

Gebze Technical University

Department Of Computer Engineering

CSE 312 /CSE 504 Spring 2022

Operating Systems

Homework #01

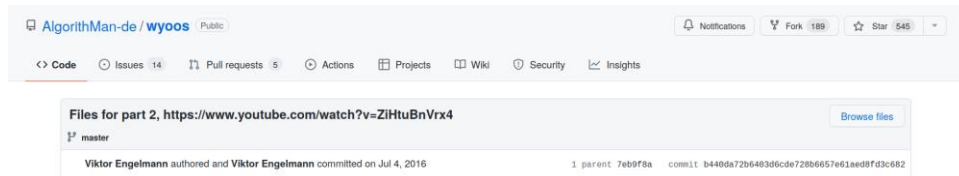
Due Date: 08.04.2022

1. Before you start the homework

In this homework, we aim to design our features or change the existing situations on the operating system which is available on the [web site](#). This operating system is created by [Viktor Engelmann](#). He explains how to write his own operating system step by step in [the video series](#). Before you start HW#1, we strongly suggest you apply following steps:

- Watch the first three videos in the playlist. [The first video](#) and [the second video](#) explain the basic idea and design of this project, so it helps you to understand his approach.
- [The third video](#) tells you how to install this operating system in a virtual box. In order to apply what he did so far in this video, you need to consider his source code of this video for your virtual machine. If you clone the source code on [the GitHub page](#), you will clone the latest version which includes everything about the operating system. In order to download the source code, which is related to the video you consider, you need to do the following steps:
 - In case of the third video, go to [the source page](#).
 - Select “Running the OS in a virtual machine” code.

- Click “Browse Files” button in the page shown below.



- In the next page, under the “Code” button, there will be “Download ZIP” option. When you select this option, you can reach the source code which is related to the video that you consider.
- If you apply everything in the third video with the source code which is explained in the previous step, and you obtain the same result as in the video, then you can start to do this homework. If you get some errors at the end of the video, you are responsible for fixing them.
- For the final step before you start the homework, you should firstly watch [the 15th video](#), and then download its source code into your virtual machine, as I explained for the 3rd video. If you have any questions about this video, please ask in the problem session as soon as possible.

2. Your task for the homework

You will implement a multithreading library for this simple OS. Your library will consist of functions for creating, terminating, yielding, and joining the threads.

Write a number of threads that communicate with each other in a producer-consumer fashion. Define what your threads do in your homework report. The communication will happen only between two threads.

Show that without defining critical regions your threads cause race conditions. The implement Petersons algorithm between two threads to show that the race condition problems are addressed.

3. General rules for homework

- a. It is not a group project. Do not share your answers to anyone in any circumstance. Any cheating means at least –100 for both sides.
- b. Your homework report is important, it should include your design decisions, your main thread structure, your thread scheduling algorithms, etc.

- c. For any questions about the homework, write on Teams chat to Gizem Süngü.
- d. Your code is responsible for checking any obvious exceptions and avoiding any possible deadlock situation. The homework is not responsible to warn you about all kinds of errors or exceptions.
- e. Write comments on the lines of your code where any critical actions happen.
- f. The names of your source files and how to install them into the homework submission page will be announced. You are responsible for following all announcements on the Teams page.
- g. After the deadline, you are responsible for explaining your project to the course assistant in a demonstration.
 - i. Each demo will be done in 10 minutes.
 - ii. Many appointments will be opened so you can select the most available time slot for yourself.
 - iii. In order to answer all possible questions, you need to command your code. The solution is to write and to do everything on your own. Your homework grade will be evaluated by your answers.