

Operating Systems, Spring 2022, Exercise 1 (Lectures 1-2)

Submit your solutions to Moodle by the deadline (January 26, 2022, 11:59). Be prepared to discuss your solutions in Zoom breakout room. Afterwards, remember to self-evaluate your solutions in Moodle.

1. Processes, basic concepts:

- (a) Why is the two-state process model not sufficient?
- (b) What are the main elements of process image?
- (c) Why are at least two modes (user and kernel) needed? Provide a concrete example where the use of a single mode would lead to problems.

2. During lectures, we went through steps of mode switch and process switch. In this exercise, we focus to **process creation and termination**:

- (a) Briefly describe what happens when a process is created?
See, e.g., Chapter 3.4 [Stallings]
- (b) List and describe three different reasons leading to process termination.

3. **Pick an operating system of your choice** (preferably for a system you have access to and can use) **and answer the following questions**.

- (a) What is the operating system you chose?
- (b) What function/program can you use to find information of the running processes in this OS?
- (c) Explore what information of the running processes you see using this function/tool, check out a manual for explanations if they are not clear, and if there are options for obtaining more information. Pick one process and list all information of the process you find relevant.

4. **Processes**. In this exercise and the next one, we use a Python simulator from OSTEP. You find the code at <https://github.com/remzi-arpacidusseau/ostep-homework/blob/master/cpu-intro>

- (a) Download the Python code `process-run.py`, read the README of the simulator and try out some of the examples provided in the readme file (to document this part, you can use a screenshot demonstrating that you are able to run the simulator).
- (b) Answer the homework questions 1 and 2 from OSTEP Chapter 4. You find the homework questions at the end of the chapter at <http://www.cs.wisc.edu/~remzi/OSTEP/cpu-intro.pdf>

5. **Processes, continued**. We continue from previous exercise, that is, use the simulator `process-run.py` as in previous exercise, and answer the homework questions 3-7

from OSTEP Chapter 4 (if you wish, you can also answer question 8, but it is not required). You find the homework questions at the end of the chapter at <http://www.cs.wisc.edu/~remzi/OSTEP/cpu-intro.pdf>