



Faculty of Computer Science and Information Technology

UNIMAS BUS SCHEDULE AND TRACKING INFORMATION SYSTEM

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Bachelor of Computer Science with Honors
(Network Computing)
2015

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SYSTEM**

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This project is submitted in partial fulfilment of the
Requirements for the degree of
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Faculty of Computer Science and Information Technology

UNIVERSITI MALAYSIA SARAWAK

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UNIMAS JADUAL BUS DAN PENJEJAKAN SYSTEM MAKLUMAT

SHANKARA VIKNESH A/L SHAMUGAM

Projek ini merupakan salah satu keperluan untuk
Ijazah Sarjana Muda Sains Komputer dengan Kepujian
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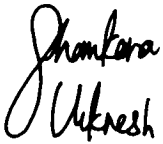
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Abstract

Real time tracking is becoming more and more popular as devices utilizing the Global Positioning System (GPS) become more readily available. GPS is a fast-growing technology with potential application in many different industries. There are many uses for this device, from using it as map navigation to guiding cruise missiles to their target. In this paper, UNIMAS Bus Schedule and Tracking Information System is a system designed to show updated bus schedule, and to track real time location of the bus using GPS.

Abstrak

Pengesanan masa nyata menjadi lebih dan lebih popular sebagai peranti menggunakan Sistem Kedudukan Global menjadi lebih mudah didapati. Sistem Kedudukan Global adalah teknologi yang cepat berkembang dengan potensi aplikasi dalam pelbagai industri yang berbeza. Terdapat banyak kegunaan untuk peranti ini, gunakannya sebagai peta navigasi untuk membimbing peluru berpandu ke sasaran mereka. Dalam kertas ini, UNIMAS Jadual Bas dan Penjejakan Sistem Maklumat adalah sistem yang direka untuk menunjukkan jadual bas dikemaskini , dan untuk mengesan lokasi masa sebenar bas menggunakan Sistem Kedudukan Global.

CHAPTER 1: INTRODUCTION

1.1 Project Title

UNIMAS Bus Schedule and Tracking Information System

1.2 Introduction

Real time tracking is becoming more and more popular as devices utilizing the Global Positioning System (GPS) become more readily available. GPS is a fast-growing technology with potential application in many different industries. There are many uses for this device, from using it as map navigation to guiding cruise missiles to their target.

Currently there are about 16,000 students in UNIMAS. As a method of transportation, UNIMAS provide buses for students to get around the university and also towards residential area with dense UNIMAS students population. A vast number of students use the bus service as their daily mode of transportation. However, not many passengers has complete information about these buses. Complete information namely, the bus schedule, the routes which the bus would pass, time taken for the bus to reach, maps that would guide the passenger with their route, and most importantly, to track the current location of the bus and provide the estimated time of arrival to its stop.

The proposed system is about developing a method of tracking the real time location of the bus. The project will consists of central web portal and mobile client application that will track real time location of the bus using GPS. There will be two method of tracking the real time location of the bus, where the first method is through text updates, and the other method is using Google maps.

Other features of this system includes updated bus schedule, estimated time of arrival, and route display.

1.3 Problems Statement

A large number of UNIMAS students use bus as their daily mode of transportation. UNIMAS currently have a fixed daily bus schedule which is done in the beginning of every semester with the help of UNIMAS student council. This fixed schedule varies from day to day, for example, weekdays have a different schedule from weekends, and a different schedule for public holidays. The schedule also changes during mid-semester break, study break, and during exam week. Any changes in the schedule will be notified via UNIMAS student council's Facebook page. This leads to one of the problems with students in UNIMAS. Due to various issues, at times student might forget or might not be informed about the latest bus schedule. Students will end up missing the bus or wait for a long period of time for the bus to arrive.

Even with a fixed UNIMAS bus schedule, students would face other problems as well, such as not knowing the arrival time of the bus. This is because the UNIMAS student body only provides the time of the bus leaving the bus depot and not the arrival time of the bus to the designated bus stop. At times, the bus might be delayed or even cancelled due to various reasons such as inadequate bus or bus under repair.

From the students perspective, having no accurate information regarding the UNIMAS bus time of arrival is a big disadvantage. This is because students might end up wasting a lot of time, waiting between one to two hours for a bus trip which has been cancelled last minute. Besides that,

students require accurate bus timing during examination period. This helps students to be punctual for exams or plan alternative method of transportation if the bus is delayed.

