

King Saud University College of Computer and Information Sciences

Computer Science Department

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		Cou	urse Code: CSC 227			
		Cou	urse Title: Operating Syste		ms	
		Sem	nester: Spring 2017			
		Туре	of Examination:	am.		
Studen	t Name:				Exam du	ration:
Studen	t ID:				90	
Studen	t Section No.				minutes. 04 May 2017	
Instruc	ctor Name:					
Tick the Relevant	Computer Sci	ience B.S	Sc. Program ABET Student Outcomes		Question No. Relevant Is Hyperlinked	Covering %
Х	a) Apply knowled the computer s	lge of co cience;	omputing and mathematics appropriate to		1	25%
X b) Analyze a problem, ar requirements appropr			nd identify and define th iate to its solution	e computing	2-3	50%
X c) Design, implement and component, or progra			ad evaluate a computer-based system, process, am to meet desired needs;		4	25%
X d) Function effectively o		tively on	1 teams to accomplish a	common goal;		
			<u>Full Mark</u>		Student's	Mark
Question No.1			4			
Question No.2			<u>3</u>			
Question No.3			<u>3</u>			
Question No.4			<u>1(</u>	<u>0</u>		
<u>Total</u>			<u>20</u>	<u>0</u>		

Question 1. [4 marks] Select ONLY ONE ANSWER (the best answer).

Copy your answer for question 1-1 to 1-8 in the table on page2. ONLY THAT TABLE WILL BE GRADED.

1. In Unix operating system, which system carcine creates the new process?	
Α.	fork()
В.	create()
C.	new()
D.	none of the mentioned

3.	A process is a program in execution that includes:
Α.	program counter
В.	stack
C.	data section
D.	all the above mentioned

5.	Parent process may terminate execution of children processes in case of:
A.	Child has exceeded allocated resources
B.	Task assigned to child is no longer required
C.	If parent is exiting
D.	all the above mentioned

2.	Collection of process's attributes used by the operating system referred as a
A.	Process Location Block
В.	Process Creation Block
C.	Process Execution Block
D.	Process Control Block

4.	The processes that are residing in main memory and are ready and waiting to execute are kept on a list called:				
A.	job queue				
В.	ready queue				
C.	execution queue				
D.	process queue				

6.	Which of the following is not the state of a process?
A.	New
B.	Old
C.	Waiting
D.	Running

7.	In designing a CPU scheduling algorithm, some targets are desirable to achieve such as
А.	Minimizing Average Turnaround Time
B.	Minimizing Average Waiting Time
C.	Maximizing CPU Utilization and throughput
D.	All of the above

8.	Applying SJF scheduling algorithm require the prediction of next CPU Burst, this can be done through		
A.	Ask the user		
B.	Assume the next CPU burst would be the same		
	as last one		
C.	Use Exponential Averaging to predict next		
	CPU burst		
D.	All of the Above		

1.	2.	3.	4.	5.	6.	7.	8.

Question 2. [3 marks]

2.1 What are the two models of inter-process communication (IPC)? (1 Point)

- A. Shared memory
- B. Message passing

2.2 The following incomplete scenarios show the two models of inter-process communication between process A and process B.

process A
M

process B
M

process B
M

process B
M

kernel
M

(a)
(b)

Using arrows complete each model scenario and give the name of the communication model? (2 Points)

Question 3. [3 marks]

When CPU switches to another process, the system must save the state of the old process and load the saved state for the new process via a context switch.

3.1 What represents the context of a process? (0.5 Mark)

PCB

3.2 On what depend the context switch time? (0.5 Mark)

Time dependent on hardware support and the size of the PCB.

3.3 Complete the diagram of a process state, with all possible conditions of migration between the different states: (2 Mark)



Question 4. [10 marks]

Suppose that the following processes arrive for execution at the times indicated below. Each process will run for the amount of the time listed as burst time.

In answering the questions, please use the specified scheduling algorithm, and base all decisions on the information you have at the time the decision must be made.

Process	Arrival Time	Burst Time	
P1	0	4	
P2	2	6	
P3	4	2	
P4	8	5	

4.1 Draw the Gantt chart for these processes with the FCFS scheduling algorithm (1 Mark).



4.2 Calculate the average turnaround time and average waiting time for these processes with the FCFS scheduling algorithm? Please use the table below (2 Mark)

	FCFS						
Process	Arrival Time	Burst Time	Turnaround Time	Waiting Time			
P1	0	4	4	0			
P2	2	6	8	2			
P3	4	2	8	6			
P4	8	5	9	4			
Average			7.25	3			

4.3 Draw the Gantt chart for these processes with Shortest Remaining Time First algorithm (Preemptive-SJF) (1 Mark).



4.4 Calculate the average turnaround time and average waiting time for these processes with the Shortest Remaining Time First (Preemptive-SJF) scheduling algorithm? Please use the table below (2 Mark)

SRTF						
Process	Arrival Time	Burst Time	Turnaround Time	Waiting Time		
P1	0	4	5	0		
P2	2	6	10	4		
P3	4	2	2	0		
P4	8	5	9	4		
	Average		6.25	2		

4.5 Draw the Gantt chart for these processes with Round Robin scheduling algorithm (1 Mark).



4.6 Calculate the average turnaround time and average waiting time for these processes with the Round Robin scheduling algorithm? Please use the table below (2 Mark)

		RR		
Process	Arrival Time	Burst Time	Turnaround Time	Waiting Time
P1	0	4	4	0
P2	2	6	14	8
P3	4	2	6	4
P4	8	5	9	4
	Average		8.25	4

4.7 As an operating system designer, which CPU scheduling algorithm would you choose and why? (1 Mark)

END OF EXAM