** MINISTRY OF EDUCATION AND TRAINING**

**FPT UNIVERSITY**

Capstone Project Document

Capstone Project Management

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| **Group 13** | |
| **Group members** | Trần Nguyễn Đăng Khoa – Team Leader – SE60680  Đặng Ngọc Huy – Team Member – SE60913  Nguyễn Hoàng Tân – Team Member - SE60819 |
| **Supervisor** | Mr. Kiều Trọng Khánh |
| **Ext. Supervisor** | N/A |
| **Capstone Project code** | MSSC |

-Ho Chi Minh City, 09/2014-

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# Table of Contents

[Table of Contents 3](#_Toc409469259)

[List of Tables 4](#_Toc409469260)

[List of Figures 5](#_Toc409469261)

[Definitions, Acronyms, and Abbreviations 5](#_Toc409469262)

[B. Report No.2 Software Project Management Plan 6](#_Toc409469263)

[1. Problem Definition 6](#_Toc409469264)

[1.1 Name of this Capstone Project 6](#_Toc409469265)

[1.2 Problem Abstract 6](#_Toc409469266)

[1.3 Project Overview 6](#_Toc409469267)

[2. Project organization 8](#_Toc409469268)

[2.1 Software Process Model 8](#_Toc409469269)

[2.2 Roles and responsibilities 8](#_Toc409469270)

[2.3 Tools and Techniques 9](#_Toc409469271)

[3. Project Management Plan 10](#_Toc409469272)

[3.1 Software development life cycle 10](#_Toc409469273)

[3.2 Phase Detail 10](#_Toc409469274)

[3.3 All Meeting Minutes 12](#_Toc409469275)

[4. Coding Convention 12](#_Toc409469276)

# List of Tables

[Table 1: Hardware Requirement for Server 9](#_Toc398557029)

[Table 2: Hardware Requirement for Mobile 9](#_Toc398557030)

[Table 3: Roles and Responsibilities Details 10](#_Toc398557031)

[Table 4: Software Development Life Cycle Detail 11](#_Toc398557032)

[Table 5: Phase 1: Requirement Analysis 12](#_Toc398557033)

[Table 6: Phase 2: Design 12](#_Toc398557034)

[Table 7: Phase 3: Implementation 12](#_Toc398557035)

[Table 8: Phase 4: Testing 12](#_Toc398557036)

# List of Figures

[Figure 1: Modified Waterfall Development Model 9](#_Toc398556983)

# Definitions, Acronyms, and Abbreviations

|  |  |
| --- | --- |
| **Name** | **Definition** |
| MSSC | Multi Services Card |
| App | Application |
| OS | Operating System |
| Admin | Administrator |
| API | Application Programming Interface |
| HTTP | Hyper Text Transfer Protocol |
| Big 4 | Cloud, Mobile, Social, Data Analytics |
| 3G | Third generation of mobile telecommunications |
| Business Card | The NFC card with contain contact information |
| Contact Card | The NFC card with contain contact information |
| Event Ticket | The NFC card with contain event ticket information |

# Report No.2 Software Project Management Plan

## Problem Definition

### Name of this Capstone Project

* Library Automation using RFIDM-Services Card (MSSC)

### Problem Abstract

Library is something familiar with each of us. Library is the collection of books, newspapers, magazines, documents and some kind of pictures, music or event painting. They contain huge amounts of information and knowledge. So the management library is not simple thing. Students who wish to borrow and return books must undergo a relatively complex process. The librarian event much more, they have to manage all borrow-return book information with a lot of thing to do. Our system will help them by Automation the return-borrowed books phase with a simple interface and easy to use. This will become much simpler.

In addition, the system also has security system. The book is not borrowed that accidentally or intentionally taken can be detected immediately. It means that the theft of the library will be stopped completely. The book will be protected effectively.

### Project Overview

#### Current Situation and Disadvantages

There are some types of library management as below:

##### Manual traditional library management

* + All activities that relate to borrowing and returning books are manual.
  + Users select books then come to librarian position to fill a form. To borrow a book, users have to fill information of that book such as: ID, title, writer, etc…
  + Librarians have to check that information. Then he/she decides which books users can borrow.

##### Library management using barcode

* + Each book has a barcode which is used to identify a book. All barcodes are different with each other.
  + When users want to borrow book, librarians will use a scanner to read the barcode. Book’s information is showed on computer screen.

However, current library management methods have some disadvantages:

##### In manual traditional method

* + Users have to do many steps to borrow books. They have to fill all required information of books:
  + The time for each user to complete the borrowing process is so long. It wastes both of users and librarians a lot of time.

##### In method using barcode:

* + The barcode needs to be seen clearly by scanner. If the barcode is not clear or any else problems with reading process, book’s information will not be read or will be wrong.

#### The Proposed System

To improve quality and control effectiveness, reduce the process of borrowing and returning the books. We have an idea about the system control library by using RFID technology (Radio Frequency Identification).

