**TANNENBAUM Book questions**

**Chapter 3**

**Questions: 2,4,5,6,7,20,24**

|  |
| --- |
| **Memory Management** |

1. Consider a logical address space of 64 (or 26) pages of 1,024 (or 210) bytes each, mapped onto a physical memory of 32 (or 25) frames.
   1. How many bits are there in the logical address?
   2. How many bits are there in the physical address?
2. Page Address Translation

Assuming a 1 KB page size, what are the page numbers and offsets for the following address references (provided as decimal numbers):

1. 2375
2. 19366
3. 30000
4. 256
5. 16385
6. Sharing memory pages
   1. What is the effect of allowing two entries in a page table to point to the same page frame in memory? Explain how this effect could be used to decrease the amount of time needed to copy a large amount of memory from one place to another.
   2. What is the copy-on-write feature, and under what circumstances is it beneficial to use this feature?
7. Given five memory partitions of 100 KB, 500 KB, 200 KB, 300 KB, and 600 KB (in order), how would the best-fit, and worst-fit algorithms place processes of 212 KB, 417 KB, 112 KB, and 426 KB (in order)? Which algorithm makes the most efficient use of memory?

200 KB

100 KB

500 KB

600 KB

300 KB

|  |
| --- |
| **Virtual Memory** |

1. Under what circumstances do page faults occur? Describe the actions taken by the operating system when a page fault occurs.
2. Define Working Set Model.
3. What is the advantage of memory mapped files
4. Consider the following page reference string:

1, 2, 3, 4, 2, 1,5,3,6,7,2,1,2,3,7,6,3,5

How many page faults would occur for the following replacement algorithms, assuming, three, frames? Remember that all frames are initially empty, so your first unique pages will cost one fault each.

1. (10 pts) LRU replacement

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

1. (10 pts) Second chance replacement, aka clock replacement

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |