CS 1550

Week 9 – Lab Assignment 3

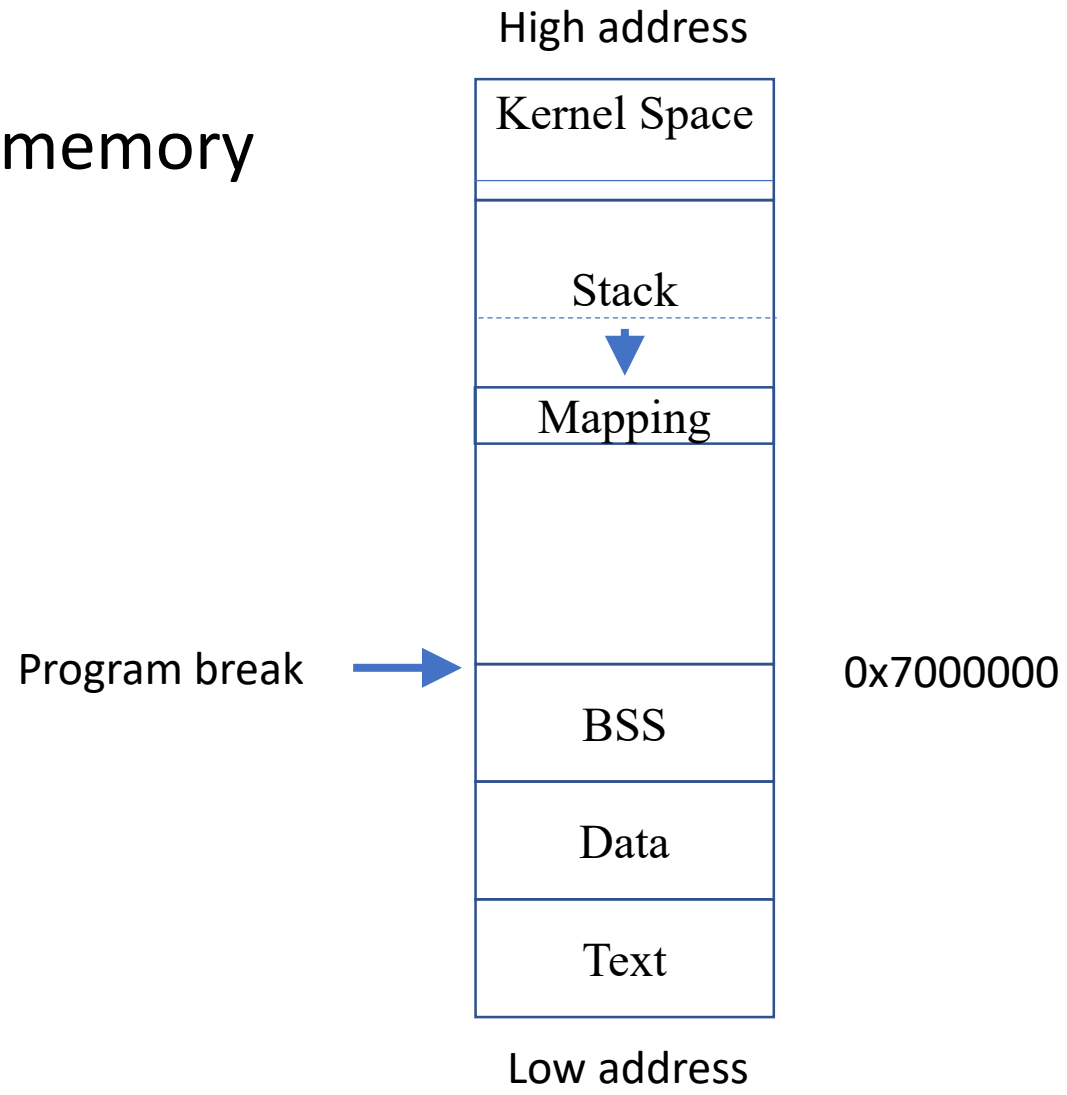
Pt 2

Teaching Assistant

Henrique Potter

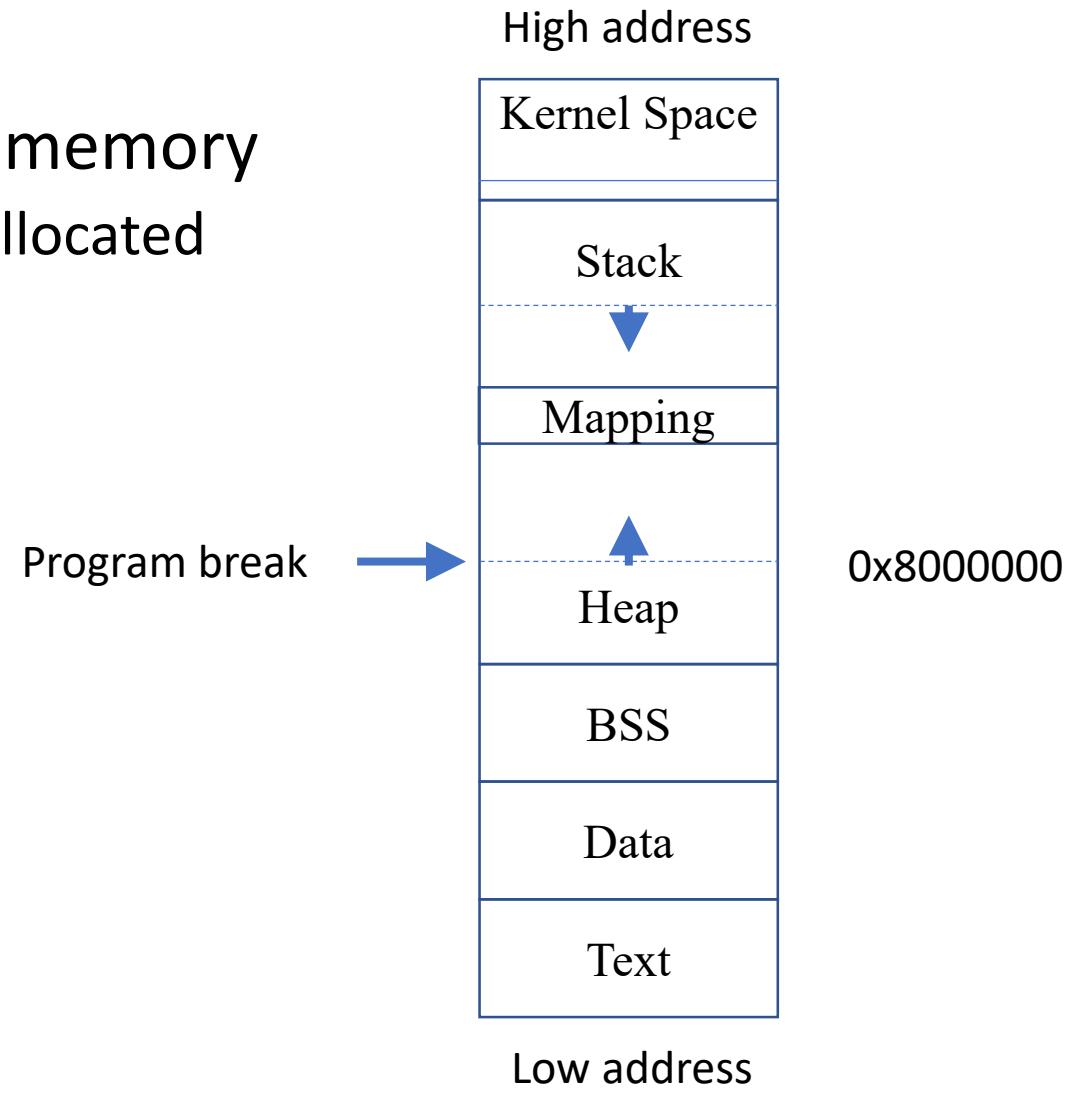
xv6 allocates memory statically