##### Desktop application

* + For Librarians:
    - Librarians can manage books (add, update, delete).
    - Librarians can manage student’s information.
    - Can define students who borrow books and number of books which he/she had borrowed.
    - Can define the books which students want to borrow (return) and update to book’s deport, auto update the book’s number which students are borrowing.
  + For students:
    - They can finish borrow-return books process right at borrow area.
    - They can check how much books they are borrowed.

##### Hardware

* + The system can read and write information of the card on books and student’s card. Then, we can know that students are borrowing which books.
  + Transmit data between reader and microcontroller to handle.

#### Boundaries of the System

* The system can be used by every people with a smart phone which enable NFC feature and a laptop/computer with Internet connection.
* The language of the system is Vietnamese.
* The complete product includes:

+ The website, for admins, partners and users.

+ The mobile applications, for partners and users.

+ All the process document involved.

#### Development Environment

##### Hardware requirements

**For server**

|  |  |  |
| --- | --- | --- |
| Windows | Minimum Requirements | Recommended |
| Internet Connection | Cable, Wi-Fi (4 Mbps) | Cable, Wi-Fi (8 Mbps) |
| Operating System | Window Server 2008 | Window Server 2008 |
| Computer Processor | Intel® Xeon ® 1.4GHz | Intel® Xeon ® Quad Core (12M Cache, 2.50 GHz) |
| Computer Memory | 1GB RAM | 2GB or more |

Table 1: Hardware Requirement for Server

**For Mobile**

|  |  |  |
| --- | --- | --- |
| Mobile | Minimum Requirements | Recommended |
| Internet Connection | 2 Mbps | 4 Mbps |
| Operating System | Android 4.0 | Android 4.4.2 |
| Hardware | NFC supported | NFC supported |
| Memory | 512MB | 1GB or more |

Table 2: Hardware Requirement for Mobile

##### Software requirements

* Window Server 2008: operating system and platform for development.
* SQL Server 2008 Enterprise R2: used to create and manage the database for system.
* Visual Studio 2012: used to implement website and web service.
* Google Code & TortoiseSVN: used for source control.
* StarUML: used to create models and diagrams.
* Skype: used for communication and meeting.

## Project organization

### Software Process Model

Project is developed under modified waterfall model (SASHIMI).

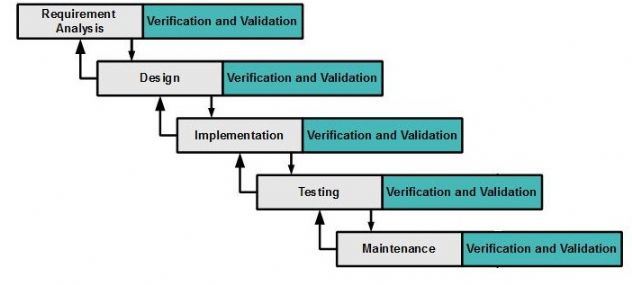


Figure 1: Modified Waterfall Development Model

For more information: <http://www.waterfall-model.com/sashimi-waterfall-model/>

### Roles and responsibilities

|  |  |  |  |
| --- | --- | --- | --- |
| **No** | **Full name** | **Role in Group** | **Responsibilities** |
| **1** | Kiều Trọng Khánh | Project manager | * Specify user requirement * Control the development process * Give out technique and business analysis support |
| **2** | Trần Nguyễn Đăng Khoa | Team Leader, BA, DEV, Tester | * Managing process * Designing database * Clarifying requirements * Prepare documents * GUI Design * Create test plan * Coding * Testing |
| **3** | Đặng Ngọc Huy | Team Member, BA, DEV, Tester | * Designing database * Clarifying requirements * Prepare documents * GUI Design * Create test plan * Coding * Testing |
| **4** | Nguyễn Hoàng Tân | Team Member, BA, DEV, Tester | * Designing database * Clarifying requirements * Prepare documents * GUI Design * Create test plan * Coding * Testing |

Table 3: Roles and Responsibilities Details

### Tools and Techniques

- Front-end technologies: HTML5, CSS3, JavaScript, jQuery, AJAX.

- Back-end technologies:

+ Website: ASP.NET MVC5 + Entity Framework 6.

+ Web service: ASP.NET Web API 2

- Mobile: Android KitKat 4.4.2 – Java 7

- Web Server: Microsoft IIS 7.5 with .Net Framework 4.5.1 enable.

- Database Management System: MSSQL Server 2008 R2 Enterprise.

