2013 - 2014 Thema 2.1 ITSD

BSS Exercises Week 4

Chapter 8

Exercise 1.1 Page sizes
Why are page sizes always powers of 2?

Exercise 1.2 Paging
On a system with paging, a process cannot access memory that it does not own; why? How could the operating system allow access to other memory? Why should it or should it not?

Exercise 1.3 Memory Reference
Consider a paging system with the page table stored in memory.
a) If a memory reference takes 160 nanoseconds, how long does a paged memory reference take?
b) If we add associative registers, and 75 percent of all page-table references are found in the associative registers, what is the effective memory reference time? (Assume that finding a page-table entry in the associative registers takes zero time if the entry is there .)

Exercise 1.4 Memory Partitions
Given five memory partitions of 100 KB, 500 KB, 200 KB, 300 KB,and 600 KB (in order), how would each of the first-fit, best-fit, and worst-fit algorithms place processes of 312 KB, 217 KB, 112 KB, and 426 KB (in order)? Which algorithm makes the most efficient use of memory?

Exercise 1.5 Page Numbers
Assuming a 1-KB page size, what are the page numbers and offsets for the following address reference s (provided as decimal numbers)?

a) 2275
b) 18764
c) 29000
d) 254
e) 16384

Chapter 9

Exercise 2.1 Page Reference String
Consider the following page reference string:

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

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

- FIFO replacement
- Optimal replacement
- LRU replacement

Example Table

Page Reference String Page Faults

Frames	1	3	2	4	2	1	5	3	2	1	6	3	7	6	3	2	1	7	3	6	
1																					
2																					
3																					
4																					
Fault																					= 0

Frames	1	3	2	4	2	1	5	3	2	1	6	3	7	6	3	2	1	7	3	6	
1																					
2																					
3																					
4																					
5																					
6																					
Fault																					= 0

Exercise 2.2 Copy-on-write
What is the copy-on-write feature and under what circumstances is it beneficial t o use this feature?
What is the hardware support required to implement this feature ?

Exercise 2.3 Hit ratio of the TLB
Explain the term hit ratio.

Exercise 9.43 TLB Reach
Explain the term TLB reach. And explain three ways of how to increase the TLB reach.