

MOBILE APPLICATION FOR E-SAMAN SYSTEM

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ABSTRACT

Mobile technology has nowadays become trend in various fields either in business, education, health, engineering, etc. The need of mobility in accomplishing work is increasing as the technology created more advanced mobile devices that are capable in multitasking such as the smartphones. The manual summons system for Security Department of Universiti Malaysia Pahang is an example of manual system that can be transformed into mobile system. The transformation project is called Mobile Application for E-Saman System. The E-Saman System is the summons management system that managed summons records while the mobile application act as the electronic summons recorder. The purpose of developing the application is mainly to assist security officer of UMP Security Department to record summons among students and staffs of UMP. The application will be developing for use on mobile device that run Android operating system platform. The result of developing this application is expected to reduce time consuming in summons activity and provide better data management of summons records.

ABSTRAK

Teknologi mudah alih telah menjadi trend hari ini dalam pelbagai bidang sama ada dalam perniagaan, pendidikan, kesihatan, kejuruteraan dan lain-lain. Keperluan mudah alih dalam menyelesaikan kerja semakin meningkat kerana teknologi teknologi maa kini telah menghasilkan peranti mudah alih yang lebih maju yang mampu dalam menjalankan pelbagai tugas, contohnya seperti telefon pintar. Sistem saman secara manual Jabatan Keselamatan Universiti Malaysia Pahang adalah satu contoh sistem konvensional yang boleh diubah menjadi sistem mudah alih. Projek transformasi ini dipanggil Aplikasi Mudah Alih bagi Sistem E- Saman. Sistem E- Saman adalah sistem pengurusan saman yang berfungsi untuk menguruskan data saman manakala aplikasi mudah alih berfungsi sebagai perekod saman elektronik. Tujuan membangunkan aplikasi ini bertujuan untuk membantu pengawal keselamatan di Bahagian Keselamatan UMP untuk merekod saman trafik dalam kalangan pelajar dan staf UMP. Aplikasi ini akan dibangunkan bagi kegunaan pada peranti mudah alih yang mempunyai sistem operasi Android. Hasil dari pembangunan aplikasi ini dijangka dapat mengurangkan masa dalam aktiviti saman dan menyediakan sistem pengurusan data saman yang lebih baik.

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LIST OF ABBREVIATIONS

UMP	Universiti Malaysia Pahang
PDA	Personal Digital Assistant
PHP	Hypertext Preprocessor
iOS	iPhone Operating System
JPJ	Jabatan Pengangkutan Jalan
AES	Automated Enforcement System
PDRM	Polis Diraja Malaysia
Myeg	Malaysian E-Government Service Berhad
IDE	Integrated Development Environment
IBM	International Business Machines Corporation
HTML	HyperText Markup Language
XML	Extensible Markup Language
DB	Database
SDLC	System Development Life Cycle
SQL	Structured Query Language
CPU	Central Processing Unit
RAM	Random Access Memory
HDD	Hard Disk Drive
GSM	Global System for Mobile
SMS	Short Message Service
DFD	Data Flow Diagram
USB	Universal Serial Bus

CHAPTER 1

INTRODUCTION

1.1 Background

Mobile technology has become a necessity in daily life nowadays covering business and entertainment activities. Dr. Shem (2013), stated that ten years ago when the first smartphone launched by Blackberry company, it only supported basic call and text messaging, push email, internet faxing and web browsing. The mobile service at that time is limited and only base on personal communication and business oriented purposes.

Now in 2014, mobile technology has become common since the existence of many mobile devices and operating systems such as Apple's iPhone and iPad running iOS and smartphones running Google Android. Many mobile applications has been developed by application developers either for entertainment or to facilitate business process. Priya (2012), defined the term mobile application as applications developed for small handheld devices, such as mobile phones, smartphones, PDAs and so on. Therefore, with mobile applications available, people no longer need to involve in traditional method for business such as meeting

with customers or capturing and storing data manually on paper or desktop computer. Everything is done on the palm of our hands everywhere and anytime.

Mobile technology can benefit organizations by providing usability to its user as it is simple and allows reducing the need of man power. It also provides availability since a mobile application can be accessed via Internet which is widely available in most countries in the world. Many organizations also choose mobile technology because of its cost effectiveness and easy to manage. Many mobile applications available nowadays are developed and made free for consumers as most of them are developed using open source software and operating systems such as Android. It can be concluded that mobile application is the most ideal option to develop a new system that requires mobility and simplicity to assist daily activity.

