EC2492: Object Oriented Programming: Final Project /Assignment: semester1 2020

PREPARED BY

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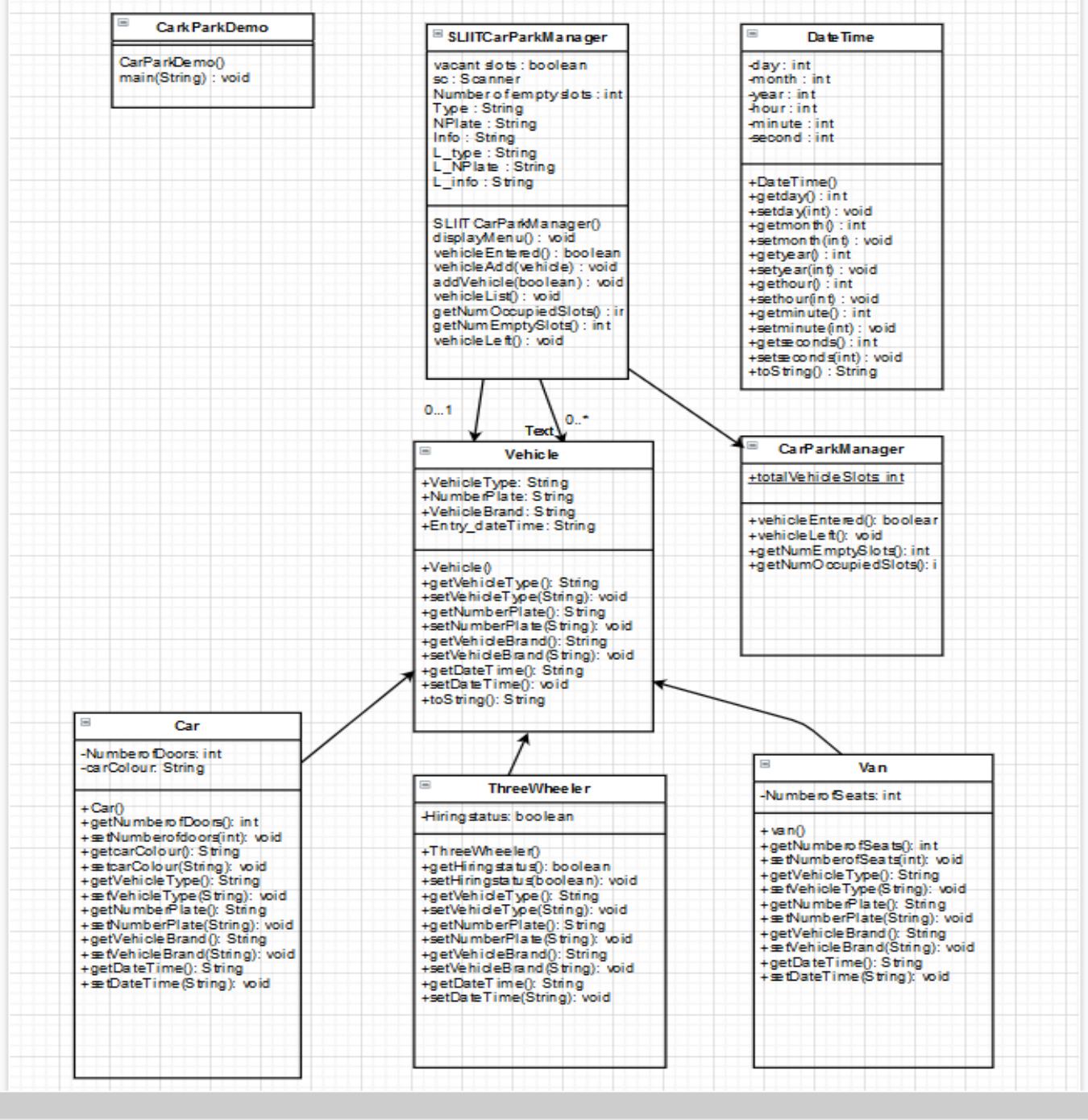
TASK 1

Class Diagram



TASK 2

The code is listed in separate classes below.

