Assessment Cover Sheet Faculty of Engineering

Module Details			
Module Code	EC2492	**Module Title**	OOP
Program: SLIIT		**Course: BSc/ BEng/**	
Stream: EEE			

Assessment details			
Title	assignment	**Group assignment**	**NO**
		If yes, Group No.	
Lecturer/ Instructor		**Date of Performance**	
Due date	23rd of May 2021	**Date submitted**	23rd of May 2021

Student statement and signature

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Details of the student/s submitting the assignment		Signature
ID Number	**Name (As per the institute records)**	
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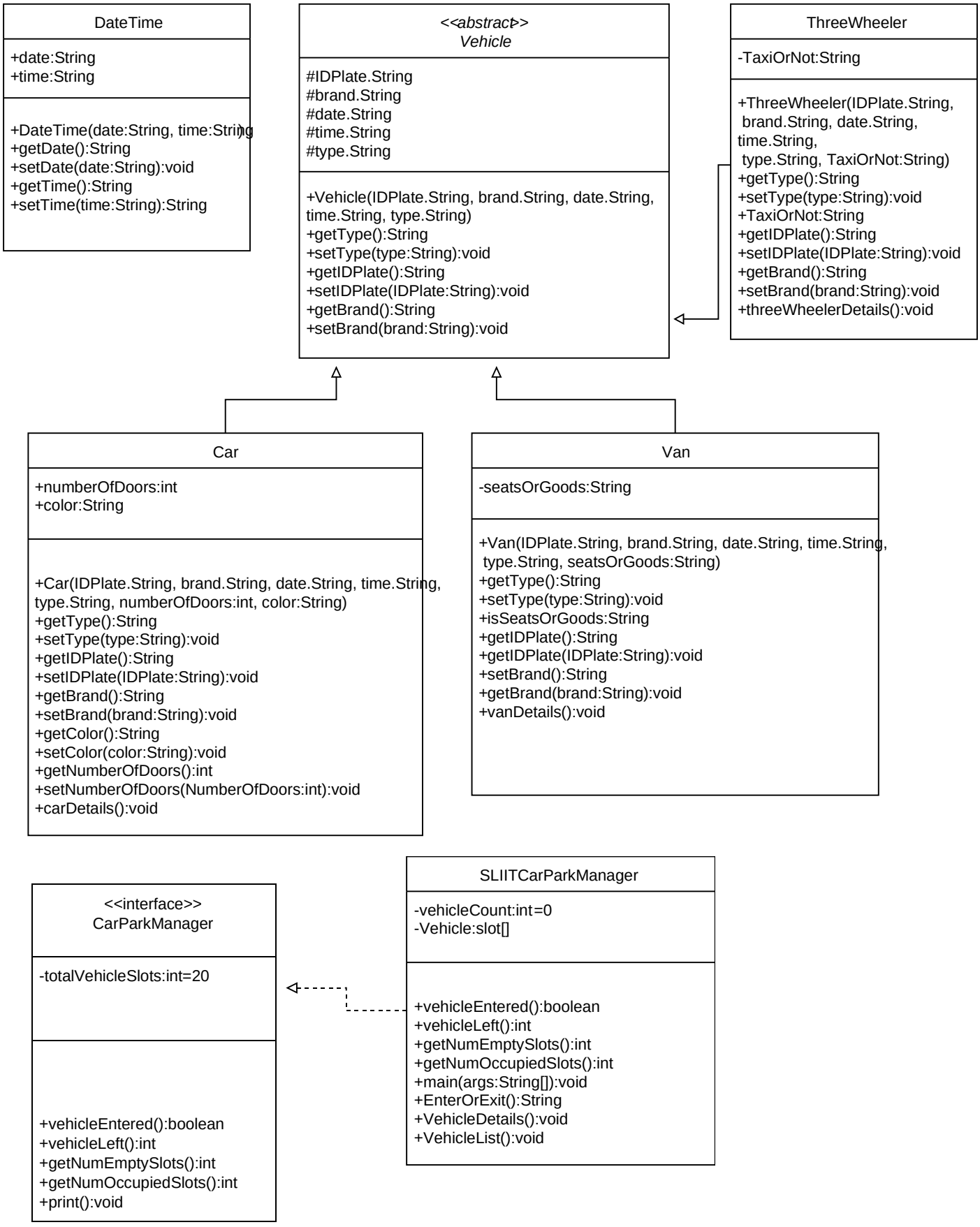
Receiving Officer (seal, signature, date)	**Specific comments about the work (including overall comments and guidelines for improvement)**		
	Tutor:	**Signature:**	**Date:**
	Marks:	**[All marks are subject to external moderation and approval of board of examinations]**	