1.2 Problem Statement

UMP Security Department is responsible for managing all security aspects in Universiti Malaysia Pahang including enforcing traffic law towards students and staffs. The common activity related to traffic law enforcement is traffic summon. Traffic summon is given by security guards towards staff and students who failed to follow rules such as vehicle parking at the restricted area, vehicle unregistered in UMP system, vehicle not displaying UMP sticker, students that do not bring matric card for identification, etc.

Currently, UMP Security Department is using manual method for traffic summon. Security officer will write traffic summon into summon sheet and give it to the traffic offenders either student or staff. Then, the security officer will bring the summon records to Security Department headquarters to be key in into the database. This current system is less effective since the process required more time and work by security staff. The data need to be key in manually one by one by referring to the summon sheet and recheck process is needed after that. The probability of human error to occur is high during key in process and it takes lots of time to finish. The risk of data loss or affected by human mistakes or incidents is also exist because summon is recorded on summon sheet that is perishable and less practical to be used for data recording.

Traffic summons will affect students for their graduation because it is considered as violation of university law to UMP. Students will be prevented from viewing their examination result or applying for graduation if they still not paying their summons and this will affect their studies. Therefore, a new reliable and effective application needs to be developing in order to solve the issue and provide a convenient system for UMP Security Department.

1.3 Goal and Objective

The goal of this project is to develop a Mobile Application for E-Saman System in UMP. The following objectives are:

- i. To identify problem of UMP Security Department in managing traffic summons in UMP.
- ii. To plan and design the architecture of Mobile Application for E-Saman System using Android application development method.
- iii. To implement and develop Mobile Application for E-Saman System using software development tools.

1.4 Scope

- i. **Target Organization**

The application will be develop mainly for Universiti Malaysia Pahang (UMP). The purpose is to provide a new mobile application for traffic summons replacing the current manual summon system. The main objective of developing the application is to aid UMP Security Department Personnel with more convenient system of managing traffic summon in UMP.

- ii. **Application User**

The application target user is the UMP security officer. UMP security officer will use the application to record traffic summon of students and staffs. The application will be used by user on mobile devices either smartphone or tablet pc while they are on duty.

iii. **Function**

The application functionality is to record traffic summons to be transfer to the database of UMP Security Department. The application will use wireless internet connection to directly store summons record into database. Wireless connection will allow data to be updated into the server instantly in real time, thus solve the problem of late key in of summon data into system.

iv. **Application Platform**

This application will be develop and run using android operating system as a platform for mobile devices such as smartphone and tablet pc. Android operating system is used because it is widely used by people and operates on most of mobile devices available nowadays. Mobile platform is chosen as it is convenient to use on the move while the security officer is on duty.

1.5 Methodology

To develop Mobile Application for E-Saman System, a suitable approach has been used to ensure systematic development process. In this project, Mobile Application Development Life Cycle has been chosen as guideline, Appscend (2013). The life cycle of mobile development is largely no different than the System Development Life Cycle (SDLC) for web or desktop applications. There are usually five major phases of the process as in Figure1.1.