1.4 Objectives

The main objective of this project is to design and develop an integrated web-based system to provide bus scheduling information to the students in UNIMAS. Other objectives are as follows:

i) To design a web-based system to display Real Time UNIMAS bus tracking via text and maps

This provides an easy way for students to know if the bus is near to their location. This will help students to make a more accurate, informed decision of whether or not they should wait at the stop, or seek alternative methods. This feature will be an improvement for the current transportation service provided by UNIMAS, addressing the dissatisfaction with the current wait time of UNIMAS buses.

ii) To develop a method of calculating and displaying estimated time of arrival of UNIMAS bus to designated bus stops

Having information about the estimated bus arrival time can dramatically improve student's transit experience. Knowing when the bus would arrive at the stop will potentially help to decrease students' frustration by minimizing waiting time. Having this feature can increase the confidence of student to use UNIMAS bus as their daily transportation, as students will know the almost exact time of arrival.

iii) To display routes taken by UNIMAS bus

UNIMAS has more than one bus travelling at a time. Some buses have the same route, while the others use different route. This objective helps students to differentiate each bus according to their destination when using the system.

1.5 Procedures/Methodologies

Methodology is the body of the method that is used to develop this project. In order to fulfill the requirement and successfully finish the proposed system, the project is developed by using rapid application development (RAD). In the short period of time given to complete this project, more emphasis will be given towards developing rather than specifications and planning. This methodology will consist of 4 stages, which is planning, prototype cycle, testing and deployment.

During the planning stage, surveys will be conducted among students of UNIMAS based on the current situation which they are facing, and their opinion on having a bus tracking system. Besides that, an interview will be also conducted with UNIMAS stakeholders, in order to finalize the project requirement.

After the planning stage, comes the prototype cycle. The prototype cycle will consist of 3 sub cycles, which is develop, demonstrate, and refine. Each cycle will be used to develop each features of the system one at a time. At the end of the prototype cycle, the prototype will consist of multiple sub cycle which will work together as a whole.

Once the prototype cycle stage is completed, intensive testing will be done prototype. This is to make sure that the designed prototype is completely functioning. The testing on the completed system is to ensure that all the objectives are achieved. In case the testing produces errors, error logs would be produced and documented by the researcher.

The final stage will be deployment. A selected number of UNIMAS bus will be implemented with the GPS tracking system. The system will be ready to be used by UNIMAS students to track the bus locations.

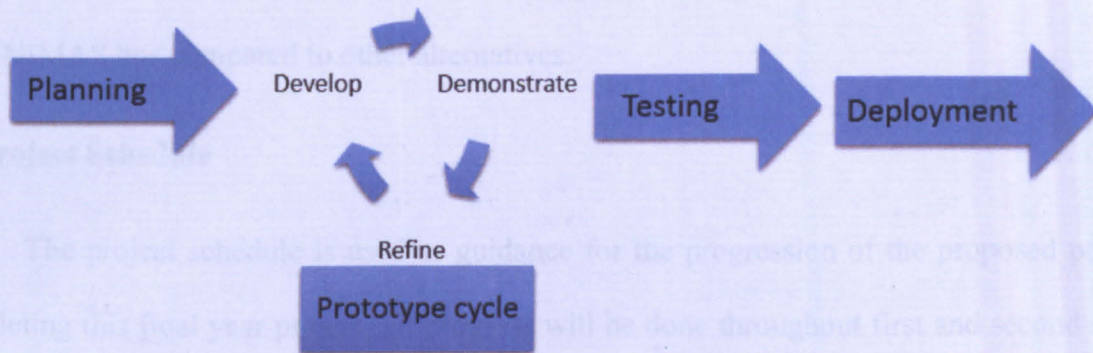


Figure 1.1: Graphical representation of Rapid Application Development

1.6 Scope

The scope of this project will be limited to a web portal, in order to update the bus schedule. This project also requires GPS, which will be installed on the bus for tracking. Besides that, a mobile client, which displays the bus schedule, bus location, estimated time of arrival and locations of bus stop.

As a proof of concept, selected number of buses will be used to test the prototype.

