SOFT400227: Operating System 2022-Fall
Homework-**7** Solutions

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

Memory Management

8.1

	Internal Fragmentation	External Fragmentation
what	allocated but not actually used by program	too short to store a program: unallocated
reason	fixed size allocation	variable size allocation
how to solve	dynamic memory blocks	paging, segmentation

表 1: Difference between Internal Fragmentation and External Fragmentation

8.3

Obviously, Best-fit is the most efficient algorithm.

memory partitions	First-Fit	Best-Fit	Worst-Fit
100 KB			
500 KB	212 KB (288 KB left) $\rightarrow$ 112 KB (176 KB left)	417 KB (83 KB left)	417 KB (83 KB left)
200 KB		112 KB (88 KB left)	
300 KB		212 KB (88 KB left)	
600 KB	417 KB (183 KB left)	426 KB (174 KB left)	212 KB (388 KB left) $\rightarrow$ 112 KB (276 KB left)
no enough memory for	426 KB		426 KB

表 2: Allocation Result Chart

8.9

a.

Answer: $2 \times 200 \text{ ns} = 400 \text{ ns}$

It's required to access memory twice for paging, one to get physical address and another to get target memory.

b.

Answer: $75\% \times 200$ ns $+ (1 - 75\%) \times 200$ ns $\times 2 = 250$ ns

When a physical is in TLB, only one memory access is need.

8.12

	logical address	Segment	Base	Offset	physical address
a.	0,430	0	219	430	649
b.	1,10	1	2300	10	2310
c.	2,500	2	90	500	error (500>100)
d.	3,400	3	1327	400	1727
e.	4,112	4	1952	112	error (112>96)

表 3: physical addresses

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 :).