UML diagram


DateTime
+date:String
+time:String
+DateTime(date:String, time:String)
+getDate():String
+setDate(date:String):void
+getTime():String
+setTime(time:String):String
<<abstract>>
Vehicle
#IDPlate.String
#brand.String
#date.String
#time.String
#type.String
+Vehicle(IDPlate.String, brand.String, date.String, time.String, type.String)
+getType():String
+setType(type:String):void
+getIDPlate():String
+setIDPlate(IDPlate:String):void
+getBrand():String
+setBrand(brand:String):void
ThreeWheeler
-TaxiOrNot:String
+ThreeWheeler(IDPlate.String, brand.String, date.String, time.String, type.String, TaxiOrNot:String)
+getType():String
+setType(type:String):void
+TaxiOrNot:String
+getIDPlate():String
+setIDPlate(IDPlate:String):void
+getBrand():String
+setBrand(brand:String):void
+threeWheelerDetails():void
Car
+numberOfDoors:int
+color:String
+Car(IDPlate.String, brand.String, date.String, time.String, type.String, numberOfDoors:int, color:String)
+getType():String
+setType(type:String):void
+getIDPlate():String
+setIDPlate(IDPlate:String):void
+getBrand():String
+setBrand(brand:String):void
+getColor():String
+setColor(color:String):void
+getNumberOfDoors():int
+setNumberOfDoors(NumberOfDoors:int):void
+carDetails():void
Van
-seatsOrGoods:String
+Van(IDPlate.String, brand.String, date.String, time.String, type.String, seatsOrGoods:String)
+getType():String
+setType(type:String):void
+isSeatsOrGoods:String
+getIDPlate():String
+getIDPlate(IDPlate:String):void
+setBrand():String
+getBrand(brand:String):void
+vanDetails():void
<<interface>>
CarParkManager
-totalVehicleSlots:int=20
+vehicleEntered():boolean
+vehicleLeft():int
+getNumEmptySlots():int
+getNumOccupiedSlots():int
+print():void
SLIITCarParkManager
-vehicleCount:int=0
-Vehicle:slot[]
+vehicleEntered():boolean
+vehicleLeft():int
+getNumEmptySlots():int
+getNumOccupiedSlots():int
+main(args:String[]):void
+EnterOrExit():String
+VehicleDetails():void
+VehicleList():void

Code

Vehicle

```
abstract class Vehicle { //create a abstract class

    // create variables with protected accsess modifiers that can give
accsess to sub classes
    protected String IDPlate;
    protected String brand;
    protected String date;
    protected String time;
    protected String type;

    // create constructor
    public Vehicle(String type,String IDPlate,String brand,String
date,String time){
        this.IDPlate=IDPlate;
        this.brand=brand;
        this.date=date;
        this.time=time;
        this.type=type;
    }

    // gettype method for get thge type of the vehicle
    public String getType(){
        System.out.println(type);
        return type;
    }

    // settype of the vehicle for set the type of the vehicle (abstract
method)
    public abstract void setType(String type);

    public String getIDPlate(){
        System.out.println(IDPlate);
        return IDPlate;
    }
    // setIDplate of the vehicle for set the IDPlate of the vehicle
(abstract method)
    public abstract void setIDPlate(String IDPlate);

    // getbrand of the vehicle for get the brand of the vehicle (abstract
method)
    public abstract String getBrand();

    // setbrand of the vehicle for set the brand of the vehicle (abstract
method)
    public abstract void setBrand(String brand);

}
```

DateTime

```
public class DateTime { // create DateTime class

    // create variables with private accsess modifiers that can give
accsess to only own class
     private String date;
     private String time;

     // create constructor
    public DateTime(String date,String time){
        this.date=date;
        this.time=time;
    }

    // get method for get values
    public String getDate(){
        return date;
    }

    // set method for set values
    public void setDate(String date){
        this.date=date;
    }

    // get method for get values
    public String getTime(){
        return date;
    }

    // set method for set values
    public void setTime(String date){
        this.date=date;
    }

}
```