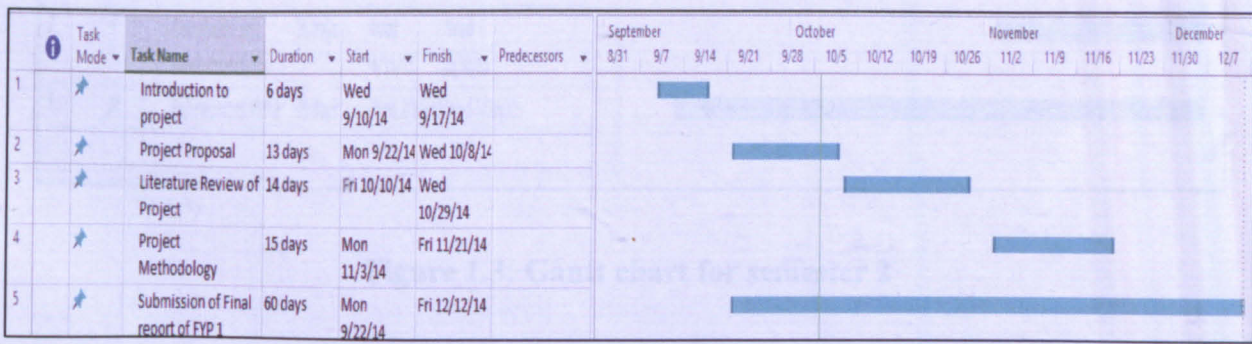
1.7 Significant of Project

The significant of this project is that it will enable students to track down real time location of the bus. The system has features such as displaying the bus location on map or using text, displaying the estimated time of arrival of the bus, displaying bus schedule, and routes taken by

each bus. By having this information in hand, students will be able to make informed decision whether to take the bus or seek other transportation options. With that, students will be able to spend their time efficiently and reach the bus stop just before the bus arrives. Furthermore, knowing the bus arrival time at the bus also can reduce the anxiety of the students while waiting for the bus. This could make using UNIMAS bus more passenger-friendly, and will encourage more people to use UNIMAS bus compared to other alternatives.

1.8 Project Schedule

The project schedule is used as guidance for the progression of the proposed project. In completing this final year project, all progress will be done throughout first and second semester of the academic year of 2014/2015. There are five main tasks in the project plan – Literature review and research, propose the design central web portal and mobile client, developing the related prototype, do testing on prototype, and finally refine the proposed system. Figure 1.2 and Figure 1.3 shows the Gantt chart of the project for 2 semesters.