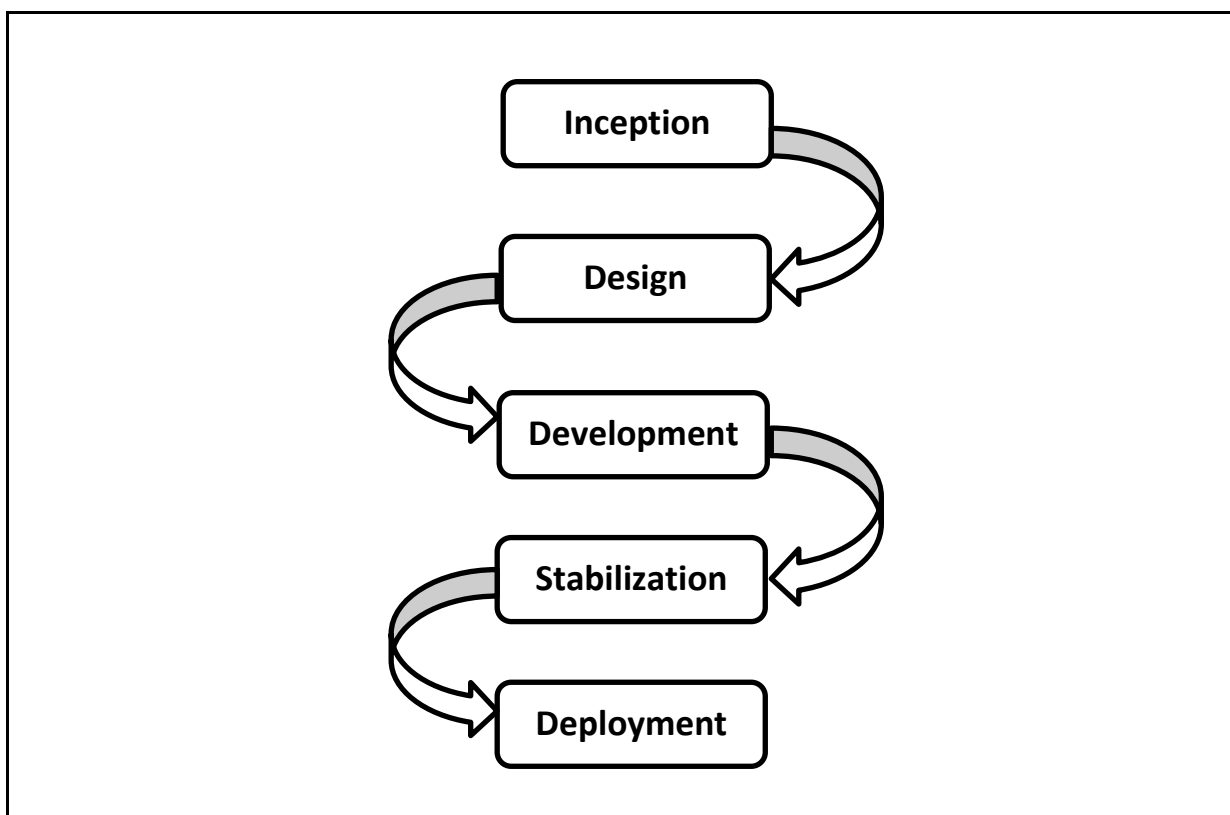


Figure 1.1: Phases in Mobile Application Development Life Cycle

a) **Inception**

This is the first phase in Mobile Development Life Cycle that will be used in the application development. This is the phase where an idea to propose the Mobile Application for E-Saman System is found by collecting information based on current existing problem face by UMP Security Department. The problem of using manual system to record summons is obtained and then refine into a solid basis for the application. The first project objective can be achieved after completing this phase.

b) **Design**

At this phase, the basic layout design and functionalities is proposed by considering based on User Experience (UX) factor. Then, a proper User Interface (UI) design is produced while considering the Interface Guidelines for various platforms. This is to ensure compatibility of application on various mobile devices and to design a good User Interface that match professional standard. The second project objective can be achieved after completed this phase.

c) **Development**

In this phase, the actual building of the application start after the concept phase has achieved some maturation. A working prototype is develop to validate functionality, assumptions, and helps to give understanding of the work scope. The designed prototyped is made to function. The third project objective can be achieved after completed this phase and Stabilization phase.

d) Stabilization

After the working system prototype is produced, it is test for any problem or bugs and fix in this phase. A beta version of the application will be release for wide user audience to get their feedback for any changes and improvements. The third project objective will be achieved after completing Development phase and this phase.

e) Deployment

After releasing the beta version and made improvement to the application, the final stabilized version is release to user during this phase. The distribution options depend on the application supported platforms such as Apple App Store for iOS applications, Google Play Store for Android applications, Windows Store for Windows Phone applications, etc. For the Mobile Application for E-Saman System however, the application is only introduced to the client which is UMP Security Department. They are also the user responsible to test the application and suggest any improvement or features to it.

All of the phases in the Mobile Application Development Life Cycle are done on a certain planned period of time. The Gantt chart of full schedule of the application development can be referred on Appendix A. The objective of this project can be achieved after all of the phases in the Mobile Application Development Life Cycle have been completed.

1.5 Summary

This chapter gave a comprehensive introduction to the Mobile Application for E-Saman System in general, as well as the step by step mobile application development life cycle to achieve the project goal. It introduced the purpose to develop the application, scope of user and general components of the application development including development platform and methods. The problems exist that resulted in this project development are also identified. The goal is set and few objectives are stated to be achieved by the end of this project. The scope of the application is set so that any procedure or methods planned to be used for development is suitably chose. The mobile application development life cycle is explained briefly to clearly describe the whole process of development to achieve success in this project. It is desired with the plan and procedure in this chapter will provide better facilities and guides for the mobile application development to proceed systematically.

