

Course Work

ITS1140 – Introduction to Network Programming

BSc (Hons.) in Computer Science via GDSE



Take-home assignment and VIVA

Total Marks: 100

Objectives

1. Students should have a good understanding of the following terms.
 - Basic understanding of Socket, Port, Protocol, TCP, UDP, IP, Skeleton, Stub, host.
 - Input and Output Streams.
 - Serialization.
2. Understand and work with Client-Server architecture.
3. Handle software development using sockets to communicate between two or more computers.

Coursework Requirements and Instructions

- You have to focus on how to implement this system using your knowledge in Network Programming.
- You are required to implement all the layers given in the application architecture. (Refer Appendix)
- This coursework consists of 2 parts, Part A and Part B.
- Both parts carry marks and you are required to successfully attempt both parts to be able to face the viva-voce at the end of this coursework. Sample questions are given to you in Part B for you to prepare yourself for the viva.
- Refer to the Coursework Guidelines at the end of each part to understand the specific guidelines to be followed.

Submission

- You should submit the deliverables of the coursework on or before the due date specified.
- You should create a private repository in GitHub for the project at the initial point of the project and submit all the updates as a commits.
- You should be submitted your GitHub link to Google classroom on or before the due time.

Live-Chat

Introduction

Play Tech Pvt Ltd. is a company that supplies various types of gaming equipment. This company has a customer support division that assists customers regarding the Play Tech equipment.

Customer support can be a boring and stressful task. Sameera, who is an employee in the customer support section of Play Tech decide to make things a bit lively by designing a Customized Chat for the employees of Play Tech Pvt Ltd.

He wanted this chat room to be exclusive to the employees of the Play Tech customer service division, where they can chat freely as a group and express themselves using emojis or images. Later on, he decided to add Unicode to the chat group since some employees are used to typing in Sinhala when they chat.

Roles

This chat room is supposed to be used by employees of the customer service division of Play Tech Pvt Ltd. who will be referred to as *users* later on.

Process

1. Users can log into the chat room using his/her name.
2. A user can send a message from the interface that he/she has. (May use Unicode characters, emojis, or images to send messages)
3. Other users can simultaneously receive that message and see it in their interface.
4. Users see the sender of the message and can respond to the messages accordingly.

System Requirements

1. Users can send or receive messages.
2. The chat should update with every message sent simultaneously with all the users.
3. The messages can contain text, Unicode characters, emojis, and images.
4. The chat interface can be minimized until it is needed to avoid disturbances to the work of the users.

Part A

1. Create the above live chat group that Sameera wants to create with appropriate validations and according to the guidelines provided below.

PLEASE NOTE: MAKE SURE THAT YOU BRING YOUR VERSION OF CHATROOM WITH YOU WHEN YOU ATTEND THE VIVA. EXACT DATE, TIME OF THE VIVA WILL BE NOTIFIED TO YOU BY THE ACADEMIC DIVISION OF IJSE VIA EMAIL.

Part B


Make sure that you are knowledgeable in the following areas before you attend the VIVA.

1. What Is Socket?
2. What Is Multiprogramming?
3. Explain the Advantages of Java Sockets & Disadvantages of Java Sockets.
4. Explain the difference between TCP and UDP protocol?
5. Brief on Client vs Server.
6. Explain the differences between Client and Server.
7. Describe client-server architecture using an appropriate diagram.
8. How does TCP work?
9. How do you write a multi-threaded server in Java?
10. What is an ephemeral port?
11. Explain the following: <ul style="list-style-type: none">a. IP Addressb. Protocolc. Port Numberd. MAC Addresse. TCPf. FTPg. Telneth. SMTPi. POP
12. Explain about Skeleton & Stub.
13. How do we Establish a Socket Connection?
14. What are the Important methods of socket & Server classes?
15. Why do we close created connections before the system Shutting Down?

