**

**CAPSTONE PROJECT REGISTER**

Class: Duration time: from …./…/…. To …/… /…..

(\*) Profession: <Software Engineer> Specialty: <ES> <IS> <JS>

x

x

(\*) Kinds of person make registers: Lecturer Students

x

1. Register information for supervisor (if have)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Full name** | **Phone** | **E-Mail** | **Title** |
| Supervisor 1 | Đặng Ngọc Minh Đức | 0989699299 | ducdnm2@fe.edu.vn | Dr. |
| Supervisor 2 | Kiều Trọng Khánh | 0908133304 | khanhkt@fe.edu.vn | Mr. |

2. Register information for students (if have)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Full name** | **Student code** | **Phone** | **E-mail** | **Role in Group** |
| Student 1 | Khúc Ngọc Thái | SE151055 | 0949936732 | thaiknse151055@fpt.edu.vn | Leader |
| Student 2 | Tăng Chí Cường | SE150676 | 0908436393 | cuongtcse150676@fpt.edu.vn | Member |
| Student 3 | Nguyễn Quang Dũng | SE150721 | 0377162315 | dungnguyenquang221@gmail.com | Member |
| Student 4 | Hồ Hữu Phát | SE151312 | 0932781745 | phathhse151312@fpt.edu.vn | Member |
| Student 5 | Thủy Võ Anh Hoàng | SE150780 | 0914108001 | hoangtvase150780@fpt.edu.vn | Member |

3. Register content of Capstone Project

(\*) 3.1. Capstone Project name:

English: Automatic Parking Management and Parking Fee Collection System

Vietnamese: Hệ thống quản lý thu phí đậu xe tự động

Abbreviation: APMS

1. **Context:**

The parking lot is usually full of the increasing number of vehicles, especially during peak hours. Users need to know which parking lot is available and they can book a parking lot before they come to the parking lot. Also, an automatic parking management system with the minimum operating cost is required.

1. **Proposed Solution:**

* APMS provides a contactless parking service that deploy at specific location (such as company’s park, apartment park, ect.)
* APMS manages the parking lot in real-time
* Users can find and book an available parking lot in advance
* APMS supports various payment methods: QR code, RFID card,…

1. **Functional Requirement:**

**Vehicle recognition:**

* Vehicle detection using sensors
* Number plate recognition using the camera
* Display number plate in LCD for the user to verify

**Parking lot management:**

* The number of the occupied parking lot
* The number of the available parking lot
* The number of booking parking lots in advance
* The in/out time of each vehicle
* Calculate the parking fee for each vehicle
* Warn the user to top-up money when the money in the account is lower than o threshold, or not enough for the current parking

**Admin Web Application:**

* Admin can manage all accounts in the system
* Admin can configure the System Configuration.
* Admin can manage all the app markets (services web app).
* Admin can receive user’s report issues.

**Staff Web Application:**

* Staff can create or edit upcoming events.
* Staff can export the report of the parking system.
* Staff can manage the lots’ information
* Staff can manage the lots’ price

**Mobile app:**

* User information, vehicle information, RFID card information
* User can find the nearest parking lot
* User can see the information about the parking lot: The number of an available parking lot
* User can book a parking lot in advance before the vehicle enters the parking lot
* User manages the money in the account
* QR code for payment

(\*) 3.2. Main proposal content (including result and product)

1. Theory and practice (document):

* Digital image processing
* The documents include User Requirement, Software Requirement Specification, Architecture Design, Detail Design, System Implementation, and Testing Document, Installation Guide, sources code, and deployable software packages
* Server-side technologies:
  + - Server: .NET/Java Technology, Windows Azure, …
    - Database Design: DBMS such as MS SQL Server, My SQL, …
* Client-side technologies:
  + - Web Client: ReactJS, NextJS, Angular, …
    - Mobile Client: Flutter, VueJS, …

1. Program:

|  |  |
| --- | --- |
| **#** | **Item** |
| ***1*** | ***System*** |
| 1.1 | Detect the coming vehicle |
| 1.2 | Recognize the number plate of the vehicle |
| 1.3 | Display the number plate of the vehicle in the LCD |
| 1.4 | Open the gate |
| 1.5 | Calculate the available parking lots |
| 1.6 | Process a booking of the parking lot |
| 1.7 | Calculate the parking fee |
| 1.8 | Get detail’s booking |
| 1.9 | Create a warning about low money in the account |
| 2.0 | Do Authentication and Authorization |
| 2.1 | Notify information based on some registered action |
| ***2*** | ***Web Application for Admin*** |
| 2.1 | Manage user account |
| 2.2 | Login |
| 2.3 | Logout |
| 2.4 | View personal information |
| **3** | **Web Application for Staff** |
| 3.1 | View parking lot information |
| 3.2 | View the parking history of a specific vehicle |
| 3.3 | Manage bookings’ transaction |
| 3.4 | Manage parking lot information |
| 3.5 | Manage price list |
| 3.6 | View personal information |
| 3.7 | Login |
| 3.8 | Logout |
| ***3*** | ***Mobile app for user*** |
| 3.1 | Register an account |
| 3.2 | Update account information |
| 3.3 | Search the nearest parking lot |
| 3.4 | Book a parking lot |
| 3.5 | Cancel a booking |
| 3.6 | View the duration of the current parking |
| 3.7 | Top-up the money |
| 3.9 | Update personal information. |
| 3.10 | Update password. |
| 3.11 | View personal information. |
| 3.12 | Login |
| 3.13 | Logout |
| 3.14 | View a history booking |

1. Proposed Tasks for students:

* Task package 1: Develop a program for number plate recognition
* Task package 2: Develop a system based above requirements (back-end, front-end, mobile application, …)
* Task package 3: Build – Deploy and Test the system
* Task package 4: Prepare all the required documents: system analysis and design, test plan, installation manual, user manual, … (all students must participants)
* Each work group should have many students participating but there will be one member responsible for the main responsibility·
* Notice: all students are required to understand the reference documents thoroughly and may need to explain them to the viva committee.

1. Other products:

* N/A

4. Other comments (propose all relative things if have)

……………………………………………….

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| --- | --- |
| **Supervisor (If have)**  *(Sign and full name)* | ……………….., date …./…../………….  **On behalf of Registers**  *(Sign and full name)* |