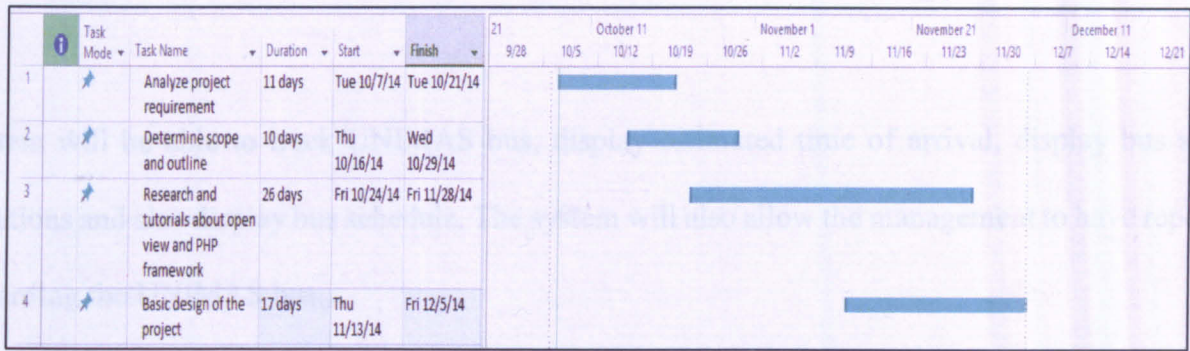


Figure 1.2: Gantt chart for Semester 1

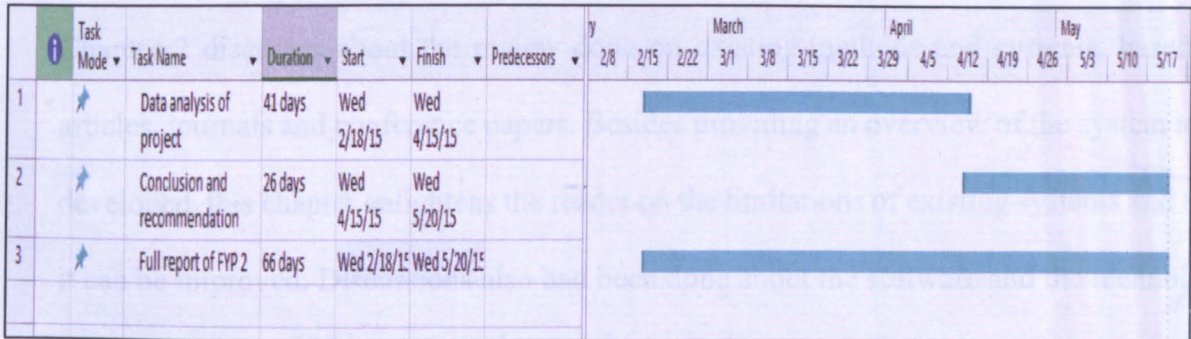
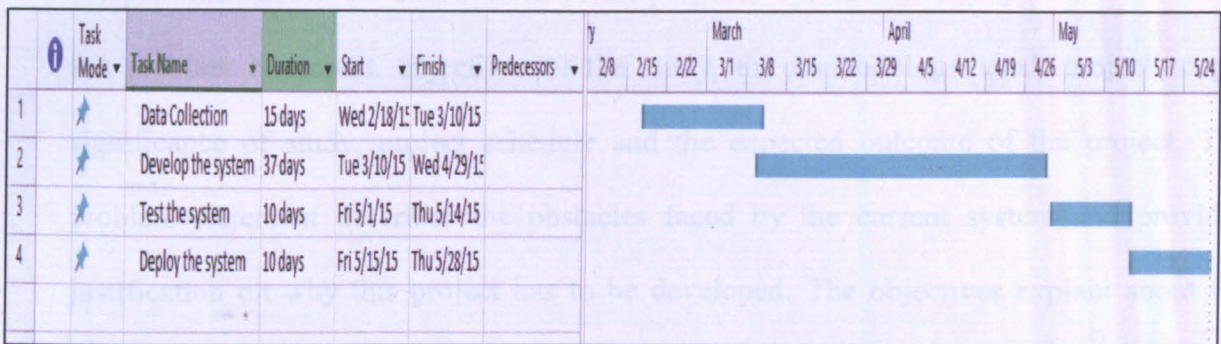


Figure 1.3: Gantt chart for semester 2

1.9 Expected Outcome

Mainly on the development of the prototype of the proposed system which is UNIMAS bus location tracking system. This system will consist of central web portal and mobile client. The

system will be able to track UNIMAS bus, display estimated time of arrival, display bus stop locations and also display bus schedule. The system will also allow the management to have reports regarding the UNIMAS bus..

1.10 Project Report Outline

1.10.1 Chapter 1: Introduction

Chapter 1 describes the introduction of the proposed system. This chapter is inclusive of the problem statement, objectives of the study, the methodology used, project scope, significance of study, project schedule and the expected outcome of the project. The problem statement describes the obstacles faced by the current system and provides justification on why this project has to be developed. The objectives explain about the project's goal. The scope clarifies the limitations of the project to be developed.

1.10.2 Chapter 2: Literature Review

Chapter 2 discusses about the review done on existing methods and systems, based on articles, journals and conference papers. Besides providing an overview of the system to be developed, this chapter enlightens the reader on the limitations of existing systems and how it can be improved. Discussions also had been done about the software and the technology tools used for this project implementation.

1.10.3 Chapter 3: Requirement Analysis and Design

This chapter describes about the methodology that will be used throughout the project development to fulfill the project requirements. The Rapid Application Development (RAD) will be used as a model to develop the proposed system. This chapter also includes

on how the requirements are obtained from the stakeholders of the system. Correspondingly, the database design too, will be comprised here, aided by Data Flow Diagrams and Entity Relationship Diagrams.

1.10.4 Chapter 4: Implementation

Chapter 4 is on the detailed description of the system's implementation. The structure of the system is described in detail using screenshots and the interface layout.

1.10.5 Chapter 5: Testing

This chapter explains about the testing done in the system

1.10.6 Chapter 6: Conclusion and Future Work

This chapter concludes the whole project developed and outlines the future work. The lessons learnt throughout the development of the project are presented with relevant examples. The future work marks the improvisation that can be made to the developed project in the nearest time to come.

1.11 Summary

This chapter discusses about the introduction of the proposed system. The proposed system is about developing a system that will be able to track UNIMAS bus, display estimated time of arrival, display bus stop locations and also display bus schedule. This system had been proposed to overcome the restrictions and limitations in the existing traditional methods and systems.