Vehicle Class

```
package com.car_park_management;

//Prepared by EN19379616


import java.time.format.DateTimeFormatter;
import java.time.LocalDateTime;
public abstract class Vehicle {

	//variables to store common data of a vehicle
	public String VehicleType;
	public String NumberPlate;
	public String VehicleBrand;
	public String Entry_dateTime;


	public abstract String getVehicleType();

	public abstract void setVehicleType(String VehicleType);

	public abstract String getNumberPlate();

	public abstract void setNumberPlate(String NumberPlate);

	public abstract String getVehicleBrand();
```

```
	public abstract void setVehicleBrand(String VehicleBrand);

	public abstract String getDateTime();

	public void setDateTime() {

		DateTimeFormatter dtf = DateTimeFormatter.ofPattern("yyyy/MM/dd
HH:mm:ss");
	  LocalDateTime now = LocalDateTime.now();
	  this.Entry_dateTime=dtf.format(now);

	  }

	@Override

	public String toString()   {
		return Entry_dateTime+"/"+getNumberPlate()+"/"+getVehicleBrand();
	}




}
```

Car Class

```
package com.car_park_management;

//prepared by EN19379616

public class Car extends Vehicle{

        private int NumberofDoors;
        private String carColour;

         public int getNumberofDoors() {
              return NumberofDoors;
           }

         public void setNumberofDoors(int NumberofDoors) {
              this.NumberofDoors = NumberofDoors ;
           }

         public String getcarColour() {
              return carColour;
           }

         public void setcarColour(String carColour) {
              this.carColour = carColour;
           }



         public String getVehicleType() {return VehicleType;}

         public void setVehicleType(String VehicleType) {this.VehicleType = VehicleType;}

         public String getNumberPlate() {return NumberPlate;}

         public void setNumberPlate(String NumberPlate) {this.NumberPlate = NumberPlate;}

         public String getVehicleBrand() {return VehicleBrand;}

         public void setVehicleBrand(String VehicleBrand) {this.VehicleBrand =
VehicleBrand;}

         public String getDateTime() {return Entry_dateTime;}

         public void setDateTime(String Entry_dateTime) {this.Entry_dateTime =
Entry_dateTime;}
         }
```

Van Class

```
package com.car_park_management;

//Prepared by EN19379616

public class Van extends Vehicle{

	private int NumberofSeats;

	public int getNumberofSeats() {
		return NumberofSeats;
	}

	public void setNumberofSeats(int NumberofSeats) {
		this.NumberofSeats = NumberofSeats;
	}

     public String getVehicleType() {
	   return VehicleType;
	   }

	   public void setVehicleType(String VehicleType) {
		  this.VehicleType = VehicleType;
		  }

	   public String getNumberPlate() {
		  return NumberPlate;
		  }

	   public void setNumberPlate(String NumberPlate) {
		  this.NumberPlate = NumberPlate;
		  }

	   public String getVehicleBrand() {
		  return VehicleBrand;
		  }

	   public void setVehicleBrand(String VehicleBrand) {
		  this.VehicleBrand = VehicleBrand;
		  }

	   public String getDateTime() {
		  return Entry_dateTime;
		  }

	   public void setDateTime(String Entry_dateTime) {
		  this.Entry_dateTime = Entry_dateTime;
		  }

}
```

Threewheeler Class

```
package com.car_park_management;

public class ThreeWheeler extends Vehicle {

	private boolean Hiringstatus;

	public boolean getHiringstatus() {
		return Hiringstatus;

	}

	public void setHiringStatus(boolean Hiringstatus) {
		this.Hiringstatus = Hiringstatus;
	}


	 public String getVehicleType() {
	 return VehicleType;
	 }

	 public void setVehicleType(String VehicleType) {
		this.VehicleType = VehicleType;
		}

	 public String getNumberPlate() {
		return NumberPlate;
		}

	 public void setNumberPlate(String NumberPlate) {
		this.NumberPlate = NumberPlate;
		}

	 public String getVehicleBrand() {
		return VehicleBrand;
		}

	 public void setVehicleBrand(String VehicleBrand) {
		this.VehicleBrand = VehicleBrand;
		}

	 public String getDateTime() {
		return Entry_dateTime;
		}

	 public void setDateTime(String Entry_dateTime) {
		this.Entry_dateTime = Entry_dateTime;
		}
}
```