Car

```
public class Car extends Vehicle{   //car class inherit from Vehicle class

    // create variables with private accsess modifiers that can give
accsess to only own class
    private int NumberOfDoors;
    private String color;

    // create a constructor
    protected Car(String type,String IDPlate, String brand, String date,
String time,int NumberOfDoors,String color) {
        super(type,IDPlate, brand, date, time);
        this.IDPlate=IDPlate;
        this.brand=brand;
        this.date=date;
        this.time=time;
        this.NumberOfDoors=NumberOfDoors;
        this.color=color;
        this.type=type;


    }

    // get method for get values
    public String getType(){
        return type;
    }

    // get method for get values
    public void setType(String type){
        this.type=type;
    }

    // get method for get values
    @Override
    public String getIDPlate(){
        return IDPlate;
    }

    // set method for set values
    @Override
    public void setIDPlate(String IDPlate){
        this.IDPlate=IDPlate;
    }

    // get method for get values
    @Override
    public String getBrand(){
        return brand;
    }

    // set method for set values
    @Override
    public void setBrand(String brand){
        this.brand=brand;
    }

    // get method for get values
    public String getColor(){
        return color;
```

```
    }

    // set method for set values
    public void setColor(String color){
        this.color=color;
    }

    // get method for get values
    public int getNumberOfDoors(){
        return NumberOfDoors;
    }

    // set method for set values
    public void setNumberOfDoors(int NumberOfDoors){
        this.NumberOfDoors=NumberOfDoors;
    }

    // this nethod for print car deails
    public void carDetails(){
        System.out.println("\ndetails of your Vehicle,");
        System.out.println("ID Plate : "+IDPlate+"\nEntry Time :
"+time+"\nVehicle type is Car\n");
    }

}
```

Van

```
import java.util.Scanner;

public class Van extends Vehicle{   // van sub class extends with vehicle
super class

    // create variables with private accsess modifiers that can give
accsess to only own class
    private static String seatsOrGoods;

    // crate a constructor
    public Van(String type,String IDPlate, String brand, String date,
String time,String seatsOrGoods) {
        super(type,IDPlate, brand, date, time);
        this.IDPlate=IDPlate;
        this.brand=brand;
        this.date=date;
        this.time=time;
        this.seatsOrGoods=seatsOrGoods;
        this.type=type;

    }

    // get method for get values
    public String getType(){
        return type;
    }

    // set method for set values
    public void setType(String type){
        this.type=type;
    }

    // set method for set values
    public String isSeatsOrGoods(){
        Scanner scan=new Scanner(System.in);
        switch (seatsOrGoods){
            case "seats":
                System.out.println("Number Of Seats : ");
                String EnterSeats = scan.nextLine();
                break;

            case "goods":
                System.out.println("Goods Capacity(kg) : ");
                String EnterCapacity = scan.nextLine();
            break;
        }

        return seatsOrGoods;
    }

    // get method for get values
    @Override
    public String getIDPlate(){
        return IDPlate;
    }

    // set method for set values
    @Override
    public void setIDPlate(String IDPlate){
```

```
        this.IDPlate=IDPlate;
    }

    // get method for get values
    @Override
    public String getBrand(){
        return brand;
    }

    // set method for set values
    @Override
    public void setBrand(String brand){
        this.brand=brand;
    }

    // print van details
    public void vanDetails(){
        System.out.println("\ndetails of your Vehicle,");
        System.out.println("ID Plate : "+IDPlate+"\nEntry Time :
"+time+"\nVehicle type is Van\n");
    }
}
```

ThreeWheeler

```
import java.util.Scanner;

public class ThreeWheeler extends Vehicle{  // create 2wheel class extends
from Vehicle class

    // create variables with private accsess modifiers that can give
accsess to only own class
    private String TaxiOrNot;

    // craete a constructor
    public ThreeWheeler(String type,String IDPlate, String brand, String
date, String time,String TaxiOrNot) {
        super(type,IDPlate, brand, date, time);
        this.IDPlate=IDPlate;
        this.brand=brand;
        this.TaxiOrNot=TaxiOrNot;
        this.type=type;

    }

    // get method for get values
    public String getType(){
        return type;
    }

    // set method for set values
    public void setType(String type){
        this.type=type;
    }
    public String TaxiOrNot(){

        return TaxiOrNot;
    }

    // get method for get values
    @Override
    public String getIDPlate(){
        return IDPlate;
    }

    // set method for set values
    @Override
    public void setIDPlate(String IDPlate){
        this.IDPlate=IDPlate;
    }

    // get method for get values
    @Override
    public String getBrand(){
        return brand;
    }

    // set method for set values
    @Override
    public void setBrand(String brand){
        this.brand=brand;
    }

    // print details
```

```
    public void threeWheelerDetails(){
        System.out.println("\ndetails of your Vehicle,");
        System.out.println("ID Plate : "+IDPlate+"\nEntry Time :
"+time+"\nVehicle type is Three Wheeler\n");
    }
}
```

