Computer Science 2B

Practical Assignment 03

2024-08-06

Deadline: 2024-08-13 12h00 Marks: 100

This practical assignment must be uploaded to eve.uj.ac.za **before** 2024-08-13 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 creating a web server. Handling of client connections must be multi-threaded.

While continuing our weather theme from practical 2, we are going to move on to another important network technology and protocol suite: the web and HTTP. For your practical, you need to create a basic web server using official HTTP protocol

Create a Java application which acts as a web server. Create a server socket which listens on port 4321. Accept any client connections and establish the needed streams for input/output. Any client requests should be processed according to HTTP. Test the web server with a web browser (Opera, Firefox, Chrome) on localhost. Use the appropriate response codes for requests:

200 When a request can be served without issue (must be able to handle binary files).

404 When a requested page/content cannot be found.

500 When an error occurs.

Different pages can be requested by the client. Based on the additional data files that have been provided to you, your server should be able to handle the following:

- localhost:4321/Joburg should serve the Joburg.html file to the client.

- localhost:4321/Durban should serve the Durban.html file to the client.
- localhost:4321/Cape should serve the CapeWithImage.html file to the client.
- localhost:4321/Africa.jpg should serve the Africa.jpg file to the client.

Bonus

1. Add to your web server the ability to serve a video streaming page that uses HTML5 or JavaScript to stream the sample video from *additional files on Eve* with the ablity to play, pause, seek and choose an alternate source video url. You will have to create your own html page for the bonus. (Please note: DO NOT include the sample video file in your final submission)

Marksheet

1. Create ServerSocket on port 4321.	[10]
2. Accept client connection using threads.	[20]
3. Sending HTTP response.	[15]
4. Handle each response type (200, 404, 500)	[15]
5. Correctly sending **image files**.	[15]
6. Coding convention (structure, layout, OO design)	[10]
7. Commenting (normal and JavaDoc commenting)	[5]
8. Correctness of solution	[10]
9. Stream page with sample video and player options	[20 (bonus)]

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.