CS 4760	**Operating Systems**	Test 3
Name:	Spring 2020	Max Pts: 64

Important: This is an open book test. You can use any books, notes, or paper. If there is a syntax error in any program segment, just write it down and you will get full credit for the problem. The test is 75 minutes long. name.

1. [6 pt] Do we need to perform partial or total memory compaction if the memory management scheme is based on pure paging? Explain your answer in a couple of sentences.

2. [6 pt] Give an example of a system call that will result in two pages being shared between more than one process.

3. [12 pt] A minicomputer uses the first-fit system for memory management. Initially, it has one block of 256KB at address 0. The requests come in the following order:

Arrival time	Burst time	Memory needed
0	9	171
7	23	66
14	27	201
17	3	184
26	15	76
30	12	103
33	10	129
34	26	41

   How many blocks are left at times 5, 12, 18, 21, 29, and 35, and what are their size and address?

4. [6 pt] What is the advantage of working set model to prevent thrashing? How does it compare with the method based on page fault frequency?

5. [6 pt] x86 architecture requirs the use of paged segmentation for memory management. But Linux uses pure paging. How does it achieve that?

6. [4+6 pt] I have a floppy disk with 1.44MB [unformatted] capacity. The data blocks are 512 bytes each.

   (a) The OS keeps track of free space by using a bit vector approach. What is the size of the bit vector for this floppy? If the OS stores the bit vector on the floppy for recovery, how many blocks are left over to be used to store data.

   (b) Now, consider that the same floppy is formatted using UFS, with an empty boot block of size 1 block. Consider 1 block to be allocated for super block. Let each inode require 1024 bytes. What can be the maximum formatted capacity of the floppy? What is the maximum file size that can be stored on this floppy if the system uses 12 direct blocks, 1 single indirect block, and 1 double indirect block?

7. [6 pt] Windows recognizes a file type by its extension. Is there still a need for a magic number to be part of the file? Explain your answer briefly.

8. [6 pt] What is the purpose of a superblock in a disk partition?

9. [6 pt] What is the difference between a character-special device and a block-special device from the perspective of operating system?