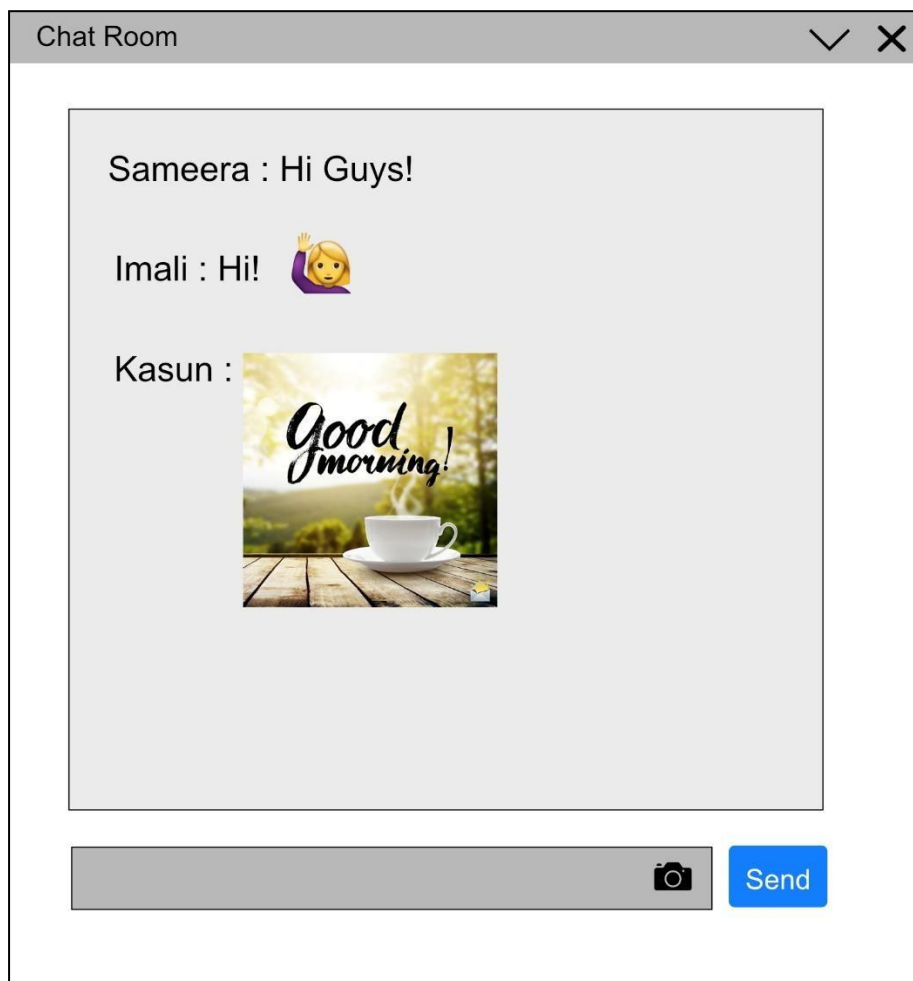
Guidelines

1. User Should be able to log in to the chat group by entering his/her name.

Live Chat



2. The user interface for sending messages should be something similar to this.



3. By Clicking on the Camera icon, the users should be able to send images to the chat. You can send images by referring to the following links.

<https://coderanch.com/t/589310/java/Transferring-image-socket>

<https://stackoverflow.com/questions/25086868/how-to-send-images-through-sockets-in-java>

4. You should enable Unicode support to add emoji. You can research it using the following link.

<https://docs.oracle.com/javase/tutorial/i18n/text/stream.html>

5. You can use your knowledge of Java Socket.
6. The chat window can be minimized to avoid disturbances to the work of the employees. Refer to the following link to learn more about minimizing a window.

<https://stackoverflow.com/questions/16591438/how-to-minimize-maximize-and-restore-down-through-buttons-in-java/33414992>

7. You have two methods to keep the live chat messages updated on all clients.
 - a. You can use the “Observable” Design pattern. Please refer to the given link to learn how to use the design pattern.

<https://www.developer.com/java/ent/article.php/1356891/a-patternframework-for-clientserver-programming-in-java.htm>
 - b. You can use a thread schedule to update the live chat in a fixed time interval.

<https://blogs.oracle.com/jtc/update-to-javafx,-sockets-and-threading:-lessons-learned>
8. Please make sure that the Skeleton and the stub of your application are clearly implemented and easy to understand.

Evaluation Criteria

Method	Marks
Live Chat Application	40
VIVA	60

Pass Marks: 50

Appendix

1. Application architecture.

