**SCHOOL BUS TRACKING AND ATTENDANCE CHECKING**

Software Design Document

**By**

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Chapter One | Introduction

1.1 Objective

The objective of the Software Design Document for “School Bus Tracking and Attendance Checking” Android application is to provide a desription of the design of a system fully enough to allow software development to proceed with an understanding what is to be built and how it is expected to be built. Once the software design document is approved, it becomes a baseline for limiting changes in the scope of the project.

The Software Design Document provides necessary information, description of the details for the software and system to be built. This documennt is based on the project proposal, project plan and software requirement specification. It contains detailed design, method design, class design, sequence diagram, entity relationship diagram and user interface design. It help developers to understand work, and guide them to implement the right software.

1.2 Project Scope

“School Bus Tracking and Attendance Checking” is a mobile application which uses Android OS. This application can help to improve the school bus system and reduce the parent worrying about their children. The parent can track the school bus position, can see their child attendance record, and get a notification message when their child enters or get off the school bus. In addition, the driver can check the student attendance by scan the QR code and can get the alert sound when the driver drives the bus over the speed limit.

The main features of “School Bus Tracking and Attendance Checking” are as follows:

**Tracking system**

Parents can track their child by the school bus position via Google Maps that they’re in. The school bus driver’s phone would send the position on to the database and can provide them to the parent.

**Attendance checking system**

School bus driver can check the children attendance via QR code when they enter and get off the bus. Moreover, parents can check whether their children is on the bus or not.

**Canceling the school bus ride system** Parent can cancel the school bus ride on the special case. For example, the children get sick, parent wants to pick their child by yourself.

**Notifying system**

System can notify the parent when their child enters and get off the bus. In addition, system can notify children when the school bus nearby school.

**Speed limit alert system**

System can warn school bus driver when drive over the speed limit that defined by the school bus appropriate speed survey in 90 people.

1.3 Acronyms and Definitions

**1.3.1 Acronyms**

SDD Software Design Document

CD Class Diagram

SD Sequence Diagram

SRS Software Requirement Specification

URS User Requirement Specification

UI User Interface

**1.3.2 Definitions**

**Feature** Transformation of input parameters to output parameters based on a specified algorithm. It describes the functionality of a product in the language of the product. Used for requirements analysis, design, coding, testing or maintenance.

**Sequence diagram** A sequence diagram is an interaction diagram that shows how processes operate with one another and in what order. A sequence diagram shows object interactions arranged in time sequence. It depicts the objects and classes involved in the scenario and the sequence of messages exchanged between the objects needed to carry out the functionality of the scenario.

**Class diagram** Class diagrams are an aspect of UML that describe a static design of the objects, and their relationships to each other, in an application. During analysis, class diagrams may just be the names of objects and how they interact, but as the design develops the details of each class, including attributes and methods, are displayed in the diagram. A class is represented by a rectangle divided into three rows. The top row contains the name of the class. The middle row lists the attribute names, while the third row lists the method names for the class.

**User interface** User interface (UI) is everything designed into an informa-tion device with which a human being may interact -including display screen, keyboard, mouse, light pen, the appearance of a desktop, illuminated characters, help messages, and how an application program or a Web site invites interaction and responds to it.

**UML** The Unified Modeling Language (UML) is a general-purpose modeling language in the field of software engineering, which is designed to provide a standard way to visualize the design of a system.

Chapter Two | System Architecture

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Figure 1: System Architecture (Overview)

**Google Maps API**

Google Maps API is a programming API that Google provides to developers. It allows developers to embed data of Google Maps into their web or application. And it helps developers provide the location services to users. In addition, Google Maps API not only helps developers to embed maps into their application, but also allows developers use JavaScript to expand their applications. Developers can add labels to the map and route, respond the user click, and use popup windows to show the information.

**QR Code**

Quick Response Code, is a two-dimensional barcode that consists of black modules arranged together in a square grid with the white background. QR Code can be readable by QR scanners in the mobile phone with cameras and smartphone. It fast in readability and large storage capacity. QR code can be read even some part of codes are damaged.[14]

**MySQL**

MySQL is the world’s most popular open source database, enabling the cost-effective delivery of reliable, high-performance and scalable Web-based and embedded database applications, including all five of the top five websites. It can create both standalone and server database. Moreover, it also supports many development tools. [22]

Chapter Three | Detailed Design

3.1 Class Diagram

## This section shows the packages and their classes that support the features described in SRS for Registration system, QR code reader and genenator system and attendance checking system. It describes the relationships between the classes and packages presented in diagram. The design of core APIs that support the features is also described. More detailed information of classes is in the Class Description section.

3.2 Class Description

Chapter Four | Database Design

4.1 ER Diagram

4.2 Table Description

Chapter Five | Sequence Diagram

Chapter Six | User Interface Design

UI-01: Login Interface

UI-02: Register interface for School bus driver

UI-03: Register interface for Parent

UI-04: Register interface for Children

UI-05: School bus driver interface

UI-06: Parent interface

UI-07: Children interface

UI-08:

UI-09:

UI-10:

UI-11:

UI-12:

UI-13:

UI-14:

Chapter Seven | Reference

[4] Google Maps Android API V2

# <https://developers.google.com/maps/documentation/android/>

[14] [*QR Code features*](http://archive.is/20120915/http:/www.qrcode.com/en/qrfeature.html). (September, 2012). Denso-Wave. Retrieved May 10, 2015.

## [22] *The World's Most Popular Open Source Database*. (2014). [Online]. Retrieved June 7, 2015, from http://www.oracle.com/us/products/mysql/overview/index.html