

UECS2103 Operating Systems
Tutorial 7

1. What is the difference between simple paging and virtual memory paging?
2. Briefly describe thrashing.
3. What is translation lookaside buffer and what is the purpose of translation lookaside buffer?
4. Translate the following 16-bit virtual addresses (the first 8 bits yield to page number, the last 8 bits yield to offset) to their corresponding real addresses (in decimal) based on the information given in Figure 1.

- i. 1001110001110101
- ii. 0010001100011011
- iii. 0010010011010001

Page #	Frame #
24	259
102	125
156	992

TLB

	Frame #
34	356
35	357
36	-

Page table

Figure 1

5. A process is divided into six pages on disk and is assigned a fixed allocation of three page frames in the main memory. The following page trace occurs:

1 2 5 1 3 2 4 5 2 4 3 5 6 2 4 1 6

Assume that the frames are initially empty. Show the successive pages residing in the three frames using:

- a. LRU replacement policy.
 - b. FIFO replacement policy.
 - c. Clock replacement policy.
6. Consider a user process of 8GB, is divided into pages, each page is 8KB and each page table entry is 4 bytes. How much memory space required to store the
 - a) page table when simple paging is applied?
 - b) root page table when 2-level scheme paging is applied?
 7. Consider the page table for a process as shown below. All numbers are decimal, all addresses are memory byte addresses and the page size is 1024 bytes.

Virtual page number (VPN)	Page frame number (PFN)
0	4
1	7
2	-
3	2
4	-
5	0

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Determine the physical address, if any, for the following virtual addresses.

- a) 1052
 - b) 2221
 - c) 5499
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- 8. Briefly describe the translation of virtual address of a segment to its corresponding real address.
 - 9. Briefly explain the combination of segmentation and paging schemes in memory management.