SOFT400227: Operating System 2022-Fall
Homework-**8** Solutions

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2022 年 10 月 30 日

Honor Code: I promise that I finished the homework solutions on my own without copying other people's work.

Memory Management

9.4

virtual address: $11123456_{16} = 0001000100010010001101000101 0110_2$
virtual-memory has $\dfrac{2^{32}}{4096} = 2^{20}$ pages.
physical-memory has $\dfrac{2^{18}}{4096} = 2^{6}$ pages.

So the first 20 bits of virtual address should be translated into 6 bits by page-table and the 6 bits result should combine with other 12 bits to generate physical address.

Page tables are in hardware, but a little software is needed to tell CPU to use it.

9.10

The system takes too much memory of paging disk. If the degree of multiprogramming decreases or the physical memory is improved the process will page fault less frequently.

a. No.

b. No.

c. No. Contrary effect.

d. Yes.

e. Yes if the memory is big enough.

f. Yes. The same reason as e.

g. Yes since CPU can transfer data faster.

h. Yes since page fault will be less and more data will be transferred once.

9.13

a.

1. initial value is 0;

2. when the page is accessed, add by 1;

3. when the page is replaced, decreased to 1;

4. choose the smallest counter, and if number is equal, FIFO.

b.

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1-4	**5**	**3**	4	**1**	**6**	**7**	**8**	**7**	**8**	**9**	**7**	**8**	**9**	**5**	**4**	**5**	**4**	**2**
1 1	**5 1**	5 1	5 1	5 1	**6 1**	6 1	6 1	6 1	6 1	**9 1**	9 1	9 1	**9 2**	9 2	**4 1**	4 1	**4 2**	4 2
2 1	2 1	2 1	2 1	**1 1**	1 1	**7 1**	7 1	**7 2**	7 2	7 2	**7 3**	7 3	7 3	7 3	7 3	7 3	7 3	**2 1**
3 1	3 1	**3 2**	3 2	3 2	3 2	3 2	**8 1**	8 1	**8 2**	8 2	8 2	**8 3**	8 3	8 3	8 3	8 3	8 3	8 3
4 1	4 1	4 1	**4 2**	4 2	4 2	4 2	4 2	4 2	4 2	4 2	4 2	4 2	4 2	**5 1**	5 1	**5 2**	5 2	5 2

c.

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1-4	5	3	4	1	6	7	8	7	8	9	7	8	9	5	4	5	4	2
1					6		8											2
2	5																	
3						7									4			
4										9								

Other things

LaTeX code refer to these things and was complied on texlive2020.

- UCB-CS70's given homework template.

- A free website useful to edit LaTeX formula code.

- A free website helpful to generate LaTeX table.

Some description refer to *Operating System Concepts 10th*, Wikipedia and Professor.Tian's PPT.

The purpose of writing in English is to adapt to bilingual teaching and to improve my poor English writing skills in preparation for a possible future exchange program.

Thanks for your correcting and grading :).