☒ Sessional-1   ☐ Sessional-II   ☐ Terminal Examination – FALL 2018

Course Title:	Operating Systems Concepts		Course Code:		CSC322 Credit Hours: 3(3.0)
Course Instructor/s:	Dr. M. Waqas Anwar, Dr. M. Hasan Jamal Mr. Nadeem Ghafoor Ch. Ms. Najam Us Sahar, Ms. Kanza Hamid		Programme Name:		BS Computer Science BS Software Engineering BS Computer Engineering
Semester:	5th	Batch: FA16	Section:	All C	Date: 15-Oct-2018
Time Allowed:	60 Minutes		Maximum Marks:		20
Student's Name:	M ISMAIL		Reg. No.		FA16-BSE-100

Important Instructions / Guidelines:
- Attempt all questions.

Question No. 1   [2+2+2=6 marks]

a) Describe the actions taken by a kernel to context switch between processes.

b) Why does thread switching take less time than process switching?

c) Describe the key difference(s) between the "User Mode" and "Kernel Mode". How does the OS know which mode the system is currently in?

Question No. 2:   [4 marks]

Draw the state transition diagram of the five process states from its creation to termination along with the description of various states.

Question No. 3:   [2+2+3+3=10 marks]

Assume that the following processes are the only processes in a computer system and that there are no input/output requests from all the given processes. Given the following arrival time, burst time and Priority for each process, draw the Gantt chart and compute the average waiting time for the following CPU scheduling algorithms:

Process	Burst Time	Priority	Arrival time
P0	8	5	0
P1	2	4	2
P2	1	6	4
P3	3	3	6

- First Come, First Served
- Shortest Remaining Time First
- Round-Robin with time quantum of 3, ignoring the context switch cost
- Preemptive Priority (A lower number indicates a greater priority)

☐Sessional-1 ☑Sessional-II ☐Terminal Examination– SPRING 2019

Course Title:	Operating Systems				
		Course Code:	CSD322	Credit Hours:	3(2,1)
Course Instructor/s:	Dr. Amjad Ali, Nadeem Ghafoor Chaudhry	Programme Name: BS CS			
Semester:	5th	Batch: BCS	Section:	A,B,C	
Time Allowed:	90 Minutes			Date:	30-04-2019
Student's Name:			Maximum Marks:		30
			Reg. No.		

Important Instructions / Guidelines:
- Attempt all questions.

Question # 1:

Suppose the following assembly language code is run concurrently by two threads: (6)

/* Thread A : */	/* Thread B: */
A1 : register1 = count;	B1: register2 = count;
A2 : register1 = register1 - 1;	B2: register2 = register2 + 1;
A3 : count = register1 ;	B3: count = register2;

A1
A2
B1
B2
A3
B3

Suppose before any of the code is run, the variable count contains the integer value 12.
a) Write a possible sequence of execution of the 6 instructions A1, A2, A3, B1, B2, B3 that produces the correct final result (count=12). B1,A1,B3,B3,B2,A2
b) Write a sequence of execution of the 6 instructions A1, A2, A3, B1, B2, B3 that produces an incorrect result (count=11). A1,A2,A3,B1,B3,B2

Question # 2:

Suppose processes P1, P2, P3 and P4 arrive in this order and have burst times 2, 3, 1, 5, 7 respectively. (6)
Using RR algorithm with quantum time of 3 units calculate average turnaround time. Make Gantt chart and show details of your calculation to get full credit.
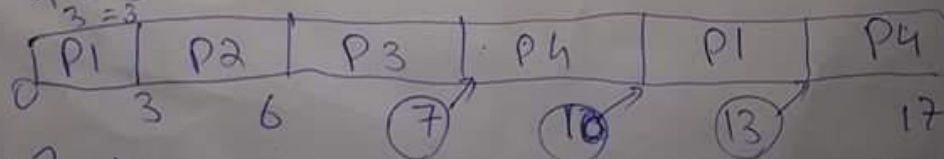
36, 3, 1, 7

Question # 3: Is the following system safe, under banker's algorithm? Justify your answer. (12)

	Maximum						Allocation						Available	
	P1	P2	P3	P4	P5		P1	P2	P3	P4	P5			
R1	2	5	6	1	7	R1	1	4	3	0	0	R1	1	
R2	2	1	5	4	5	R2	0	1	4	4	1	R2	0	
R3	2	4	4	1	2	R3	2	2	1	0	1	R3	1	

a) Calculate the Need matrix
b) Is the system in a safe state? If so, show one sequence of processes which allows the system to complete. If not, explain why. Show your computation step-by-step.

Question # 4: (6)

S1, S2, S3 and S4 are shared semaphores. Add the semaphores necessary to synchronize processes A, B, C, D, and E so that process A must finish executing before B starts, process B must finish before C or D starts, and process D must finish before process E starts. Show your solution. Remember to indicate the initial value of each semaphore. S1, S2, S3, S4 = 0

$\sqrt{5}$

$= (5)^{1/2}$

$9 = 3$

$3 = 3$

$\frac{47}{5} = 10$

P1	P2	P3	P4	P1	P4

0   3   6   (7)   (10)   (13)   17

7+13+...+ 43   17+13+7+10
17+13+7+6

10.5

30
13
43/5

17
13
7
6

17
13
7

Course Title:	Operating Systems			Course Code:		CSD322	Credit Hours:	3(2,1)
Course Instructor/s:	Dr. Amjad Ali, Nadeem Ghafoor Chaudhry			Programme Name:		BS Software Engineering		
Semester:	5ᵗʰ	Batch: BCS		Section:	A,B,C		Date:	18-03-2019
Time Allowed:		60 Minutes			Maximum Marks:			20
Student's Name:				Reg. No.				

Important Instructions / Guidelines:
- Attempt all questions.

Question #1: (3+3+3 = 9)
  a) What is the purpose of system call instructions? Describe three general methods for passing parameters to the operating system 2
  b) Describe the key difference(s) between the "User Mode" and "Kernel Mode". How does the OS know which mode the system is currently in? 3
  c) What resources are used when a thread is created? How do they differ from those used when a process is created? 2

Question # 2 : The following events may occur to a process. Identify the state it is in at the time of the event and the state it transitions to. (5) 5

Event	Starting state	Ending state
I/O complete	W	Ready
Process admitted to ready queue for first time	N	"
Scheduler preempts (interrupts) process	Run	Ready
Process finishes execution (task is complete)	"	term
Process initiates I/O	↵	waiting

Question #3 : (3+3)

  a) Compare User Level Threads and Kernel Level Threads. 3
  b) What is thread pool and what are its pros and cons. 2