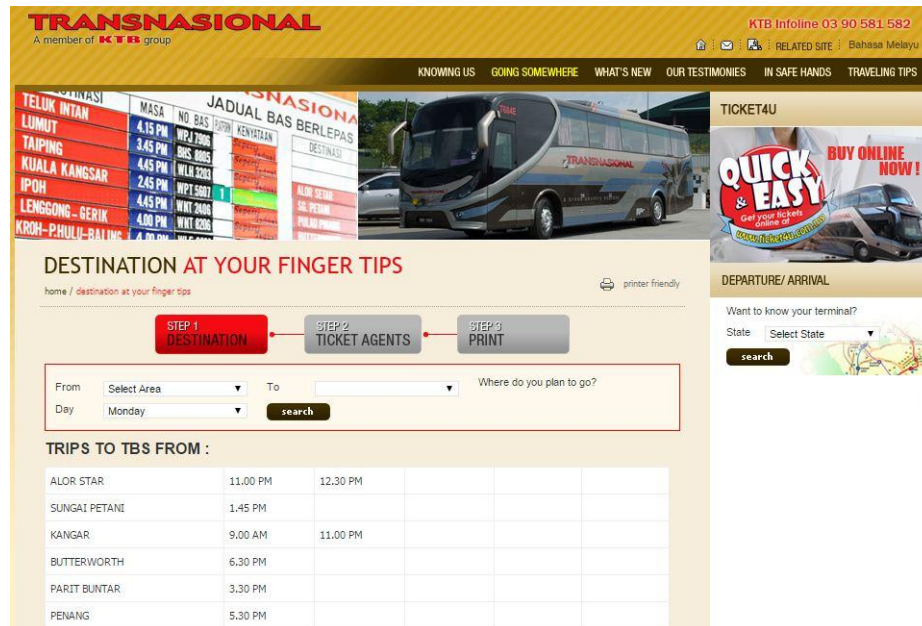


Figure 3. Transnasional website

Transnasional is one of the popular bus operator in Southeast Asia serving more than 200 destinations. Transnasional doesn't have their own online booking system. When the users enter Transnasional website, they can only view the schedule of the bus. After the users view the schedule, they need to buy from ticket agents such as Easybook.com to perform online transaction or manually at ticket counter. Transnasional didn't provide their own online ticketing system. Transnasional need to improve their current e-ticketing system.

Advantages	Disadvantages
<ul style="list-style-type: none"> • Popular bus operators in Malaysia • Cover many destination in Malaysia • Reasonable price 	<ul style="list-style-type: none"> • User can't buy ticket directly from Transnasional website • Need third party to buy ticket

Table 3. Advantages and Disadvantages of Transnasional

4. Trivago

Trivago is an apps that have similarity with my project. Trivago compares all hotel prices in Malaysia based on selected location by the users. Trivago listed all hotel including homestay in nearby location based on price. It acts as a middleman or broker that arrange buyer with seller Trivago will display all information about the hotel website, price, date and availability. Users need to do transaction with actual seller because Trivago is a broker that rearrange buyer with seller. Trivago is really good apps for tourist to search for homestay and hotel in their nearby location. Trivago is based on real-time situation. It will updated automatically when the availability is full.

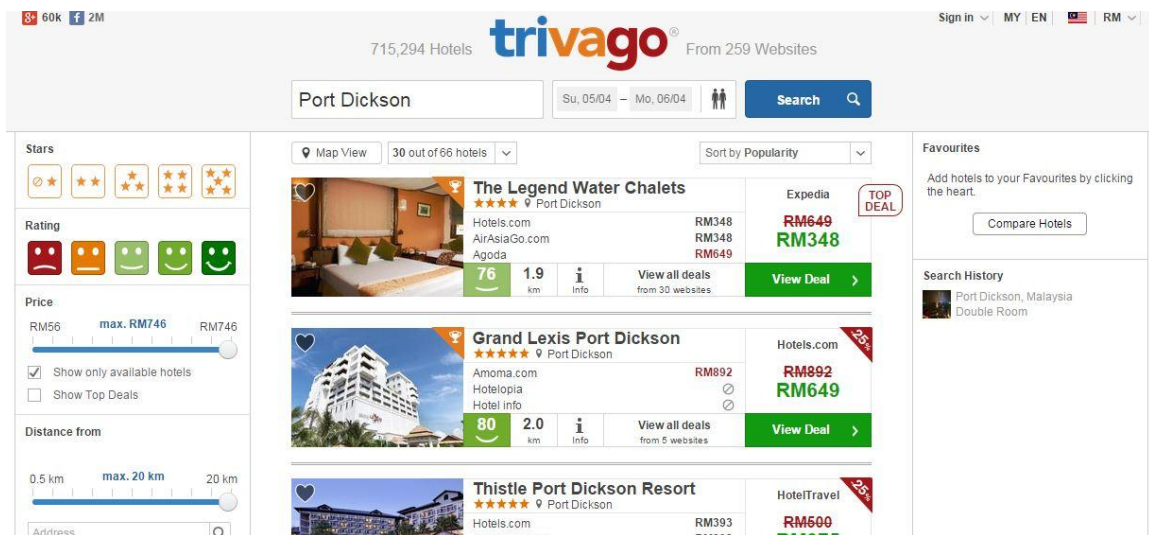


Figure 4. Trivago website

Advantages	Disadvantages
<ul style="list-style-type: none"> • Real-time online booking system • Can compare price for hotel • Available in website and mobile apps 	<ul style="list-style-type: none"> • Not many people know about this apps • Limited scope to hotel only • Need to visit the actual sellers to book the ticket because the apps only acts as middleman. They get commission from the sellers.

Table 4 : Advantages and Disadvantages of Trivago

5. KTB Ticket4U Mobile Apps

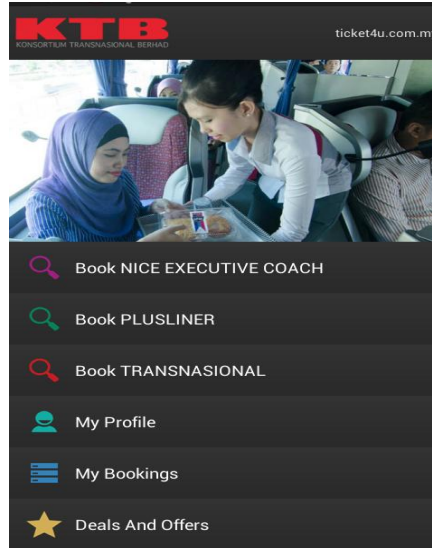


Figure 5. KTB Ticket4U mobile apps

KTB Ticket4U is the only mobile apps in Malaysia that offer ticket bus services. From the screenshot, we can see that users need to choose from NICE Executive Coach, Plusliner or Transnasional. Sometimes the user doesn't know what destination they are offering. The users also didn't know which bus operators cheaper than others. Based on the current mobile apps, it is harder for the customer to buy ticket for their perfect destination. Most of the customers need to browse one by one to choose the best bus ticket. It is time consuming for user to search for ideal ticket bus.

Advantages	Disadvantages
<ul style="list-style-type: none"> • Attractive apps • Provide various option of bus operators 	<ul style="list-style-type: none"> • Need to browse from one bus operator to another to get the best ticket • Slow responds • Hard to find ideal destination • Time consuming

Table 5 : Advantages and Disadvantages of KTB Ticket4U mobile apps

6. Sky Scanner

Skyscanner is an apps that provide instant online comparison for flights, car hire and hotels. The apps shows the lowest price for the selected day to the user. It will help the user to buy the lowest ticket for selected destination with no extra fees. This apps is use for airplane customer only. The apps also have similarity with my current project.

Skyscanner has flexible search options which can browse through month or years to get the best price. Skyscanner is the world’s travel search engine for tourist to get the best deal.

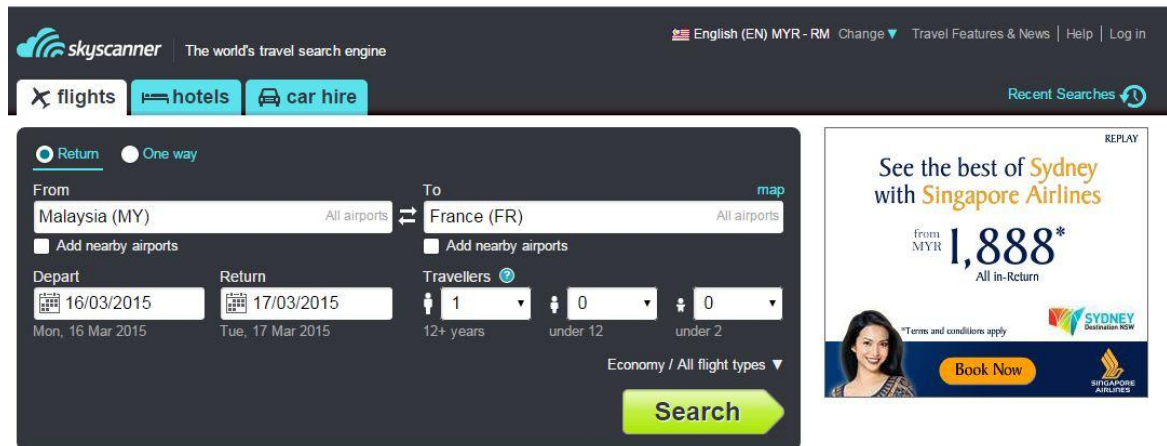


Figure 6. Skyscanner website

Advantages	Disadvantages
<ul style="list-style-type: none"> • Display the cheapest ticket price on selected day • Attractive apps • Available in mobile apps and website • - Provides flights, hotels and car hire services. 	<ul style="list-style-type: none"> • Doesn't have bus ticket • Some of tickets need to buy from other website

