Faculty of Computer & Information Sciences
Ain Shams University
Subject: (CSW251)
Object-Oriented Programming
Year: (2nd year) undergraduate

Examiners: Dr. Sherin Moussa
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Offering Dept.: Computer Science
Academic year: 2nd term 2019-2020

Research Topic (2)
Title: Internet Router Rental 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 "routerrental_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 "RouterRental", which will be the name of the .java file.

   - You can find the .java file at this path …/src/routerrental_package/ RouterRental.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:

   An Internet Router Rental System is an application that helps managing routers rental reservations.

   The System includes:

   - A router has a unique serial number, a model, number of ports…etc.
   - A reservation that has number, reservation date, start date, type (daily, weekly, monthly), and an automatically generated due date.
   - An invoice that has the router serial number, the reservation number, and an automatically generated renting fees (depending on the router model and the reservation duration).
   - The customers of this application are divided into two types: Residents and Foreigners, where resident customers are granted 25% discount on renting fees.
   - Customers can do the following functionalities:
     - Rent a router.
     - Cancel a rent (accepted only before the start date at least by 2 days).
     - Extend renting duration.

- Change the router model.
- Report a technical issue or a feedback.

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