SCHOOL OF COMPUTER SCIENCE ENGINEERING

Parking Management System

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Project Report
of
CSE2006 – MICROPROCESSOR & INTERFACING

Fall Semester 2021-22

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Submitted to
Faculty: Dr. E. Konguvel
Date: 8th December 2021
Slot: E2

Signature:

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ABSTRACT

Finding a perfect parking spot in today's fast paced metropolitan cities, particularly during the busy times, is a huge headache for drivers. The trouble emerges from not knowing where the accessible spaces might be; regardless of whether known, numerous vehicles might seek after exceptionally restricted parking spots to cause genuine traffic gridlock. In this project, we design and emulate a model of Parking System that permits drivers to viably find empty parking spots utilizing assembly language. We have decided to emulate our project with the help of EMU 8086 emulator. With the help of our project, a parking facility manager can keep track of the number of two wheelers and 4 wheelers parked at a particular time, how many vacant spots are there for a particular type of vehicle (two and four wheelers), how many total vacant spots are left in the facility and also manage his earnings and profits.

1. INTRODUCTION

Finding a perfect parking spot in today's fast paced metropolitan cities, particularly during the busy times, is a huge headache for drivers. The trouble emerges from not knowing where the accessible spaces might be; regardless of whether known, numerous vehicles might seek after exceptionally restricted parking spots to cause genuine traffic gridlock.

In this project, we design and emulate a model of Parking System that permits drivers to viably find empty parking spots utilizing assembly language. We have decided to emulate our project with the help of EMU 8086 emulator. With the help of our project, a parking facility manager can keep track of the number of two wheelers and 4 wheelers parked at a particular time, how many vacant spots are there for a particular type of vehicle (two and four wheelers), how many total vacant spots are left in the facility and also manage his earnings and profits. This will help automate the parking lot and also make it easier to track sales of parking spaces and prevent traffic from accumulating inside the parking lot.

2. LITERATURE REVIEW

1. Javaid, Sabeen & Sufian, Ali & Pervaiz, Saima & Tanveer, Mehak. (2018). Smart traffic management system using Internet of Things. 393-398. 10.23919/ICACT.2018.8323770.

2018 20th International Conference on Advanced Communication Technology (ICACT)

Smart traffic management system using Internet of Things.

One of the primary dimensions of a smart city is the traffic management system. Traffic congestion is common on roadways as a result of the rapid development of population and urban mobility in metropolitan centres. This study proposes a smart traffic management system based on the Internet of Things (IoT) to address different challenges related to road traffic management and to assist authorities in effective planning. To optimise traffic flow on roads, a hybrid strategy (a

combination of centralised and decentralised) is utilised, and an algorithm is developed to efficiently manage diverse traffic circumstances. For this, the system uses data from a) cameras b) and sensors to calculate traffic density, and subsequently operates traffic lights. Another Artificial Intelligence-based method is used to forecast future traffic density in order to reduce traffic congestion.

2. Pala, Z., & Inanc, N. (2007). Smart Parking Applications Using RFID Technology. 2007 1st Annual RFID Eurasia. https://doi.org/10.1109/RFIDEURASIA.2007.4368108

2007 1st Annual RFID Eurasia

Smart Parking Applications Using RFID Technology

Check-ins and check-outs will be completed quickly without the need to stop the cars, avoiding traffic congestion during these processes. During check-ins and check-outs, drivers will not be required to stop at circulation points, and parking tickets will be invalid. Ticket-jamming issues for ticket-processing devices will also be avoided. Vehicle owners will not be required to make any payments at each check-out, allowing for better traffic flow. The generation of exhaust gas as a result of such waiting will be eliminated because there would be no waiting between check-ins and check-outs. A central parking-car tracking system, an atomized income tracking system, and a car tracking system for charging have all been created and implemented. A more sophisticated and fast-operating parking-lot system has been established in place of cars parking on streets.

3. M. Sukru Kuran, Aline Carneiro Viana, Luigi Iannone, Daniel Kofman, Gregory Mermoud, et al.. A Smart Parking Lot Management System for Scheduling the Recharging of Electric Vehicles. IEEE Transactions on Smart Grid, Institute of Electrical and Electronics Engineers, 2015, 6 (6), pp.2942-2953.

2015 IEEE Transactions on Smart Grid

A Smart Parking Lot Management System for Scheduling the Recharging of Electric Vehicles

They propose a centralised electric vehicle (EV) charging scheduling system for parking lots in this research, based on a realistic vehicular mobility/parking pattern that focuses on individual parking lots. We divide electric vehicles into two categories based on their mobility and parking patterns: regular EVs and irregular EVs. Regular EVs are modelled using an extensive trace-based vehicle mobility model acquired from the Canton of Zurich, and irregular EVs are modelled using a probabilistic pattern built on top of this trace. This is the first EV charging schedule analysis in the literature, to our knowledge, that considers a realistic vehicular mobility pattern focusing on individual parking lots.

4. Ghazal, Bilal & Khatib, Khaled & Chahine, Khaled & Kherfan, Mohamad. (2016). Smart traffic light control system. 140-145. 10.1109/EECEA.2016.7470780.

2016 Third International Conference on Electrical, Electronics, Computer Engineering and their Applications (EECEA)

Smart traffic light control system

Traffic signal control frameworks are generally used to screen and control the progression of autos through the intersection of numerous streets. They expect to acknowledge smooth movement of vehicles in the transportation courses. Notwithstanding, the synchronization of numerous traffic signal frameworks at adjoining crossing points is a confounded issue given the different boundaries included. Customary frameworks don't deal with variable streams moving toward the intersections. Furthermore, the common impedance between adjoining traffic signal frameworks, the dissimilarity of vehicles stream with time, the mishaps, the entry of crisis vehicles, and the person on foot crossing are not carried out in the current rush hour gridlock framework. This prompts gridlock and clog.

5. A. K. Sikder, A. Acar, H. Aksu, A. S. Uluagac, K. Akkaya and M. Conti, "IoT-enabled smart lighting systems for smart cities," 2018 IEEE 8th Annual Computing and Communication Workshop and Conference (CCWC), 2018, pp. 639-645, doi: 10.1109/CCWC.2018.8301744.

2018 IEEE 8th Annual Computing and Communication Workshop and Conference (CCWC)

IoT-enabled smart lighting systems for smart cities

The rate of urbanisation has accelerated dramatically in recent decades. In order to create a better lifestyle in metropolitan regions, more upgraded services and apps are required. The concept of a smart city, which is the interconnection of current digital technologies in the setting of a city, is a promising way to improve the quality and performance of urban services. With the introduction of the Internet of Things (IoT) in the smart city, new opportunities for developing new services and integrating multiple application areas using Information and Communication Technologies have developed.

6. Lanke, Ninad & Koul, Sheetal. (2013). Smart Traffic Management System. International Journal of Computer Applications. 75. 19-22. 10.5120/13123-0473.

International Journal of Computer Applications (0975 – 8887) 2013.

Smart Traffic Management System

Congestion is a big issue in many Indian cities, as well as other countries. Traffic congestion has been caused by signal failure, poor law enforcement, and inefficient traffic management. One of the primary issues in Indian cities is that the existing infrastructure cannot be expanded any further, leaving only better traffic management as an alternative. Congestion has a negative influence on

the economy, the environment, and the quality of life in general. As a result, it is past time to address the traffic congestion issue efficiently. Video data analysis, infrared sensors, inductive loop detection, wireless sensor networks, and other approaches are available for traffic control.

7. Chew, Ivan & Karunatilaka, Dilukshan & Tan, Chee Pin (Edwin) & Kalavally, V.. (2017). Smart lighting: The way forward? Reviewing the past to shape the future. Energy and Buildings. 149. 10.1016/j.enbuild.2017.04.083

May 2017

Smart lighting: The way forward? Reviewing the past to shape the future. Energy and Buildings.

