

Name _____

All questions are worth 10 points. Maximum score: 100.

1. Is the following system in a safe state? If so show the “safe sequence” otherwise, list the processes that cannot be added to the safe sequence. If P4 makes a request of (1,0,1,0) and we grant the request, will the system be in a safe state?

	Has					Max					Available			
	A	B	C	D		A	B	C	D		A	B	C	D
P0	1	1	0	1		2	2	1	1		1	0	2	0
P1	1	1	1	1		4	1	1	2					
P2	2	1	1	1		3	1	2	1					
P3	1	0	0	1		1	3	1	1					
P4	1	1	0	0		2	2	2	4					

2. Given a shared variable S that has an initial value of 100, the following two statements are executed in two separate processes P1 and P2. Give the final values of S and explain how each can occur. Show how to protect these two statements with semaphores so that no error occurs.

P1

...

$S = S + 12;$

...

P2

...

$S = S - 40;$

...

3. What information can we expect to find on a hard drive, regardless of the file system that is on the drive. In your discussion, explain how the structure of a hard drive is different from the structure of a floppy disk.

4. Given the following five processes and associated burst times, give the GANTT chart for the scheduling algorithms First Come First Served (FCFS), Shortest Job First (SJF), and Round Robin with a quantum of 3. Give the average wait time for each algorithm

Process Number	Burst Time
0	2
1	8
2	7
3	1
4	2

5. In the NTFS file system, explain the function of the MFT (Master File Table). What are file attributes? What are some of the standard files found in the MFT? Where do we find the data for short files (10-12 bytes)?

6. Explain the three file organizations, Linked List, Indexed, and Multiple Contiguous blocks. In your explanation, give an example of a commonly used file system that has the given structure.

9. How many network cards would you need for a Ring Network? For a Bus network? For a fully connected network with 10 computers? For a hypercube network with 32 computers?

10. What are the three lowest layers of the ISO 7-layer communication standard? What is the function of each of these layers?