INFORMATICS INSTITUTE OF TECHNOLOGY
In collaboration with
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Object Oriented Principles
5COSC007C

Coursework – Phase 1

Vehicle Rental System

Module Leader's Name – Mr. Guhanathan Poravi

Dinuka Piyadigama
UoW ID – 17421047
IIT ID – 2018373

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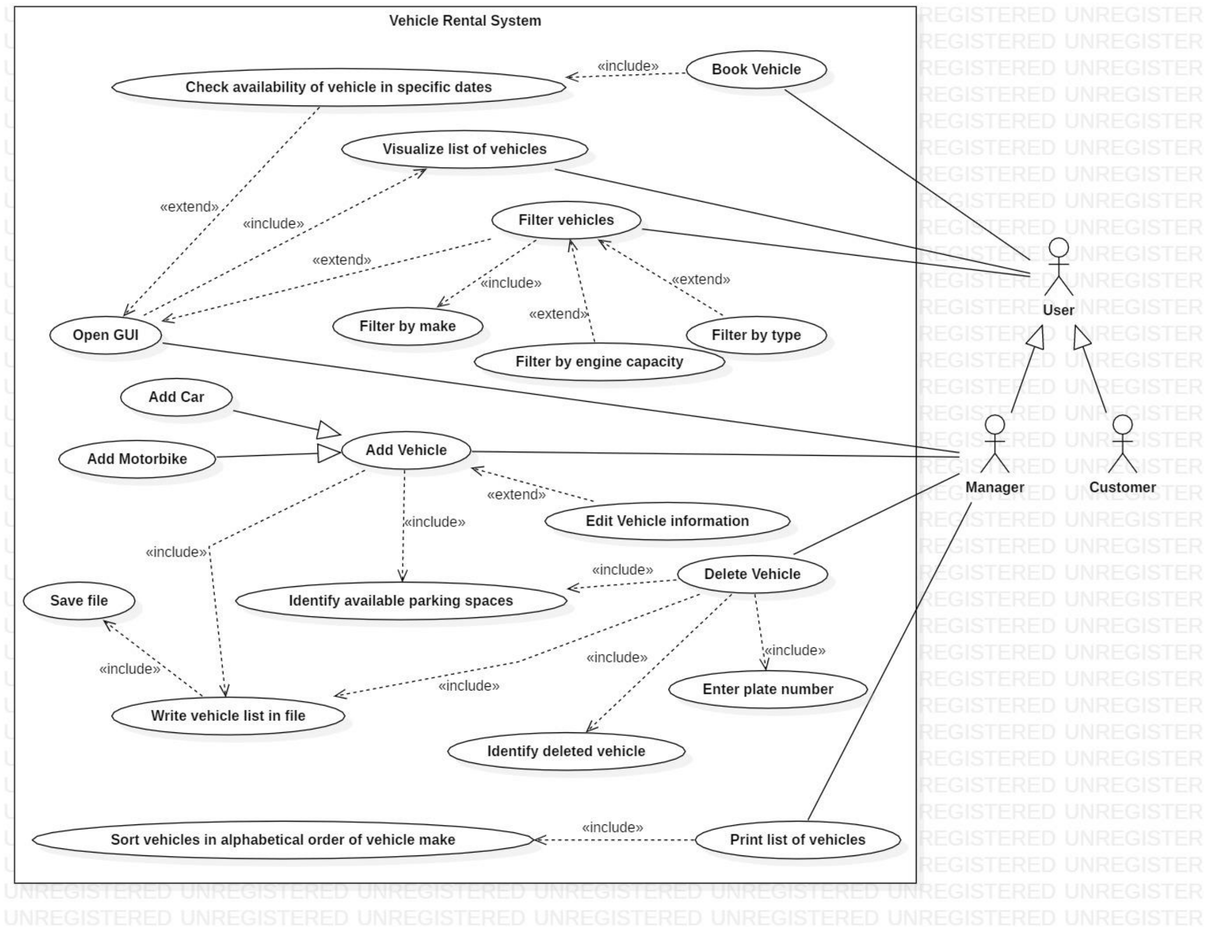
Design