The quest for pervasive networking and device interoperability in buildings is fueling the creation of a new generation of smart gadgets that can gather, process, and exchange data thanks to integrated electronics, sensors, and wireless connectivity. The Internet of Things (IoT) is a broad term that includes wireless sensor networks, home automation, mobile devices, and lighting control systems, among other things.

3. DRAWBACK IN THE EXISTING WORK

After carefully reviewing the research papers and journals related to our topic, we figured that most of the projects have used IOT based smart systems to simulate their models, which requires physical microprocessors such as Arduino/Raspberry Pi etc. We were not able to find a lot material on how to simulate the Parking management System with the need of a microprocessor using just Machine Level code.

4. PROPOSED WORK

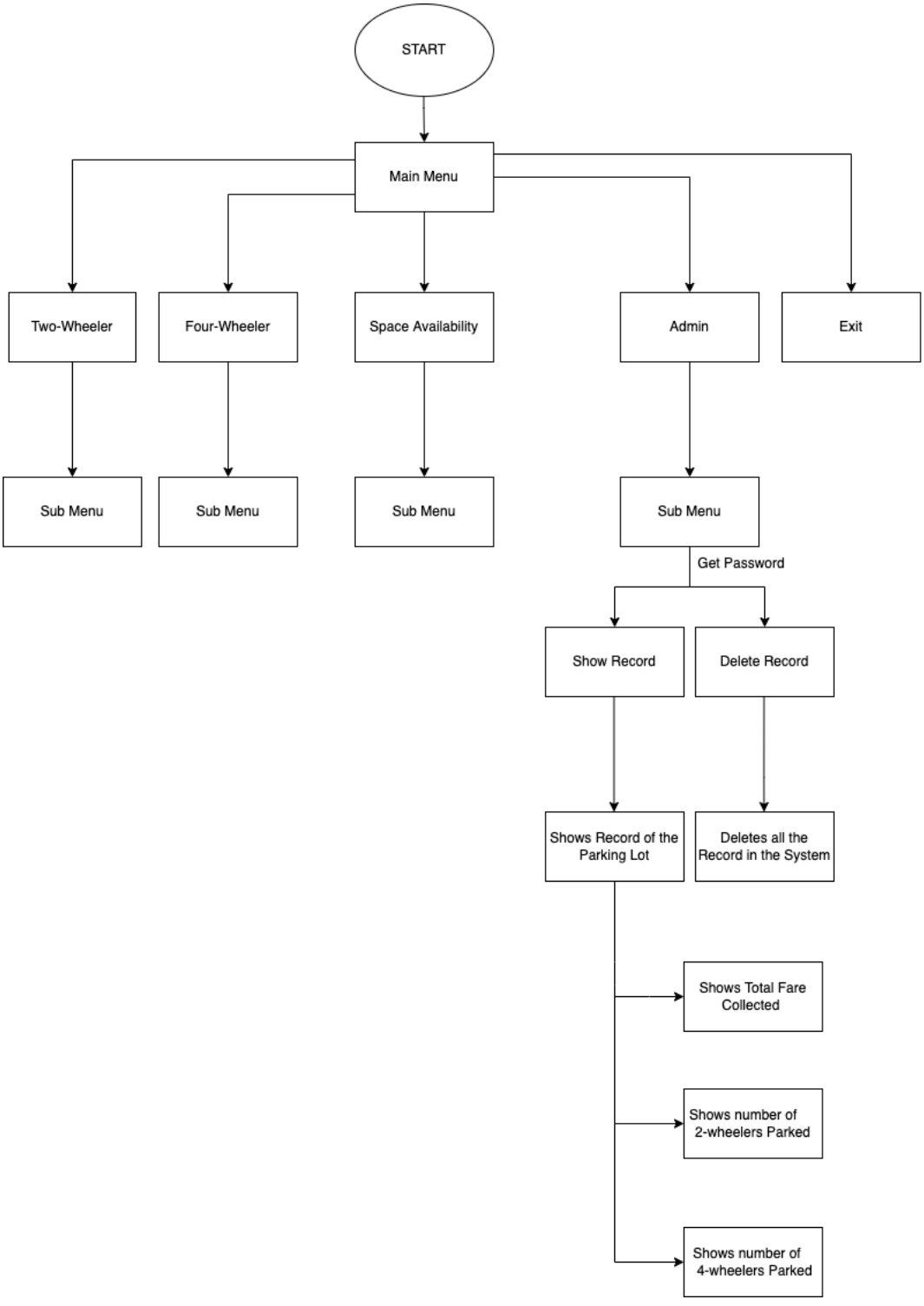
Since, there is little implementation of a full-fledged Management System in Assembly Language, we decided to simulate our idea, using nothing but Machine Level code. Since, the Assembly Language is the lowest level language that a machine can understand, it is clear that the System will be quicker than most or all of the systems built in any other language (example: Python/C++/Java/Javascript…).

5. BLOCK DIAGRAM AND FLOW CHART FOR THE ALGORITHM

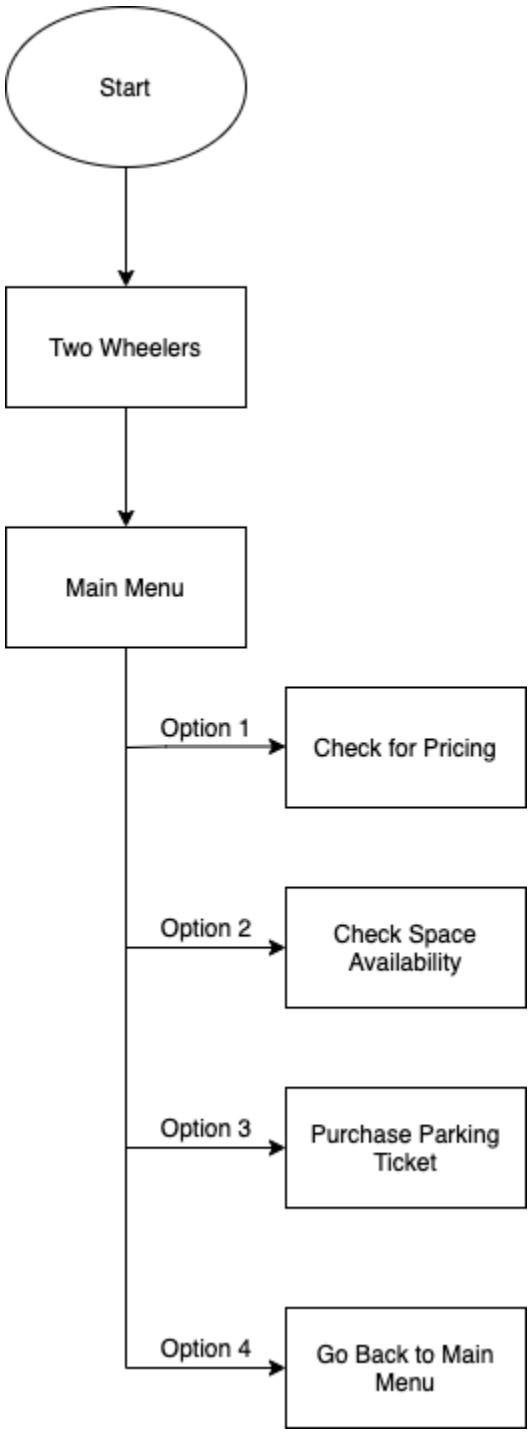
5.1 BLOCK DIAGRAM:

