Important: This is an open book test. You can use any books, notes, or paper but no electronic device. *Do not log into the computer during the test, or use any electronic or communications device. Change your cell phones to slent mode.* Any calculations and rough work can be done on the back side of the test pages. If there is a syntax error in any program segment, just write it down and you will get full credit for the problem. You will lose five points for not writing your name.

1. [6 pt] How does the OS view memory? How is it different from the programmer's view of memory?

2. [6 pt] What are TLBs? What is their role in memory management?

3. [10 pt] Explain how will you create an indexed sequential file? How will you access a record in such a file? Do all the records have to be same size?

4. [6 pt] Describe "security through obscurity" with an example.

5. [10 pt] Consider the following scenario for some processes on an embedded system with 8 cores that has 1GB of user memory available.

Process	Memory Required	Arrival Time	Burst Time
p0	160MB	1	7
p1	820MB	4	14
p2	40MB	12	10
p3	70MB	16	10
p4	340MB	23	14
p5	690MB	26	13

Assume that the system picks up processes from the job queue based on what is available and can be fit in. In case of a tie, system arbitrates by selecting the process with a smaller burst time requirement. Show the memory layout using first-fit scheme and best-fit scheme at times 0, 10, 20, 30, and 40.

6. [18 pt] Consider a disk with 256 cylinders, indexed from 0 to 255, with 0 being the innermost and 255 being the outermost cylinder. The system receives disk requests on the following tracks in the specified order

$$92, 96, 60, 46, 11, 137, 204, 94, 128, 89$$

The head is currently on cylinder 58, and is moving towards inner cylinder (cylinder 0). Give the total number of tracks traversed for the given requests using each of the following algorithms.

(a) FCFS scheduling

(b) SSTF scheduling

(c) SCAN scheduling

(d) C-SCAN scheduling, servicing requests as head moves outwards

(e) LOOK scheduling

(f) C-LOOK scheduling, servicing requests as head moves outwards