- User asks for 10MB of memory



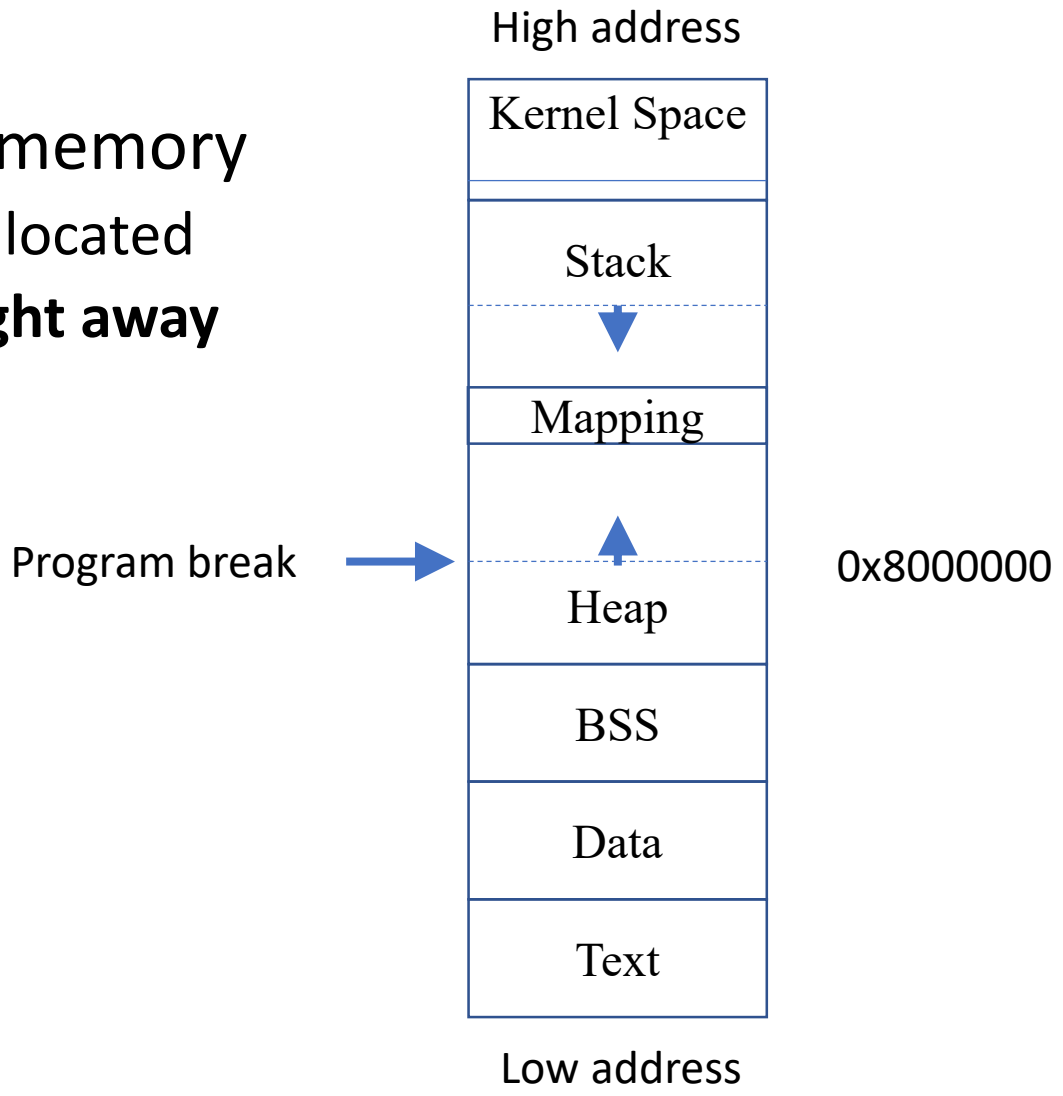
xv6 allocates memory statically

- User asks for 10MB of memory
  - That exact amount is allocated



