Review

Challenge #1

Scored

Your Answers | Your Notes (Editable)

1. What are sockets? How are sockets represented in the Java programming language? (5marks)

   SOCKETS: are communication endpoints used for sending and receiving data between two nodes on a network or devices.

   In Java programming language, sockets are represented by the classes java.net.Socket and java.net.ServerSocket.

2. What is the difference between a ServerSocket and a Socket ? (10 marks)

   ServerSocket: is used on the server side to listen for incoming client connection requests.

   Socket: is used on the client side to initiate a connection to the server.

3. Which class represents the sockets that both the client and server use to communicate with each other? (5 marks)

   java.net.Socket

4. The code sample below shows server side code of a connection. Accept connection from clients on line 11 by using the appropriate method. Also, close the connections before the end of the program. (15 marks)

```
1  import java.io.*;
2  import java.net.*;
3
4  public class Server {
5      public static void main(String[] args) {
6          try {
7              // Created a ServerSocket and bind it
   to a specific port
8              ServerSocket serverSocket = new
   ServerSocket(1234);
9              System.out.println("Server is running
   and waiting for client connection...");
10             // Accept client connections(write
   code here)
11             Socket clientSocket =
   serverSocket.accept();
12
13             System.out.println("Client connected:
   " +
   clientSocket.getInetAddress().getHostAddress());
14
15             // Read data from the client
16             BufferedReader reader = new
   BufferedReader(new
   InputStreamReader(clientSocket.getInputStream()));
17             String message = reader.readLine();
18             System.out.println("Received from
   client: " + message);
19             PrintWriter writer = new
   PrintWriter(clientSocket.getOutputStream(), true);
20             writer.println("Hello from the
   server!");
21
22             // Close the client socket
23             clientSocket.close();
24
25             // Close the server socket
26             serverSocket.close();
27
28             System.out.println("Server closed.");
29         } catch (IOException e) {
30             e.printStackTrace();
31         }
32     }
33 }
```

5. What is the difference between a thread and a process? (10 marks)

THREAD: is a path of execution within a process.

PROCESS: is an independent unit of execution with its own address space.

6. What is a daemon thread? (5 marks)

DEAMON THREAD is a thread that runs in the background, providing services to other threads or performing tasks such as garbage collection.

7. What are the benefits of multi-threading? (10 marks)

The benefits of multi-threading are;

1. Improved performance
2. Better resource utilization
3. Increased responsiveness
4. Simplified program structure for handling concurrent tasks.

8. List two ways to create a thread instance in java? (10 marks)

Two ways to create a thread instance in Java are by extending the Thread class or implementing the Runnable interface and passing it to a Thread object.

9. What is the difference between race condition and deadlock? (10 marks)

RACE CONDITION: occurs when multiple threads access shared data and try to modify it at the same time, leading to unpredictable results.

DEADLOCK: occurs when two or more threads are blocked forever, waiting for each other to release resources.

10. What is the synchronised keyword used for? (5 marks)

SYNCHRONIZED KEYWORD: in Java it is used to create a block of code that can only be executed by one thread at a time, preventing multiple threads from accessing shared resources simultaneously and avoiding race conditions.

11. Which of these methods is used to wait for a thread to complete it's execution before moving to the next step in a program? (5 marks)

- (●) join()
- ( ) sleep()
- ( ) await()

12. Which of these classes is a good representation of the HashTable data structure in java? (5 marks)

- (●) HashMap
- ( ) Arrays
- ( ) String

13. Under the hood Hashtables make use of linkedlists. (5 marks)

- ( ) True
- (●) False

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