CHAPTER 2

LITERATURE REVIEW

2.1 Overview

In this chapter, there will be six subtopics that will cover consists of the definitions of the Mobile Applications for E-Saman System, existing mobile applications, and software and hardware requirements to develop the application.

Subtopic 2.2 will describe the definition and structure of mobile application. Subtopic 2.3 will define and discuss about E-System, while subtopic 2.4 will explain the concept of E-Saman system. Subtopic 2.5 will cover on the existing mobile applications for E-Saman system and discuss in detail on the specifications and functions of current applications that can be improved on this project. The last subtopic 2.6 will discuss in detail about the software and hardware requirements in developing the applications in this project.

Overall contents in this chapter will provide the detail information regarding the method of implementation that will be carried out in this project.

2.2 Mobile Application

Mobile applications trend has been implemented in various fields such as business and entertainment. In 2013, the Apple App Store generated \$10 billion in application downloads as stated on ITBusinessEdge (2014). Both Google Play Store and Apple App Store have attracted over 50 billion downloads consecutively during 2013. For 2014, the momentum is likely to continue, but in a variety of directions.

Amy (2011) stated that, a mobile application or also called native application is a program that runs on a handheld device (phone, tablet, e-reader, iPod Touch, etc.) which has a “smart” operating system which supports standalone software and can connect to the internet via Wi-Fi or a wireless carrier network. She also stated that the term native application means that the mobile application can only be native to only one type of mobile operating system such as either iOS, Android, BlackBerry, Symbian, Windows Phone, etc. For example, an Android application works only on Android devices, so a piece of mobile application must be developed and maintained separately to allow the application available to other mobile platforms.

A mobile application’s structure will usually consist of multi-layered components which are the presentation layer, business layer, and data layer, Microsoft (2011). Mobile application can also be divided into two types of application either thin Web-based client or a rich client. In rich client application, the business and data services layers are likely to be located on the mobile device itself. In the thin client application, all of the layers will be located on the server.

Figure 2.1 illustrates the typical structure of a mobile application specifically the rich client architecture with components grouped by areas of concern. The rich client architecture consists of Mobile Client Application part and Mobile Support Infrastructure. Mobile Client Application is the client-side of the application that contains Presentation Layer, Business Layer, Data Layer, and Local Database or Cache. It is also the part to implement security and configuration of the application.

Mobile Support Infrastructure is the server-side of the application where data sources and web servers are implemented. It is connected to the client-side for data storing via online network.