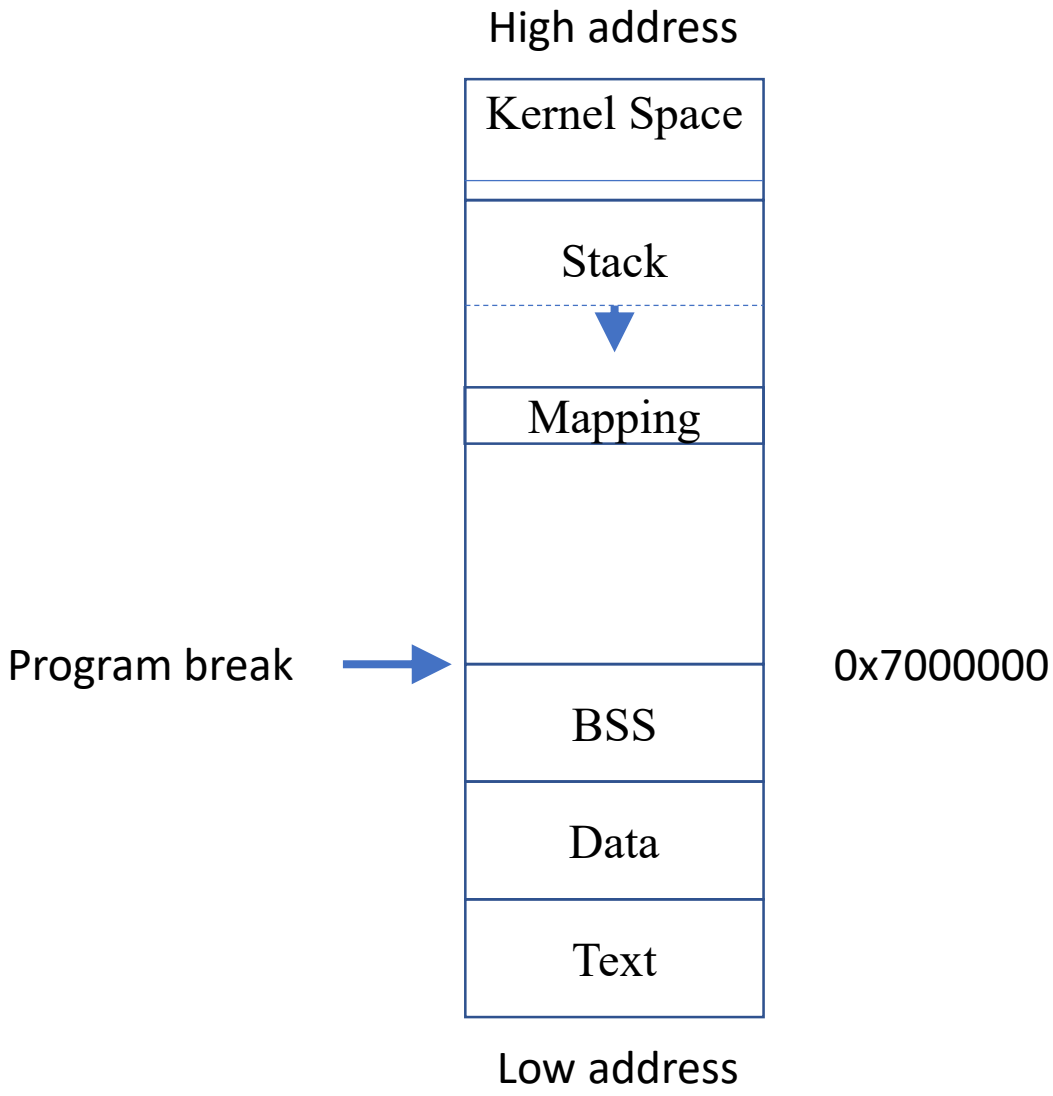
xv6 allocates memory statically

- User asks for 10MB of memory
  - That exact amount is allocated
  - **May not be used straight away**