5.2 FLOWCHARTS:

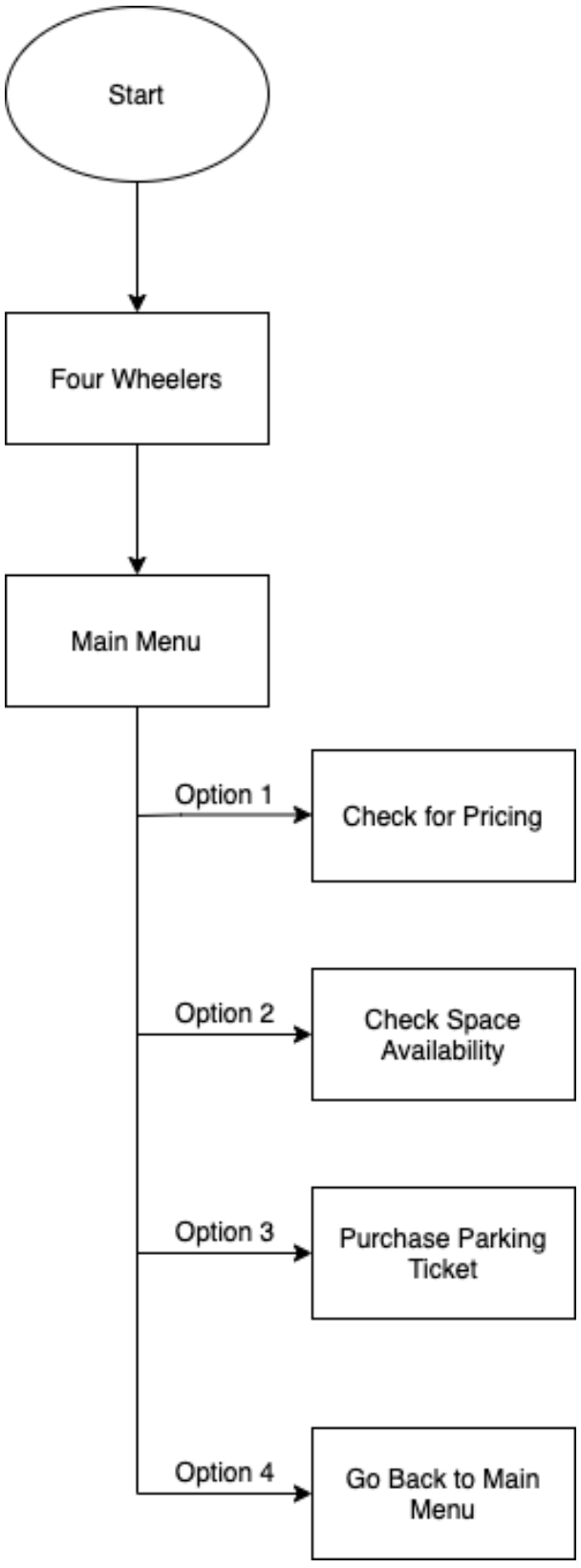
5.2.1 Main Menu Flowchart:


START
Main Menu
Two-Wheeler
Four-Wheeler
Space Availability
Admin
Exit
Sub Menu
Sub Menu
Sub Menu
Sub Menu
Get Password
Show Record
Delete Record
Shows Record of the Parking Lot
Deletes all the Record in the System
Shows Total Fare Collected
Shows number of 2-wheelers Parked
Shows number of 4-wheelers Parked

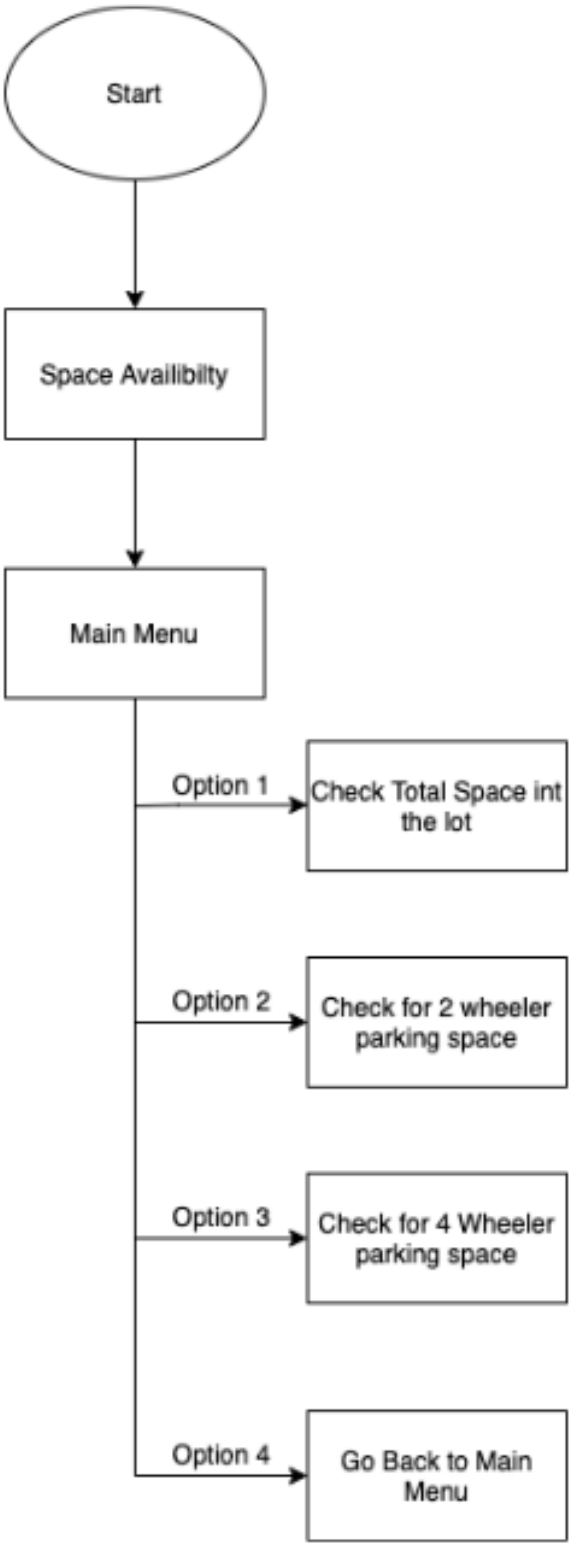
5.2.2 Two-Wheeler Flowchart:



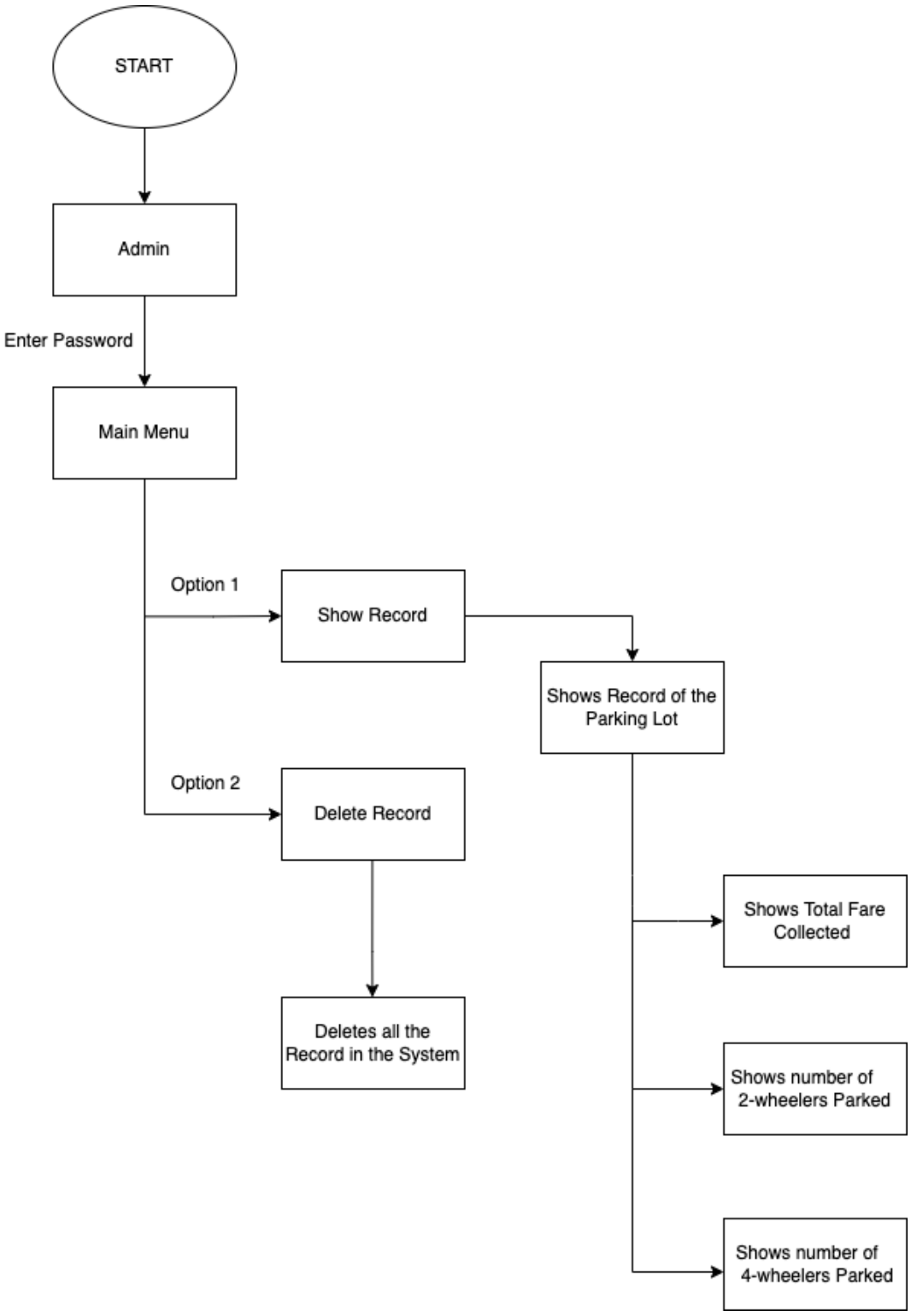
5.2.3 Four-Wheeler Flowchart:



5.2.4 Check Space Availability Flowchart:



5.2.5 Admin Flowchart:



6. IMPLEMENTATION

When we first run the program, the user is greeted with a welcome message along with the project details such as the creators' names and their respective registration number. The user is prompted to press any key to enter the "PARKING MANAGEMENT SYSTEM".

The main menu comprises of 4 options, ie:

- Two Wheeler
- Four Wheeler
- Check Space Availability
- Admin

The last option (EXIT) allows the user to terminate out of the system. The Main Menu is broken down into the following modules:

6.1 TWO-WHEELER

When the user chooses "TWO-WHEELER" option, the user is taken to the Two-Wheeler menu and he/she can now from the following options:

- Pricing: This will show the user the price of a two-wheeler parking ticket.
- Check Space Availability: This will show the user the number of parking slots left for a two-wheeler.
- Purchase Parking Ticket: On choosing this option, the user is prompted to confirm if he/she wants to buy the ticket, if yes, the user is charged Rs. 200 and the console returns to the Main Menu.
- Go Back: The user can go back to the Main Menu by using this option.

6.2 FOUR-WHEELER

When the user chooses "FOUR-WHEELER" option, the user is taken to the Four-Wheeler menu and he/she can now from the following options:

- Pricing: This will show the user the price of a four-wheeler parking ticket.
- Check Space Availability: This will show the user the number of parking slots left for a four-wheeler
- Purchase Parking Ticket: On choosing this option, the user is prompted to confirm if he/she wants to buy the ticket, if yes, the user is charged Rs. 400 and the console returns to the Main Menu.
- Go Back: The user can go back to the Main Menu by using this option.

6.3 CHECK SPACE AVAILABILITY

This option allows the user to glance at the current status of the Parking Lot. It shows the total number of slots left for both Two-wheelers and Four-wheels (combined and

individually). The user can check the availability of a space for his/her vehicle with just a press of a button, hence saving time.

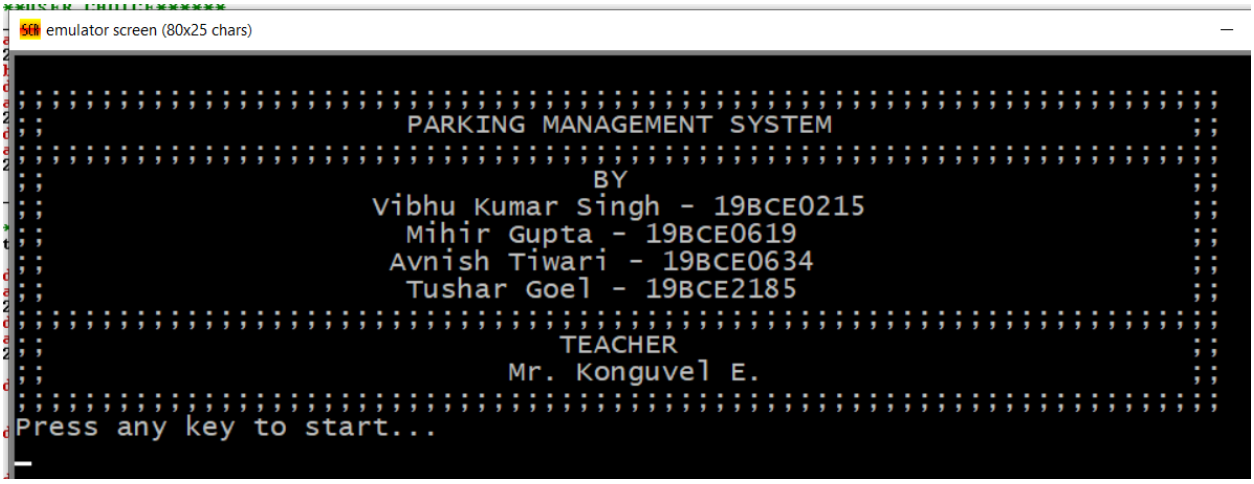
6.4 ADMIN

The system contains some data which can only be accessed by an Administrator of the Parking Management System. In order to prevent just anyone to enter the Admin Module and access sensitive data, this module has been password protected. When the right password is entered, the administrator can access the Details such as the total amount collected through parking ticket sales.
If the need be, the admin also has the option to delete the whole database. This will clear all data in the parking system.

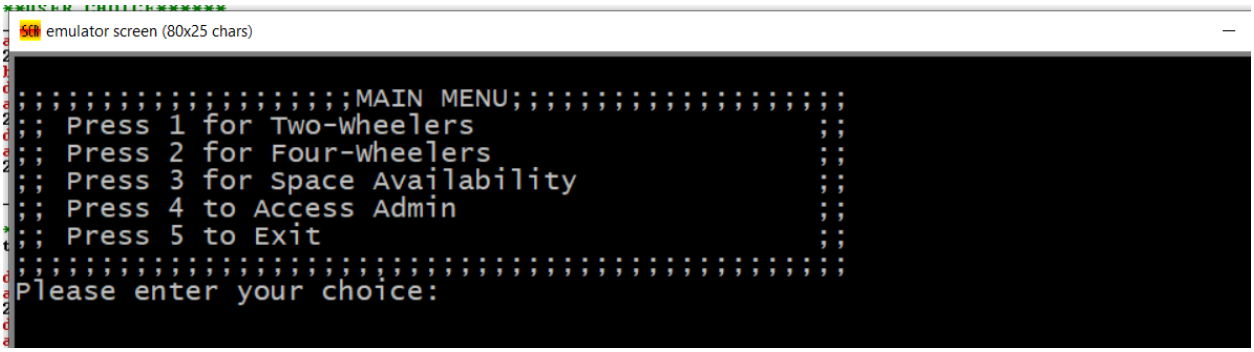
Finally, the user can press 5 in the Main Menu to exit the program.

