

# Assignment 7, Operating Systems

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Ch 7 problems: 7.2, 7.6, 7.7, 7.8, 7.12, 7.13, 7.14

## 7.2 8 bits

**7.6** This isn't first-fit; otherwise, X would have been placed in 4M.

This isn't best-fit; otherwise X would have been placed in 2M

It must be next fit where the pointer was at the beginning of X. This implies that X was placed in a 7M free block and that 1M was freed afterwards.

With best-fit, the 3M is placed in the 3M free space. With first-fit, it is placed in the 4M space. With next-fit, it is placed in the 5M. With worst-fit, it is placed in the 8M.

**7.7** 1M is split in half continuously until the left side gets a 128 block which 70 occupies.

70's buddy is split into 64's and 35 occupies the left side.

The leftmost 256 is split into 128s and the 80 occupies the left side.

Return A frees the leftmost 70 (assuming A refers to that).

Request 60 splits the leftmost unoccupied 128 into 64s and occupies the left side.

Return B frees the 35 and unsplit the leftmost 64s and then unsplit the leftmost 128s

Return D frees the 60, which frees the 64 buddies into 128.

Return C frees the 128, which frees its buddy into 256, which then frees its original buddy into 512, which then frees the very first buddy into 1M

**7.8** (Assuming we are the left buddy)

Its buddy is 011011110100 if the block is 4 bits

Its buddy is 011100000000 if the block is 16 bits

**7.12** 16+10 bits in the logical address.

$2^{10}$  bytes in a frame.

22 bits to address a frame.

$2^{16}$  entries in the page table.

23 bits in each page table entry.

- 7.13** The first 8 bits address pages, and the last 8 bits address the frame. So if the 8 bit page number is 20 in decimal, then its frame number is 5. Then the translation is 0000010110111010.

Rightmost 10 bits offset the address. Leftmost 6 specify segment number, which is 5 in decimal. Then simply add  $4096 \cdot 5 + 22$  with the base 10 of 10111010.

- 7.14** 858

378

c faults.

1440

882