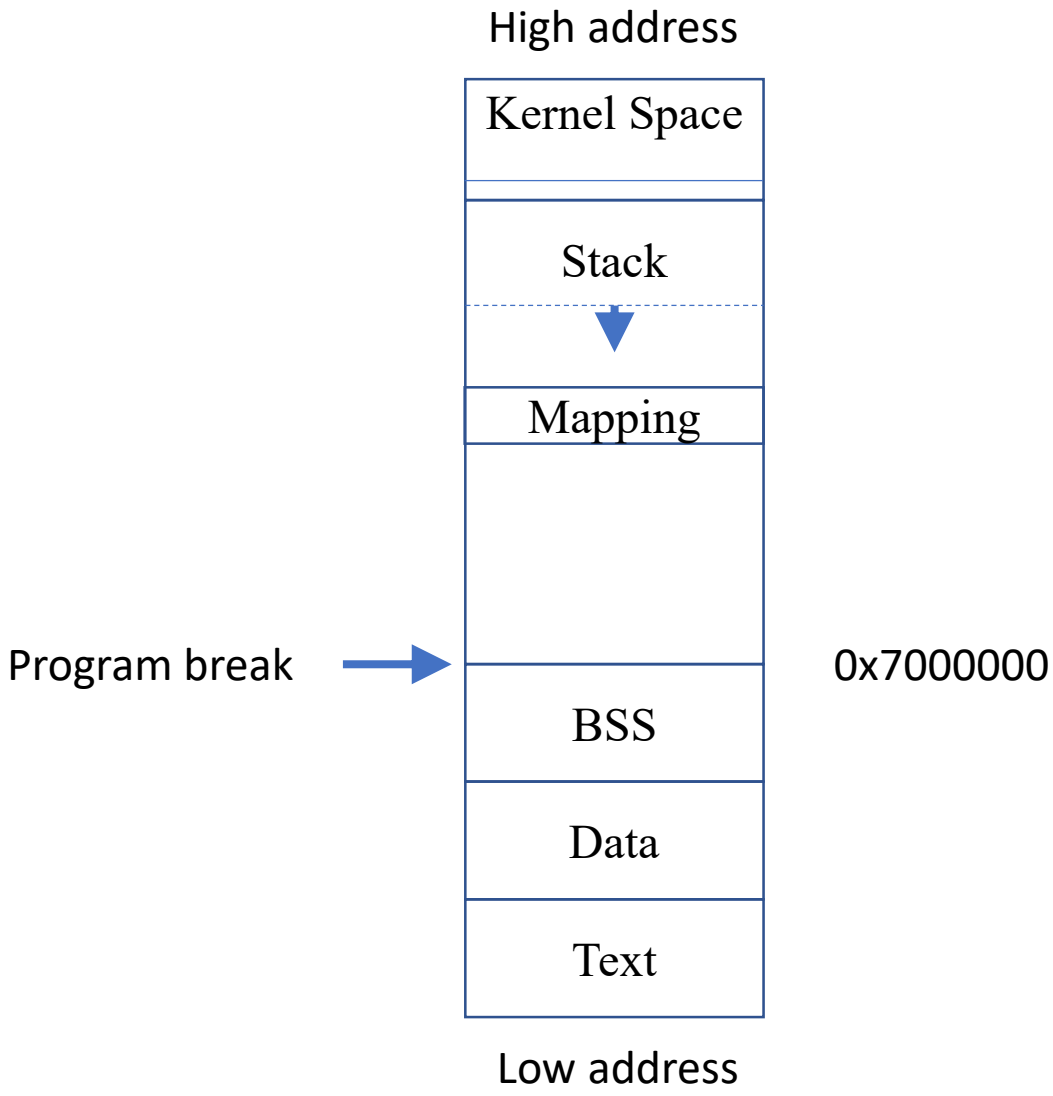
xv6 Lazy memory allocation

- So we are going to allocate on demand



xv6 Lazy memory allocation

- So we are going to allocate on demand
