QUIZ 1

1.What is the purpose of interrupts? What are the differences between a trap and an interrupt?

2.What are multiprogramming and multitasking and what is the difference between them?

3.What is the difference between a system call and a system program?

QUIZ 2

- Which of the following components of program state are shared across threads in a multithreaded process?
  a. Register values
  b. Heap memory
  c. Global variables
  d. Stack memory

- What are the two models of interprocess communication? What are the strengths and weaknesses of the two approaches?

- What will be the output of the following program (assume there are no errors in execution)?

```
int main()
{
 pid_t pid, pid1;
 pid = fork();
 if (pid == 0) {
  pid1 = getpid();
  printf("child: pid = %d, pid1 = %d", pid, pid1);
 } else {
  pid1 = getpid();
  printf("parent: pid = %d, pid1 = %d, pid, pid1);
  wait(NULL);
 }
 return 0;
}
```

QUIZ 3

Circle the scheduling algorithm(s) that can result in starvation:
a. First-come, first-served
b. Shortest job first
c. Round robin
d. Priority

1.Describe how the Swap() instruction can be used to provide mutual exclusion. Include code/pseudocode.

2.Consider the following set of processes, with the length of the CPU burst given in milliseconds:

Process	Burst Time	Priority
P_1	9	3
P_2	3	1
P_3	2	5
P_4	1	4
P_5	5	2

The processes are assumed to have arrived in the order P_1, P_2, P_3, P_4, P_5, all at time 0.

a. Draw four Gantt charts that illustrate the execution of these processes using the following scheduling algorithms: FCFS, SJF, nonpreemptive priority (a smaller priority number implies a higher priority), and RR (quantum = 1).

FCFS

SJF

nonpreemptive priority

RR

b. What is the turnaround time of each process for each of the scheduling algorithms in part a?

c. What is the waiting time of each process for each of these scheduling algorithms?

d. Which of the algorithms results in the minimum average waiting time (over all processes)?

QUIZ 4

Assuming a byte-addressed system with 16-bit logical and physical addresses and 8KB pages, translate the following logical addresses into physical addresses using the provided page table:

page	frame
0	0
1	
2	7
3	4
4	
5	1
6	3
7	2

a. 0xAAC4

b. 0x02C8

c. 0xE310

1.Name the types of fragmentation created by contiguous memory allocation and paging, respectively (one for each), and describe the difference between them (the two kinds of fragmentation).

2.What is the difference between the `signal` operation invoked on condition variables within monitors and the `signal` operation invoked on semaphores?

QUIZ 5

Under what circumstances do page faults occur? Describe the actions taken by the operating system when a page fault occurs.

1.Consider the following page reference string:
1, 3, 2, 4, 3, 5, 6, 7, 2, 3, 2, 1, 7, 6, 5, 4, 7, 2, 5, 6
How many page faults would occur for the following replacement algorithms, assuming one, four, and seven frames? Remember that all frames are initially empty, so your first unique pages will cost one fault each.
LRU replacement

FIFO replacement

Optimal replacement

2.Consider the parameter Δ used to define the working-set window in the working-set model. What is the effect of setting Δ to a small value on the page-fault frequency and the number of active (nonsuspended) processes currently executing in the system? What is the effect when Δ is set to a very high value?

QUIZ 6

What are the two access modes in which a file can be opened and what is the difference between them?

What are the advantages of the variant of linked allocation that uses a FAT to chain together the blocks of a file?

Suppose that a disk drive has 5,000 cylinders, numbered 0 to 4999, with the read-write head currently over cylinder 999. The queue of pending requests, in order of arrival, is:
57, 3543, 913, 2774, 2948, 1509
Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for each of the following disk-scheduling algorithms (assuming the head's initial movement is toward higher numbered cylinders for c-f)?
a. FCFS

b. SSTF

c. SCAN

d. LOOK

e. C-SCAN

f. C-LOOK