A4: User Level Processes

2/19/2025

150 Points Possible

Attempt 1

In Progress

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Unlimited Attempts Allowed

Details

This assignment is a continuation of the blitz OS. You should continue your work in the same GitHub repo of the A3 assignment. However, you should keep your a3 branch intact, and at the end of the assignment, you should create an a4 branch. Detailed instructions on files and branches are available in the handout. There are two documents: the handout and the blitz OS documentation. It is important to read the documentation before attempting to work on the assignment tasks. The documentation is quite long, as some of the details are useful for later assignments. I suggest working through the tasks and referring to the documentation when needed. A4 hints are handy for enumerating tasks.

- Handout: **Handout_A4_509.pdf (https://wwu.instructure.com/courses/1764413/files/128795340?wrap=1) (https://wwu.instructure.com/courses/1764413/files/128795340/download?download_frd=1)**
- Additional Documentation: **509_A4_Documentation.pdf (https://wwu.instructure.com/courses/1764413/files/128795343?wrap=1) (https://wwu.instructure.com/courses/1764413/files/128795343/download?download_frd=1)**
- Files: **A4Files.zip (https://wwu.instructure.com/courses/1764413/files/128795236?wrap=1) (https://wwu.instructure.com/courses/1764413/files/128795236/download?download_frd=1)**
- Desired Output Example: **A4_DesiredOutput.txt (https://wwu.instructure.com/courses/1764413/files/128795344?wrap=1) (https://wwu.instructure.com/courses/1764413/files/128795344/download?download_frd=1)**

Link to hints:

A4 Hints.pdf (https://wwu.instructure.com/courses/1764413/files/128795332?wrap=1) (https://wwu.instructure.com/courses/1764413/files/128795332/download?download_frd=1)

A4 CL Args CP Hints.pdf (https://wwu.instructure.com/courses/1764413/files/128795347?wrap=1) (https://wwu.instructure.com/courses/1764413/files/128795347/download?download_frd=1)

QA: I will update the QA as I get new student questions.

Task 1: StartUserProcess

- What is the integer argument for the StartUserProcess() method? What is it used for?

    - You can ignore this for now as it will be unused.
- The A4_Hints pdf says to “check permission” with (fcb.inode.mode & MODE_EXE) == MODE_EXE, what should happen if this check fails?
    - You should close the file using file.Close and invoke fatal error with a message indicating lack of execution permission.
- The A4_Hints pdf says to “Figure out stack top and system stack,” could you elaborate on “figure out?”
    - The stack is the last page in the address space of the process. The stack top can easily be calculated by multiplying number of pages with page size. The System stack address is indicated in the handout (how to calculate it).
- What do the arguments mean for BecomeUserThread()? For example, what is the “initStack” supposed to be?
    - InitStack is the stacktop (max address in virtual space) for the new thread.
    - InitPC: initial Program Counter. This is returned when you use LoadExecutable.
    - InitSystemStack: initial system stack that you calculated previously.
    - Pointer to arguments. For StartUserProcess, you can just use a “0”, but for ExecNewProgram, you should have it set as a pointer to the stack location where the arguments array can be found.

Task 2: System Call Handlers

- For the method AddrSpace.GetStringFromVirtual(), what are the arguments localName and filename? I thought that “localName” is referring to the name of the argument that’s passed, but what is “filename”? But many arguments are named “filename”, so I’m a little confused.
    - AddrSpace.GetStringFromVirtual() does not have a localname nor a filename argument. It has two arguments: kernelAddr: A String to hold what is read. VirtualAddr: the virtual address to read from. maxSize: The max size of bytes to read.
- What Sys calls need to set toStore to true?
    - Read and Stat need write access to the buffer where they store the result of what they read.

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