  - When the program asks we will make it think it actually have allocated all it needs



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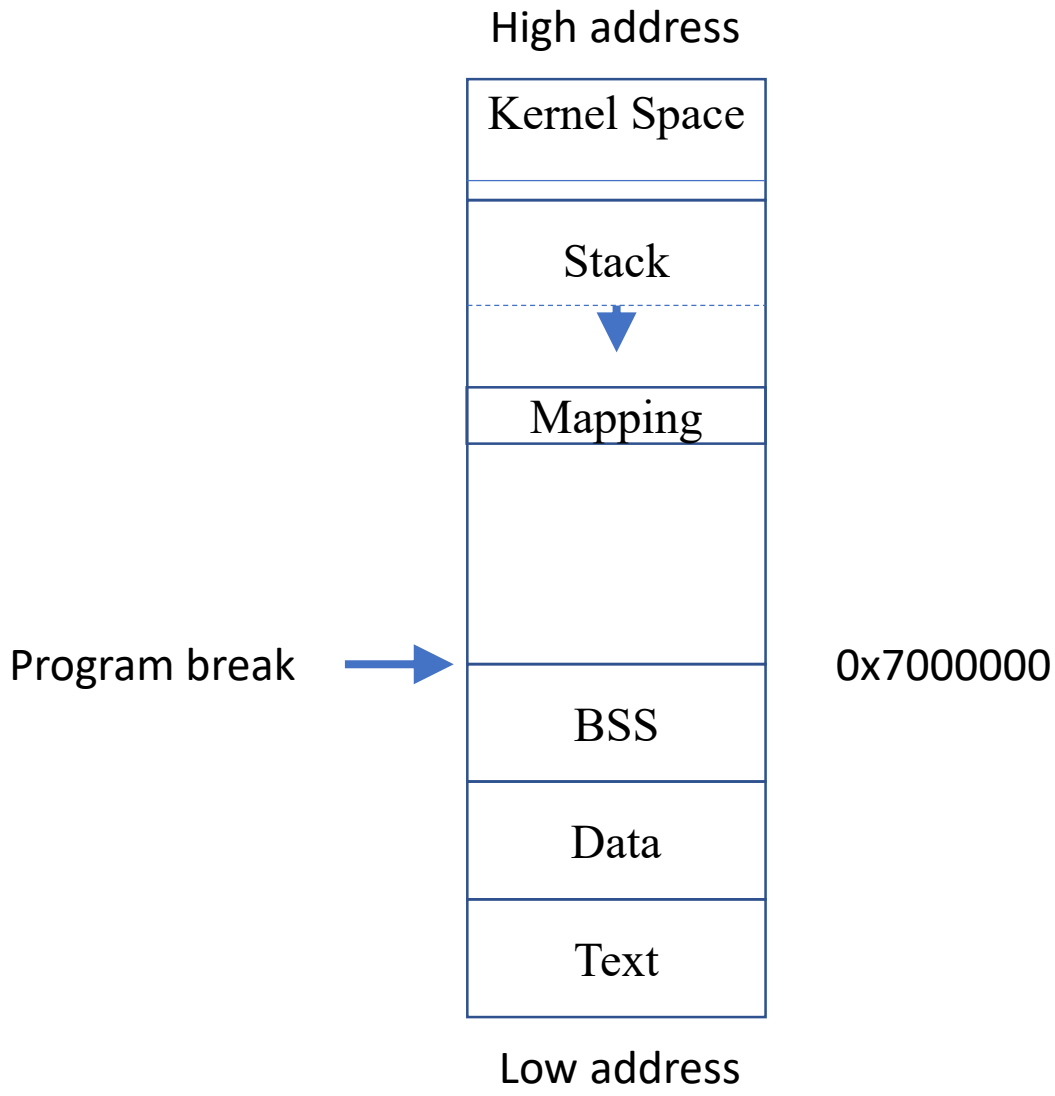