Table 6. Advantages and Disadvantages of Skyscanner website

7. Terminal Bersepadu Selatan

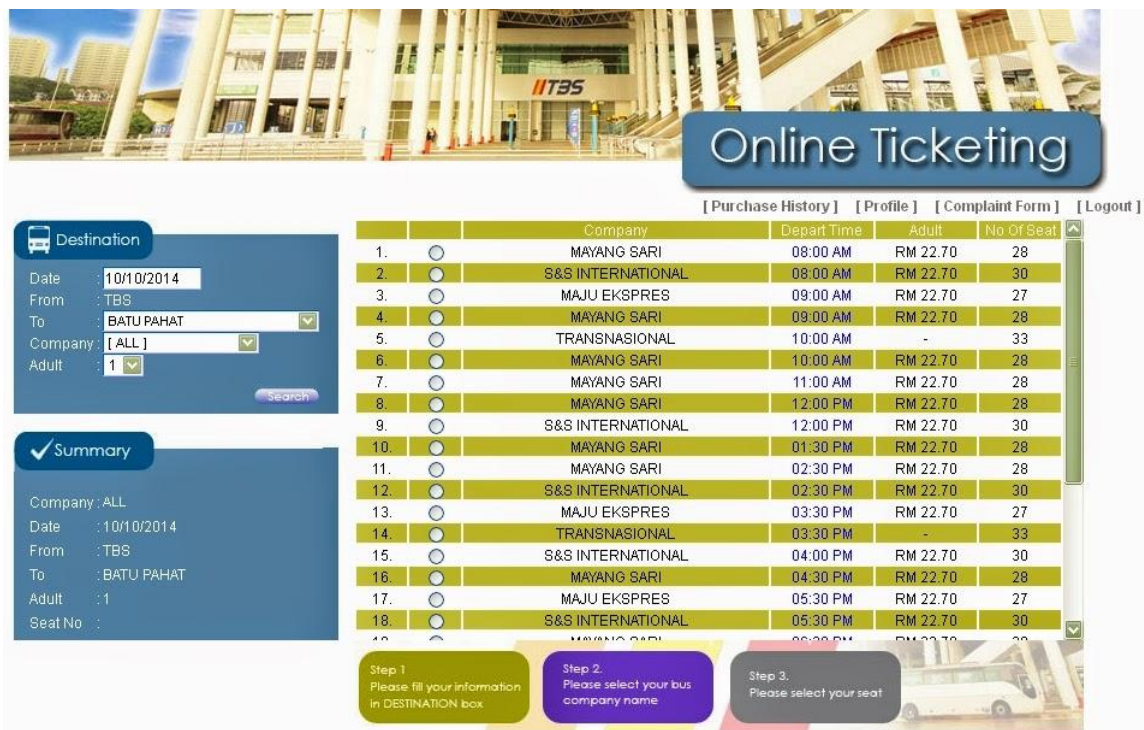


Figure 7. Terminal Bersepadu Selatan

Terminal Bersepadu Selatan is one of the largest integrated bus in Malaysia centralized in Kuala Lumpur. It is operated by MAJU Terminal Management and Services (TMAS). Terminal Bersepadu Selatan has their own integrated online ticketing website system. They integrated all bus company in Malaysia. All buses need to depart from Terminal Bersepadu Selatan. Terminal Bersepadu Selatan is focusing on people in Kuala Lumpur. They didn't have a mobile apps and only operates in website system.

Advantages	Disadvantages
<ul style="list-style-type: none"> • Integrated all bus in Malaysia • Good online services • Attractive website 	<ul style="list-style-type: none"> • All buses are departed from Terminal Bersepadu Selatan • Don't have mobile apps.

Table 7. Advantages and Disadvantages of Terminal Bersepadu Selatan website

3.0 Methodology

3.1 Research Methodology

1. Observation and Analysis

Observing the current online ticket bus apps and web based to develop a better ticket bus apps system. The author observed some of the mobile apps such as BusTicket4U on android. The author also observed the Transnasiona, TBS Terminal Station, Plusliner and SS International website to analyse all the problem faced by the users. After all the observations are recorded, the author create analysis about all the problem face by them and try to come out with solution and idea to improve current online ticket bus system. The author listed out all the advantages and disadvantages of the current related system. Individual observation by author in the nearest bus ticket counter. Most of the customers are frustrated when they need to queue especially in festive and busy days that can queue about 10-20 people.

2. Questionnaires

The questionnaires are distributed to the customers who use current online ticket bus system. Questionnaires are distributed to the class, social media and hostel room to get a feedback from the users. The purpose of questionnaires is to collect information and requirements what the users want in bus ticket apps. The questionnaires will be covered about improvement of current system and problem of the current ticket system. The questionnaires are consists of question based on demographic background, background info and customer behavior.

List of questionnaires

Section A : Demographic

1. What is your gender?
2. What is your age?
3. Do you own android or iOS?

Section B : Customer behaviour

4. Do you prefer long travel for long distance using car or bus?
5. How often do you travel by bus?
6. Do you always buy ticket from ticket counter, mobile apps or website?
7. Which destination you always travel?

Section C: Knowledge about online bus ticketing in Malaysia

8. Do you know about online bus ticket website in Malaysia?
9. Have you ever used any online bus ticket website or apps?
10. Do you satisfied with current online ticketing system?
11. What is the problem you always face when using existing system?
12. From the list below, which bus operator do you always use?
13. What is the improvisation on current online ticketing system?

3.2 System Development Methodology

Methodology

The project methodology that been used in development of system is System Development Life Cycle. The waterfall model is linear approach to software development which development is a flowing downwards just like a waterfall through a several phases.

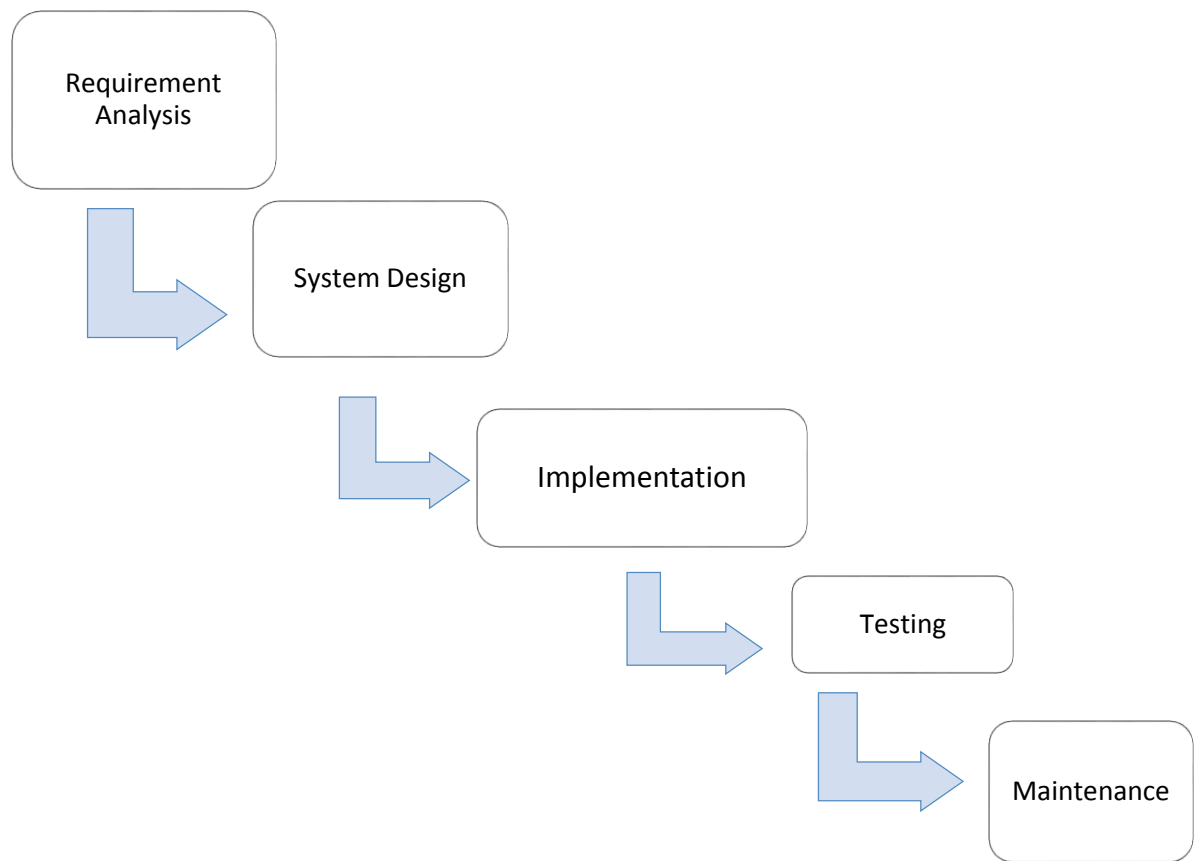


Figure 8. Waterfall model

1. Requirement Analysis

In the requirement analysis, we gather as much information from the loyal customer of bus. We analysis all the existing system that related to reservation of ticket bus. We analyses all the problem from existing web and apps and try to come out with solution to create a better system for customers.

All possible requirements of the system that related to the developed are recorded in this phase. The gather all requirements based on questionnaires and analysis on existing online bus ticketing system.

2. System design

System design are based from requirement analysis. We design the interface of the system design. The design is the prototype of the system design where all the functional requirement is satisfied. The system design must meet all the requirement and objectives of the ticket bus broker system. We design the system, interface and database of the system based on the requirement analysis. The interface also based on our questionnaires.

3. Implementation

Implementation phase where all the software code are created. During these phase, the process of coding of software code based on system design and requirement analysis. The process of coding including the comparison of all price in database and display info to users. The implementation is the hardest part of this project. The implementation phase will be developed by using Android Studio IDE and Android SQLite

4. Testing

After the implementation of the system design, apps are tested to users. The testing is needed to find any bug or mistake in our system requirements. Testing will be done to ensure quality and acceptance of the system. User acceptance testing will be done after the implementation is completed. The author will asked approximately 5 students and 5 employees from bus operator company. During user acceptance testing, the testing will focus on functionality, ease of use, efficiency and acceptability.

5. Maintenance

After the apps is completed, the apps will be maintained by correcting error and bug faced by user in testing phase. Maintenance is needed to sustain the performance of the apps and solve any error in requirement.