## Project Management Plan

### Software development life cycle

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Phase** | **Description** | **Deliverables** | **Resource needed** | **Dependencies and Constrains** | **Risks** |
| **Requirement Analysis** | - Collect requirements from customer.  -Identify and clarify requirements for the system in general. | -Introduction of proposed system.  -Software requirement specification.  -Project Task Plan.  - Prototypes | 20 man-days | N/A | - Missing requirement  - Unclear scope of project  - Lack of member share of understand |
| **Design** | - Architecture design for the system  - Detail design using top-down break down  - Choose Architecture style | - Software Design Document  - Base code structure  - Technology notes | 20 man-days | Depend on “Requirement Analysis” | - Lack of experience.  - Not fulfil requirement. |
| **Implementation** | - Coding system core functions and other feature with GUI  - Unit test | - Main user’s functions on web and mobile.  - Unit test document | 50 man-days | Depend on “Design”. | - Lack of experience and knowledge.  - Human mistake. |
| **Testing** | - Integration test the system  - Alpha test  - Correct bugs  - Beta test  - Acceptance test | - Test document  - Defect log | 20 man-days | Depend on “Implementation” | - Lack of experience  - Missing test case |
| **Maintenance** | - Deploy on sever and mobile | - Installation guide  - User Manual | 10 man-days | Depend on “Testing” | - Lack of experience. |

Table 4: Software Development Life Cycle Detail

### Phase Detail

#### Phase 1: Requirement Analysis

|  |  |  |
| --- | --- | --- |
| **Task** | **Description** | **Author** |
| **1. Collect requirements** | Find which systems currently provide similar service, their strengths and weakness. | KhoaTND, HuyDN, TanNH |
| **2. Identify and clarify main functions.** | Define which main functions system should provide. | KhoaTND, HuyDN, TanNH |
| **3. Create System Introduction.** | Complete Introduction Report. | KhoaTND |
| **4. Software Project Management Plan.** | Prepare Project Management Plan. | KhoaTND |
| **5. Website Prototype.** | Build a prototype of proposed system (Website/Mobile). | KhoaTND, HuyDN, TanNH |
| **6. SRS** | Create SRS document. | KhoaTND, HuyDN, TanNH |

Table 5: Phase 1: Requirement Analysis

#### Phase 2: Design

|  |  |  |
| --- | --- | --- |
| **Task** | **Description** | **Author** |
| **1. Architecture Design** | Implement function import and breakdown data from docx files. | KhoaTND, HuyDN, TanNH |
| **2. Detailed Design** | Compare new document with existed documents of system. | KhoaTND, HuyDN, TanNH |
| **3. Database Design** | Get jobs from other server to recommendation. | KhoaTND, HuyDN, TanNH |
| **4. Technology research** | Create search engine for basic search and advance search. | KhoaTND, HuyDN, TanNH |
| **5. Design Document** | Create software design document | KhoaTND, HuyDN, TanNH |

Table 6: Phase 2: Design

#### Phase 3: Implementation

|  |  |  |
| --- | --- | --- |
| **Task** | **Description** | **Author** |
| **1. Front-end web functions** | Implement front-end functions on web | KhoaTND, HuyDN, TanNH |
| **2. Back-end web functions** | Implement back-end functions on web | KhoaTND, HuyDN, TanNH |
| **3. Mobile functions** | Implement mobile application | HuyDN, TanNH |
| **4. Suggestion algorithms** | Research and implement suggestion algorithms | KhoaTND |
| **5. Unit testing** | Write test case and testing for web functions | KhoaTND, HuyDN, TanNH |
| Write test case and testing for mobile functions | HuyDN, TanNH |

Table 7: Phase 3: Implementation

#### Phase 4: Testing

|  |  |  |
| --- | --- | --- |
| **Task** | **Description** | **Author** |
| **1. Integration testing** | Write test case and testing system | KhoaTND, HuyDN, TanNH |
| **2. Alpha testing** | Do alpha test with customer | KhoaTND, HuyDN, TanNH |

Table 8: Phase 4: Testing

#### Phase 5: Maintenance

|  |  |  |
| --- | --- | --- |
| **Task** | **Description** | **Author** |
| **1. Installation guide** | Write installation guide | KhoaTND |
| **2. User Manual** | Write user manual | KhoaTND, HuyDN, TanNH |

Table 9: Phase 4: User Interface

### All Meeting Minutes

Refer to Meeting Minutes folder.

## Coding Convention

C#: Using to develop desktop application.

Summary:

* Naming Convention:
  + Use camel case for variable’s name. Eg: minValue, maxValue…
  + For function name, class name, use Pascal case. Eg: SearchEvent, GetRecommendEvent…
* Layout Convention:
  + Write only one statement/declaration per line.
  + Indent continuation one tab stop (four spaces).
  + Add at least one blank line between method definitions and property definitions.
  + Use parentheses to make clauses in an expression apparent.
* Commenting Convention:
  + Place the comment on a separate line, not at the end of a line of code.
  + Begin comment text with an uppercase letter.
  + End comment text with a period.
  + Insert one space between the comment delimiter (//) and the comment text.
  + Do not create formatted blocks of asterisks around comments.
* Language Guidelines:

Using C# Code Convention From:

<http://msdn.microsoft.com/en-us/library/vstudio/ff926074.aspx>

C/C++: Using to develop hardware

Summary:

* Naming convention:
  + Use camel case for variable’s name. Eg: minValue, maxValue…
  + For function name, class name, use Pascal case. Eg: SearchEvent, GetRecommendEvent…

Using C/C++ code convention from:

<http://msdn.microsoft.com/en-us/library/vstudio/ff926074.aspx>