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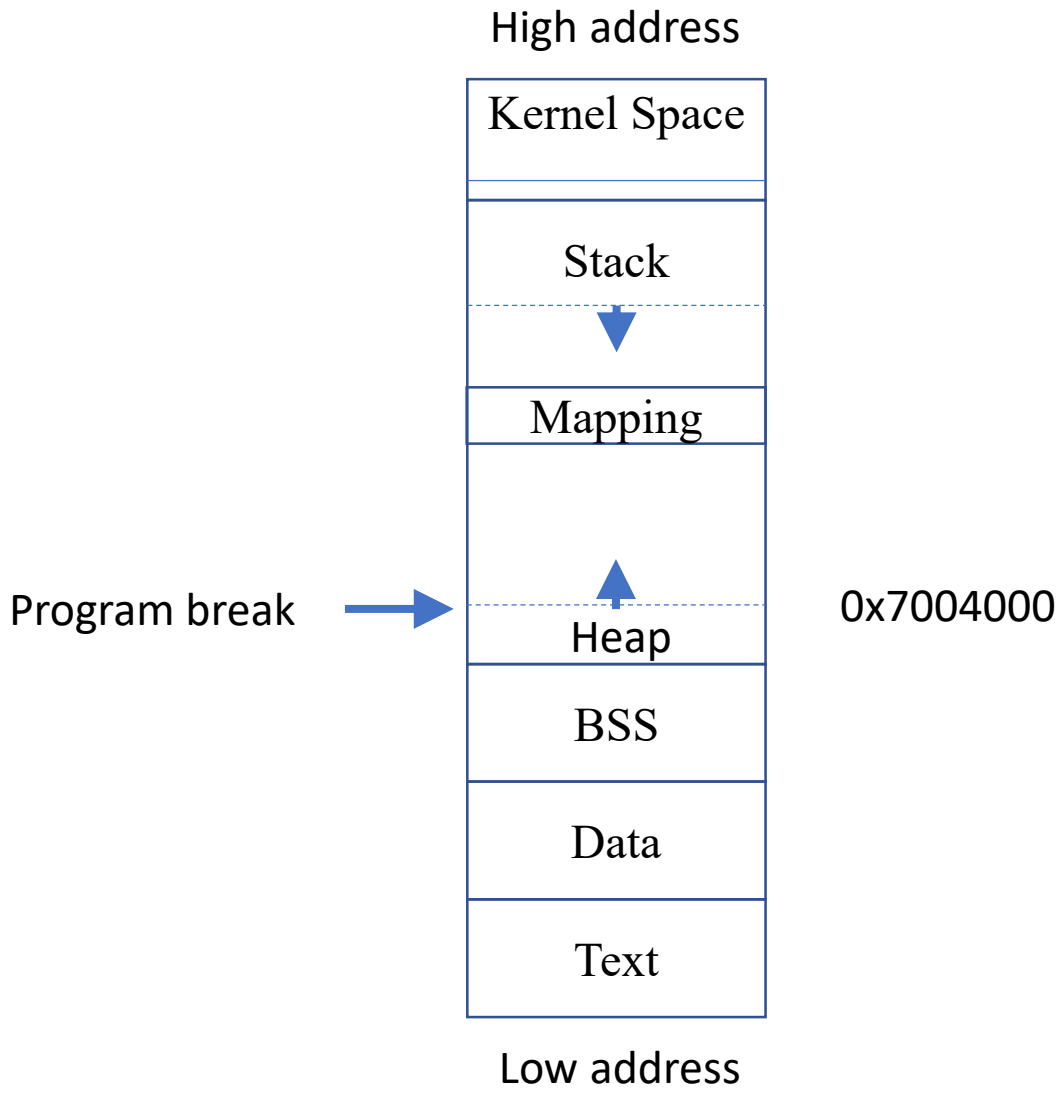