3.3 Tools

1. Android Studio IDE

Android Studio is the official IDE for Android application development. It was built on the popular IntelliJ IDEA Java IDE. Android Studio provides flexibility and extensibility that can be built by using IDE. It can design interface of the android application. Features of Android Studio IDE

- Provide code templates to build common features
- Drag and drop layout editor
- Allow the developer to work with layout in Design and Text View
- Preview layout

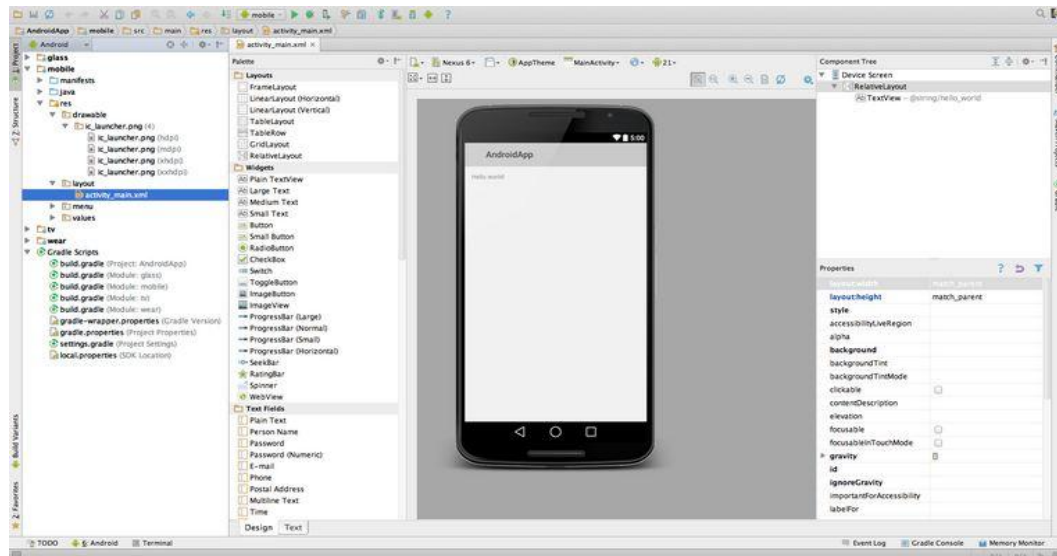


Figure 9 Android Studio IDE software interface

2. Android Software Development Kits (SDK)

Software Development Kits allows developer to create applications for Android operating system. The Android SDK provides all the tools needed by developer to build apps for Android in all operating system such as Windows, Linux and Mac. It includes sample project with source code, library and emulator to build Android application.

3. Android SQLite

In order to store user and app data, Android SQLite is one of the way to store database. Android SQLite is an open source database which support android operating system. SQLite widely used in every Android devices. Bus ticket comparison need to use database to compare bus operator in term of price, availability, routes and specialty. Database management is very crucial in bus ticket comparison project.

Hardware

1. Personal Computer or Laptop

Personal Computer or Laptop will be used during the development of the mobile apps. Coding and designing are done by using PC. Android Studio IDE need to install in laptop. It is easy to use laptop for mobile purpose. The requirement for laptop or personal computer to develop this apps are :-

- Operating system : Microsoft Windows 2003/Vista/7/8
- 32 or 64 bit
- RAM : 2GB RAM minimum
- Recommended : 4GB RAM
- Disk space : 500 MB disk space
- Minimum screen resolution : 1280 x 800

2. Android Smartphone

After the coding and designing are completed, the mobile apps will be tested using Android smartphone. We tested the apps on android smartphone only. Android smartphone is much cheaper than iOS. Android didn't' need a license to create an apps..



Figure 10. Android Mobile Phone

3.4 System Architecture

A system architecture is basically the conceptual model on how the system work and structure of the system. For online ticket bus comparison apps, its architecture consist of server that holds database and comparing all data in database before give information to the users. The users search for selected location of origin and destination of the users. The database consists of all database from 2 bus operators. The author chooses 2 bus operators for a prototyping purpose.

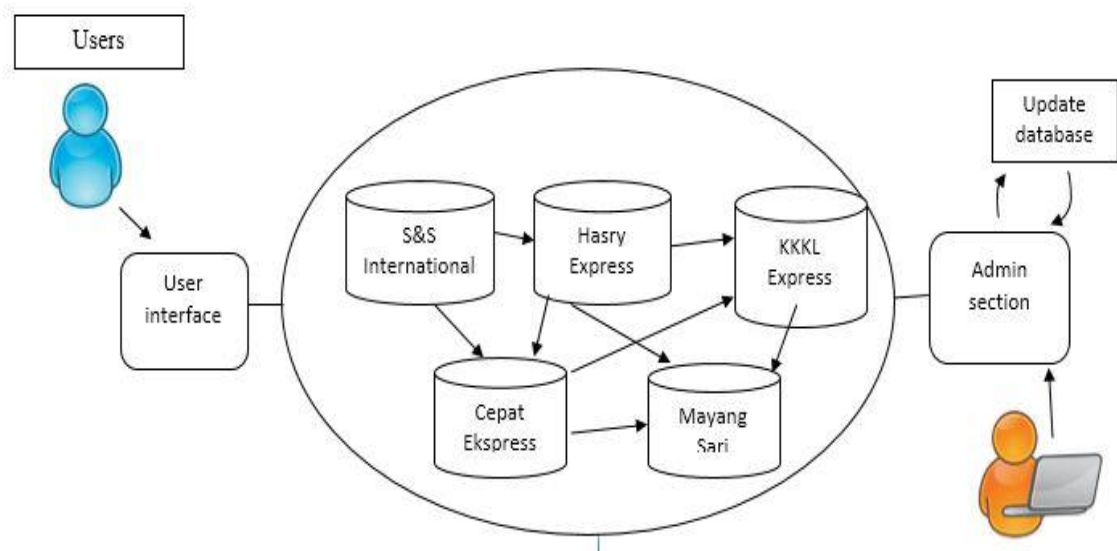


Figure 11. System architecture of Bus Ticket Comparison Apps

Comparing all database in term of price, availability, routes,
time for all five bus operators

