



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, virtual page number and offset for a 4-KB page and for an 8KB page: **20000, 32768, 60000** (2)
 - b) Write the difference between internal & external fragmentation. Which of these is exhibited by a paged memory scheme? Which is exhibited by a segmented memory scheme? (2)
 - c) Suppose a system has **48-bit virtual addresses**, and **32-bit physical addresses**. If pages are 4KB, how many entries are in the page table? (2)
2.
 - a) Consider a swapping system in which memory consists of the following hole sizes in memory order: **10KB, 4 KB, 20 KB, 18 KB, 7 KB, 9KB, 12 KB** and **15KB**. Which hole is taken for successive segment requests of
 - i. 12 KB
 - ii. 09 KB
 for first fit (from the beginning)? Now repeat the question for best fit and worst fit. (3)
 - 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)

2 1 3 2 1 4 7 1 3 0
 - 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	1	5	2	0
P₁	1	0	0	0	1	7	5	0				
P₂	1	3	5	4	2	3	5	6				
P₃	0	6	3	2	0	6	5	2				
P₄	0	0	1	4	0	6	5	6				

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

- a) What is the content of **Need matrix**? (1)
- b) Is the system in a **safe state**? (4)

- 4.
- Contiguous allocation of files leads to disk fragmentation, because some space in the last block will be wasted in files whose length is not an integral number of blocks. Is this internal fragmentation or external fragmentation? (2.5)
 - Use the given information to calculate the average disk access time for one sector, in milliseconds. The average seeks time 7 ms, transfer rate 6 MB/sec rotation speed 5000 RPM, sector size 1024 bytes and controller overhead 2 ms. Assume the queue is idle (no service time). (2.5)
5. Disk requests come into the disk driver for cylinders are presented in the following table. In all cases, **the disk head is initially at cylinder 4**. Find the average number of seeks for the given approaches:
- First-come, first served. (1.5)
 - Shortest seek time first or closest cylinder next. (1.5)
 - Look or Elevator algorithm (moving upward). (2)

Cylinder #	Request Time
33	2.230
117	3.123
30	4.230
37	6.230
35	8.230
10	10.230
191	12.123
32	12.230
36	14.230
198	15.123