



Computer Science 2B

Practical Assignment 02

2024-07-30

Deadline: 2024-08-06 12h00

Marks: 70

This practical assignment must be uploaded to eve.uj.ac.za **before** 2024-08-06 12h00. Late or incorrect submissions **will not be accepted**, and will therefore not be marked. You are **not allowed to collaborate** with any other student.

Make use of [proper coding conventions](#) and [documentation](#). Marks will be deducted if these are not present. Your submission should include a batch file.

The reminder page includes details for submission and queries. Please ensure that **ALL** submissions follow the guidelines. The reminder page can be found on the last page of this practical - read the reminder page carefully.

This practical will focus on a server application.

In this practical, we will be implementing a protocol for a simple weather information server.

In an attempt to provide weather updates for various locations, you have been asked to develop a simple weather information application. This application will use a custom protocol, specified below, to provide weather information based on requests sent to it.

In order to test the implemented protocol, we can interact with it using [PuTTY](#) and typing requests that facilitate typical usage. The server should run on port **8888** (you may use any suitable port number for testing purposes) and displays *“Ready for incoming connections...”* when the server is started.

Upon connection of a client with the server, the server responds with a **“HELLO - you may make 4 requests and I’ll provide weather information”** message. When the client wants to start a session with the server, it sends a **“START”** message to the server and it promptly responds with a **“REQUEST or DONE”** message - indicating that it is ready to receive requests. A client may only attempt to query the server 4 times until it displays + **“GOOD BYE - [4] queries answered”** message to the client, which is followed by the connection being terminated.

Once the server is ready, we can start to query it. In order to submit a request, the client sends a message in the following format:

“REQUEST [location]”

Where the "[location]" part can be any city name the client wishes to submit. Once the message is received by the server, it analyses the message and responds to it in the following way (using the **"0# [Weather Info]"** message format):

- If the location contains is "*Johannesburg*", the server responds with **"Clear Skies in Joburg"**.
- If the location is "*Durban*", the server responds with **"Sunny and Warm in Durban"**.
- If the location is "*Cape Town*", the server should respond with **"Cool and Cloudy in Cape Town"**.
- For anything else, the server should randomly respond with either **"No data available"**, **"Please try again later"** or **"[Location] data outdated"**.

However, if the client sends a **"DONE"** message to the server at any point, it should respond with a **"0# GOOD BYE - [x] queries answered"** (where # is the response number and x is the amount of requests made) and terminates the connection at its end.

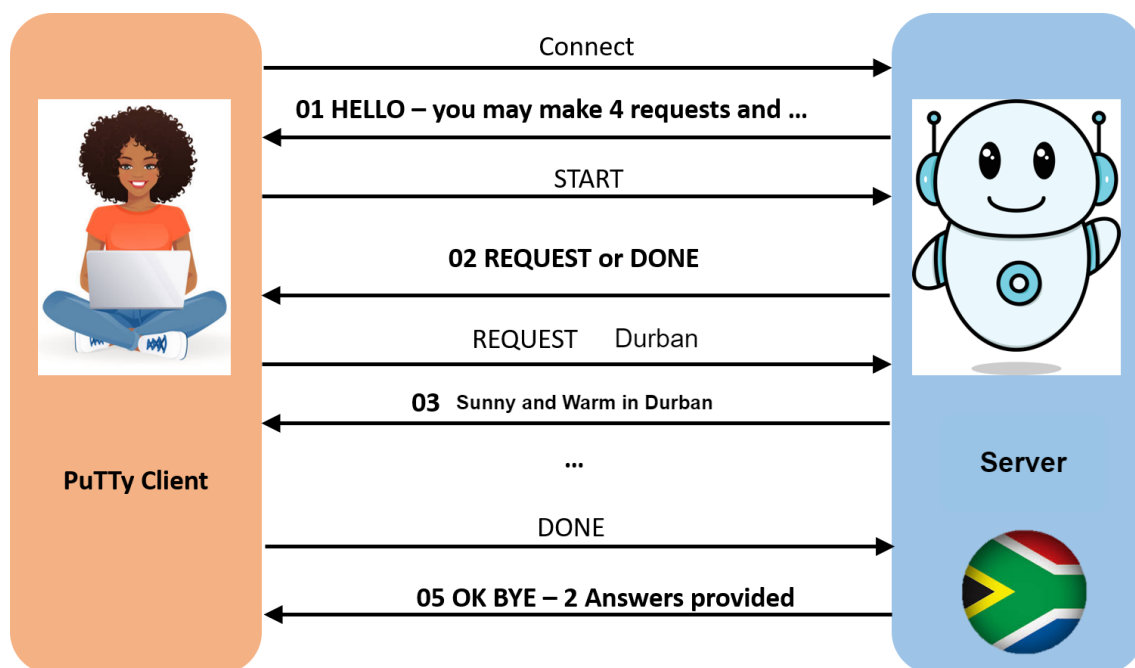


Figure 1: A typical example of Client-Server interaction for the Weather Information Server

Bonus

Allow for simultaneous client connections to the server by making use of a multi-threaded approach. (Hint: The handling of each client's session is placed within a thread)

Marksheet

- | | |
|--|--------------|
| 1. Server messages displayed in correct order. | [10] |
| 2. Answer responses correct. | [10] |
| 3. Server terminates connection after 4 answers. | [10] |
| 4. Server terminates once DONE command is sent. | [5] |
| 5. Coding convention (structure, layout, OO design). | [5] |
| 6. Commenting (normal and JavaDoc commenting). | [5] |
| 7. Correct execution. | [25] |
| 8. Bonus - Multiple threads for client connections | [10 (bonus)] |
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NB

Submissions which **do not compile** will be capped at 40%

The awarding of marks is dependent on the student's ability to effectively justify and demonstrate understanding of the practical work presented.

Execution marks are awarded for a correctly functioning application and not for having some related code.

Reminder

Your submission must follow the naming convention as set out in the general learning guide:

SURNAME_INITIALS_STUDENTNUMBER_SUBJECTCODE_YEAR_PRACTICALNUMBER

Your submission must include the following folders:

- `bin` - (*Required*) - Should be empty at submission but will contain runnable binaries when your submission is compiled.
- `docs` - (*Required*) - Contains the batch file to compile your solution, and any additional documentation files. All documentation files must be in **PDF** format. Your details must be included at the top of any **PDF** files submitted. **Do not include generated JavaDoc.**
- `src` - (*Required*) - Contains all relevant source code. Source code must be placed in relevant sub-packages! Your details must be included at the top of the source code.
- `data` - (*Optional*) Contains all data files needed to run your solution.
- `lib` - (*Optional*) Contains all libraries needed to compile and run your solution.

Every submission **must** include a batch file that contains commands which will:

- Compile your Java application source code.
- Compile associated application JavaDoc.
- Run the application.

Do not include generated JavaDoc in your submission. All of the classes/methods which were created/updated need to have JavaDoc comments.

Note that only **one** main submission is marked. If you have already submitted once and want to upload a newer version, then submit a newer file with the same name as the uploaded file in order to overwrite it.

Bonus submissions should be uploaded separately and clearly named as the bonus submission - which will then be marked accordingly.

It is important to make use of **each practical opportunity** as preparation for the practical semester test (ST2). The practical assignments also contribute to the **Practical Component Mark** (PCM). There will be 9 practical assignments (P00-P08) this semester which will be released on a weekly basis except when tests are being written.

The process to **query** your practical assignment with an assistant is discussed in the learning guide as well as the first practical lecture.