3.5 System modelling

Use Case Diagram

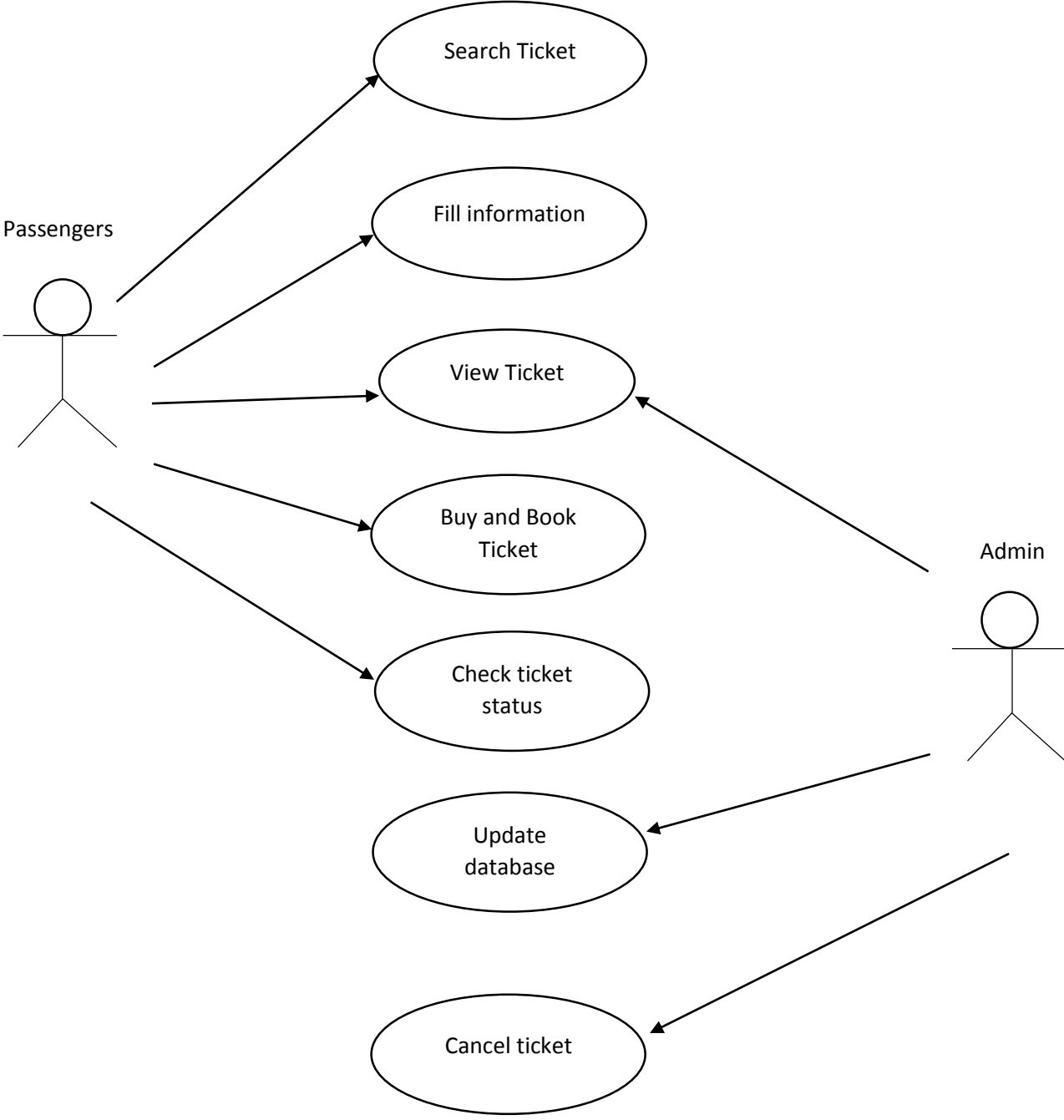


Figure 12. Use-Case Diagram

Activity Diagram

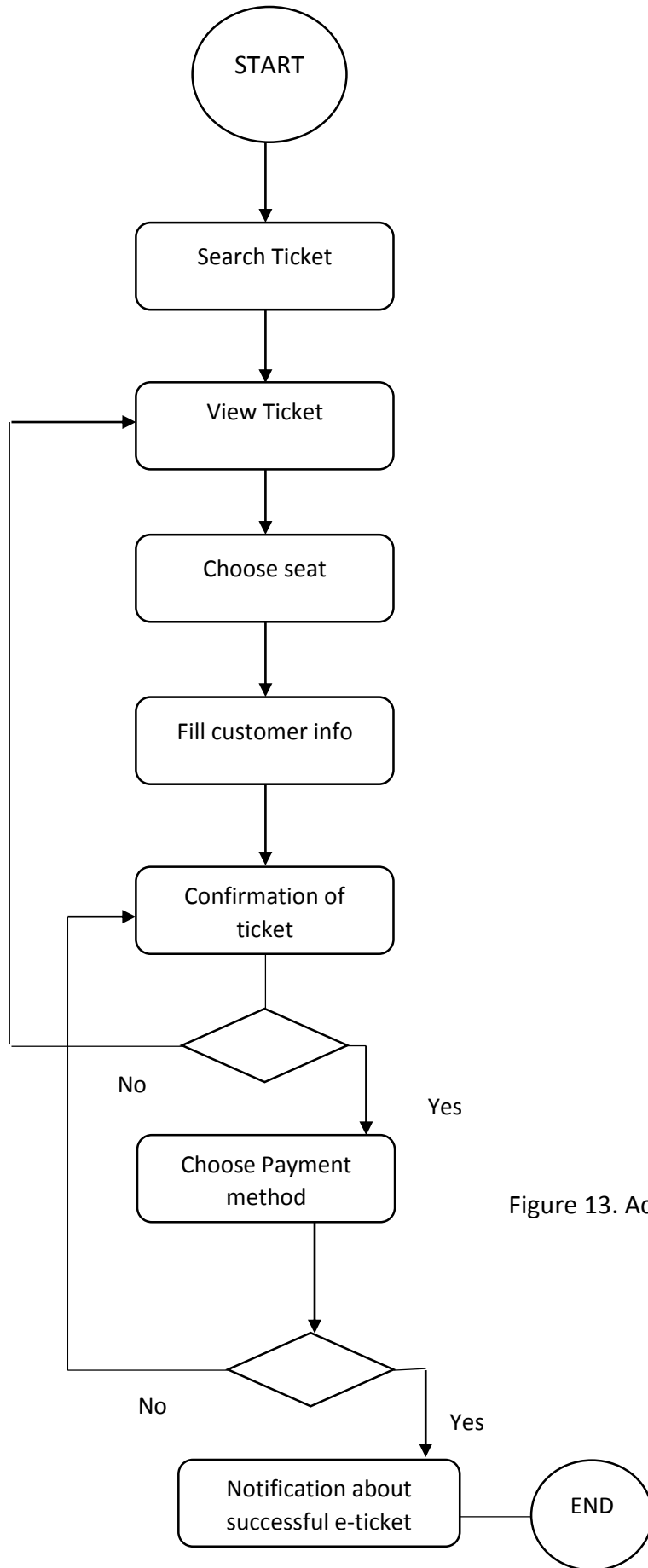


Figure 13. Activity Diagram

Class Diagram

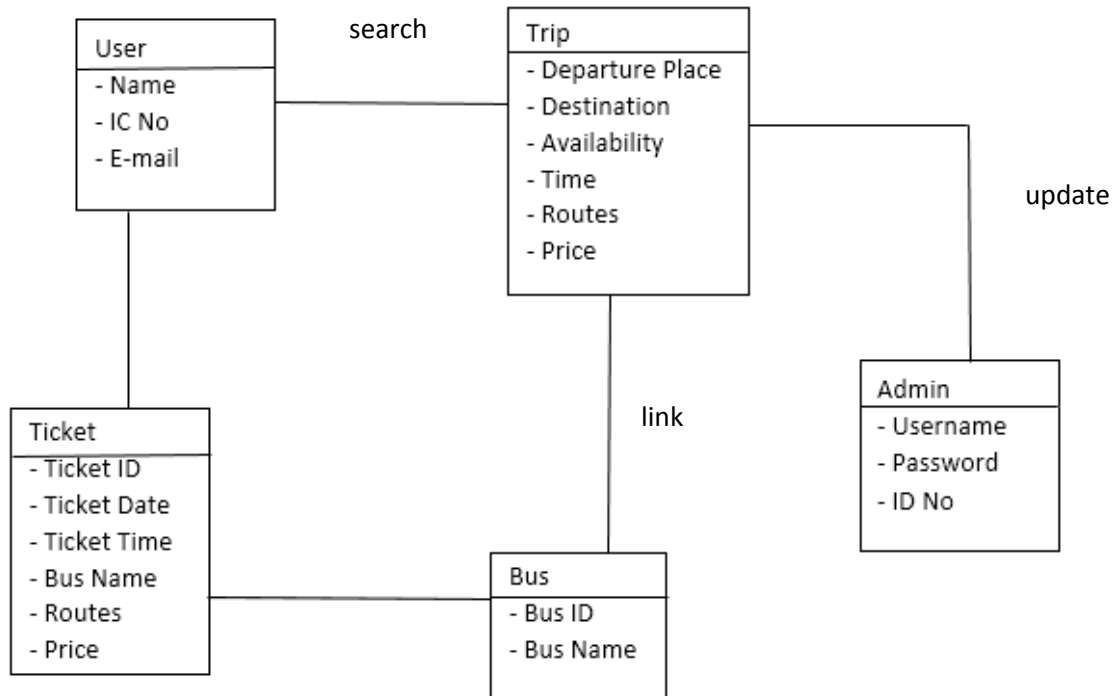


Figure 14. Class Diagram

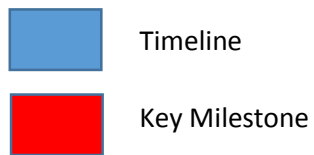
Class Diagram consists of 5 main class. There are User, Ticket, Trip, Bus and Admin. User class is all the information that store by the customers. Before buy the ticket, the users need to fill in customer information which are name, ic no and email for verification purpose. All the information is needed to give boarding pass (e-ticket) and receipt of purchasing ticket

Ticket class is where all the information stored about e-ticket. When the users already successful purchase the tickets, the users will be given an e-ticket. E-ticket is acts as a boarding pass for the users. Trip class is all the information about destination and origin. This is where users search for selected trips.

3.6 Gantt Charts

Details of work	Week													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Initiation Phase														
1.1 Project Proposal	■	■												
1.2 Gather information		■	■											
1.3 Project Approval			■											
1.4 Literature review research				■	■									
Research and Analysis Phase														
2.1 Existing System					■	■								
2.2 Questionnaires distribution						■	■							
2.3 Results and discussion								■	■					
2.4 Requirements gathering										■				
Prototype Design Phase														
3.1 System architecture design											■	■		
3.2 System modelling design													■	
3.3 Interface design														■

Table 8 Gantt Chart



4.0 Results and Discussion

The author already distributed online questionnaires using Google survey and through social media and emails. The total of respondents are 40 people. Most of the respondent are from university students who always going back to their hometown.

Questionnaires

Part A : Demographic info

1. What is your gender?

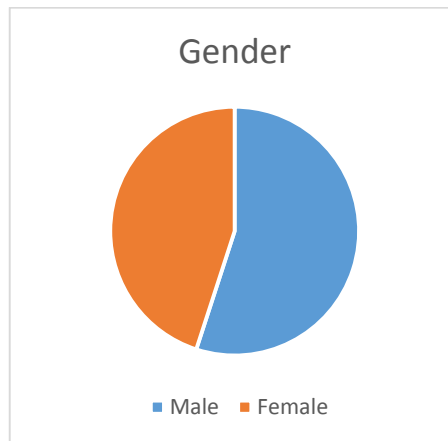


Figure 15. Gender chart

- 55% of the respondents (22 respondents) are Male
- 45% of the respondents (18 respondents) are Female

2. What is your age?

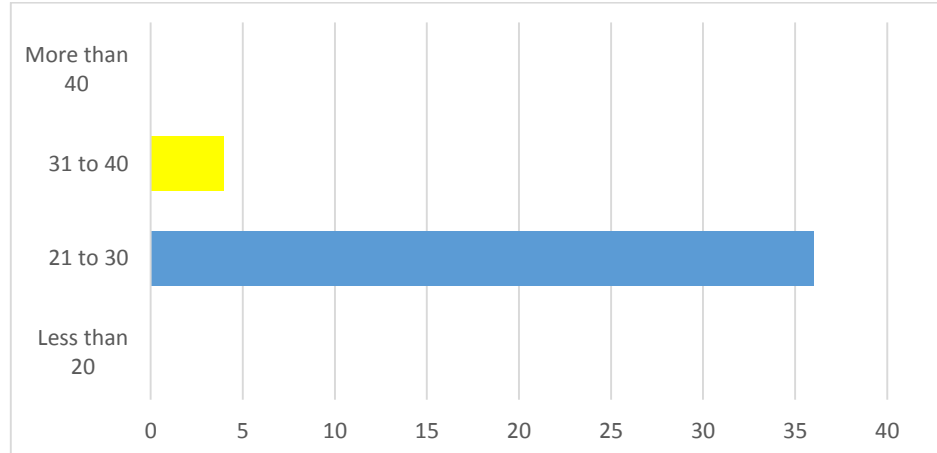


Figure 16. Age chart

- 0% of the respondent are age less than 20
- 90% of the respondents (36 respondents) are between 21 to 30
- 10% of the respondents (4 respondents) are between 31 to 40
- 0% of the respondents are age more than 40.

3. Do you own Android or iOS?

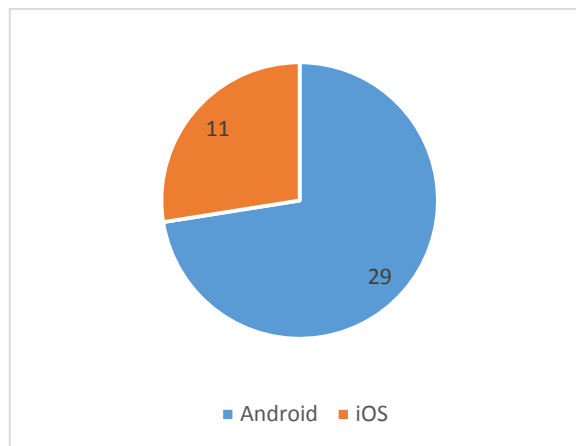


Figure 17. Mobile operating system chart

The majority of the respondents are using Android operating system

- 72.5% of the respondents (29 respondents) are using Android operating system

- 27.5% of the respondents (11 respondents) are using iOS operating system

Section B : Customer behaviour

4. Do you prefer travel to long distance by bus or car?

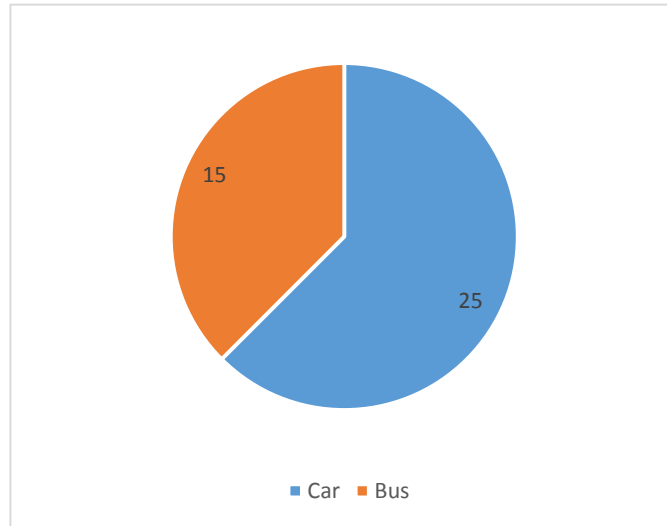


Figure 18. Transport preferable

- 62.5% of the respondents (25 respondents) prefer travel by car
- 37.5% of the respondents (15 respondents) prefer travel by bus