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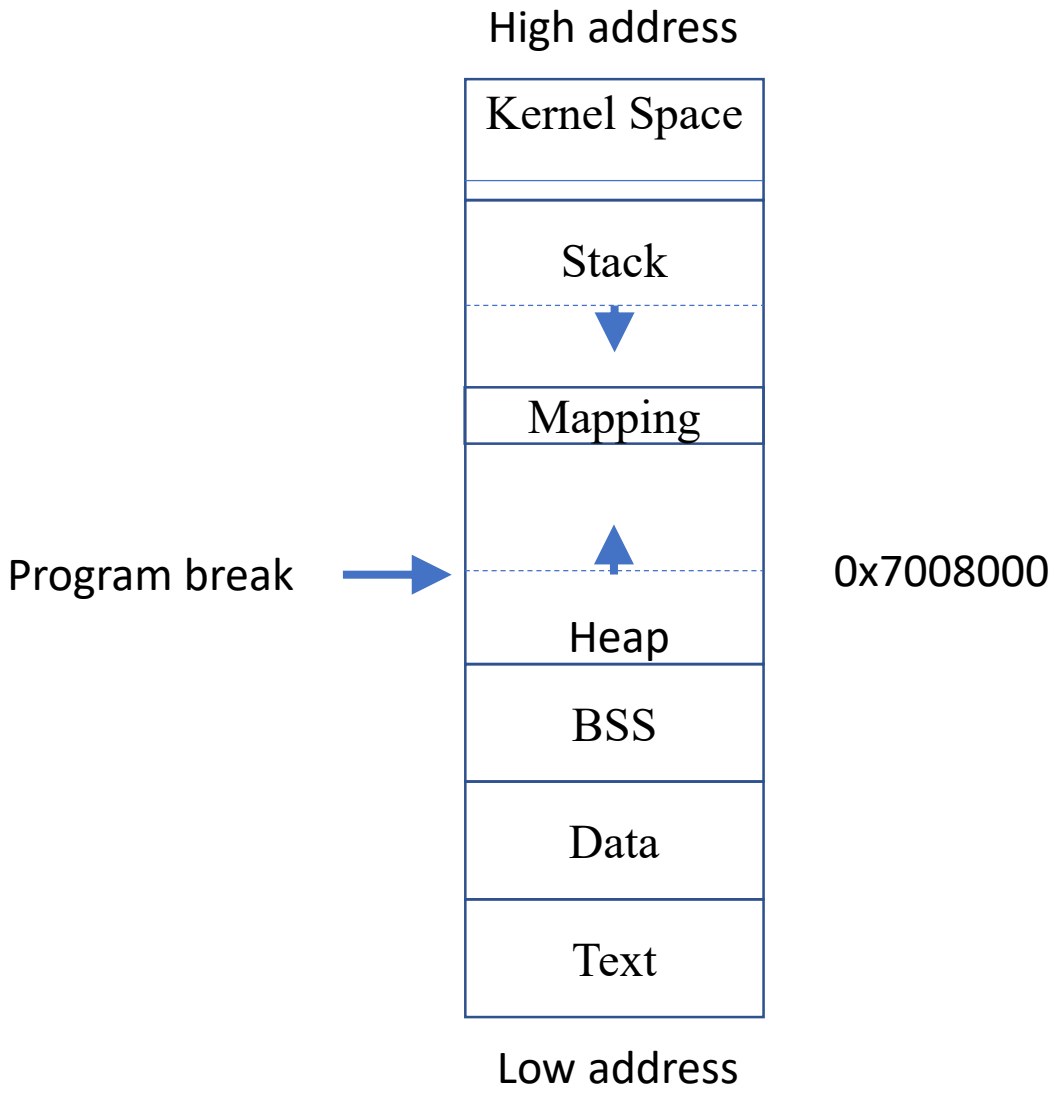