DateTime Class

```
package com.car_park_management;

//prepared by EN19379616

public class DateTime {

	//variables to hold attributes of the date
	private int day;
	private int month;
	private int year;


	public int getday() {
		return day;
	}

	public void setday(int day) {
		this.day = day;
	}

	public int getmonth() {
		return month;
	}

	public void setmonth(int month) {
		this.month = month;
	}

	 public int getyear() {
		 return year;
	    }

	 public void setyear(int year) {
		 this.year = year;
	    }

	 //variables to hold attributes of the time
	 private int hour;
	 private int minute;
	 private int second;

	 public int gethour() {
		return hour;
	 }
	 public void sethour(int hour) {
		this.hour = hour;
	 }

	 public int getminute() {
		return minute;
	 }
	 public void setminute(int minute) {
		this.minute = minute;
```

```
	}

	public int getsecond() {
		return second;
	}
	public void setsecond(int second) {
		this.second = second;
	}

	@Override
	public String toString() {
		return day+"."+month+"."+year+"/"+hour+":"+minute+":"+second;

	}

}
```

CarParkManager Class

```
package com.car_park_management;

//Prepared by EN19379616

public interface CarParkManager {

	final int totalVehicleSlots = 20;
	boolean vehicleEntered();
	void vehicleLeft();
	int getNumEmptySlots();
	int getNumOccupiedSlots();



}
```