5. How often do you travel by bus?

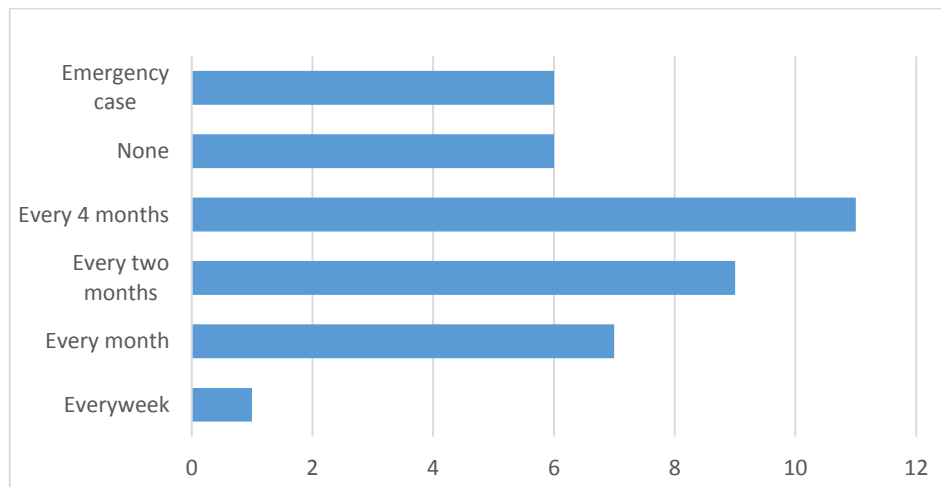


Figure 27. Travel behavior by bus

- 2.5 % of the respondent (1 respondent) travel using bus every week
- 17.5% of the respondents (7 respondents) travel using bus every month
- 22.5% of the respondents (9 respondents) travel using bus every two months

- 27.5% of the respondents (11 respondents) travel using bus every four months
- 15% of the respondents (6 respondents) don't travel using bus
- 15% of the respondents (6 respondents) travel using bus in emergency case.

6. Do you always buy bus ticket from counter, website or mobile apps?

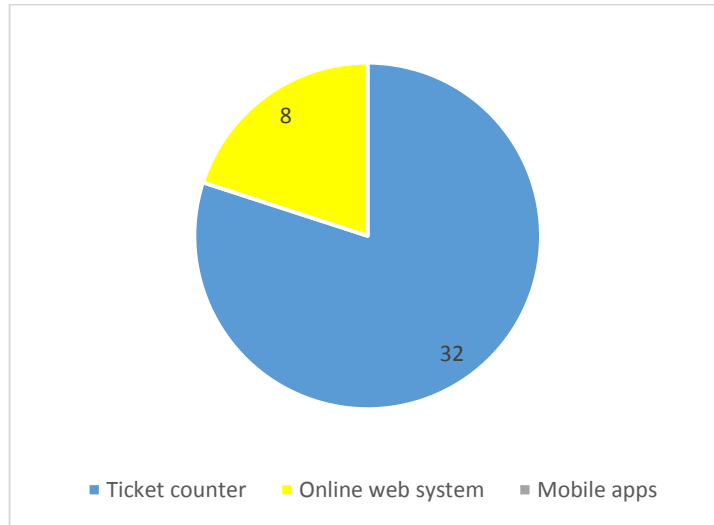


Figure 19. Source of bus-ticket

Majority (80 %) of the respondents (32 respondents) buy ticket from ticket counter. It is because buy ticket from ticket counter is easy and fast procedure. They might waste their time and energy to go to ticket counter which far away from their house. The customers doesn't have an information about the availability of the bus ticket. Sometimes the ticket sold out on time they arrive at the ticket counter. Buy ticket at counter is a traditional way to buy ticket

20% of the respondents (8 respondents) buy ticket from online website system. No respondents ever buy ticket from mobile apps. Bus ticket apps is quite a few in Malaysia. It is much easier to buy from ticket counter and website rather than mobile phone.

7. Which destination you always travel?

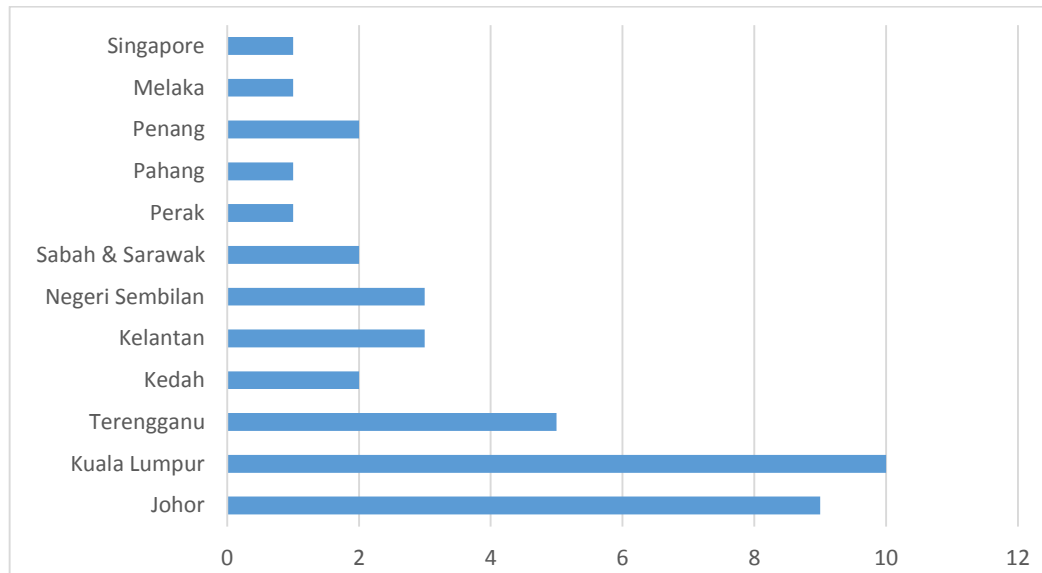


Figure 20. Destination

- Majority (25%) of the respondents (10 respondents) are travel to Kuala Lumpur
- 22.5% of the respondents (9 respondents) are travel to Johor
- Singapore, Melaka, Pahang and Perak are the least destination of the respondents.

Section C: Knowledge about online bus ticketing in Malaysia

8. Do you know about online bus ticketing in Malaysia?

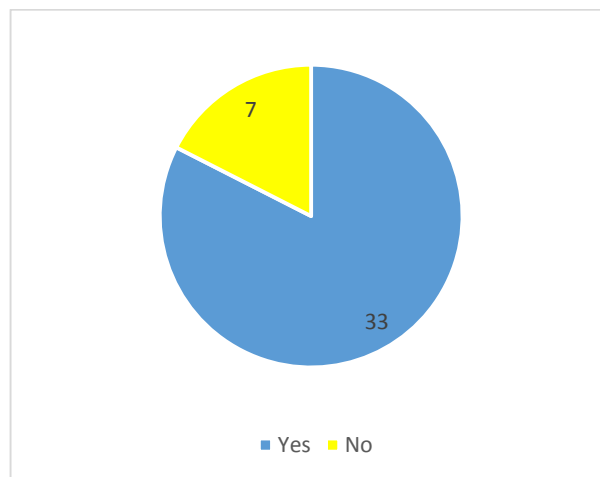


Figure 21. Knowledge about online bus ticketing system

Most of the respondents know about online bus ticketing. 82.5% of the respondents (33 respondents) know about online bus ticketing in Malaysia. Most of the people in Malaysia are aware with online bus system. Only 17.5 of the respondents (7 respondents) didn't know about online bus ticketing in Malaysia.

9. From the list below, which bus operator do you always use?

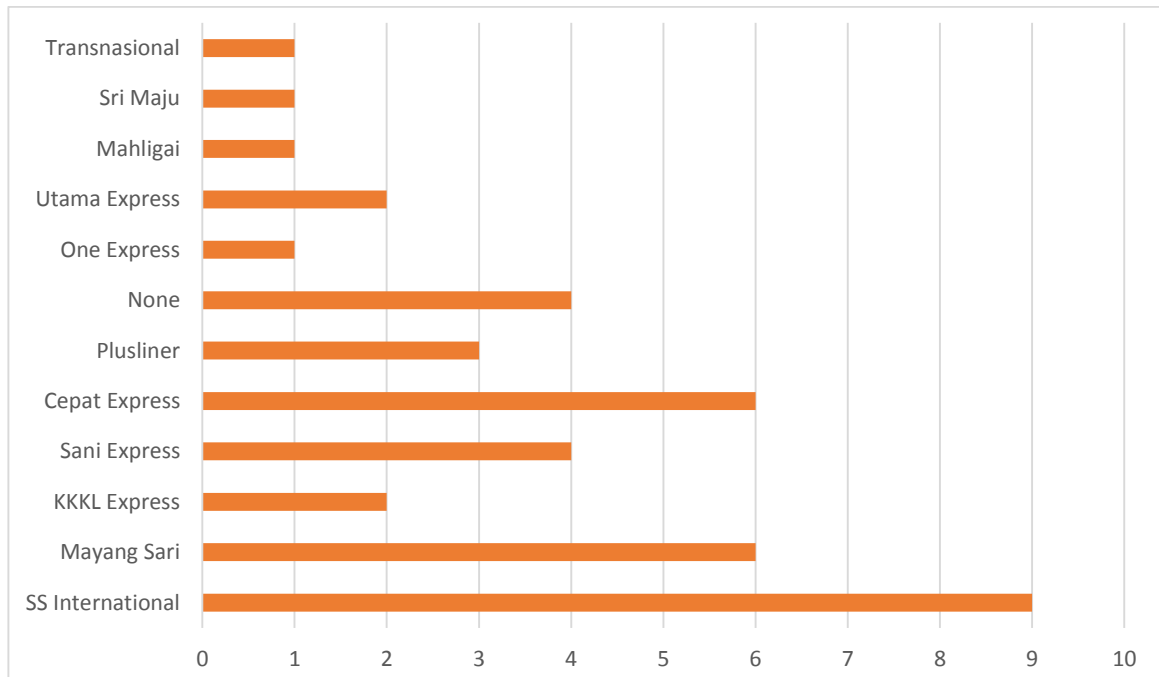


Figure 22. Bus operators

22% of the respondents (9 respondents out of 40) always use SS International as their favourite bus operator. From the observations, SS International offer variety of destination. Most of destination can be found easily by their website. Another factor may related to demographic of the respondents. Most of the respondents always travel to Johor. SS International provides daily trips to major cities especially Johor Bahru and Kuala Lumpur. Most of the destinations are Johor. SS International has their own website and no mobile application yet.