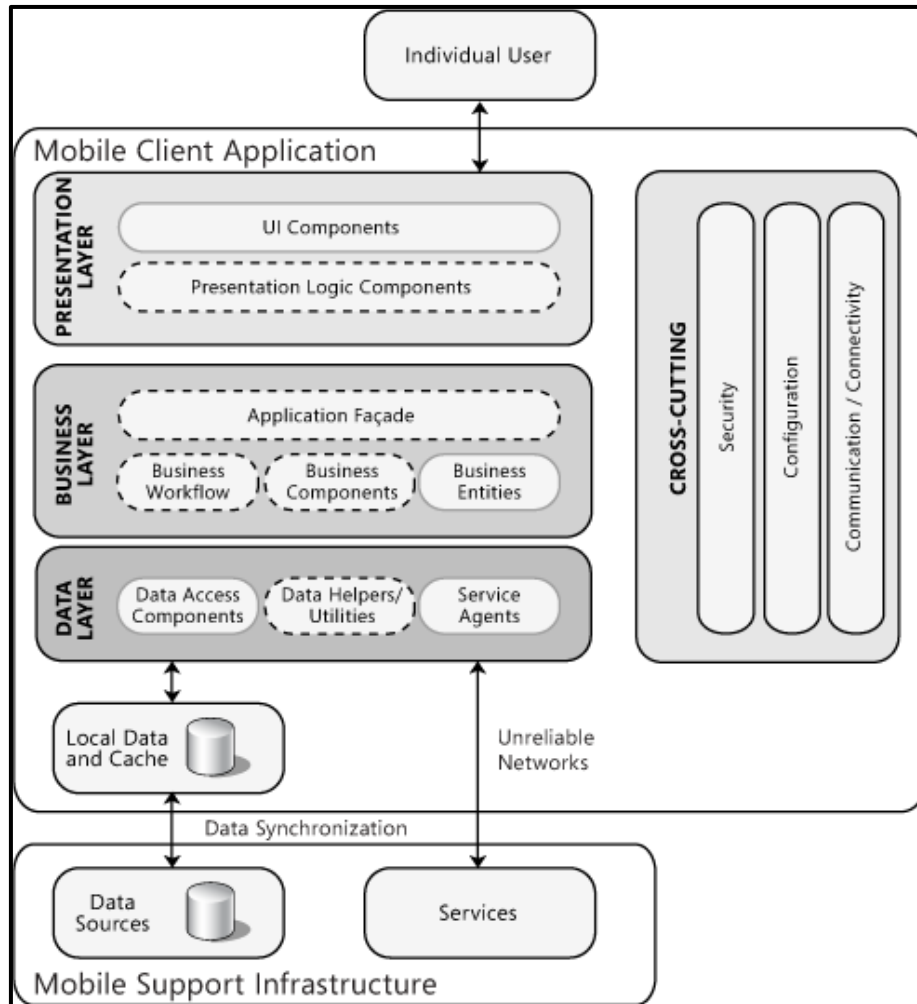


Figure 2.1: General Structure of Mobile Application

2.3 E-System

Electronic System (E-System) is groupings of electronic circuits and components which are designed to accomplish one or more complex functions, Babylon (2009). It is a system of integrated programs designed to make it easier for a user to discover information in a convenient way rather than manual system. The examples include telecommunication systems, computer systems, power distribution systems, radar systems, electronic music systems, and many others.

E-System usually implemented an online system concept in managing services to user. Online E-System is defined as any electronic interactive system that delivers information to users via telephone lines to personal computers (PCs) or via cables to terminals, SoftLabs (2010). The system provides information, usually in text form, about news, education, business, entertainment, shopping, and more. Some also provide message services and graphic and audio information. The term videotext was formerly applied to electronic interactive systems of this type.

E-System has transformed the old manual system into a better and easier system. It has also triggered a full scale development of online technology including mobile technology. Every single task nowadays is available via online system such as E-Commerce, E-Business, E-Education, etc. It makes it easier for people as the system can be access either via personal computers or mobile devices through internet connection.

2.4 E-Saman System

E-Saman is an electronic online summon system. The scope of the system differ base on the types of summon that become the objective of the system development. The system can be either traffic summons system, parking summons system, or any kind of online summon system. The E-Saman system usually develops on web based systems that use programming language such as PHP and MySQL. Web based systems is a computer system that transmitted over the World Wide Web, Dictionary (2011). In general, the E-Saman system can be access by user on the internet via a web browser.

The E-Saman system usually has the functions of displaying existing summon records, inserting and storing new summon records. Electronic summon system start with web based system that functions as a data hub for user and system's administrator to store and view summon record. The system then upgraded into a more convenient web application that allow user to pay summon via online banking. Various types of summons that covered different offenses are also included into the electronic summon system from time to time as the needs by organization increases.

The current existing E-Saman systems in Malaysia are mainly function to allow user to check summons record. There is still no function to pay summons online via bank integration with the system. Some example for E-Saman system in Malaysia is the Myeg website that allows Malaysian citizens to check summons for JPJ and PDRM, Myeg (2012). The E-Saman systems in Malaysia are also available in mobile platform that can be downloaded from the Android Playstore for Android smartphone's user.

2.5 Existing Mobile Application for E-Saman System

There are many mobile applications for E-Saman System available for download either from the Google Playstore for Android platform or the Apple Store for iOS platform. These mobile applications can all be downloading for free and ready to be use. Below are some examples of the Android mobile application for E-Saman System.

2.5.1 Malaysia Parking Summons

Malaysia Parking Summons is a free mobile application developed by MAXSIM (2013) to allow people to check for parking summon issued by local governments of Malaysia. The application requires internet connection to function, but did not require user for registration or log in to access it. User just needs to key their vehicle registration number to check for parking summons records. A list of parking summons for the vehicle will be display if there are records and a pop up notification of 'No Summon Record Found' will appear if there is no record of summons.

