

Project Title: Automated Parking System

CSC1100 Element of Programming

Section: 4

Group: Ibn-Bajjah

Lecturer: Mdm. Suriani bt. Sulaiman

Muhammad Syahmi Fathimi bin Ahmad Fauzi	1715845
Muhammad Farhan bin Azhar	1718485
Muhammad Nur Aqmal bin Khatiman	1712719
Irfan bin Jamil	1711025

Introduction

“Park, Swipe, Leave”

- Have you heard that statement?
- Have you heard about Automated Parking System (APS)?
- Real world APS building is a place where you can safely **park** your vehicle in a garage. Then you **swipe** your card at the sensor and that garage will move your vehicle to one of the parking lot in that building. You can **leave** your car there happily.
- To illustrate the real world APS, **Ibn-Bajjah APS** will replace swipe the card with plate number and pin number;

Real World APS



APS in China



APS in Germany



APS in Kuala Terengganu, Malaysia



System Overview

Ibn-Bajjah APS User Features

- Park/Unpark the vehicle
 - Select vehicle type (car/motorcycle)
 - Enter vehicle plate number
 - Set 6 digits PIN numbers (when park)
 - Enter valid 6 digits PIN numbers (when unpark)
 - Get the receipt (when unpark)

Ibn-Bajjah APS Admin Features

- Monitor APS data
 - Select vehicle type (car/motorcycle)
 - View all parking lot (available/not)
 - View all vehicle details sorted by (plate-no/lot-no/date-time-in)
 - Search vehicle plate number to find its lot number
 - Search lot number to find its vehicle plate number
 - View total sales
 - Shutdown the system

Ibn-Bajjah APS Rates

Car Rates

Hours	Rates/hour (for each day)
1 st - 3 rd hours	RM4.50
4 th & 5 th hours	RM3.50
6 th - 9 th hours	RM3.00
10 th - 18 th hours	RM2.00
19 th - 24 th hours	Free

Motorcycle Rates

→ RM2.00 per day

Functions/Methods Description

In main.cpp

- Basically the User Interface of the system

Functions	Description
initAdmin()	Create admin for the system
validateAdmin()	Asking admin permission to perform admin features
main(), userMenu(), adminMenu(), showReceipt(), showAtTop(), showAllParkingLots(), showAllDetails()	Display the the menus, receipt, total parking left, all parking lots and all vehicle details
userFeatures(), adminFeatures()	Doing/Calling the most important function of Ibn-Bajjah APS system
inputOption()	Validate all options inputs from user
calcTotalSales()	Calculate total sales each time user unpark their vehicle
pauseScreen(), clearScreen()	"pause, see, clear"

Functions/Methods Description

In **aps.cpp/aps.h**

- Basically the system of the Ibn-Bajjah APS system

Methods (or function)	Description
AutoParkingSystem()	Constructor: initialize data members
setPlateNo(), setPinNo(), setLotNo(), setVehicleType()	Set all this first before we read the file
validateInput()	Validate what we set above
readFile()	Read the appropriate file base on vehicleType we set above and store the data in the dynamic memory
writeFile()	Write the new vehicle data in the appropriate file or remove that particular data if it exist in the file
The gets methods (eg. getPinNo())	Will return data that we want
The sortBy methods (eg. sortByPinNo())	Will sort the data in the file using Insertion Sort Algorithm

Functions/Methods Description

In `aps.cpp/aps.h`

- Basically the system of the Ibn-Bajjah APS system

Methods (or function)	Description
The searchBys methods	Search data in the file using Binary Search Algorithm. The file need to be sorted first
<code>formatString()</code>	Format the user inputs for all strings to uppercase with no spaces
<code>genLotNo()</code>	Generate unique lot number for each new plate number
<code>calcDuration()</code>	Calculate the duration in seconds
<code>calcCharges()</code>	Calculate the total charges based on the total seconds
<code>swapStr()</code> , <code>swapTime()</code>	Swap 2 data during sorting

Generated Files

- Four (4) files will be generated after the system run:
 - admin.dat (username and password)
 - sales.dat (current total sales)
 - apscar.dat (car data file)
 - apsmoto.dat (motorcycle data file)