CarParkManager

```
public interface CarParkManager {   // create car park manager class as a
interface

    // created the methods and variables with nobody
    final int totalVehicleSlots = 20;
    boolean vehicleEntered();
    int vehicleLeft();
    int getNumEmptySlots();
    int getNumOccupiedSlots();
}
```

SLIITCarParkManager

```
import java.util.Scanner;

public class SLIITCarParkManager implements CarParkManager {    // crate
SLIITCarParkManager class, implement from CarParkManager class

    private static int vehicleCount=0;  // get a new variable to count
vehicles
    private static Vehicle []slot = new Vehicle[totalVehicleSlots]; //
crate an array to store the Vehicles

    private static boolean trueOrFalse; // crate a boolean to get the
return value from vehicle enter method

    // create the vehicle enter class for calculate entering vehicle
details
    @Override
    public boolean vehicleEntered() {
        if(vehicleCount<totalVehicleSlots){     // if for find space
available or not
            vehicleCount++; // incremant vehicle count if the space
available
                System.out.println("\n"+getNumEmptySlots()+" Slots
Available");//print the available slots
            trueOrFalse=true;//condition status
        }
        else {  // no space available
            System.out.println("Sorry, There are no parking slots
available\n");//a messege
            SLIITCarParkManager cm=new SLIITCarParkManager();// create a
object
            cm.EnterOrExit();// call the method

            trueOrFalse=false;//condition ststus
        }

        return trueOrFalse;// return status
    }

    // create a class for calculate regarding lefting vehicles
    @Override
    public int vehicleLeft() {
        Scanner scan=new Scanner(System.in);//create a scarnner object
        System.out.println("Your ID Plateeee :" );//asking a question
        String IDPlate = scan.nextLine();//get the answer and store the
data

    for(int i=0;i<=totalVehicleSlots;i++){ // looking for the leaving
vehicle array slots
        if(slot[i]==null) { //fix the error if find a empty array
           // System.out.println("slot "+i+" is empty");

        }else {
            String searchIDPlate = slot[i].getIDPlate();// leaving
vehicle`s number plate

            if (IDPlate.equals(searchIDPlate)) {// compare number plates
                vehicleCount--; // decremant vehicles
```

```
                System.out.println("\n"+getNumOccupiedSlots() + " free
vehicle Slots available\n");
                slot[i] = null; // make thew slot empty
                vehicleList(); // go to the vehicle details
                break;  // break the loop
            }

        }

    }

        return 0 ;
    }

    //calculate empty slots
    @Override
    public int getNumEmptySlots() {
        return totalVehicleSlots-vehicleCount +1;
    }

    //calculate occupied slots
    @Override
    public int getNumOccupiedSlots() {
        return totalVehicleSlots-vehicleCount;
    }

    // main method
    public static void main(String[] args) {

        // create a infinite loop
        while (true) {

            Scanner scan = new Scanner(System.in);  //create scanner object
            SLIITCarParkManager cm = new SLIITCarParkManager();//create
object

            // switch statement for find the vehicle enter or exit
            switch (cm.EnterOrExit()){

                case "enter":   // if vehicle enter do the followings
                    cm.vehicleEntered(); // go to this class
                    cm.VehicleDetails(); // go to this class
                    break;  // break the switch statement

                case "exit": // if vehicle exit do the followings
                    cm.vehicleLeft();// go to this class
                    break;// break the switch statement
            }
        }
    }

    // create a method
    public String EnterOrExit(){
        Scanner scan=new Scanner(System.in);    //create object
        System.out.println("Enter or Exit : "); //ask a question
        String EnterExit = scan.nextLine(); // store the answer

        return EnterExit;   //return the answer
    }

    // vehicle details class
    public void VehicleDetails(){
```

```
        Scanner scan=new Scanner(System.in);     //create object
        System.out.println("Vehicle Type (car,van,three wheel): "); //ask a
question
        String vehicle_type = scan.nextLine();  // create a object
        // if condition for get the correct input

if(vehicle_type.equals("car")||vehicle_type.equals("van")||vehicle_type.equ
als("three wheel")) {
            switch (vehicle_type) { //switch statement
                case "car":

                    /*
                    System.out.println("xxxxxxx"); ----------> asking a
question
                    String carIDPlate = scan.nextLine(); ----> store it
                    */

