Kingdom of Saudi Arabia
Ministry of Education
College of Computer
Department of Computer Science

بسم الله الرحمن الرحيم

Qassim University
College Of Computer

المملكة العربية السعودية
وزارة التعليم
كلية الحاسب
قسم علوم الحاسب

Course: CS222 "Operating Systems"
Semester 451- 2023

(A)

Mark 26 /30

Duration: 1 hour
Day 26/10/2023

Student Name: [redacted] Student ID: [redacted]

For Instructor use only

Outcomes	1	2	3	4	5	6
Course covering Outcomes	√				√	

Question	1	2	3	4	5
Covered Outcome	1,5	1,5	1,5	1,5	1,5
Allocated mark	6	6	6	6	6
Earned mark	6	6	2	6	6

Total		
1	5	Exam
15	15	30

Question 1, 1x6=6 Marks

6

Choose correct (best match) one of the four given answers:

1. **The queue which contains a set of all processes in the system:**
   a. The Job Queue. b. The Ready Queue
   c. The Waiting Queue d. The Device Queue.

2. **The scheduler that selects which process should be executed next and allocates CPU is called:**
   a. Long-term scheduler b. Medium-term scheduler
   c. Short-term scheduler d. High-term scheduler

3. **If the CPU generated a logical address = 501 and the value of the relocation register = 1320, the physical address will be:**
   a. 2740 b. 1821
   c. 902 d. 819

4. **It is a process that cannot affect or be affected by other processes executing in the system:**
   a. A Cooperating process b. An Independent process
   c. A Passive process d. A Terminated process

5. **An abstract hardware of a single computer into several different execution environments:**
   a. Virtual machine. b. Live migration
   c. Cloud computing d. Network Address Translation (NAT).

6. **Which of the following is not an advantage of multiprocessors systems:**
   a. Increasing throughput b. Reducing reliability
   c. Economy of scale d. Fault tolerance

Question 2, 1x6=6 Marks

6

Mark the below Statements True or False:

1. Binary semaphore contains an integer value that can range over an unrestricted domain. [F]
2. When the time quantum increases, the number of context switches increases. [F]
3. The MMU maps the virtual address generated by the CPU to its physical address. [T]
4. Protection is used to defense of the system against internal and external attacks. [F]

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5. SJF scheduling gives maximum average waiting time for a given set of processes. [F]
6. CPU utilization means keeping the CPU as busy as possible. [T]

Question 3, 1x6=6 Marks

Fill in the blank with the exact Word or Phrase:

1. Entity containing file system is known as a volume
2. security defense of the system against internal and external attacks.
3. Peterson's Solution is a solution to the Critical Section problem.
4. A file system must be mounted before it can be accessed.
5. Cooperating process can affect or be affected by the execution of another process.
6. A program must be brought from from disk into memory and placed within a process for it to be run.

Question 4, (3 + 3 respectively) =6 Marks

Short answer type questions:

1. List four different possible states for a process?

1- New
2- Waiting
3- Ready
4- Running
5- Terminated

Starvation → low p may never exe
Aging time Progress in Pro Pri

2. In priority scheduling techniques low priority processes may never execute, what is this problem called and what is the solution to prevent such a problem?

It called Starvation
and the solution is Aging

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Question 5, =6 Marks

Consider the following table:

Process	Duration (Burst time)
P1	21 4
P2	3 2
P3	6 3
P4	2 1

P4	P2	P3	P1

6

SJF

Assume that all processes arrived at time 0, use the Non Pre-emptive Shortest Job First scheduling technique, draw the Gantt chart for the processes, and calculate the average waiting time.

P4	P2	P3	P1
2	5	11	32

$Avg = \frac{2 + 5 + 11}{4} = \frac{18}{4} = 4.5$

Good luck
Dr. Sualaiman Al amro