7. SCREENSHOTS OF PROTOTYPE

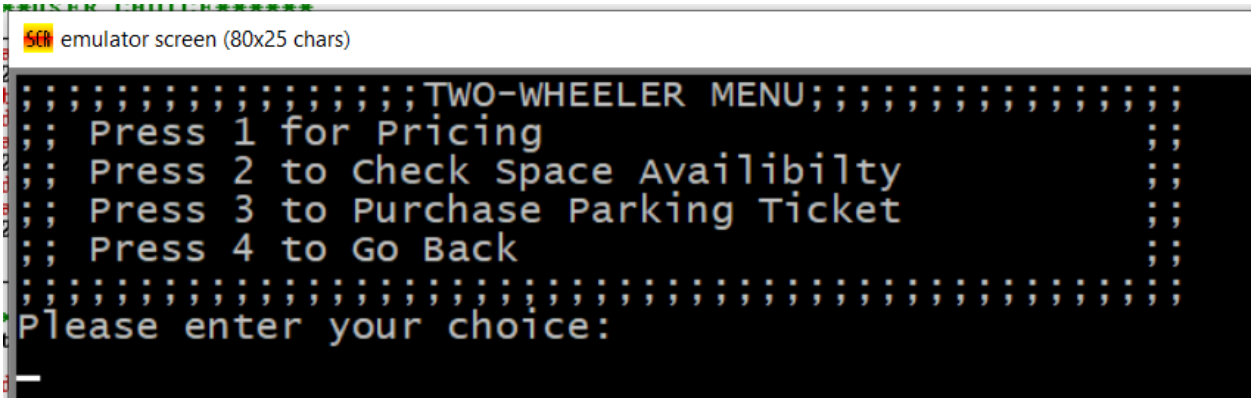
7.1 Welcome Screen:



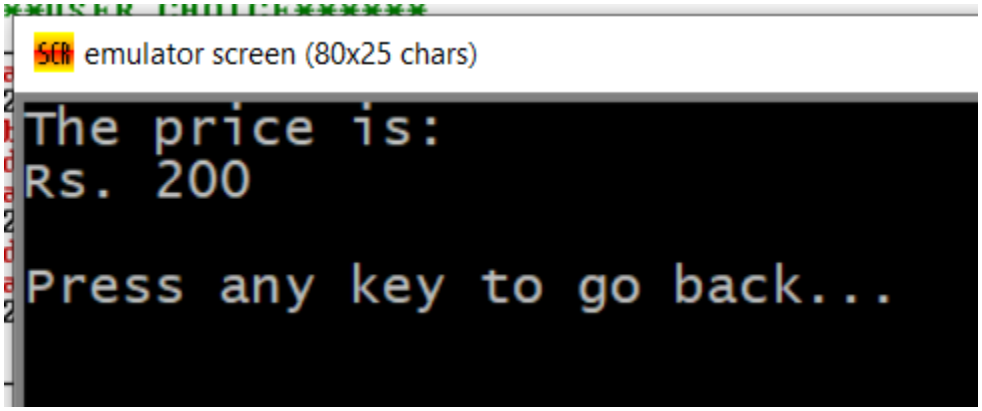
7.2 Main Menu:



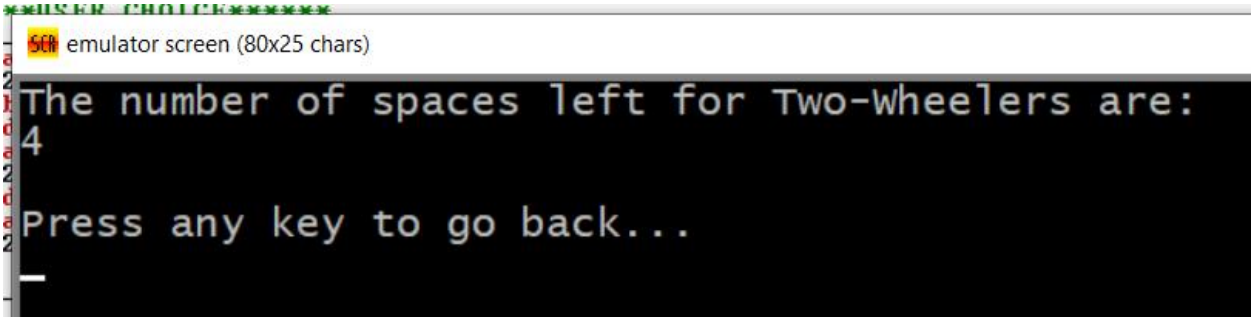
7.2.1 Two-Wheeler:



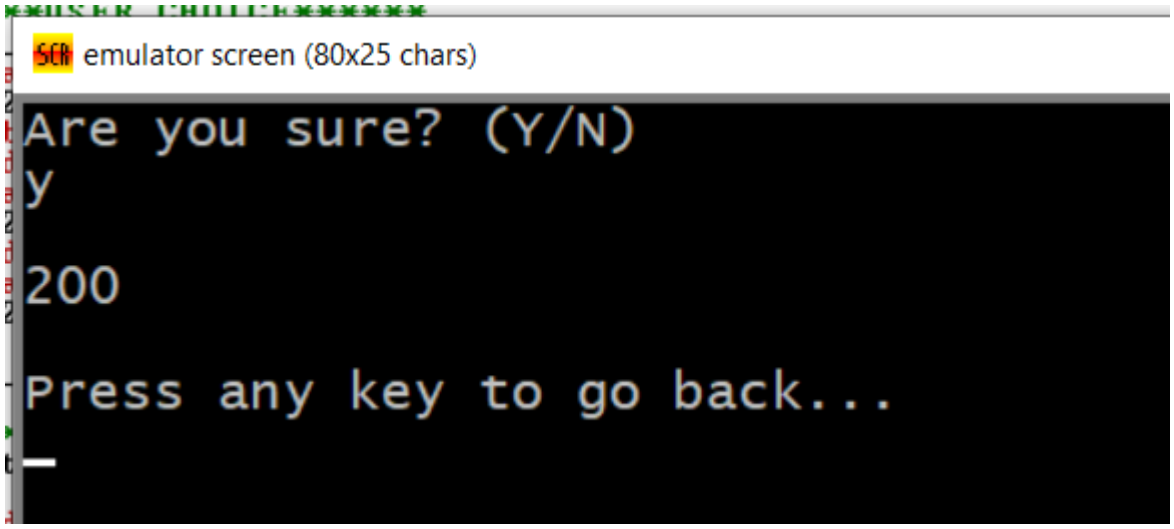
Pricing:



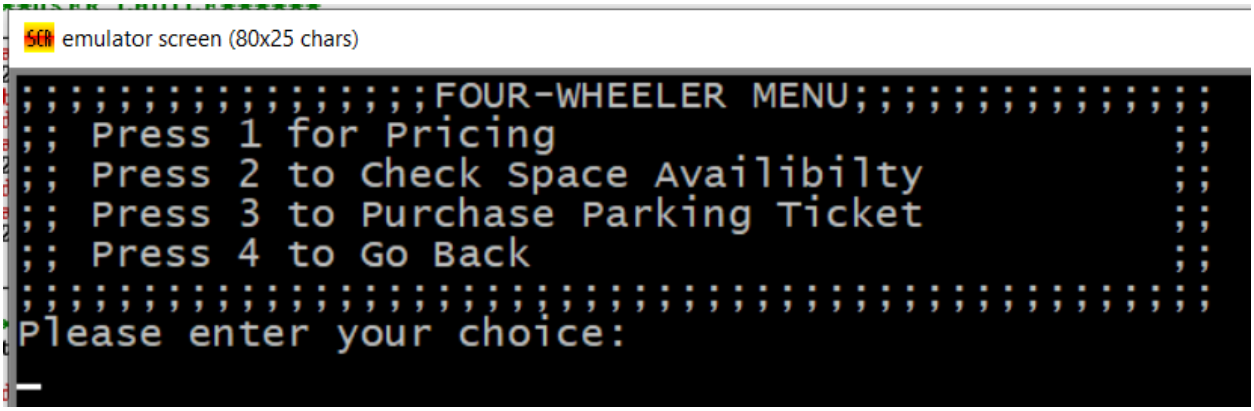
Check Availability:



