

# INTRODUCTION TO OPERATING SYSTEMS

## Final Exam

30 Points, 3 hours

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## Rules

- The "exam server" and the "temporary server" will be provided in the class for this exam. Both of them have the same (your usual) credentials.
- The "exam server" is the server in which you will find your assignments and should leave your answers.
- The "temporary server" will be erased after exam. You have the docker container "os\_muhammad\_ahmed\_1\_container" with root privileges on the "temporary server". Use it (not "exam server") for your experiments. Take in account that this server is shared server for all students. Find your home folder, then "os" and work inside. Do not use "exam server" for experiments. The server may reboot several times.
- Both the "exam server" and the "temporary server" will be restarted several times during the exam. Save your work frequently to be ready for interruptions.
- Login to the exam server using SSH and your credentials. The address will be provided in the class.
- Once logged in, go to the "os" directory. All actions must be performed inside the "os" directory.
- Files and directories outside of "os" will not be assessed. Double-check that all your work is contained within the "os" directory.
- Leave your files, directories and shell scripts (if any) on the exam server and log out from it after the exam.
- Do not change your files after the deadline. The dates of your files will be checked and the whole assignment will be left without evaluation in case of cheating.
- Searching on the internet and using AI is allowed and encouraged during the exam.
- Communication with other people is prohibited during the exam. The same code or text within two or more reports will lead to leaving the exam without evaluation for all such reports.
- The exam will not be evaluated in case of violation of the rules and cheating.

## Assignment

### Open Question

10 points

Select any topic that was described during the semester. Expand this topic with materials that are not provided in materials uploaded in the Google Classroom.

Write full article (old and new materials) (above 400 words) into the "advanced\_topic.md" file in the "oq" directory. Md file should be well formatted. The file without specific md formatting will not be evaluated. (4 points).

The article should include 2 visualizations, that are created by you. The visualizations should be relevant to the topic. Include them in the relevant places. (4 points).

Include the reference(s) to the lecture materials and at least 2-3 references to external sources. (2 points).

### Practical Problem

10 points

In exam server find the python program inside provided directory "programs" and do the following:

- a) Run this program and find the port that this program listens to. You may use the "ss" command for this.
- b) Connect to this port using command "telnet 127.0.0.1 <port>" and get the message from this program. You may need additional terminal and connection to connect to the running program. Kill your process if something goes wrong. Use "exam server" container only for your experiments.
- c) Find all running processes related to the program that are launched when running the provided program.

Create report "explore\_program\_Muhammad.md" into the provided "programs" directory on the exam server as the answer to this task.

The report should contain 3 sections:

- The first section should contain the instructions for finding the process(es), port and message of the program. Provide the path of your program, name of your program and other necessary information. (4 points).
- The second section should contain the process(es), port and the message of the program. (4 points).

Note that if you need to conduct some experiments with the program, use university class computer, your personal computer or provided container from temporary server (Find your home folder, then "os" and work inside.).

## Reflection

10 points

Create file "reflection.md" in the directory "os". The file should be well formatted. File without md formatting will not be evaluated.

Write the following information to this file:

- The aspects (at least 100 words) in which AI was useful in this exam. You are allowed to add the examples from the different exams or assignments if AI was not useful in this exam. (2 points).
- The aspects (at least 100 words) in which AI was unable to help. You are allowed to add the examples from the different exams or assignments if AI was useful in every aspect of this exam. (2 points).
- The role of the search engines (at least 100 words) in writing this exam. You are allowed to add the examples from the different exams or assignments if the role of search engines was minimal in this exam. (2 points).
- The bar chart in which you will show the relative comparison of usage of AI, Search Engines and Manual Work while doing this exam. (4 points).