104062203 陳涵宇

1. Problem Set

1. Consider a logical address space of 256 pages, with a 4KB page size, mapped onto a physical memory of 64 frames.

a. How many bits are required in the logical address?

b. How many bits are required in the physical address?

256 pages = 2^8 pages (8 bits).

4KB page size = 2^{12} Bytes page size (12 bits).

64 frames = 2^6 frames (6 bits).

a. 8 + 12 = 20bits

b. 12 + 6 = 18bits

2. Consider a computer system with a 32-bit logical address and 4-KB page size. The system supports up to 512-MB of physical memory. How many entries are there in each of the following?

a. A conventional single-level page table

b. An inverted page table

4KB page size = 2^{12} Bytes page size (12 bits).

512-MB of physical memory = 2^{29} Bytes (29 bits)

a. $2^{32} / 2^{12} = 2^{20}$ entries

b. $2^{29} / 2^{12} = 2^{17}$ entries

3. Consider the following segment table:

Segment	Base	Length
0	219	600
1	2300	14
2	90	100
3	1327	580
4	1952	96

What are the physical addresses for the following logical addresses?

a. 0, 430 (segment#, logical address)

b. 1, 10

c. 2, 500

d. 3, 4000

e. 4, 112

a. 219 + 430 (< 600) = 649

b. 2300 + 10 (< 14) = 2310

c. illegal, since 500 > 100

d. illegal, since 4000 > 580

e. illegal, since 112 > 96