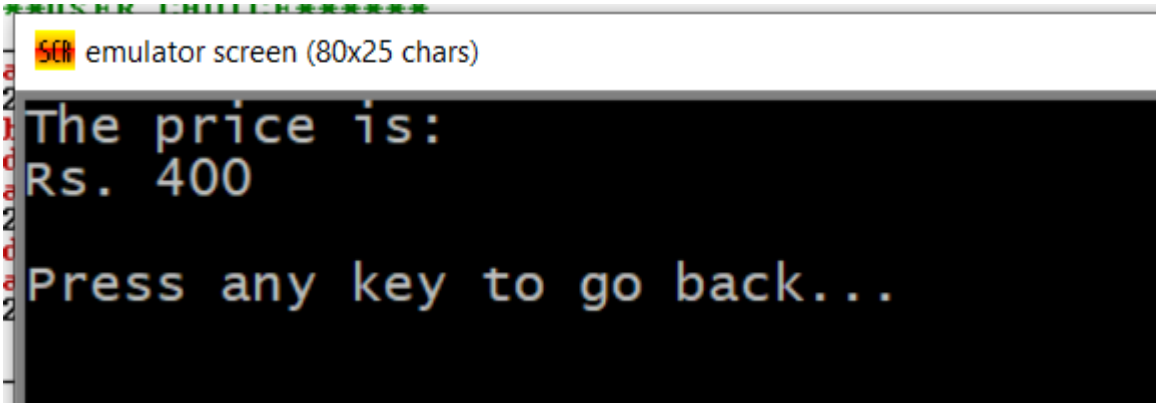
Purchase Ticket:



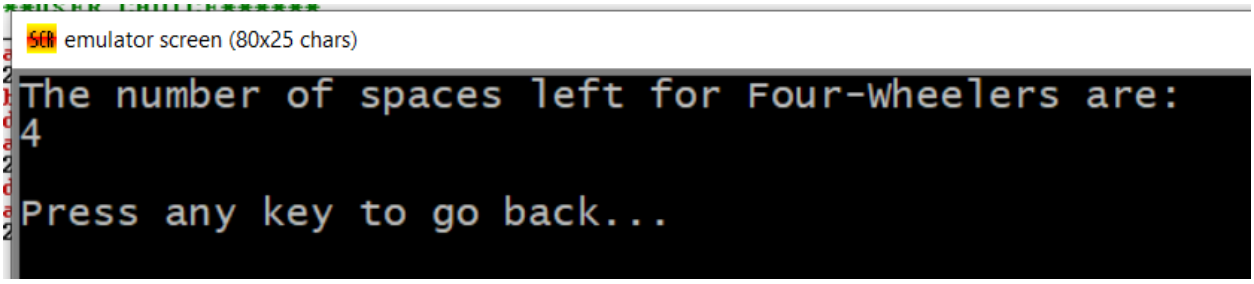
7.2.2 Four-Wheeler:



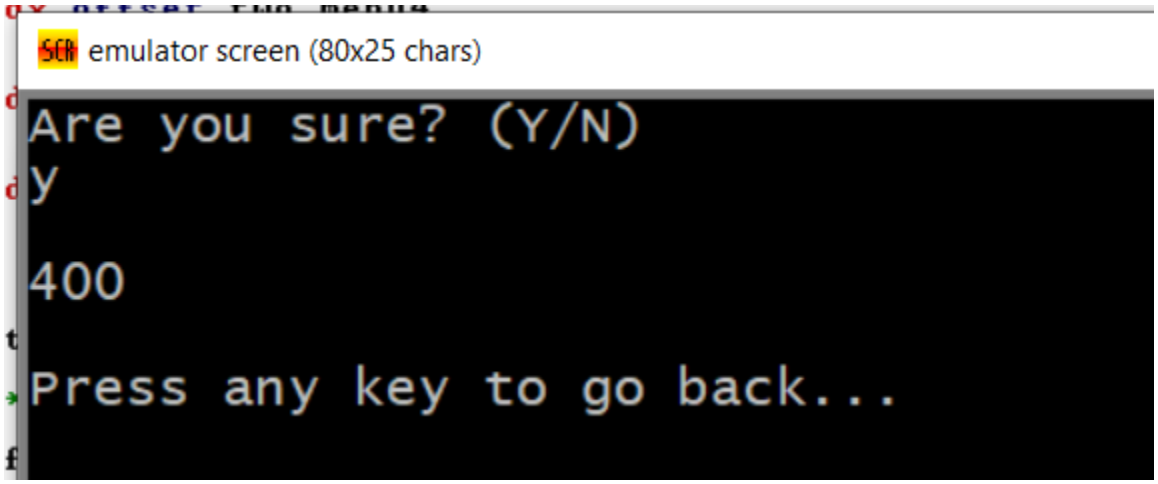
Pricing:



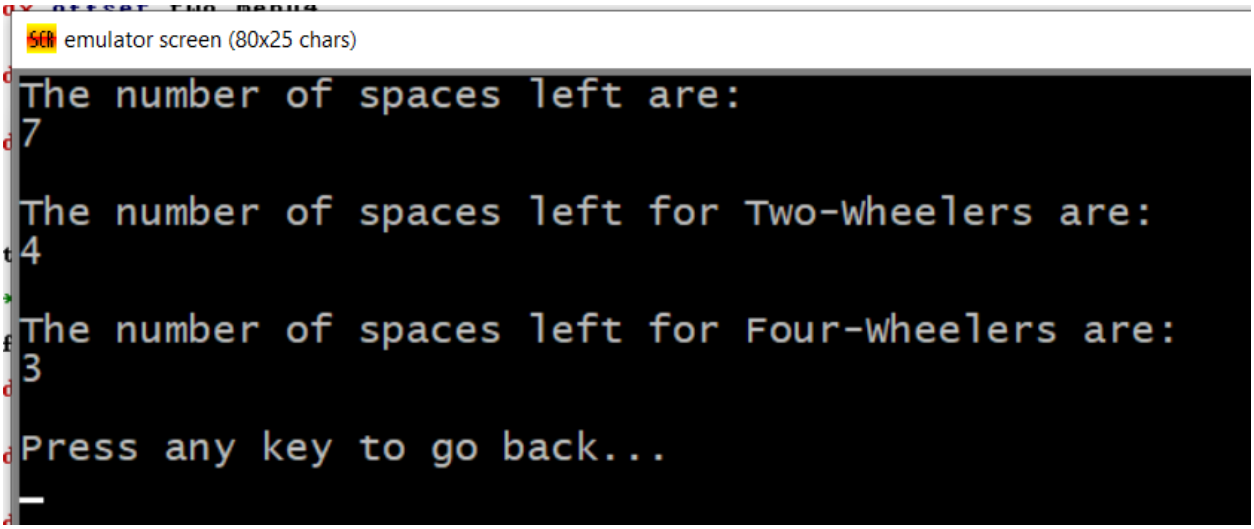
Check Availability:



Purchase Ticket:

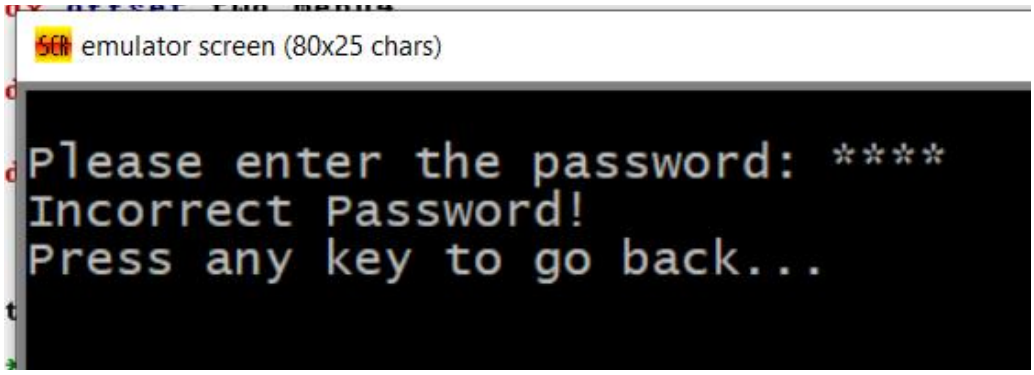


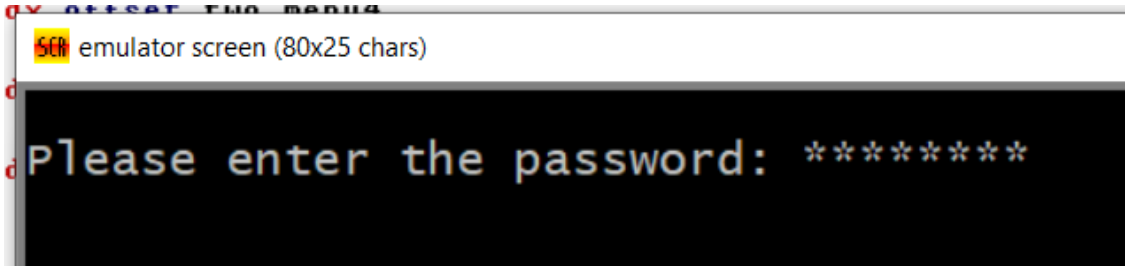
7.2.3 Check Space Availability:



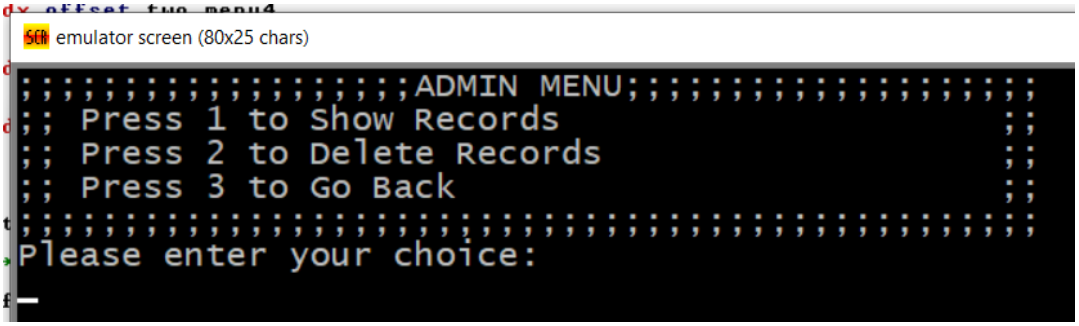
7.2.4 Admin:

Password Screen:

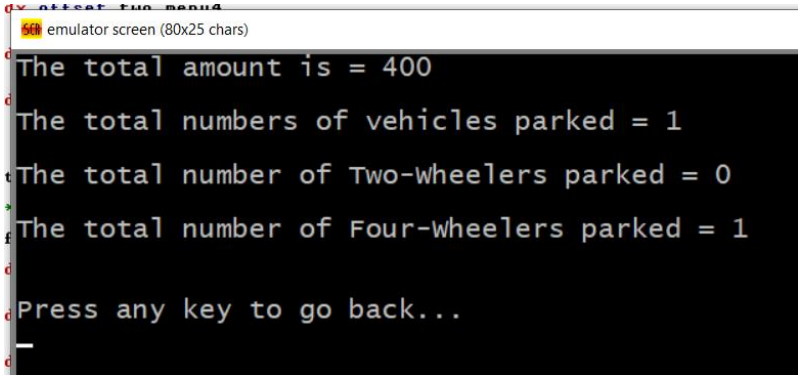




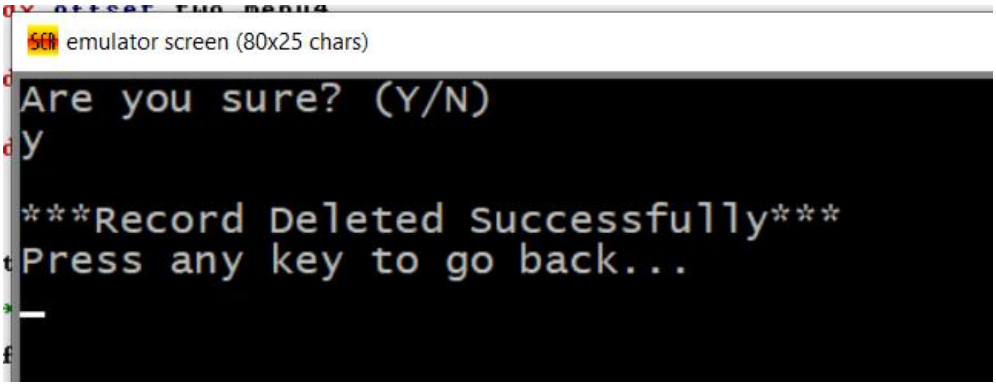
Admin Dashboard:



Show Records:



Delete Records:



8. RESULTS

The built system is robust and has no loopholes in terms of safety. This system can further be optimized by adding the following functionality:

- All the data can be stored in a database, in order to make data persistent.
- There can be a way to keep track of the exact slots (Slot No.) that are empty.
- This system can be extended to a multilevel parking, where the user is indicated on which exact floor he/she needs to park their vehicle.

What we have built is an implementation of a basic idea about making the parking experience better for the customers and the workers.

9. CONCULSION

As the research demonstrated, the idea was to build a system to increase the efficiency of parking lots as much as possible. We can see that this was achieved using Assembly Language code, 8086 Assembly Language to be more specific. A user can easily check for available slots, purchase a parking ticket and park their vehicle without wasting time. As a plus, the admin

module adds more safety and functionality to the system. It is clear that the Parking Management System is fast, user friendly and efficient.

10. REFERENCES

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5) Javaid, Sabeen & Sufian, Ali & Pervaiz, Saima & Tanveer, Mehak. (2018). Smart traffic management system using Internet of Things. 393-398. 10.23919/ICACT.2018.8323770.

6) A. K. Sikder, A. Acar, H. Aksu, A. S. Uluagac, K. Akkaya and M. Conti, "IoT-enabled smart lighting systems for smart cities," 2018 IEEE 8th Annual Computing and Communication Workshop and Conference (CCWC), 2018, pp. 639-645, doi: 10.1109/CCWC.2018.8301744.

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9) "Smart Car Parking System", Jayakshei Dadaji Bachhav1, Prof. Mechkul M. A.2 - (IRJET) [2017]

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11. APPENDIX (CODE)

