# Final Exam

# Operating System

Computer and Syst. Dept.
Time Allowed: 3 hrs.
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2012– 2013

## *Solve as you can:*

### *Question 1: Define Operating system, then:*

- What are OS goals?
- What are the different types of OS?

### *Question 2: True or False (and why?)*

(a) The number of the cylinders is greater than the number of tracks in any surface. ( )
(b) Paging may suffer from external and internal fragmentations. ( )
(c) In paging Frame size may be (in some cases) greater than page size. ( )
(d) Each process must have a process control block (PCB) in memory. ( )

### *Question 3: Explain why? (Use the minimum words)*

(a) It is important to include inter-Track and inter-Sector gaps on the disk surface.
(b) Memory is a preemptable recourse, while CD driver is not.

### *Question 4: Use figures only to:*

(a) Explain the linked disk allocation method.
(b) Ready queue and input queue.
(c) Different process states.
(d) Block diagram showing the computer internal structure.
(e) Explain how MMU works.
(f) Different steps for processing a user program.

### *Question 5:*

*i. Define (in few words) the following Terms:*

Sector, Cylinder, Disk access time, Disk bandwidth

*Then* use the SSTF scheduling technique to calculate the total head movement for the following:

- Queue: 98, 183, 37, 122, 14, 124, 65, 67, 25, 78, 107,15
- Head starts at: 53.

*ii. A hard disk has* 4096 tracks on each surface. It has 4 plates. There are 1024 sectors per track and each sector stores 512 bytes, calculate:

- Number of tracks per cylinder.
- Number of cylinders in the disk.
- Number of tracks in the disk.
- Cylinder size.
- Total Disk size.
- size of the data that can be read by the head at a time?

**Turn the Page**

## *Question 6: What is the main difference between?*

(a) A process and a program.
(b) Paging and demand paging.
(c) Internal and external fragmentations.
(d) Virtual memory and cache memory.

## *Question 7: Discuss* what is meant by the following parameters:

CPU utilization, System throughput, Turnaround time, Waiting time, Response time, Context switch.

*Then*, Consider the following set of processes, with the length of the CPU burst time given in milliseconds:

| Process | Burst Time |
|---|---|
| $P_1$ | 3 |
| $P_2$ | 4 |
| $P_3$ | 1 |
| $P_4$ | 4 |
| $P_5$ | 2 |
| $P_6$ | 6 |

*Using* **FCFS** then **SJF** then **RR with Q=2** algorithms;

(a) Draw the Gant chart illustrates the execution of these processes.
(b) What is the Waiting Time (WT) for each process, and then calculate the Average Waiting Time (AWT) for all processes.
(c) What is the Turnaround time for each process?

## *Question 8: Give brief definition for:*

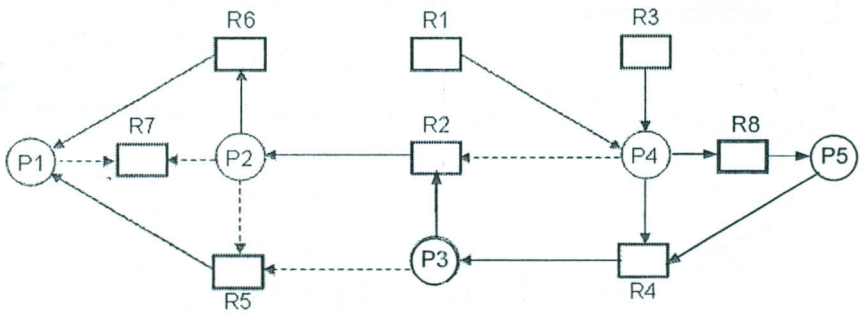
(a) Deadlock.
(b) Safe sequence.
(c) Valid-invalid bit.

## *Question 9: Determine* the number of page fault using optimal page replacement algorithm using 4 memory frames with the following reference string:

7,0,1,2,1,0,3,0,4,4,5,4,2,3,0,5,3,2,1,2,4,0,1,7,0,1

## *Question 10: For the following Resource Allocation Graph:*

- What is the safe sequence?
- If P2 requests R7, is it reasonable to grant this request?




**With Best Wishes ... ☺ ... Dr: Ahmed Saleh**

**PLZ, send your comments about the exam to: aisaleh@yahoo.com**