The second highest is Cepat Express and Mayang Sari. About 15% of the respondents (6 respondents) always use Cepat Express and Mayang Sari. Cepat Express and Mayang Sari have similar website interface. The factor that differentiate both of the bus operators is preferred location. Mayang Sari have a very limited destination.

10. Have you ever used any bus ticket apps or website?

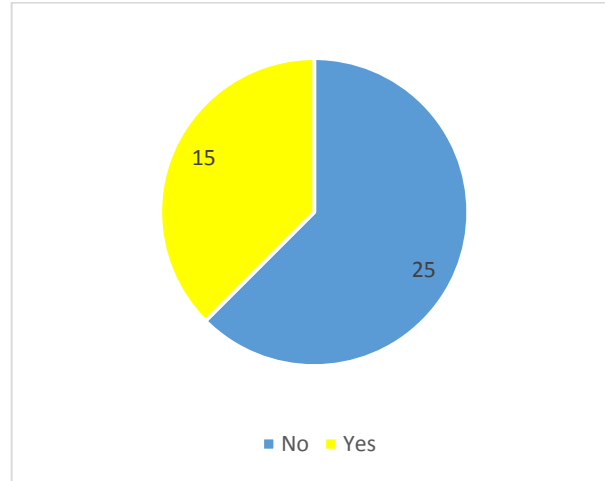


Figure 23. Usage of bus ticket apps or website

62.5% of the respondents (25 respondents) never used any bus ticket apps or website. Most of the respondents like to buy ticket at counter based on previous question. Buy ticket from ticket counter easy but time wasting because they need to go to the counter place. The other reason why they doesn't use existing bus ticket apps or website because they don't know how to buy ticket from their system. Most of the people doesn't have credit card or online bank account to perform online transaction. Besides, they find existing bus ticket system is very complicated and inefficient. Most of the website have a very complicated procedure and slow responds.

37.5% of the respondents have used bus ticket apps or website. The total respondents who have user bus ticket is quite low. Our community didn't expose with online bus ticketing system. Most of the people doesn't know about online system. There is no promotion by the bus operator to use online system rather than buy from ticket counter.

11. Do you satisfied with current online bus ticket system?

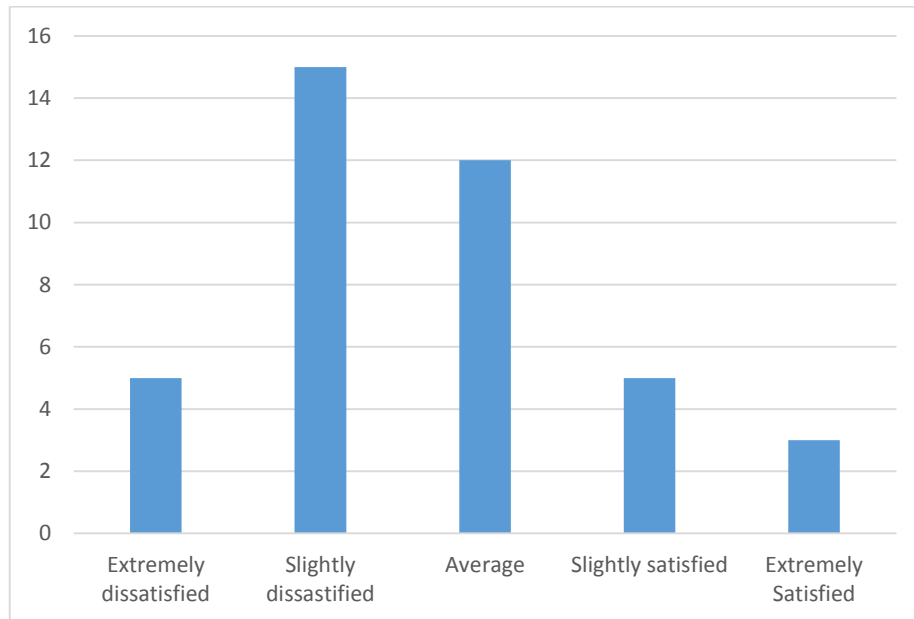


Figure 24. Quality of current online bus ticket system

37.5% of the respondents (15 respondents) slightly dissatisfied with existing online bus ticketing system in Malaysia. Most of the bus operator's website are act individually and not integrated with all bus operators. Besides that, another factor lead to dissatisfaction is complicated procedure. They need to follow all the procedures to buy online ticket. It is far complicated rather than buy ticket manually from ticket counter in bus station.

Only 7.5% of the respondents (3 respondents) extremely satisfied with existing online bus ticketing system in Malaysia. The existing online bus ticket system is not good enough because the number of satisfied respondents based on my survey are really low. Existing system need to be improved to attract more people to use their system.

12. What is the problem you always face when using online ticket bus system?

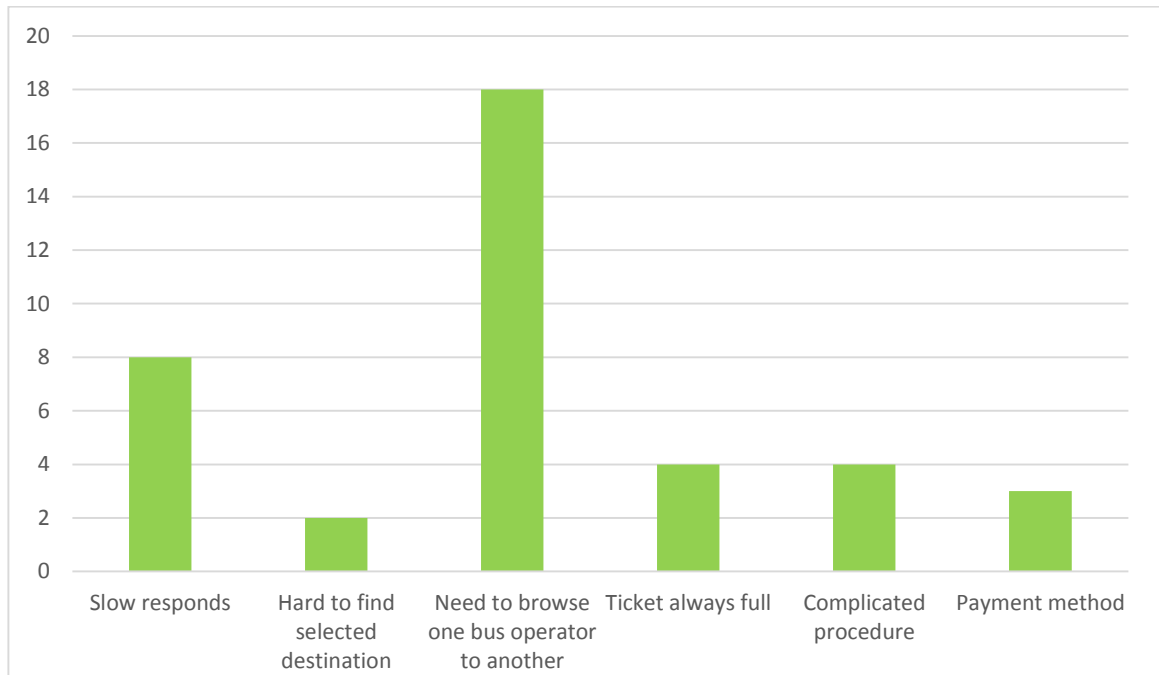


Figure 25. Problem faced by users when using online bus ticket system

Majority of respondents faced a problem to browse one bus operator to another. 45% of the respondents (18 respondents) have a problem to browse one bus operator to another. This is the problem mostly faced by the bus customers. Most of the bus operator in Malaysia have their specific destination and doesn't have all destination that the users wanted. They need to browse one bus operators to another website to search for their selected destination. There is

20% of the respondents (8 respondents) said that the system has a slow responds. Slow respond means the system is inefficient. Slow responds is one of the reason why online bus ticketing is rarely use by people. They would prefer to buy ticker from counter which is much faster than slow responds online system.

13. What is the improvisation you need to add in current online bus ticket system in Malaysia?

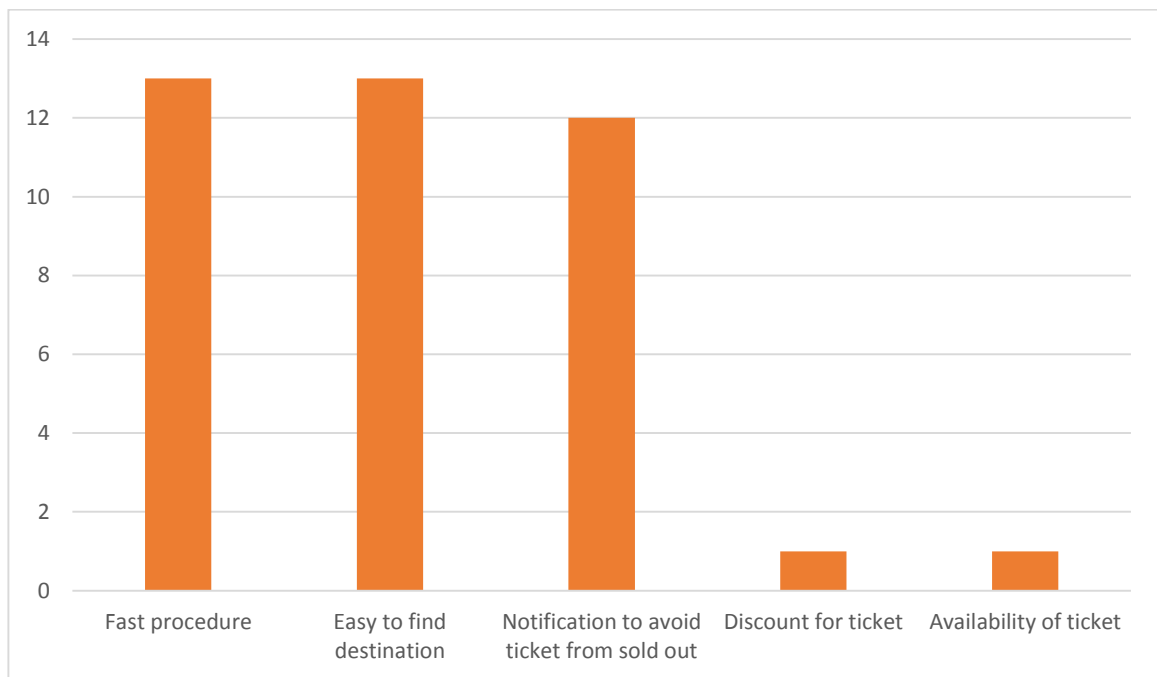


Figure 26. Improvisation on current online bus ticket system

32.5% of the respondents (13 respondents) suggested to increase the efficiency of the procedure. The procedure for existing online bus ticketing system is quite complicated. Complicated procedure will lead frustration to customers. Some of the system have an unnecessary procedure which stall the flow of procedure. Most of the bus operators need to register first before buy the tickets. The registration information needed by website sometimes too many and unimportant.