1 & 2) Use Case Diagram

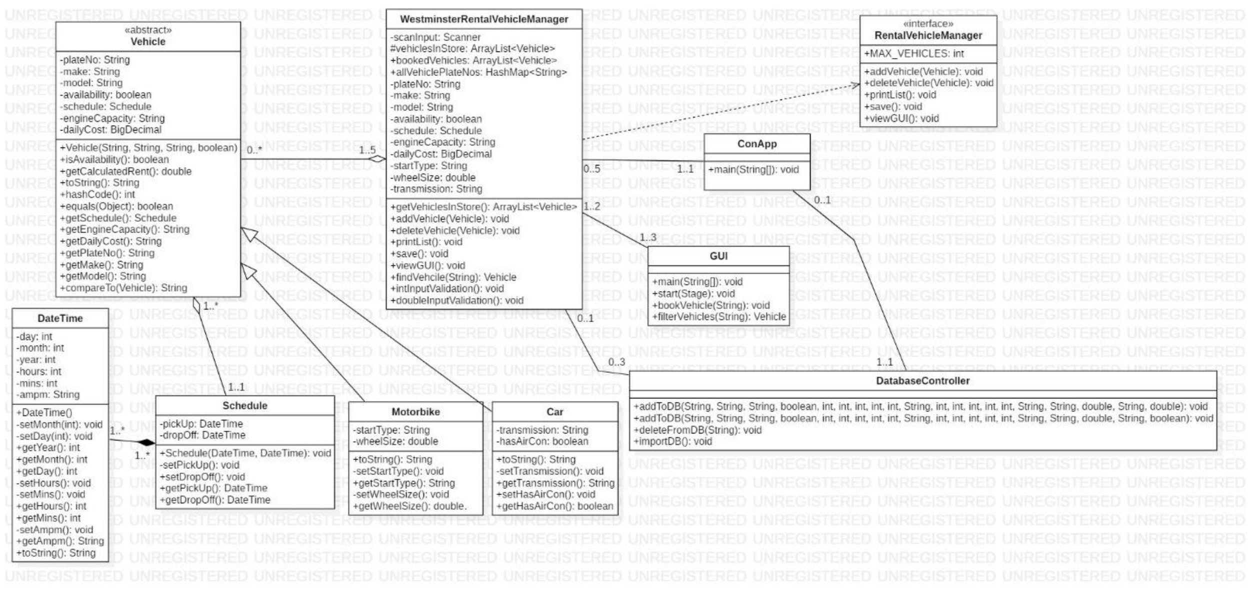
"You are required to develop a program that implements a basic vehicle rental system."
I have included the GUI section and the Console section in the same use case diagram as the assignments says that both of these are part of a single system.

***"Create a Graphical User Interface** (GUI) that can be opened selecting an option from the menu console"*
My use case diagram satisfies this condition as well.

But I have ensured that the customers can't change the information in the system by using specialization, which clearly shows that the Manager is only allowed to perform managerial operations.



3) Class Diagram



Code

4) Vehicle class

```
package lk.dinuka.VehicleRentalSystem.Model;

import java.math.BigDecimal;
import java.util.Objects;

public abstract class Vehicle implements Comparable<Vehicle>{
    private String plateNo;
    private String make;
    private String model;
    private boolean availability;
    private Schedule schedule;
    private String engineCapacity;
    private BigDecimal dailyCost;

    public static int count = 0;

    public Vehicle(String plateNo, String make, String model, boolean availability, Schedule
schedule, String engineCapacity, BigDecimal dailyCost) {
        this.plateNo = plateNo;
        this.make = make;
        this.model = model;
        this.availability = availability;
        this.schedule = schedule;
        this.engineCapacity = engineCapacity;
        this.dailyCost = dailyCost;

        count++;
    }

    @Override
    public String toString() {
        return "Vehicle{" +
                "plateNo='" + plateNo + '\'' +
                ", make='" + make + '\'' +
                ", model='" + model + '\'' +
                ", availability=" + availability +
                ", schedule=" + schedule +
                ", engineCapacity='" + engineCapacity + '\'' +
                ", dailyCost=" + dailyCost +
                '}';
    }

    public String getPlateNo() {
        return plateNo;
```

```
}

public String getMake() {
    return make;
}

public String getModel() {
    return model;
}

public boolean isAvailability() {
    return availability;
}

public Schedule getSchedule() {
    return schedule;
}

public String getEngineCapacity() {
    return engineCapacity;
}

public BigDecimal getDailyCost() {
    return dailyCost;
}

public BigDecimal getCalculatedRent(){
    return dailyCost;       //calculate dailycost*no of days and return!!!!!!!!!!!!!!!
}

@Override
public boolean equals(Object o) {
    if (this == o) return true;
    if (o == null || getClass() != o.getClass()) return false;
    Vehicle vehicle = (Vehicle) o;
    return availability == vehicle.availability &&
            Objects.equals(plateNo, vehicle.plateNo) &&
            Objects.equals(make, vehicle.make) &&
            Objects.equals(model, vehicle.model) &&
            Objects.equals(schedule, vehicle.schedule) &&
            Objects.equals(engineCapacity, vehicle.engineCapacity) &&
            Objects.equals(dailyCost, vehicle.dailyCost);
}

@Override
public int hashCode() {
        return Objects.hash(plateNo, make, model, availability, schedule, engineCapacity,
dailyCost);
    }

    @Override
    public int compareTo(Vehicle obj) {
        return this.make.compareTo(obj.getMake());     //used for sorting vehicle alphabetically
according to make
    }
}
```