CODE: https://github.com/Vibhukumar10/Team-7-CSE2006

12. PLAGIARISM REPORT

Plagiarism Detector.net

Date: December, 08 2021

PLAGIARISM SCAN REPORT

0%	100%	936	5770
Plagiarised	Unique	Words	Characters

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ABSTRACT Finding a perfect parking spot in today's fast paced metropolitan cities, particularly during the busy times, is a huge headache for drivers. The trouble emerges from not knowing where the accessible spaces might be; regardless of whether known, numerous vehicles might seek after exceptionally restricted parking spots to cause genuine traffic gridlock. In this project, we design and emulate a model of Parking System that permits drivers to viably find empty parking spots utilizing assembly language. We have decided to emulate our project with the help of EMU 8086 emulator. With the help of our project, a parking facility manager can keep track of the number of two wheelers and 4 wheelers parked at a particular time, how many vacant spots are there for a particular type of vehicle (two and four wheelers), how many total vacant spots are left in the facility and also manage his earnings and profits. 1. INTRODUCTION Finding a perfect parking spot in today's fast paced metropolitan cities, particularly during the busy times, is a huge headache for drivers. The trouble emerges from not knowing where the accessible spaces might be; regardless of whether known, numerous vehicles might seek after exceptionally restricted parking spots to cause genuine traffic gridlock. In this project, we design and emulate a model of Parking System that permits drivers to viably find empty parking spots utilizing assembly language. We have decided to emulate our project with the help of EMU 8086 emulator. With the help of our project, a parking facility manager can keep track of the number of two wheelers and 4 wheelers parked at a particular time, how many vacant spots are there for a particular type of vehicle (two and four wheelers), how many total vacant spots are left in the facility and also manage his earnings and profits. This will help automate the parking lot and also make it easier to track sales of parking spaces and prevent traffic from accumulating inside the parking lot. 6. IMPLEMENTATION When we first run the program, the user is greeted with a welcome message along with the project details such as the creators' names and their respective registration number. The user is prompted to press any key to enter the "PARKING MANAGEMENT SYSTEM". The main menu comprises of 4 options, ie: - Two Wheeler - Four Wheeler - Check Space Availability - Admin The last option (EXIT) allows the user to terminate out of the system. The Main Menu is broken down into the following modules: 6.1 TWO-WHEELER When the user chooses "TWO-WHEELER" option, the user is taken to the Two-Wheeler menu and he/she can now from the following options: - Pricing: This will show the user the price of a two-wheeler parking ticket. - Check Space Availability: This will show the user the number of parking slots left for a two-wheeler. - Purchase Parking Ticket: On choosing this option, the user is prompted to confirm if he/she wants to buy the ticket, if yes, the user is charged Rs. 200 and theconsole returns to the Main Menu. - Go Back: The user can go back to the Main Menu by using this option. 6.2 FOUR-WHEELER When the user chooses "FOUR-WHEELER" option, the user is taken to the Four-Wheeler menu and he/she can now from the following options: - Pricing: This will show the user the price of a four-wheeler parking ticket. - Check Space Availability: This will show the user the number of parking slots left for a four-wheeler - Purchase Parking Ticket: On choosing this option, the user is prompted to confirm if he/she wants to buy the ticket, if yes, the user is charged Rs. 400 and the console returns to the Main Menu. - Go Back: The user can go back to the Main Menu by using this option. 6.3 CHECK SPACE AVAILABILITY This option allows the user to glance at the current status of the Parking Lot.It shows the total number of slots left for both Two-wheelers and Four-wheels (combined and individually). The user can check the availability of a space for his/her vehicle with just a press of a button, hence saving time. 6.4 ADMIN The system contains some data which can only be accessed by an Administrator of the Parking Management System. In order to prevent just anyone to enter the Admin Module and access sensitive data, this module has been password protected. When the right password is entered, the administrator can access theDetails such as the total amount collected through parking ticket sales. If the need be, the admin also has the option to delete the whole database. This will clear all data in the parking system. Finally, the user can press 5 in the Main Menu to exit the program. 8. RESULTS Thebuilt system is robust and has no loopholes in terms of safety. This system can further be optimized by adding the following functionality: -

All the data can be stored in a database, in order to make data persistent. - There can be a way to keep track of the exact slots (Slot No.) that are empty. - This system can be extended to a multilevel parking, where the user is indicated on which exact floor he/she needs to parktheir vehicle. What we have built is an implementation of a basic idea about making the parking experience better for the customers and theworkers. 9. CONCULSION As the research demonstrated, the idea was to build a system to increase the efficiency of parking lots as much as possible. We can see that this was achieved using Assembly Language code, 8086 Assembly Language to be more specific. A user caneasily check for available slots, purchase a parking ticket and park their vehicle without wasting time. As a plus, the admin module adds more safety and functionality to the system. It is clear that the Parking Management System is fast, user friendly and efficient

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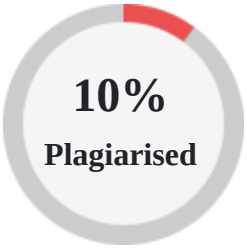

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1. Javaid, Sabeen & Sufian, Ali & Pervaiz, Saima & Tanveer, Mehak. (2018). Smart traffic management system using Internet of Things. 393-398. 10.23919/ICACT.2018.8323770. Smart traffic management system using Internet of Things. One of the primary dimensions of a smart city is the traffic management system. Traffic congestion is common on roadways as a result of the rapid development of population and urban mobility in metropolitan centres. This study proposes a smart traffic

management system based on the Internet of Things (IoT) toaddress different challenges related to road traffic management and to assist authorities in effective planning. To optimise traffic flow on roads, a hybrid strategy (a combination of centralised and decentralised) is utilised, and an algorithm is developed to efficiently manage diverse traffic circumstances. For this, the system uses data from a) cameras b) and sensors to calculate traffic density, and subsequently operates traffic lights. Another Artificial Intelligence-based method is used to forecast future traffic density in order to reduce traffic congestion. 2. Pala, Z., & Inanc, N. (2007). Smart Parking Applications Using RFID Technology. 2007 1st Annual RFID Eurasia. https://doi.org/10.1109/RFIDEURASIA.2007.4368108 2007 1st Annual RFID Eurasia Smart Parking Applications Using RFID Technology Check-ins and check-outs will be completed quickly without the need to stop the cars, avoiding traffic congestion during these processes. During check-ins and check-outs, drivers will not be required to stop at circulation points, and parking tickets will be invalid. Ticket-jamming issues for ticket-processing devices will also be avoided. Vehicle owners will not be required to make any payments at each check-out, allowing for better traffic flow. The generation of exhaust gas as a result of such waiting will be eliminated because there would be no waiting between check-ins and check-outs. A central parking-car tracking system, an atomized income tracking system, and a car tracking system for charging have all been created and implemented. A more sophisticated and fast-operating parking-lot system has been established in place of cars parking on streets. Regular EVs are modelled using an extensive trace-based vehicle mobility model acquired from the Canton of Zurich, and irregular EVs are modelled using a probabilistic pattern built on top of this trace. This is the first EV chargingschedule analysis in the literature, to our knowledge, that considers a realistic vehicular mobility pattern focusing on individual parking lots.

4. Smart traffic light control system Traffic signal control frameworks are generally used to screen and control the progression of autos through the intersection of numerous streets. They expect to acknowledge smooth movement of vehicles in the transportation courses. Notwithstanding, the synchronization of numerous traffic signal frameworks at adjoining crossing points is a confounded issue given the different boundaries included. Customary frameworks don't deal with variable streams moving toward the intersections. Furthermore, the common impedance between adjoining traffic signal frameworks, the dissimilarity of vehicles stream with time, the mishaps, the entry of crisis vehicles, and the person on foot crossing are not carried out in the current rush hour gridlock framework. This prompts gridlock and clog. 5. A. K. Sikder, A. Acar, H. Aksu, A. S. Uluagac, K. Akkaya and M. 2018 IEEE 8th Annual Computing and Communication Workshop and Conference (CCWC) IoT-enabled smart lighting systems for smart cities The rate of urbanisation has accelerated dramatically in recentdecades. In order to create a better lifestyle in metropolitan regions, more upgraded services and apps are required. The concept of a smartcity, which is the interconnection of current digital technologies in the setting of a city, is a promising way to improve the quality and performance of urban services. With the introduction of the Internet of Things (IoT) in the smart city, new opportunities for developing new services and integrating multiple application areas using Information and Communication Technologies have developed. 6. Lanke, Ninad & Koul, Sheetal. (2013). Smart Traffic Management System. International Journal of Computer Applications. 75. 19-22. 10.5120/13123-0473. Smart Traffic Management System Congestion is a big issue in many Indian cities, as well as other countries. Traffic congestion has been caused by signal failure, poor law enforcement, and inefficient traffic management. One of the primary issues in Indian cities is that the existing infrastructure cannot be expanded any further, leaving only better traffic management as an alternative. Congestion has a negative influence on the economy, the environment, and the quality of life in general. As a result, it is past time to address the traffic congestionissue efficiently. Video data analysis, infrared sensors, inductive loop detection, wireless sensor networks, and other approaches are available for traffic control.

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