                    System.out.println("ID Plate : ");
                    String carIDPlate = scan.nextLine();

                    System.out.println("Brand : ");
                    String carbrand = scan.nextLine();

                    System.out.println("Date : ");
                    String cardate = scan.nextLine();

                    System.out.println("Time : ");
                    String cartime = scan.nextLine();

                    System.out.println("Color : ");
                    String color = scan.nextLine();

                    System.out.println("Number of doors : ");
                    int NumberOfDoors = scan.nextInt();

                    // create a object for car constructor
                    Car c = new Car(vehicle_type,carIDPlate, carbrand,
cardate, cartime, NumberOfDoors, color);
                    c.carDetails(); // call to the car details

                    // for loop for store the details in the array
                    for (int i = 0; i <= 20; i++) {
                        if (slot[i] == null) {  //find a empty slot
                            slot[i] = c;    // assign values
                            break;  // break the loop
                        }

                    }
                    break;

                case "van":
                    System.out.println("ID Plate : ");
                    String vanIDPlate = scan.nextLine();

                    System.out.println("Brand : ");
                    String vanbrand = scan.nextLine();

                    System.out.println("Date : ");
                    String vandate = scan.nextLine();

                    System.out.println("Time : ");
                    String vantime = scan.nextLine();
```

```
                    System.out.println("Seats or Goods : ");
                    String seatsOrGoods = scan.nextLine();
                    //create a object
                    Van v = new Van(vehicle_type,vanIDPlate, vanbrand,
vandate, vantime, seatsOrGoods);
                    v.isSeatsOrGoods(); // fint the van is goods or seats
                    v.vanDetails(); // call to print details

                    // for loop for store the details in the array
                    for (int i = 0; i <= 20; i++) {
                        if (slot[i] == null) {  // find a empty slot
                            slot[i] = v;    // assign values
                            break;//break loop
                        }

                    }
                    break;// break switch

                case "three wheel":
                    System.out.println("ID Plate : ");
                    String twlIDPlate = scan.nextLine();

                    System.out.println("Brand : ");
                    String twlbrand = scan.nextLine();

                    System.out.println("Date : ");
                    String twldate = scan.nextLine();

                    System.out.println("Time : ");
                    String twltime = scan.nextLine();

                    System.out.println("Taxi or Not for hire :");
                    String taxiOrNotForHire = scan.nextLine();

                    // create a object
                    ThreeWheeler t = new
ThreeWheeler(vehicle_type,twlIDPlate, twlbrand, twldate, twltime,
taxiOrNotForHire);
                    t.threeWheelerDetails();

                    // for loop for store the details in the array
                    for (int i = 0; i <= 20; i++) {
                        if (slot[i] == null) {  // find a empty slot
                            slot[i] = t;    //aassign values
                            break;  // break for loop
                        }

                    }
                    break;  // break switch statement
            }
        }else { // if the enterd vehicle type is wrong
            System.out.println("\nPlease enter correct key word
again\n");// print a messege
            vehicleCount--;//decrement vehicle count for avoid a error
            SLIITCarParkManager cm=new SLIITCarParkManager(); // crewate
object
            cm.EnterOrExit();   // call to this method

        }
    }
```

```
    // this class for print vehicle list
    public void vehicleList(){
        System.out.println("currently parked vehicle list,");//print a
message
        for(int i=0;i<totalVehicleSlots;i++){    // for lopo for find
vehicle slots
            if(slot[i]==null){  // avoid the eroor come with null classes
            //System.out.println("Vehicle slot "+(i+1)+" is empty");
            }
            else {
                // print the detail list
                System.out.println("ID Plate:"+slot[i].getIDPlate()+",
Entry Time:"+slot[i].time+", Vehicle type is:"+slot[i].getType());
                }
        }
        System.out.println();// just break a line
    }
}
```

Demo video link

https://drive.google.com/drive/folders/1-TYI7MsFcGSniqdsTxHji4CwMFzoRrB9?usp=sharing