SLIITCarParkManager Class

```
package com.car_park_management;

//prepared by EN19379616

import java.util.ArrayList;

import java.util.*;



public class SLIITCarParkManager implements CarParkManager {

        static boolean vacant_slots = false;

        Scanner sc = new Scanner(System.in);

        static int Number_of_empty_slots = totalVehicleSlots;
        String L_NPlate;
         ArrayList<Vehicle> Vehicles = new ArrayList<>();


         Vehicle newVehicle;



        public void displayMenu()
```

```
//Initial menu displaying
{
        System.out.println();
        System.out.println();
        System.out.println("Enter 1 to enter the main menu:");
        int Return_to_menu=sc.nextInt();

        if(Return_to_menu == 1)
        {



        sc = new Scanner(System.in);
        int selectedoption;



System.out.println("**************************************************");
        System.out.println();
        System.out.println();

        System.out.println("1. Enter new vehicle to the park");
        System.out.println("2. Leave a vehicle from the park");
        System.out.println("3. To display list of vehicles currently parked");
        System.out.println("4. Number of occupied slots at present");
        System.out.println("5. Number of empty slots at present");
        System.out.println();
        System.out.println();
```

```
    System.out.println("**************************************************");

            System.out.print("Please enter your option:");
selectedoption = sc.nextInt();

switch (selectedoption) { //select the service
case 1:
    this.addVehicle(vehicleEntered());
    break;
case 2:
    this.vehicleLeft();
    break;
case 3:

    this.vehicleList();
    break;
case 4:

    System.out.println("Occupied Slots:"+this.getNumOccupiedSlots());

    break;
case 5:
    System.out.println("Empty Slots:"+this.getNumEmptySlots());

    break;
case 0:
    System.exit(0);
```

```
        }

        displayMenu();

                    }
            }

 public boolean vehicleEntered() { // checking vacant slots availability
            if (Number_of_empty_slots > 0 )
            {vacant_slots = true;}
            return vacant_slots;

}

 void vehicleAdd(Vehicle v) {


             Vehicles.add(v);}
public void addVehicle(boolean vacantVlots){ // Adding vehicle
if(vacantVlots)
{
            Number_of_empty_slots--
;
             System.out.println("\t 1 - Car");
     System.out.println("\t 2 - Van");
     System.out.println("\t 3 - ThreeWheeler");

     System.out.print("Select the type of the vehicle:");
```

```
int selectedVehicleType = sc.nextInt();



 switch (selectedVehicleType) {  //vehicle type selection
 case 1:
        Car car = new Car();
        car.setVehicleType("Car");

        System.out.println("\n\t**** A car entered the park****  ");

        System.out.println("\nEnter the Number Plate number of the Car:");
        car.setNumberPlate(sc.next());

        System.out.println("Enter the Brand of the Car:");
        car.setVehicleBrand(sc.next());

        System.out.println("Enter the number of Doors of the Car:");
        car.setNumberofDoors(sc.nextInt());

        System.out.println("Enter the Color of the Car:");
        car.setcarColour(sc.next());

         car.setDateTime();

                newVehicle=car;
```

```
        break;

case 2:
        Van van = new Van();
        van.setVehicleType("Van");

        System.out.println("\n\t****A van entered the park****");

        System.out.println("\nEnter the Number Plate number of the Van:");
        van.setNumberPlate(sc.next());

        System.out.println("Enter the Brand of the Van:");
        van.setVehicleBrand(sc.next());

        System.out.println("Enter the number of seats in the van:");
        van.setNumberofSeats(sc.nextInt());

        van.setDateTime();

       newVehicle=van;



        break;

case 3:
        ThreeWheeler threewheeler = new ThreeWheeler();
        threewheeler.setVehicleType("ThreeWheeler");
```

```
            System.out.println("\n\t****A ThreeWheeler entered the park **** ");

            System.out.println("\nEnter the Number Plate number of the ThreeWheeler:");
            threewheeler.setNumberPlate(sc.next());

            System.out.println("Enter the Brand of the ThreeWheeler:");
            threewheeler.setVehicleBrand(sc.next());

            System.out.println("Hiring status of the ThreeWheeler:");
            threewheeler.setHiringStatus(sc.nextBoolean());

            threewheeler.setDateTime();



           newVehicle=threewheeler;
            break;

    }

    Vehicles.add(newVehicle);


}
else
{System.out.println("No available slots");}
```

```
displayMenu();
}




public void vehicleList(){ // Displaying the vehicle list

        for(Vehicle i: Vehicles) {
                System.out.println();
        System.out.print(" Vehicle:"+i.VehicleType);
        System.out.print(" Number Plate:"+i.NumberPlate);
        System.out.print(" Vehicle Brand:"+i.VehicleBrand);
        System.out.print(" Date Time:"+i.Entry_dateTime);
        }

}
public int getNumOccupiedSlots(){return (totalVehicleSlots-Number_of_empty_slots);}
public int getNumEmptySlots(){ return Number_of_empty_slots;}




public void vehicleLeft(){   // Vehicle leaving from the park
        System.out.println("\nEnter the Number Plate number of the leaving vehicle:");
        L_NPlate=sc.next();
```

```
        int flag=0;
        for(Vehicle i: Vehicles) {
                //System.out.println(i.NumberPlate);
                String NP=i.NumberPlate;
                if(L_NPlate.equalsIgnoreCase(NP)) {
                        System.out.println("****One vehicle Left****");
                        Vehicles.remove(i);
                        flag=1;
                        break;
                }}

                if(flag==0) {
                        System.out.println("!!There is no such a entry please try again with correct number plate!!");

                }



    Number_of_empty_slots++;

    displayMenu();


}


}
```

CarParkDemo Class

```
package com.car_park_management;

//Prepared by EN19379616

public class CarParkDemo {
	public static void main(String[] args) {

		System.out.println("\t  SLIIT Car Park Management System");
		System.out.println();
		SLIITCarParkManager sliitcarpark = new SLIITCarParkManager();
		sliitcarpark.displayMenu();

	}

}
```