---

5) Motorbike class

```
package lk.dinuka.VehicleRentalSystem.Model;

import java.math.BigDecimal;
import java.util.Objects;

public class Motorbike extends Vehicle {

    private String startType;
    private double wheelSize;

    public Motorbike(String plateNo, String make, String model, boolean availability, Schedule
schedule, String engineCapacity, BigDecimal dailyCost, String startType, double wheelSize) {
        super(plateNo, make, model, availability, schedule, engineCapacity, dailyCost);
        this.startType = startType;              //making sure that this extra info is added when
creating a new Motorbike object
        this.wheelSize = wheelSize;
    }

    public String getStartType() {
        return startType;
    }

    public void setStartType(String startType) {
        this.startType = startType;
    }

    public double getWheelSize() {
        return wheelSize;
    }

    public void setWheelSize(double wheelSize) {
        this.wheelSize = wheelSize;
    }
    @Override
    public String toString() {
        return super.toString() + "Motorbike{" +
                "startType='" + startType + '\'' +
                ", wheelSize=" + wheelSize +
                '}';
    }

    @Override
    public boolean equals(Object o) {
        if (this == o) return true;
        if (o == null || getClass() != o.getClass()) return false;
        if (!super.equals(o)) return false;
        Motorbike motorbike = (Motorbike) o;
        return Double.compare(motorbike.wheelSize, wheelSize) == 0 &&
                Objects.equals(startType, motorbike.startType);
    }

    @Override
    public int hashCode() {
        return Objects.hash(super.hashCode(), startType, wheelSize);
    }
}
```

---

6) Car

```
package lk.dinuka.VehicleRentalSystem.Model;

import java.math.BigDecimal;
import java.util.Objects;

public class Car extends Vehicle {

    private String transmission;
    private boolean hasAirCon;

    public Car(String plateNo, String make, String model, boolean availability, Schedule
schedule, String engineCapacity, BigDecimal dailyCost, String transmission, boolean
hasAirCon) {
        super(plateNo, make, model, availability, schedule, engineCapacity, dailyCost);
        this.transmission = transmission;              //making sure that this extra info is added
when creating a new Car object
        this.hasAirCon = hasAirCon;
    }
    public String getTransmission() {
        return transmission;
    }

    public void setTransmission(String transmission) {
        this.transmission = transmission;
    }

    public boolean isHasAirCon() {
        return hasAirCon;
    }

    public void setHasAirCon(boolean hasAirCon) {
        this.hasAirCon = hasAirCon;
    }

    @Override
    public String toString() {
        return super.toString() + "Car{" +
                "transmission='" + transmission + '\'' +
                ", hasAirCon=" + hasAirCon +
                '}';
    }

    @Override
    public boolean equals(Object o) {
        if (this == o) return true;
        if (o == null || getClass() != o.getClass()) return false;
        if (!super.equals(o)) return false;
        Car car = (Car) o;
        return hasAirCon == car.hasAirCon &&
                Objects.equals(transmission, car.transmission);
    }

    @Override
    public int hashCode() {
        return Objects.hash(super.hashCode(), transmission, hasAirCon);
    }
}
```

---

7) RentalVehicleManager Interface

```
package lk.dinuka.VehicleRentalSystem.Model;

public interface RentalVehicleManager {
    //constants
    int MAX_VEHICLES = 50;


    //methods
    void addVehicle(Vehicle newVehicle);
    void deleteVehicle(Vehicle delVehicle);
    void printList();
    void save();
    void viewGUI();

}
```

---

8) WestminsterRentalVehicleManager class

```
package lk.dinuka.VehicleRentalSystem.Controller;

import lk.dinuka.VehicleRentalSystem.Model.RentalVehicleManager;
import lk.dinuka.VehicleRentalSystem.Model.Vehicle;

import java.util.ArrayList;
import java.util.Scanner;

public class WestminsterRentalVehicleManager implements RentalVehicleManager {

    private static Scanner scanInput = new Scanner(System.in);

    protected static ArrayList<Vehicle> vehiclesInSystem = new ArrayList<>();       //making
sure that customers can't modify the vehicles in the system
    public static ArrayList<Vehicle> bookedVehicles = new ArrayList<>();

    public static ArrayList<Vehicle> getVehiclesInSystem() {        //accessed in GUI
        return vehiclesInSystem;
    }


    @Override
    public void addVehicle(Vehicle newVehicle) {

    }

    @Override
    public void deleteVehicle(Vehicle delVehicle) {

    }

    @Override
    public void printList() {

    }

    @Override
    public void save() {

    }

    @Override
    public void viewGUI() {

    }
}
```

