Quiz on Client-Server Socket Programming and Multithreading in Java

Multiple Choice Questions (MCQs)

1. **What is the purpose of the `ServerSocket` class in Java?**
   a) To establish a connection to a remote server
   b) To listen for incoming client connections
   c) To send data to the client
   d) To close the server program
2. **Which of the following methods is used to accept a client connection in a server program?**
   a) `connect()`
   b) `accept()`
   c) `listen()`
   d) `bind()`
3. **What exception must be handled when working with sockets in Java?**
   a) IOException
   b) SocketException
   c) NetworkException
   d) FileNotFoundException
4. **Which method is used to read data from a socket in Java?**
   a) `readLine()`
   b) `read()`
   c) `getData()`
   d) `fetch()`
5. **What is the primary advantage of using multithreading in socket programming?**
   a) Increases CPU usage
   b) Handles multiple clients simultaneously
   c) Reduces server workload
   d) Simplifies debugging

Short Answer Questions

1) Explain the role of the `accept()` method in the `ServerSocket` class.
   a) The accept() method of the ServerSocket class waits for an incoming client connection. When a client attempts to connect to the server, the accept() method accepts the connection and returns a Socket object that can be used to communicate with the client.
2) What is the difference between `Runnable` and `Thread` when creating a multithreaded program?
   a) Runnable is an interface that defines a single method run(). It allows a class to implement multithreading without extending the Thread class, which enables inheritance from other classes.
   b) Thread is a class that directly represents a thread. You can create a thread by extending the Thread class and overriding its run() method.

3) Write the syntax for creating a server socket that listens on port 8080.
   a) ServerSocket serverSocket = new ServerSocket(8080);
4) How does multithreading improve the performance of a socket-based server?
   a) Multithreading allows a server to handle multiple client connections concurrently. Each client can be processed in its own thread, ensuring that the server doesn't become blocked by a single client. This improves responsiveness and scalability.
5) Describe the purpose of the `InputStream` and `OutputStream` classes in socket programming.
   a) InputStream: Used to read data from a socket. It represents an input stream of bytes coming from the client or server.
   b) OutputStream: Used to write data to a socket. It represents an output stream of bytes being sent to the client or server

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Practical Questions

1. Write a Java program to create a simple server that listens on port 12345 and sends a welcome message to any connected client.
2. Modify the above program to handle multiple clients using multithreading.
3. Write a Java client program that connects to a server, sends a message, and prints the server's response.