32.5% of the respondents (13 respondents) suggested to create a system that can easily find destination. Most of the destination in current ticketing system doesn't provide many destinations. Some of the bus operators only specific in North of Malaysia. Some of the bus operators only focus on East of Malaysia. New customers will have a hard time to buy ticket.

30% of the respondents (12 respondents) agree to create notification for registered customers to avoid ticket from sold out. This problem always happened in festive season. Many people prefer travel to by bus

4.2.1 Summary of Discussions

Based on the questionnaires, the author gather all the requirements needed to develop Integrated Ticket Bus Comparison Apps. Most of the respondents are using Android mobile operating system. Android is an open source mobile operating system which attract many people to buy their products. Android smartphone are also much cheaper than iOS. Android smartphone is affordable for most of the people. The ticket bus comparison apps is developed using Android operating system with Android Studio and SQLite software. Android doesn't require license to develop apps unlike iOS.

Most of the respondent suggested to increase the efficiency of the procedure. The procedure for existing online bus ticketing system is quite complicated. Some of the system have an unnecessary procedure which stall the flow of procedure. Most of the bus operators need to register first before buy the tickets. The registration information needed by website sometimes too many and unimportant. The author try to come out with simple procedure and speed up the transaction

Majority of respondents faced a problem to browse one bus operator to another. Most of the bus operator in Malaysia have their specific destination and doesn't cover all destinations in Malaysia. They need to browse one bus operators to another website to search for their selected destination. The author innovates the existing system by integrating all bus operators database in one system. The users will have an easy time to search for their ideal destination

4.3 User interface

1. Date search section (Round Trip)

The screenshot shows a mobile application interface for a Round Trip search. At the top, there are three buttons: 'About', 'Search', and 'Help'. Below these, there are two tabs: 'ROUND TRIP' (selected) and 'SINGLE TRIP'. The main content area contains two large green buttons labeled 'From' and 'To'. Below these, there are two sections: 'Departure Date' and 'Return Date'. Each section has a date picker with three options: 25 Jun, 26 Jul, and 27 Aug. At the bottom, there is a blue button labeled 'Next'.

Figure 27. Date search section I

2. Date search section (Single Trip)

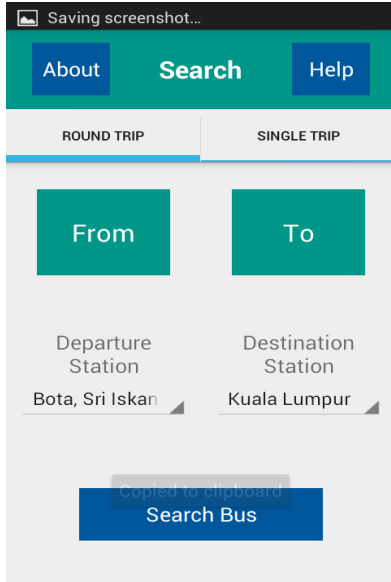
The screenshot shows a mobile application interface for a Single Trip search. At the top, there are three buttons: 'About', 'Search', and 'Help'. Below these, there are two tabs: 'ROUND TRIP' and 'SINGLE TRIP' (selected). The main content area contains two large green buttons labeled 'From' and 'To'. Below these, there is a section labeled 'Departure Date' with a date picker showing three options: 25 Jun 2014, 26 Jul 2015, and 27 Aug 2016. At the bottom, there is a blue button labeled 'Next'.

Figure 28. Date Search section II

The user must choose the origin and destination. The user also need to specify the exact date for the ticket. The user need to choose how many passengers they want to book. They also need to specify whether child or adult. Child and adult have a different prices.

From figure 16, the user must choose the origin and destination. The user also need to specify the exact date for the ticket. The user need to choose how many passengers they want to book. They also need to specify whether child or adult. Child and adult have a different prices.

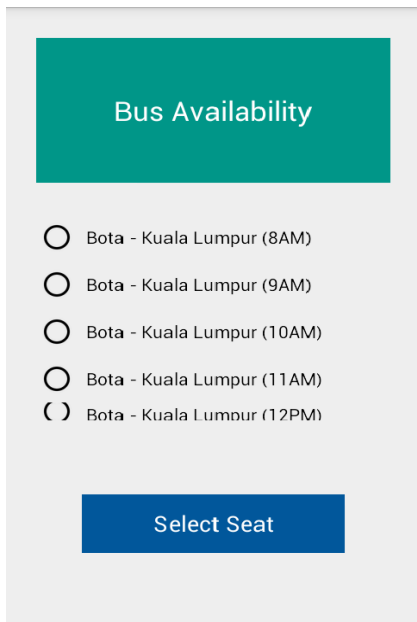
2. Origin and Destination Search Section



From the Figure 17, the user choose the departure and destination. After that, user click on Search Bus button

Figure 29 Destination section

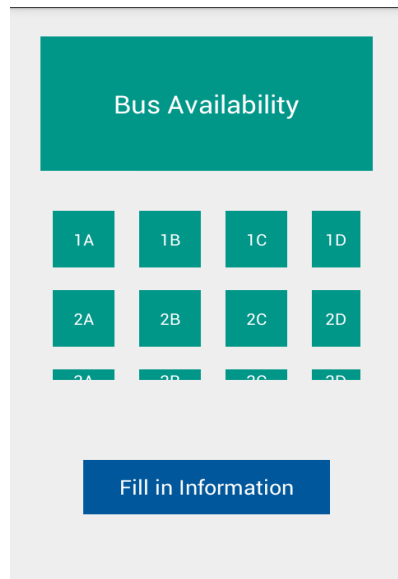
3. Comparison of all tickets from all bus operators



From the Figure 17, the apps comparing the price and listed bus operators info on specific dates. The list of information display by the apps are date of schedule, time, price, routes, availability, and name of bus operator. All the information is important to the customer before the customers buy the ticket. The user taps on the best ticket that they wanted.

Figure 30. Comparison page of all bus operators

4. Choose the seat by the customers



Interface page where user their seat for the selected bus. The interface shown availability of the seat. The user click on selected seat and press Confirm button.

Figure 31. Seat Selection

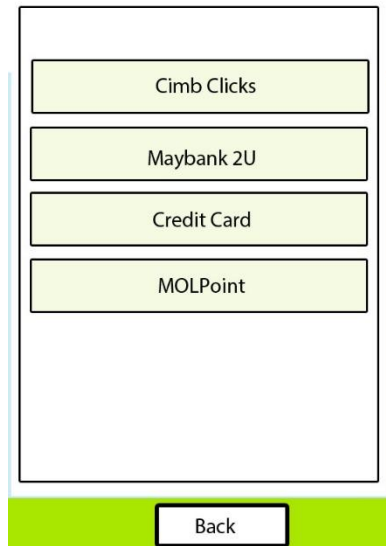
6. Fill out customer information

A screenshot of a mobile application form for customer information. The form has a white background with a black border. It contains three text input fields: "Name:", "IC Number:", and "Telephone no:". Each field has a grey rectangular placeholder. At the bottom of the form, there are two buttons: "Submit" and "Cancel", both with a green background and white text.

User need to fill in important information before buying the ticket to ensure legal people and avoid scam.

Figure 32. Customer information

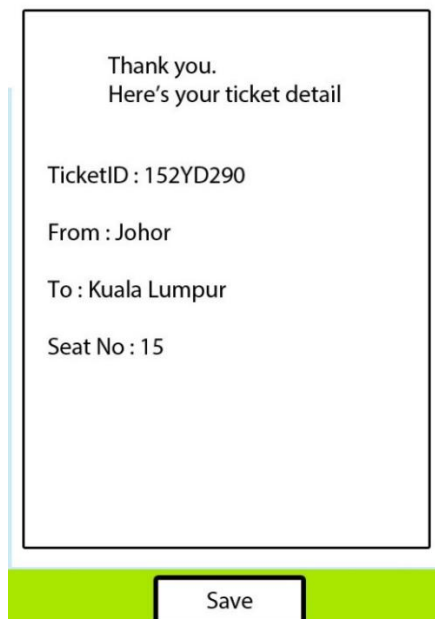
7. Proceed with payment



Proceed with payment methods. The users need to choose from various choices to complete online transaction

Figure 33. Payment method

8. The apps notified the successful of online booking and ticket info



After the payment is completed, user will get notification on successful transaction and information about e-ticket. The user need to display this receipt to the bus conductor before boarding the bus.

Figure 34. Notification of successful payment and ticket info

4.3 User Acceptance Testing

User acceptance testing

System testing has been done with user acceptance testing. Total of 10 persons had been asked to test the apps. All the respondents are students in Universiti Teknologi Petronas and familiar with mobile apps. Test participants are age around 18-24. They have experience with using computer and mobile technology and don't have a problem using mobile apps. We also gather their demographic information. We developed a paper based questionnaire to be used by the test participants during the study session. After testing, we distributed the questionnaires to the respondents.

The questionnaires are

- 1 Does the mobile apps easy to use?
- 2 Does the mobile apps help you to buy bus tickets?
- 3 How you rate the efficiency of the apps?
- 4 Is it user friendly?
5. How do you rate functionality of the application in terms of performance?
6. Rating for each section
 - i) Search section
 - ii)Information display section
 - iii)Seat selection section
 - v) Customer information section
 - iv) Receipt section

User Acceptance Test Form

Title : Bus4U: Mobile Application for Online Bus Ticket Reservation
Developer : Adib Afifi bin Saadon
Student ID : 16629
Programme : Information & Communication Technology

1. Gender : _____

2. Age : _____

In the scale of 1-5, Please tick the best option for the following questions

(5=Excellent, 4=Very Good, 3=Good, 2=Poor, 1=Very Poor)

No	Topic	Very Poor	Poor	Average	Good	Excellent
1	Does the mobile apps easy to use?					
2	Does the mobile apps help you to buy bus tickets?					
3	How you rate the efficiency of the apps?					
4	Is it user friendly?					
	Rating for each section					
	i) Search section					
	ii)Information display section					
	iii)Seat selection section					
	v) Customer information section					
	iv) Receipt section					
5.	How do you rate functionality of the application in terms of performance?					

