

HM1 Implementation

Class Server

Java implementation that purposefully handles multiple socket connections on port 8080. This is a simple server that Takes in a client number and a message and responds with the timestamp, client number, and message.

The **ClientHandler** extends the Thread class which means each socket will have a dedicated kernel thread achieving proper multiprocessing handing multiple sockets at once.

This **ClientHandler** achieves RAII by overloading the **run()** with proper releasing of resources back to the host machine.

Class Client

Java implementation that purposefully connects to a local server at port 8080. The Client Class has a function **void sendClientNumber(clientNumber, hostname, port, message)** that requests a socket connection to the server and reading only 1 line from the server.

Error Handling and Tests

Maven was installed with Mockito to create test cases that made sure that common exceptions were being thrown for both client and server.

Test 1: testClientProcessCommunication()

Provides the ideal function of the Server and Client

Test 2: testSocketIOException()

Provides the function that mocks when the server is down and the client is trying to send a message ultimately receiving with an I/O Exception.

Test 3: testClientHandlerIOException()

Provides the function that mocks when the server sends the client a message that the client cannot receive with an I/O Exception.

Test 4: testClientHandlerGenericException()

Provides the scenario where the Server evokes a runtime error

Test 5: testClientHandlerCloseIOException()

This scenario provides an I/O Exception on socket close after a request has been completed.

Test 6: testClientHandlerCloseGenericException()

This scenario provides a runtime error on the server after the request has been completed.

```
tvo@tvos-MacBook-Pro-5 Distributed-Systems % mvn test
[INFO] Scanning for projects...
[INFO]
[INFO] -----< com.tamkhaiovo:distributed-systems-hw1 >-----
[INFO] Building distributed-systems-hw1 1.0-SNAPSHOT
[INFO]   from pom.xml
[INFO] -----[ jar ]-----
[INFO]
[INFO] --- dependency:3.6.1:properties (default) @ distributed-systems-hw1 ---
[INFO]
[INFO] --- resources:3.3.1:resources (default-resources) @ distributed-systems-hw1 ---
[INFO] skip non existing resourceDirectory /Users/tvo/Documents/portfolio/Distributed-Systems/src/main/resources
[INFO]
[INFO] --- compiler:3.13.0:compile (default-compile) @ distributed-systems-hw1 ---
[INFO] Nothing to compile - all classes are up to date.
[INFO]
[INFO] --- resources:3.3.1:testResources (default-testResources) @ distributed-systems-hw1 ---
[INFO] skip non existing resourceDirectory /Users/tvo/Documents/portfolio/Distributed-Systems/src/test/resources
[INFO]
[INFO] --- compiler:3.13.0:testCompile (default-testCompile) @ distributed-systems-hw1 ---
[INFO] Nothing to compile - all classes are up to date.
[INFO]
[INFO] --- surefire:3.2.2:test (default-test) @ distributed-systems-hw1 ---
[INFO] Using auto detected provider org.apache.maven.surefire.junitplatform.JUnitPlatformProvider
[INFO]
[INFO] -----
[INFO] T E S T S
[INFO] -----
[INFO] Running HW1.ClientServerTests
WARNING: A terminally deprecated method in sun.misc.Unsafe has been called
WARNING: sun.misc.Unsafe::objectFieldOffset has been called by net.bytebuddy.dynamic.loading.ClassInjector$UsingUnsafe$Dispatcher$CreationAction (file:/Users/tvo/.m2/repository/net/bytebuddy/byte-buddy/1.15.11/byte-buddy-1.15.11.jar)
WARNING: Please consider reporting this to the maintainers of class net.bytebuddy.dynamic.loading.ClassInjector$UsingUnsafe$Dispatcher$CreationAction
WARNING: sun.misc.Unsafe::objectFieldOffset will be removed in a future release
Sent: Client #1: Test Message
Received from Server: Hello from Server
[INFO] Tests run: 6, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.515 s -- in HW1.ClientServerTests
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 6, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO] -----
[INFO] BUILD SUCCESS
[INFO]
[INFO] Total time: 1.794 s
[INFO] Finished at: 2026-02-01T20:56:27-08:00
[INFO]
```