BRAC University, Dhaka Department of Computer Science and Engineering
CSE321: Operating Systems
Quiz - 4

Marks: 15 **Time: 25 Min**

Name:	ID:	Section:

1. Determine if the following sentences are true or false. For any false sentence, write its correct form. 3*1 = 3

   i. TLBs are used to reduce memory access time. (T)

   ii. In the worst-fit, the smallest hole that is big enough is allocated. (F)

   The largest hole is allocated in the worst-fit scenario.

   iii. MMU translates a physical address to a logical address. (F)

   MMU translates a logical address to a physical address.

2. What is an external fragmentation? How can you handle external fragmentations in your system? 2

   External fragmentation occurs due to situation where there are enough total memory spaces to satisfy a request, but these spaces are not contiguous, hence, cannot be allocated.

   Compaction is the technique to handle external fragmentations. (Paging, half mark)

3. Suppose there is a process P with 16 bytes and a page size of 4 bytes. The main memory size is 28 bytes. The page table for P is: 2 + 2 + 2

p	f
0	4
1	0
2	3
3	6

   Find the physical addresses of these logical addresses: 0100 and 1101 and draw the mapping.

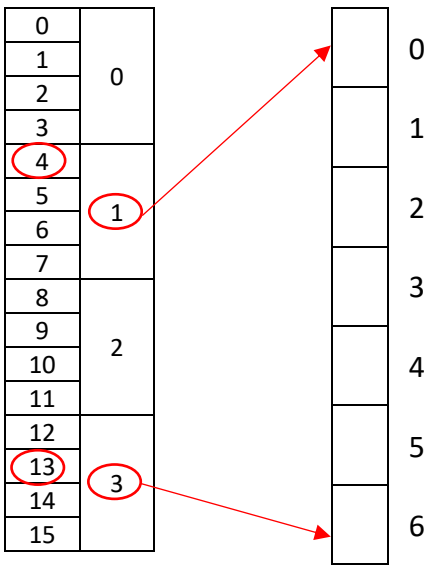
   $(0100)_2 = (4)_{10}$, $0 * 4 + 0 = (0)_{10} = (00000)_2$

   $(1101)_2 = (13)_{10}$, $6*4 +1 = (25)_{10} = (11001)_2$

   Alternative approach:

   001 00, 1 -> 0, $0 *4 + 0 = (0)_{10} = (00000)_2$

   011 01, 3 -> 6, $6 *4 + 1 = (25)_{10} = (11001)_2$



4. Assume that ε = 9ns and it takes 120ns for memory access. Calculate EAT for α = 80% and α = 90%. 2 + 2

   EAT = 0.8 x 129 + 0.2 x 249 = 153ns

   EAT = 0.9 x 129 + 0.1 x 249 = 141ns