



EAST WEST UNIVERSITY BANGLADESH
Department of Computer Science & Engineering

CSE325: Operating System (3)

Midterm II Exam

FALL 2016

Total Marks: 30

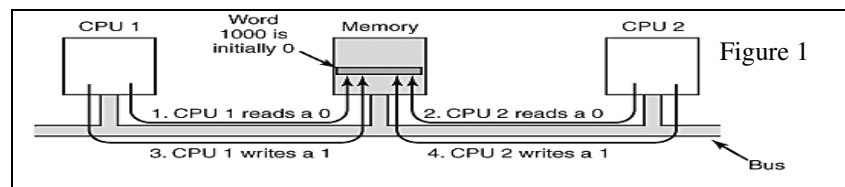
Instructor: Dr. Md. Shamim Akhter

Time: 90 minutes

1.

- a) OS provides two different models for inter process communication (IPC). What are the two (2) models? Explain which one is faster and why? (3)
- b) Suppose we want to solve the critical section problem in a single processor system. We have available either of the following two options:
 Option A: **Disable interrupts.**
 Option B: **Use a built-in synchronization hardware instruction, such as Test-and-Set Lock (TSL).** (3)
 - i. State one advantage of Option A over Option B.
 - ii. State one advantage of Option B over Option A.

- c) In figure 1, both CPU1 and CPU2 are executing **TSL instruction** with the same **shared Lock** variable and initialized to 0.



What kind of problem can occur in such circumstance and how does TSL solve the problem? (4)

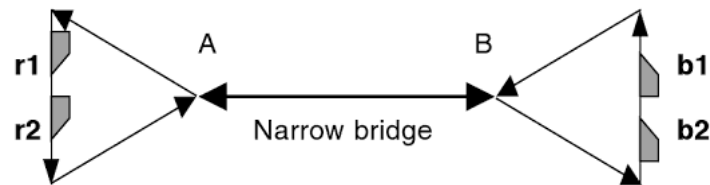
2. By “**Multilevel Queue Fixed priority**” scheduling algorithm, draw the CPU scheduling Gantt chart and complete waiting time table for the given processes information. (10)

	Queue Name	Process	Burst Time	Arrival Time	Algorithm
Highest Priority	1 st Foreground	P1	40	0	SRTF Preemptive
		P2	15	10	
		P3	45	20	
		P4	10	30	
	2 nd Foreground	P5	30	0	RR interval:20 Preemptive
		P6	10	110	
		P7	6	112	
		P8	4	280	
Lowest Priority	Background	P9	30	60	Semi SJF Preemptive
		P10	20	130	

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Waiting time										

3.

- a) Figure 2 shows a traffic route around the narrow bridge AB on a river. Two types of cars (red and blue) can move along the designated routes that involve indefinite number of trips across the bridge. The bridge is so narrow that at any time only one car can pass through the bridge.



Write the name of the suitable synchronized model and justify your answer to ensure

- **Mutual exclusion**, at most one car is on the bridge (AB) at any time.
 - **Bounded wait**, no car is indefinitely prevented to crossing the bridge.
 - **Relative speed**, any combination (Red after Red, Red after Blue, Blue after Red, and Blue after Blue) of car movement is possible to pass through the bridge.
 - **Note: think the red car as P_0 and the blue car as P_1 , and bridge AB as a critical section.** (4)
- b) Lamport's bakery algorithm ensures- **the process will come first will serve first**, in multi-process critical section solution. Is starvation possible with bakery algorithm? Why or Why not? (3)
- c) Write three differences between **monitor and counting semaphore**. (3)