University of Technology, Jamaica
School of Computing and Information Technology CIT3009 – Advanced Programming

Facilitator(s):	Oniel Charles		
Assessment:	Group Assignment (No more than 5 persons per group)		
Given week of:	June 11, 2023	Due week of:	July 17, 2023

The work-from-home trend has caused a significant shift in the way employees and employers operate, resulting in mutual benefits. As a result, there is a higher demand for high-speed internet access in homes, placing a greater burden on the telecommunications industry. Flow, in particular, has experienced a substantial increase in service requests and a growing number of internet-related inquiries. To address this, the manager requires an issue logging system capable of capturing all customer requests, complaints, and queries. When an issue is received, a customer service representative will log it and either provide a solution or assign/schedule a service technician to resolve the problem.

Your task is to develop a TCP/IP socket-based Client/Server application that facilitates the described scenario. The Client application should send requests to the server application since only the server can establish connections to the database. The client application should have a graphical user interface (GUI) to enhance the user experience, while the server application does not necessarily require a GUI but may include graphical components if desired.

Your system must capture all data about Customers, Customer - Representatives, Technicians and Issues.

Instructions:

1. Develop your group solution with the use of a GitHub Repository or its equivalent to host the project's source code files, to which each member of the group is expected to contribute. Proof of members' contribution will be verified via the project's history logs.

2. I am to receive an invitation from each group to collaborate on their project, **within seven (7)** days of this document being distributed. My GitHub username is **oniel-charles.**

System Functionalities

Authentication:

- Customers should be able to log on to the system using their Customer ID number and password to gain access to the dashboard.
- Representatives and Technicians (Employees) should be able to log on to the system using their Staff ID and password to gain access to the dashboard.

Customer Services

o On the Dashboard, Customers should be able to choose the service they would like assistance with, i.e., to either lodge a complaint , make a query or request service.

o They should also be able to register the nature and details of their complaint, so that a Representative can access it later (**Be creative and come up with at least three categories of complaints**);

o Customers should be able to view all past complaints in a list. For each complaint in the list, the last response date and who provided the response, should be shown.

o Customers should also be able to view a specific complaint and all its associated responses.

Employee Services

- Representatives should be able to view a list of services on the dashboard along with the number of resolved and outstanding complaints.
- Representatives should be able to view all Customer complaints relating to a particular service, e.g., All complaints relating to Broadband.
- Representatives should be able to assign a complaint to a technician.
- Technicians should be able to view a particular Customer complaint and the details relating to that issue, so that they may prepare a response, including proposed date of visit.
- When viewing specific Customers' complaints, a Representative should see Customers' details to include:
    o Customer ID,
    o Name (first name and last name),
    o Email address,
    o Contact number,
    o Type of issue, and
    o Details of the issue.

Live Chat

- Technicians should be able to indicate their availability for a live chat session, so that Customers can initiate a live chat session.
- Technicians should be able to participate in a live chat session with Customers, to address their issues.
- Customers should be able to initiate a live chat with a Representative, to address their issue.

Development Tools

- Eclipse IDE (JDK 1.8 or higher)
- MySQL 8 current version (Administered with MySQL Workbench or PhpMyAdmin)
- MySQL Connector/J (JDBC)
- Hibernate 5 (Object Relational Mapping)
- Apache Log4J2 (Logging and Audit Trails)
- Git or its equivalent (Version Control)

Deliverables

- Group Report
    - o Details of each group members contribution
    - o Declarations of Authorship - one for each group member
- Application User Manuals
    - o Customer Services Employees User Guide (Document or Screen Recording)
    - o Customer User Guide (Document or Screen Recording)
- Server-side application
- Client-side application – Customer
- Client-side application – Customer Services Employees

Assessment

- Written Report, to include:
    - o Object-Oriented Analysis and UML Diagrams
    - o Learning Trail for each group member, i.e., challenges faced, steps taken to overcome the challenges, and lessons learned.
- Application User Manuals
- Functioning Software solution
- 30 minutes grading interview – all group members must be able to fully present the project.

Milestone 1: 10 Marks – Weight 20%

Database Design and Domain **[3 Marks]**

- Create Tables (Fields, Data Types, Constraints, Relationships)
- Normalized Tables (At least 3rd Normal form)
- Create Domain Objects (Including Inheritance)

Traditional Database Connectivity **[3.5 Marks]**

- CRUD operations (select with condition, multiple select, insert, update, delete) • Managing Result Sets
- Manage and Log All Exceptions

Object-Relational Mapping **[3.5 Marks]**

- Setup ORM
- CRUD operations (select with condition, multiple select, insert, update, delete) • Managing Result Sets
- Manage and Log All Exceptions

Milestone 2: 10 Marks – Weight 20%

Events Logging **[5 Marks]**

- Setup Loggers
- Setup Appenders (Console and Rolling File)
- Setup Layouts
- Logging All Events (Information, Warnings)
- Logging All Exceptions (Errors and Fatal)

Version Control / Continuous Integration **[5 Marks]**

- Create Project Repository (Git Desktop Client, Eclipse Git or GitHub/Equivalent) • Collaboration by group members using Git.

Milestone 3: 10 Marks – Weight 20%

TCP/IP Socket-based Networking and Object Serialization **[7 Marks]**

- Setup TCP/IP Client
- Setup TCP/IP Server
- Mechanisms to send serialized objects over network streams.
- Log All Events
- Manage and Log All Exceptions

Multi-Threading **[3 Marks]**

- Thread TCP/IP Server Engine to manage multiple client requests. • Log All

Events

- Manage and Log All Exceptions

Milestone 4: 10 Marks – Weight 10%

Advanced Graphical User Interface **[10 Marks]**

- Create Parent Window
- Create Internal Forms for each database table (insert, select, update, delete)
- JTables with Table Models must be used.
- Implement Menu Bars, Keyboard Short Cuts, Tool Tips, Mnemonics. **System**

Functionalities: 60 Marks – Weight 20%

- Users – Customers, Representatives & Technicians, should be able to log into the system with their Customer ID and password, and Staff ID and password respectively **[5 marks]**
- Customers should be able to choose the category of complaint they need assistance with, and state the nature of the complaint, so that a Representative may view the complaint later. **[5 marks]**
- View a past complaint and all its associated responses. **[5 marks]**
- View a list of past complaints, showing in the list, the last date of response and the name of the person who provided the response. **[5 marks]**
- Representatives should be able to view a list of services from a dashboard, along with the number of resolved and outstanding complaints. **[5 marks]**
- Representatives should be able to view all Customers' complaints by category. **[5 marks]**

- Employees should be able to view the complaint details, and account information of a specific Customer, so that an appropriate response may be prepared. **[5 marks]**

- Representatives should be able to respond to a Customer's enquiry. **[5 marks]**

- Representatives should be able to assign a complaint to a technician. **[5 marks]**

- Technicians should be able to view a particular Customer complaint and the details relating to that issue, so that they may prepare a response, including proposed date of visit. **[5 marks]**

- The system should contain a live chat feature, which will:

- Allow Customers to initiate a live chat with employees. **[5 marks]**
- Allow employees to engage Customers in a live chat session, to provide feedback on enquiry status. **[5 marks]**

Documentation: 10 Marks – 10% [10 marks]