---

9) DateTime class

```
package lk.dinuka.VehicleRentalSystem.Model;

public class DateTime {
    private int year;
    private int month;
    private int day;
    private int hours;
    private int mins;
    private String ampm;


    public DateTime(int year, int month, int day) {        //this order of parameters needs to be
maintained to properly validate day
        this.year = year;

    }

    public DateTime(int year, int month, int day, int hours, int mins, String ampm) {        //this
order of parameters needs to be maintained to properly validate day
        this.year = year;
        setMonth(month);         //validate month
        setDay(day);          //validate day
        this.hours = hours;     //have validations in setters!!!!!!!!!!!!!!
        this.mins = mins;     //have validations in setters!!!!!!!!!!!!!!
        this.ampm = ampm;     //have validations in setters!!!!!!!!!!!!!! and make sure that
toString is given properly

        System.out.printf("Date & Time entered is : %s\n", this);         //checking input date &
time
```

```
    }

    private void setMonth(int month) {              //validate month
        if (month > 0 && month <= 12) {
            this.month = month;
        } else {
            System.out.printf("Invalid month (%d); set to 1\n", month);
            this.month = 1;             //inserted to maintain object in consistent state
        }
    }

    private void setDay(int day) {              //validate day

        int[] daysPerMonth = {0, 31, 28, 31, 30, 31, 30, 31, 31, 30, 31, 30, 31};

        if (month == 2 && day == 29 && (year % 400 == 0 || (year % 4 == 0 && year % 100 != 
0))) {
            this.day = day;
        } else if (day > 0 && day <= daysPerMonth[month]) {                        //check if date is 
within range of month
            this.day = day;
        } else {
            System.out.printf("Invalid day (%d); set to 1\n", day);
            this.day = 1;             //inserted to maintain object in consistent state
        }
    }

    public int getYear() {
        return year;
    }

    public int getMonth() {
        return month;
    }

    public int getDay() {
        return day;
    }

    public int getHours() {
        return hours;
    }

    private void setHours(int hours) {
        this.hours = hours;
    }
    public int getMins() {
        return mins;
    }

    private void setMins(int mins) {
        this.mins = mins;
    }

    public String getAmpm() {
        return ampm;
    }

    private void setAmpm(String ampm) {
        this.ampm = ampm;
    }

    @Override
    public String toString() {
        return "" + day +
                "/" + month +
                "/" + year +
                "  " + hours +
                ":" + mins +
                "" + ampm +
                "";
    }
}
```

---

10) Schedule class

```
package lk.dinuka.VehicleRentalSystem.Model;

import java.util.Objects;

public class Schedule {
    private DateTime pickUp;
    private DateTime dropOff;

    public Schedule(DateTime pickUp, DateTime dropOff) {
        this.pickUp = pickUp;
        this.dropOff = dropOff;
    }

    public DateTime getPickUp() {
        return pickUp;
    }
    public void setPickUp(DateTime pickUp) {            //Is there a point in having setters 
here!!!!!!!?????
        this.pickUp = pickUp;
    }

    public DateTime getDropOff() {
        return dropOff;
    }

    public void setDropOff(DateTime dropOff) {
        this.dropOff = dropOff;
    }

    @Override
    public String toString() {
        return "Schedule{" +
                "pick up=" + pickUp +
                ", drop off=" + dropOff +
                '}';
    }

    @Override
    public boolean equals(Object o) {
        if (this == o) return true;
        if (o == null || getClass() != o.getClass()) return false;
        Schedule schedule = (Schedule) o;
        return Objects.equals(pickUp, schedule.pickUp) &&
                Objects.equals(dropOff, schedule.dropOff);
    }

    @Override
    public int hashCode() {
        return Objects.hash(pickUp, dropOff);
    }
}
```

11) DatabaseController class

```
package lk.dinuka.VehicleRentalSystem.Controller;

public class DatabaseController {

//    public static void addToDB() {
//        //Adding a Motorbike to the Collection
//    }
```

```java
//
//
//    public static void addToDB() {
//        //Adding a car to the Collection
//    }

    public static void deleteFromDB(String plateNo) {
        //Deleting an item from the Collection

    }

    public static void importDB() {
        //Importing stored data in db to application
    }
}
```

---

12) ConApp class

```java
package lk.dinuka.VehicleRentalSystem;

public class ConApp {

    public static void main(String[] args) {

    }
}
```

---

13) GUI class

```java
package lk.dinuka.VehicleRentalSystem.View;

public class GUI {
}
```
