

CS 326 Allocation Scenarios

Debugging

gdb

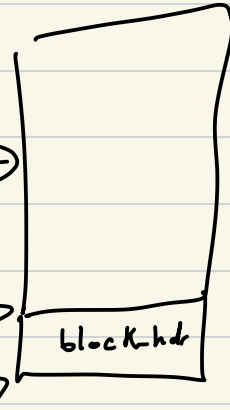
Roocode

memtest

free(p)

free(p)

free(np)



struct block_hdr *bp:

$$bp = (p - \underset{\uparrow}{\text{sizeof}(\text{struct block_hdr})})$$

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(void*)

$$bp = (\text{struct block_hdr} *) (p - \text{sizeof}(\text{struct block_hdr}));$$

$$bp = ((\text{struct block_hdr} *) p) - 1;$$

Heap Sanity Checking

struct

block_hdr {

[uint magic_top = 0xDEADBEEF

struct list_elem elem;

uint size;

uint used;

char name[8];

[uint magic_bottom = 0xAAAAAA00

char *cp;

cp = (char *) malloc(100);

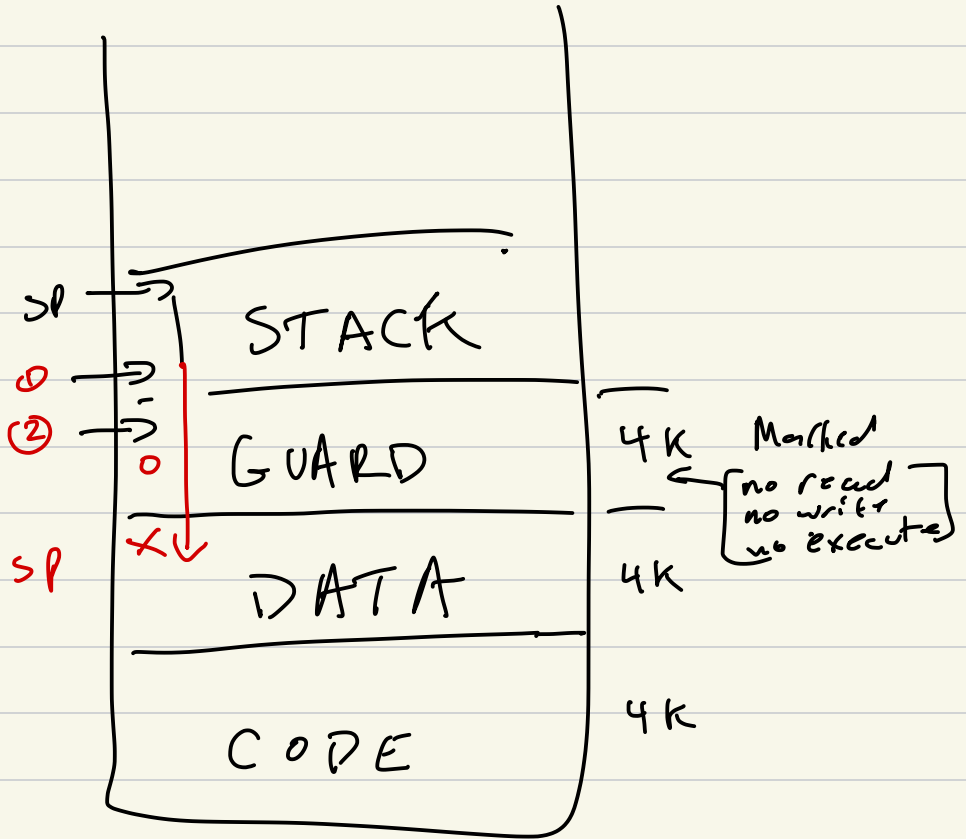
...

cp = cp + 50;

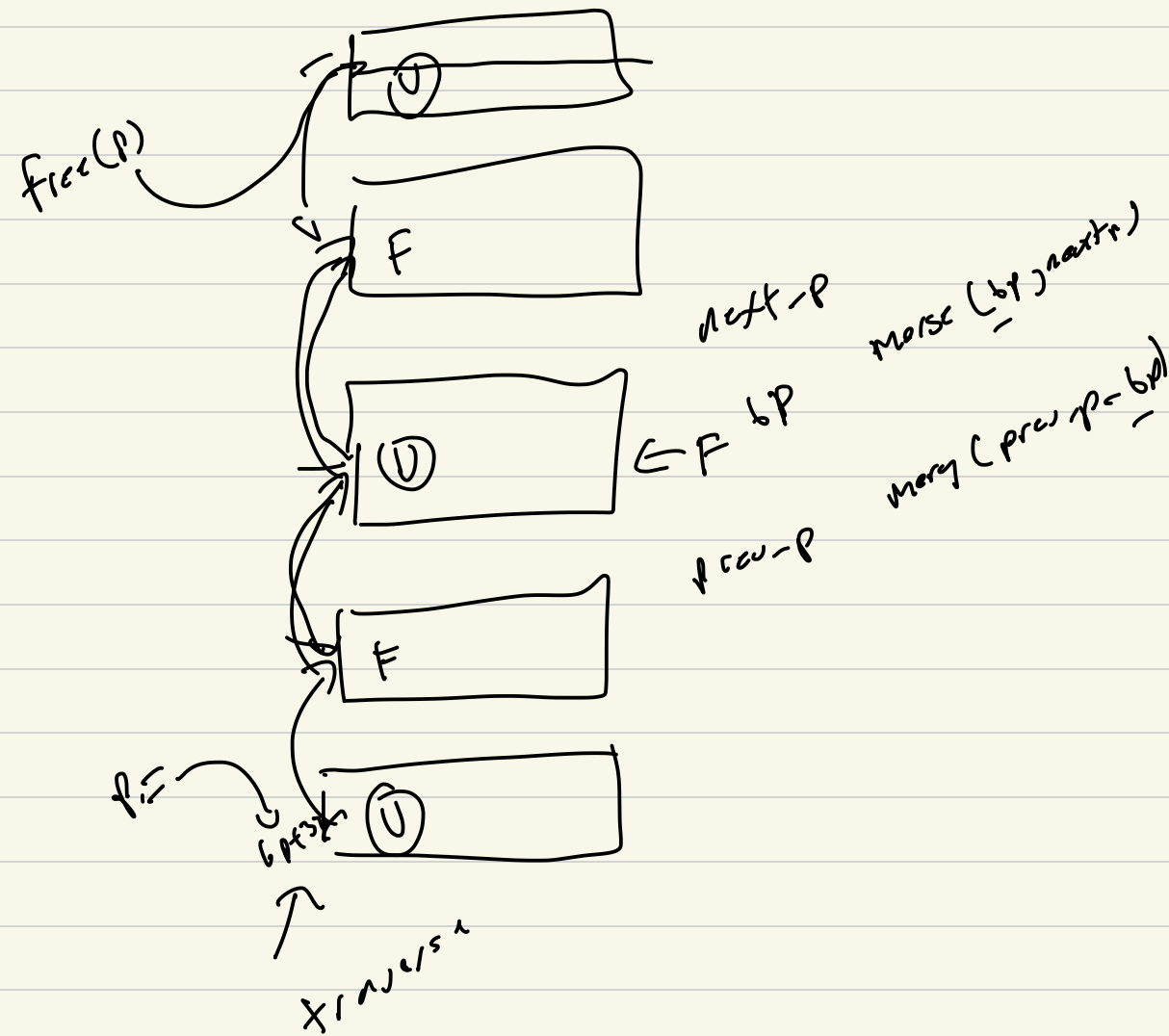
cp[5] = 'a';

