



EAST WEST UNIVERSITY BANGLADESH
Department of Computer Science & Engineering

CSE325: Operating System

Final-Term Examination

Fall 2015

Total Marks: 30

Instructor: Dr. Md. Shamim Akhter

Time: 90 minutes

PART-I : Memory Management (15)

1.

- a) For each of the following decimal virtual addresses, compute the virtual page number and offset for a 1K (1024 bytes) page size. Thereafter, convert the virtual address to physical address using the given page table information. (2)

i. 4404 ii. 900

Virtual page	Valid	Physical page
0	No	
1	No	
2	Yes	1
3	No	
4	Yes	3
5	No	
6	Yes	0
7	Yes	2

- b) Consider the following **segment table** for **process X**:

Segment #	Base	Length
0	3000	450
1	2000	350
2	2650	350
3	1050	350

What are the physical addresses for the following logical addresses (Segment#, Offset)? (3)

i. 0,240 ii. 2,450 iii. 1,000

- c) If a system has **32-bit address space**, **four (4) kilobytes** (2^{12}) page size, and each page table entry consumes **four (4) bytes**, how much memory would be required to keep the entire page table in memory? (2)

2.

- a) FIFO is known to exhibit Belady's anomaly. Could LRU exhibit Belady's anomaly? Why or why not? (2)

- b) If FIFO page replacement is used with **four (4) frames (initially empty)**, how many page faults will occur with the following page references? (3)
0 1 7 2 3 2 7 1 0 3
- c) Calculate the page fault for the above problem with LRU page replacement. (3)

PART-II : Dead Lock, File and Storage Management (15)

3. Consider the following snapshot of a system:

	<u>Allocation</u>				<u>Max</u>				<u>Available</u>			
	A	B	C	D	A	B	C	D	A	B	C	D
P₀	0	0	1	2	0	0	1	2	2	1	0	5
P₁	2	0	0	0	2	7	5	0				
P₂	0	0	3	4	6	6	5	6				
P₃	2	3	5	2	4	3	5	6				
P₄	0	3	3	2	0	6	5	2				

Answer the following questions using the **banker's algorithm**:

- What is the content of **Need matrix**? (1)
 - Is the system in a **safe state**? (4)
- 4.
- What file access pattern is particularly suited to **chained file allocation** on disk? (1)
 - What file allocation strategy is most appropriate for **random access files**? (1)
 - Consider a system that supports the strategies of **contiguous, linked and indexed** allocation. What criteria should be used in deciding which strategy is best utilized for a particular file? (3)
5. Disk requests come into the disk driver for cylinders **10, 22, 20, 2, 40, 6, 38** (in that order). A seek takes **five(5) msec** per cylinder moves. How much seek time is needed for:
- First-come, first served. (1)
 - Shortest seek time first or Closest cylinder next. (2)
 - Look or Elevator algorithm (initially moving upward). (2)

In all cases, **the disk head is initially at cylinder 20.**