Please write your comments

4.4 Results and Discussions

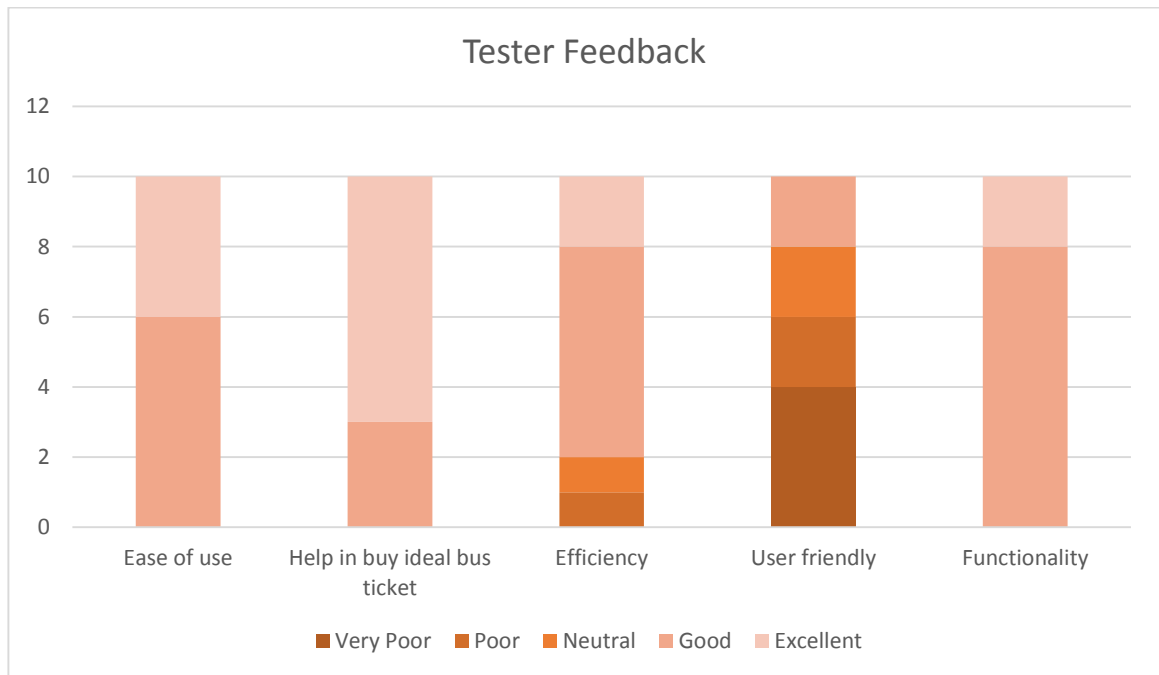


Figure 35: Test Feedback

The rating is from 1 to 5 which rating 1 signifies very poor by the users and 5 signifies excellent by the users. Most of the respondents agree that this mobile apps can help them to buy ideal ticket for them. Most of the respondents also agree this mobile apps can be easily use because most of the respondents are from early 20s. Most of the respondents familiar with current mobile phone apps technology. 6 from 10 respondents says that this mobile apps is excellent in helping user to buy ideal ticket for them since the apps list down all possible option from various bus operators.

Some of the respondents doesn't agree about user friendly criteria. They think that the apps lacked of some function. The mobile apps doesn't have user friendly criteria. Some of the respondents state that the user can't cancel their ticket after purchasing. 4 from 10 respondents stated that this mobile apps has a very poor user friendly features. The author will try to improve current mobile apps and try to solve all problem face by respondents.

6 from 10 respondents agree with the efficiency of the mobile apps. The mobile apps requires a simple procedure to buy bus ticket rather than existing online bus ticketing system using website. Only one respondents doesn't agree that this mobile apps is fast enough to buy bus ticket. He may find out the procedure quite long.

Most of the respondents satisfied with the functionality of the Bus4U mobile apps. They can carried out objectives using functionality of the apps.

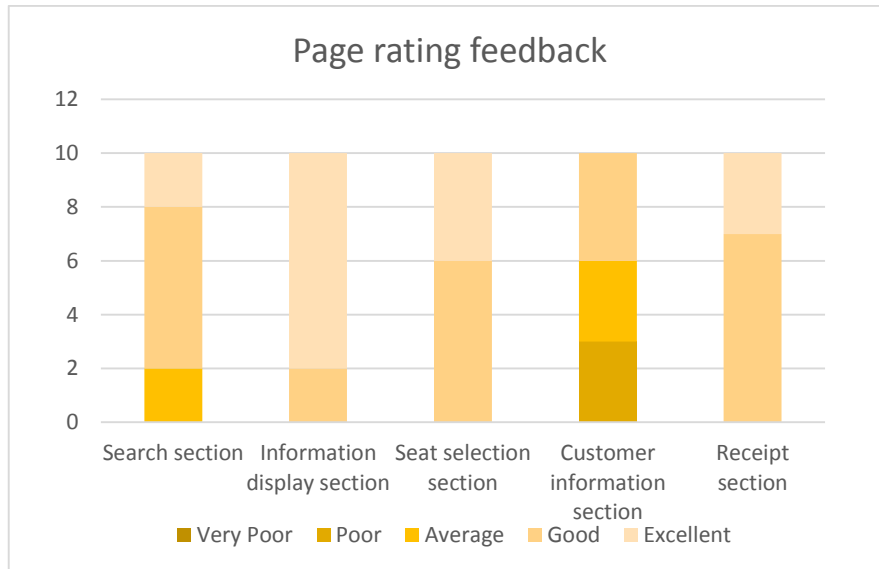


Figure 36. Page rating feedback

The author also provide a rating for every page in Bus4U mobile apps. This questionnaires are needed to improve performance and interface for all pages in the apps. Based on the feedback, most of the respondents like the information display section page. They like how the information is being display and shown to the users. 6 out of 10 respondents give a good rating to seat selection section. The interface is really easy for user to select their seat.

However, most of the respondents doesn't like the customer information section. They find it quite complicated to fill in all user information. The author will improve the interface from time to time. Around 7 from 10 respondents love the interface of the receipt section. The receipt section contain all info needed for the customers to board bus. The information contain date, time and ticket No. These information is important to the customers.

5.0 Conclusion

The author found that ticket bus comparison is a huge market in Malaysia because no mobile apps in Malaysia that provide a comparison of ticket bus among all bus operator in Malaysia. This system is very significant to be developed as the current system are acts as individual business. There is only one mobile apps in Malaysia that offer online ticket bus. The author hope that this project will be going bigger and can make cooperation with other bus company such as Terminal Bersepadu Selatan. This new system could revolutionize the current online bus ticketing system.

This ticket bus comparison can go further because it benefits most of the passengers who want to book ticket easily without browsing one by one bus operator in Malaysia. E-ticket is a popular issue especially in developed country like Malaysia. Ticket Bus Comparison can save money by comparing prices among all bus operators in Malaysia. The user can make a wise decision buying the lowest price. This apps also can create a competition to all bus operators to provide a reasonable price and good services to customers. This apps can be the best tourist apps to tourist in Malaysia. Most of the places in Malaysia can be reached by bus. Bus is the cheapest public transportation in Malaysia for a long distance destination.

5.1 Recommendation

In the future, the author wanted to have a collaboration with all bus operators to develop this apps for real. The profit are come from commission of the sale. The apps acts as a middleman that bring buyers and sellers by promoting their services in the apps. The author also want to create a mobile apps for Terminal Bersepadu Selatan. Terminal Bersepadu Selatan is one of the largest integrated transport terminal built by MAJU Terminal Management and Services. The disadvantages of Terminal Bersepadu Selatan is they didn't offer a destination trip to north of Malaysia such as Kedah, Perlis and Penang. However, Terminal Bersepadu Selatan is one of the popular bus terminal because of the strategic places. They don't have a mobile apps. They already have website system that can buy ticket like other bus operators. They can have more customers if they develop mobile apps. They already integrated bus operators in their system but only for south bound trip in Malaysia like Johor Bahru, Melaka and Singapore.

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Universiti Teknologi Petronas

Appendix

1. Questionnaires



Survey On Current Bus Ticket Comparison Apps

I am conducting a survey for my current final year project. The study is to integrate and compare all bus operator in Malaysia in term of price, routes, schedule and availability in one apps instead of browsing through all express bus websites.. The bus ticket comparison can help tourist and citizens to buy and book the best ticket to travel in Malaysia.

The author would like you to spend some of the quality time in answering this survey. Your cooperation is truly appreciated. Thank you.

*Required

What is your gender? *

- Male
- Female

What is your age? *

- <20
- 21-30
- 31-40
- >40

Do you own android or iOS? *

- Android
- iOS

Do you prefer travel to long distance by bus or car? *

- Car
- Bus

How often do you travel using bus? *

- Everyweek
- Every month
- Every two months
- Every 4 months
- None
- Other:

Do you always buy bus ticket from counter, website or mobile apps? *

- Ticket counter
- Online web system
- Mobile apps

Which destination you always travel? *

- Johor
- Kuala Lumpur
- Terengganu
- Kedah
- Kelantan
- Negeri Sembilan
- Sabah & Sarawak
- Perak

Do you know about online bus ticketing in Malaysia? *

- Yes
- No

From the list below, which bus operator do you always use? *

- SS International
- Mayang Sari
- KKKL Express
- Sani Express
- Cepat Express
- Other:

Have you ever used any bus ticket apps or website? *

- Yes
- No

Do you satisfied with current online ticket bus system? *

1 2 3 4 5

Not Satisfied Satisfied

What is the problem you always face when using online ticket bus system? *

- Slow responds
- Hard to find selected destination
- Need to browse one bus operator to another
- Complicated procedure
- Ticket always full
- Other:

What is the improvisation you need to add to current online bus ticket system in Malaysia? *

- Fast procedure
- Easy to find destination
- Notification to avoid ticket from sold out
- Other:

2. User Acceptance Test Form

User Acceptance Test Form

Title : Bus4U: Mobile Application for Online Bus Ticket Reservation

Developer : Adib Afifi bin Saadon

Student ID : 16629

Programme : Information & Communication Technology

1. Gender : _____

2. Age : _____

In the scale of 1-5, Please tick the best option for the following questions

(5=Excellent, 4=Very Good, 3=Good, 2=Poor, 1=Very Poor)

No	Topic	Very Poor	Poor	Average	Good	Excellent
1	Does the mobile apps help you to buy bus tickets?					
2	Is it user friendly?					
3	How you rate the efficiency of the apps?					
4	Rating for each section					
	i) Search section					
	ii) Information display section					
	iii) Seat selection section					
	v) Customer information section					
	iv) Receipt section					
5.	How do you rate functionality of the application in terms of performance?					

Please write your comments (if any):
