King Saud University

Applied Operating Systems

Total Marks: 25 **Time: 1 pm – 3:00pm (120 minutes)**
Summer 2015-16 **Name:** ……
Midterm Exam 2 **ID#:** ……
Date: 9-August-2015 **Dr. Safwan Qasem**

Question 1. [14 marks] Select ONLY ONE ANSWER (the best answer)..

1.	A scheduling method in which a processes can be interrupted whether they have completed their current task or not is	**2.**	**Dynamic linking** means that linking routines is done at:
a.	Dynamic	**a.**	Compilation time
b.	Pre-emptive	c.	Loading time
d.	Non-pre-emptive	**e.**	Execution time
f.	Static	**g.**	Proper time

3.	CPU scheduling decisions may take place when a process	**4.**	**Throughput** of a scheduling algorithm is
a.	Switches from running to waiting state	**a.**	amount of time to execute a particular process
b.	Switches from running to ready state	**b.**	amount of time a process has been waiting in the ready queue
c.	Switches from waiting to ready	**c.**	number of processes that complete their execution per time unit
d.	All of the above	**d.**	amount of time it takes to get the first reaction from a process

5.	Dispatch latency is :	**6.**	In Shortest Job First algorithm, the next CPU burst is computed using
a.	When the dispatcher stops running new processes	**a.**	Only the previous predisctions
b.	The reason why the dispatcher stops a running process	**b.**	Only the past measured execution time
c.	time it takes for the dispatcher to stop one process and start another one	**c.**	Only the recent history of the process
d.	Is a process finishes its execution	**d.**	The past predictions and the past measurements

7.	In Priority Scheduling, Aging means :	**8.**	The CPU can only execute programs that are
a.	Kill the old processes with low priority	**a.**	In the disk
b.	Increase the process priority with time	**b.**	In the RAM
c.	Compute the age of new processes	**c.**	In the ROM
d.	Decrease the process priority with time	**d.**	In the registers

9.	Cache memory is positioned between	**10.**	The base register contains

a.	CPU registers and the flash memory
b.	The RAM and the ROM
c.	The RAM and the CPU registers
d.	The Disk and the RAM

a.	The total size of the memory of a process
b.	The address of the beginning of the memory area of a process
c.	The position of the operating system in the memory
d.	The address of the last position in the memory area of a process

11.	Address binding of instructions and data to memory addresses at Compile time is used
a.	When the memory locations cannot be identified before execution
b.	When the memory locations cannot be identified before compilation
c.	When the memory locations are determined before the compilation
d.	When the memory locations are very small

12.	Relocation register is used to
a.	Access the disk
b.	Compute the logical address
c.	Compute the physical address
d.	Compute the priority of a process

13.	The memory management unit MMU is
a.	A software that controls the memory
b.	An algorithm for virtual memory
c.	A Library used by the compiler
d.	A hardware device that maps virtual to physical address

14.	When allocating memory to processes, Worst-Fit means
a.	Allocate the smallest available memory area
b.	Allocate the biggest available memory area
c.	Allocate the first available memory area
d.	Allocate the last available memory area

Question 2. [6 marks]

Answer following statement using True (T) or False (F):

Statement	**Answer**
a. In First Come First Serve, a process with short execution time is executed first	F
b. In Shortest job first, it is necessary to predict the next CPU burst of each process	T
c. Starvation happens when a process gets access the CPU for a very long time	F
d. In Round Robin Scheduling algorithm, some processes may stop execution before the end of their quantum	T
e. In Round Robin Scheduling algorithm, all process get the same Quantum of CPU	T
f. Dynamic loading means that a routine is not loaded until it is called	T

Question 3. [8 marks]

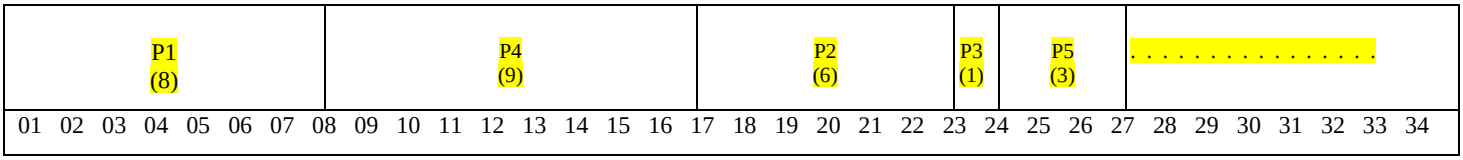
Consider the following set of processes, with the length of the CPU-burst time given in milliseconds:

Process	Burst	Priority	Arrival Time
P1	8	4	0
P2	6	1	3
P3	1	2	5
P4	9	2	1
P5	3	3	12

a) Draw four Gantt charts illustrating the execution of these processes using FCFS, SJF, a non-pre-emptive priority (a smaller priority number implies a higher priority), and RR (quantum = 1) scheduling.

