Research Topic (1)

Title: Car Pooling Mini System

Research Description

1. **Research short description/general objectives**

   The objective of this Research Project is to apply the learnt Object-Oriented Programming Concepts in a software application, fulfilling the course intended learning outcomes (ILOs).

2. **Guidance to Submission**

   - It is an **individual work**, any attempt for plagiarism / cheating will be subjected to failing the course.
   - The submitted project should be implemented using Java code.
   - Submit **only** running code.
   - Your program should contain only one package named "carpooling_package".
   - Put all your solution code in one .java file.
   - One .java file can consist of multiple classes with only one of them is public.
   - The only public class in the file must be the class that contains the main function and it must be named as "CarPooling", which will be the name of the .java file.
   - You can find the .java file at this path …/src/carpooling_package/ CarPooling.java
   - **ALL** the following concepts **MUST be applied** by your design and **MUST** highlight them by **making comments on the different pieces of code satisfying them**:
     1. **Inheritance tree(s)**
     2. **Polymorphism & Overloading**
     3. **Overriding**
     4. **Abstract class(es)**
     5. **Interface(s)**
     6. **Final data member(s)**
     7. **Final method(s)**

8. **Static data member(s)**
9. **Static method(s)**
10. **Exception handling (Both Java defined exception(s) and your own defined exception object(s))**
11. **Different Access modifiers should be used throughout the project as needed.**
12. **Calculated data members**
13. **Apply at least one of the SOLID object-oriented design principles**

- **MUST** Generate Project Documentation using JavaDoc utility. To generate a Javadoc for a single .java file that contains multiple classes, all classes should be declared public. So, when you finish your code, please follow these steps:
  - Declare all classes public "even though it will cause an error ".
  - Generate the Javadoc files.
  - Undo the declaration you made such that your code contains a single public class as illustrated above.
- You can find the Javadoc folder at this path …/dist/javadoc

3. Research Phases/Requirements

Design and Implement a mini project with the following description:

Car Pooling System is an application that helps managing cars scheduling and bookings.

- This Car Pooling System starts by searching car routes to book them.
- A route has a start assembly location (address) and a destination location (address).
- A car has a unique code, number of trips per day, a unique route, a maximum capacity per trip, and the driver name.
- A ticket has the car code and price.
- Passengers are divided into two categories:
  - Subscribers: take 50% discount on ticket price.
  - Non-Subscribers
- Passengers can do the following functionalities:
  - Search for routes.
  - Reserve a ticket in a car if available.
  - Subscribe a frequent passenger (the subscription fees depend on passenger age, and number of trips to be reserved).
  - Unsubscribe a frequent passenger.

- Report Complaint/Review.

Note: You can add any extra information or functionalities to support your design.

4. Research Deliverables

One .java file for all your code and **One .Zip file** for the JavaDoc folder.

NOTE: It is **YOUR OWN RESPONSIBILITY** to check that both .java and .Zip files are not corrupted (by downloading them after you upload them to the system and try to re-open them) before your final submission. Any corrupted files will not be accepted and will not be re-submitted, and you will be subjected to failing the course.

5. Research References

You are free to use any external resources as a guide for your project, but you need to mention them in your JavaDoc comments.

With My Best Wishes,
Dr. Sherin Moussa
Dr. Sally Saad