The application is currently support parking summons check for a few City Council (Majlis Perbandaran) and City Hall (Dewan Bandaraya) such as Dewan Bandaraya Kuala Lumpur (DBKL), Majlis Perbandaran Subang Jaya (MPSJ), Majlis Perbandaran Kuantan (MPK), etc. Figure 2.2 shows the interfaces of Malaysia Parking Summons mobile application. There are four main interface of the application. The first interface is the main page, the second interface is the page to check summons where user prompt to enter their vehicle number, the third interface is the display summons record page, and the last interface is the page for description of each summons record.

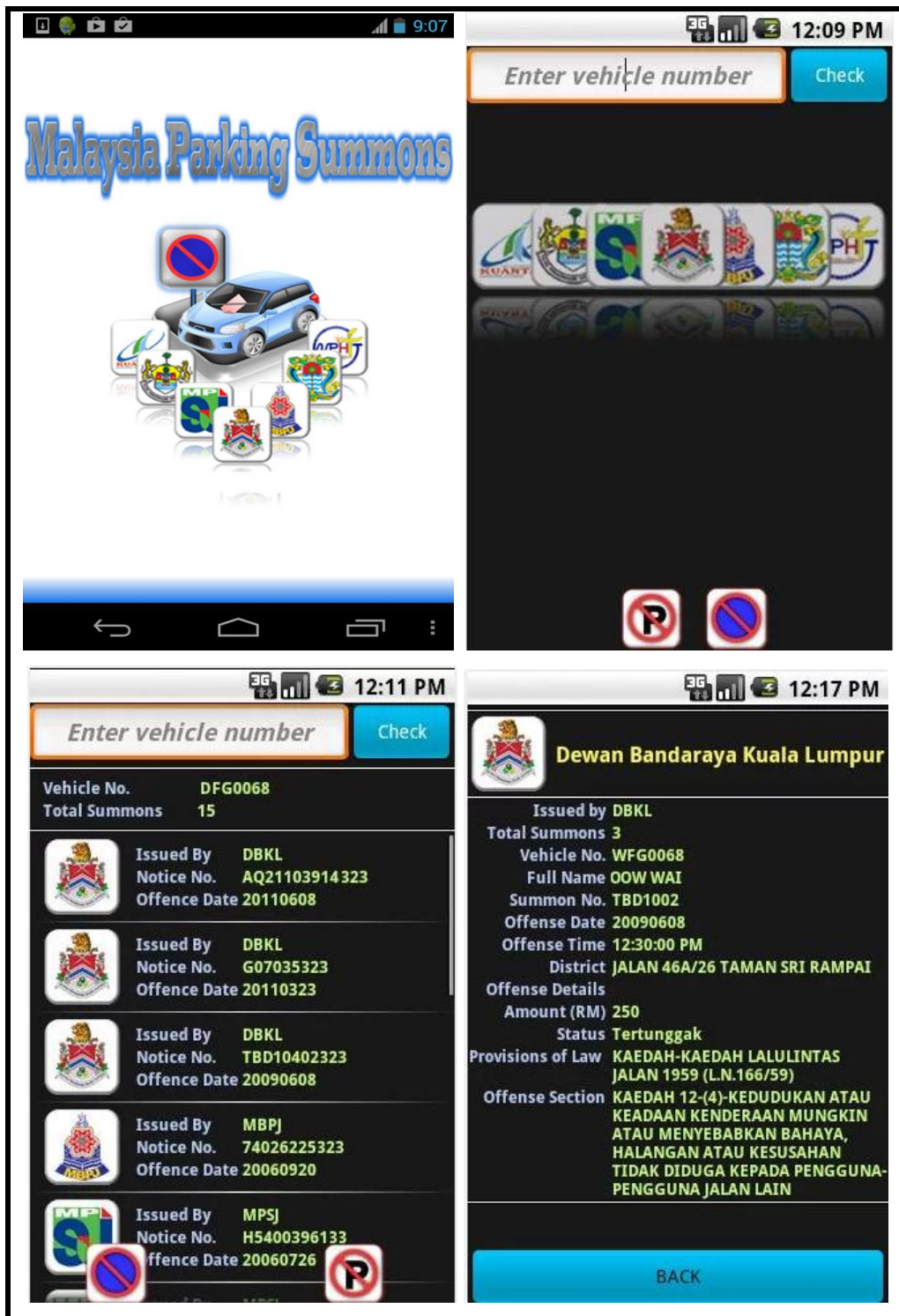


Figure 2.2: Interface of Malaysia Parking Summons application