free(cp)

Guard Page

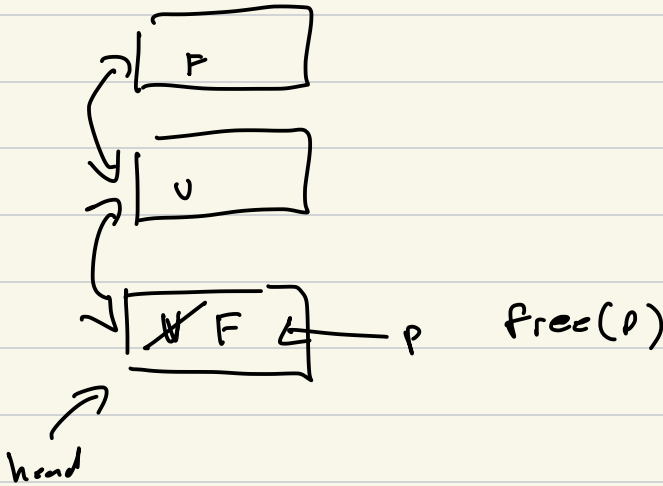


Validate p from free(p)

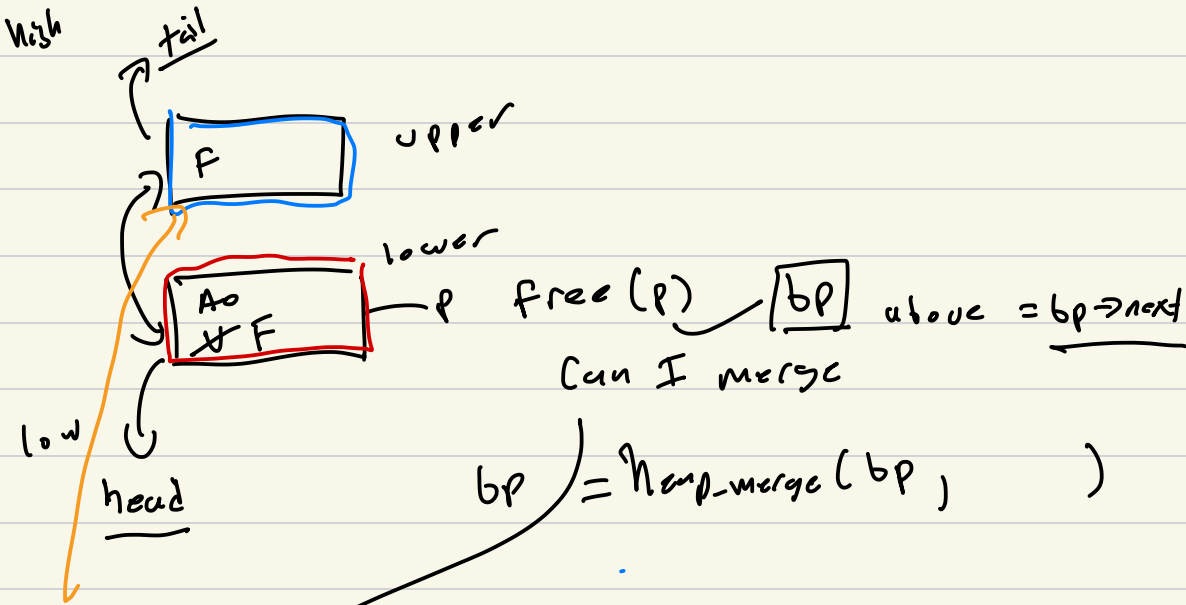


Merging Free Blocks

No merging



Simple merge



struct block_hdr *

heap_merge (struct block_hdr * below,
struct block_hdr * above)

Can I merge?

if (below->used == 0 && above->used == 0)

below + sizeof(struct block_hdr) + below->size
=
above
}