

Name: _____

Homework #9: Operating Systems (9 points)

Due to Gradescope by 11:45 PM on Thursday, October 21st

You need to submit a pdf to Gradescope; failure to assign questions to pages will result in a 10% deduction on your grade

Homework Goal: Review and practice the material we have covered for the Operating Systems unit.

Vocab and Definitions

1. Practice some vocab from this chapter! (0.5 points)
GUI stands for _____.
The _____ holds the line of processes that are ready to run.
2. List the four major tasks that the operating system handles that we discussed in class. (0.5 points)
3. Define superusers and give an example of why we need them, besides for maintaining password files. (0.5 points)
4. What is the difference between a program and a process? (0.5 points)
5. Suppose I have a process in the BLOCKED state, waiting to get a file that your process has. You have a process in the BLOCKED state, waiting to get a file that my process has. What is this situation called, and how can it be resolved? (0.5 points)

Process States

6. The following table provides a grid of the possible process states. Label each valid transition, coming FROM the left column and going TO the right. If a transition does not occur, *leave the box blank*.

Think about all possible transitions. For example, when does dispatch occur? What state do we come from? To which state do we go? Write “dispatch” in that box. (1.5 points)

		Going TO this state				
		NEW	READY	RUNNING	BLOCKED	EXIT
Coming FROM this state	NEW					
	READY					
	RUNNING					
	BLOCKED					
	EXIT					

7. Suppose you have two processes to run: a CPU-intensive process and an I/O-intensive process. If you are trying to run these processes on a heavily loaded single processor machine (it has a lot of other processes that also need to run), then what state will each process spend most of its time in (besides RUNNING)? Justify your response. (1 point)
- CPU-intensive process
 - I/O-intensive process

Virtual Memory

10. Answer the following questions using this virtual memory table. (1 point)

Physical Memory Address	Virtual Memory Address	Allocated To:
0 - 15	0 - 15	Program A
16 - 31	0 - 15	Program B
32 - 47	16 - 31	Program A
48 - 63	32 - 47	Program A
64 - 79	?	Program B

- a. What range of addresses should replace the question mark in the above table?

 - b. Program A wants to access a variable stored in virtual address 35. What physical address is this variable stored in?
11. Consider a Python program that is stored in your computer's memory. For this program, what is the first virtual address (give a number)? Is this guaranteed to be the same as the first physical address? Why or why not? (1 point)