(a) First Come First Serve [2 marks]:

a-1 Draw Gantt chart illustrating the execution of these processes using First Come First Serve [1 mark]

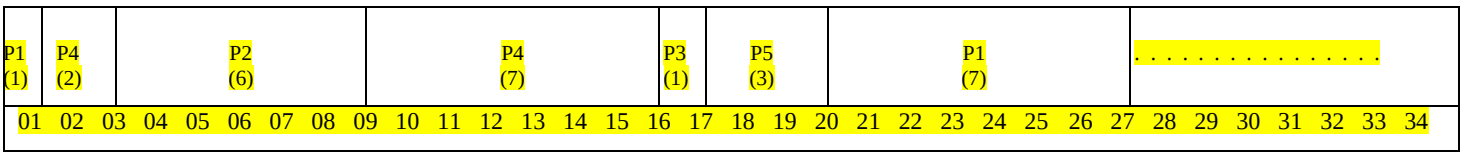


a-2 Compute the turnaround time of all processes [1 mark]

Process	Turnaround Time
P1	8
P2	20
P3	19
P4	16
P5	15

(b) <u>Pre-emptive</u> Priority Scheduling [3 marks]:

b-1- Draw Gantt chart illustrating the execution of these processes using pre-emptive priority (a smaller priority number implies a higher priority) [2 mark]



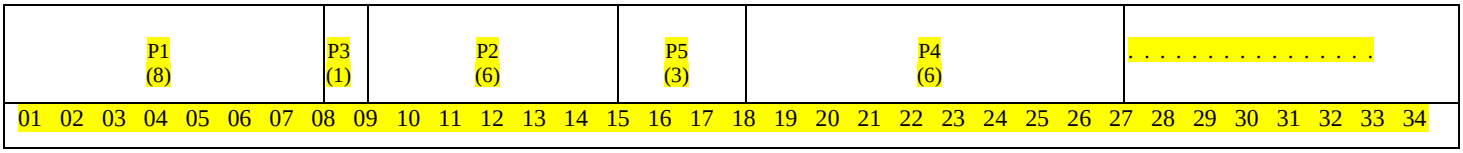
b-2 Compute the Response time of all processes [1 mark]

Process	Response Time
P1	0
P2	0
P3	11
P4	0
P5	5

(c) Non <u>Pre-emptive</u> Shortest Job First [3 marks]:

b-1- Draw Gantt chart illustrating the execution of these processes using Non pre-emptive Shortest Job First scheduling algorithm [2 mark]

Process	Burst	Priority	Arrival Time
P1	8	4	0
P2	6	1	3
P3	1	2	5
P4	9	2	1
P5	3	3	12



b-2 Compute the Waiting time of all processes [1 mark]

Process	Waiting Time
P1	0
P2	6
P3	3
P4	17
P5	3

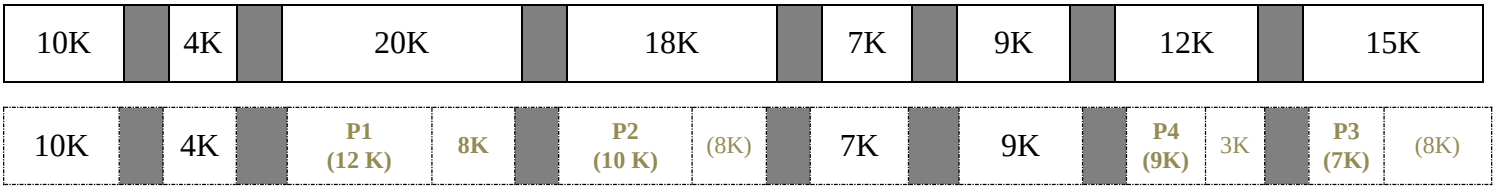
Question 4. [2 marks]
Consider that the memory is in the following situation:

Having 8 memory frea areas of 10KB, 4KB, 20KB, 18KB, 7KB, 9KB, 12KB, and 15KB (in order), if the following processes need to get memory:

Process	Memory Requirement
P1	12 KB
P2	10 KB
P3	7 KB
P4	9 KB
P5	11 KB

Use the first-fit, algorithms to place the processes in the memory maps given below.

Here is an example:



First fit