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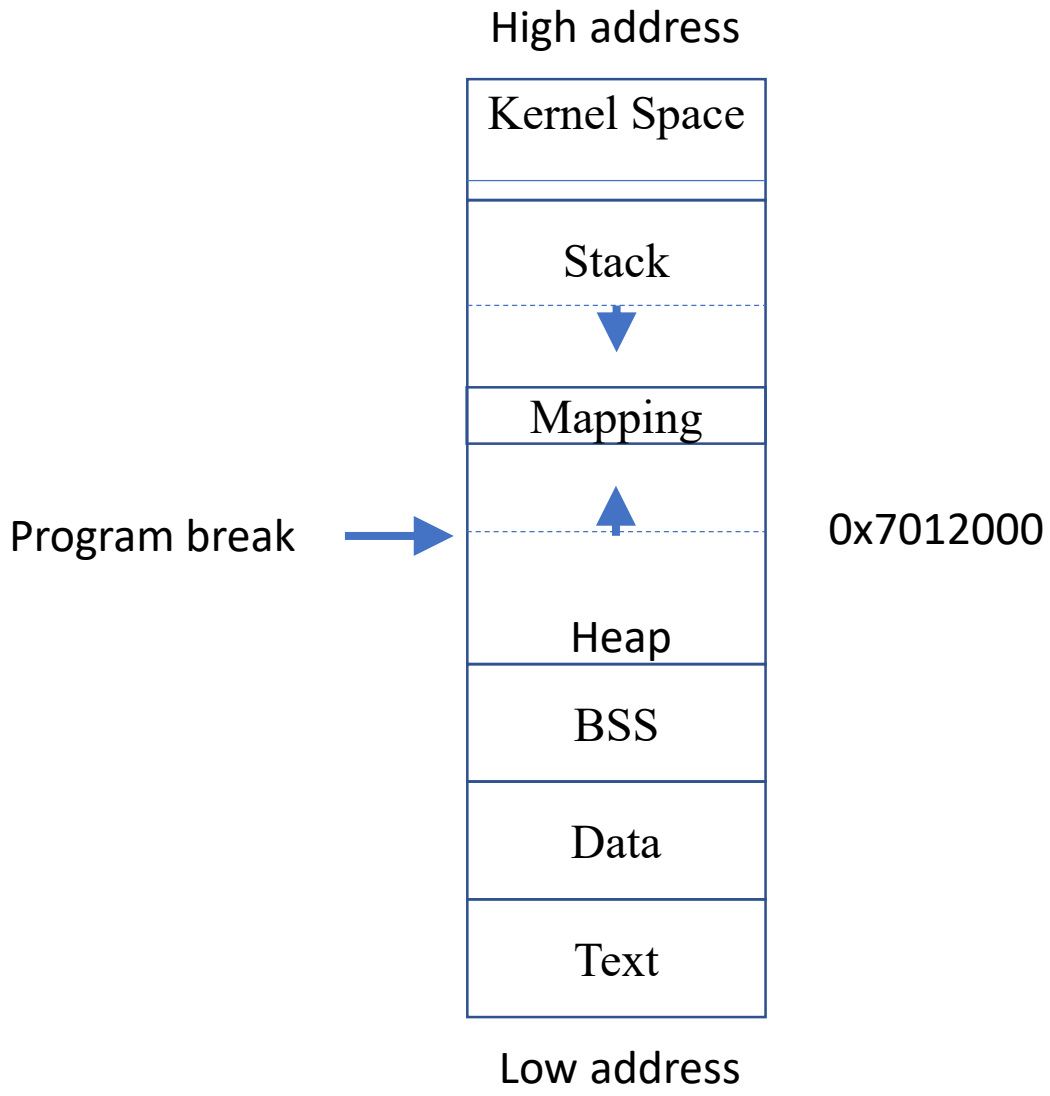

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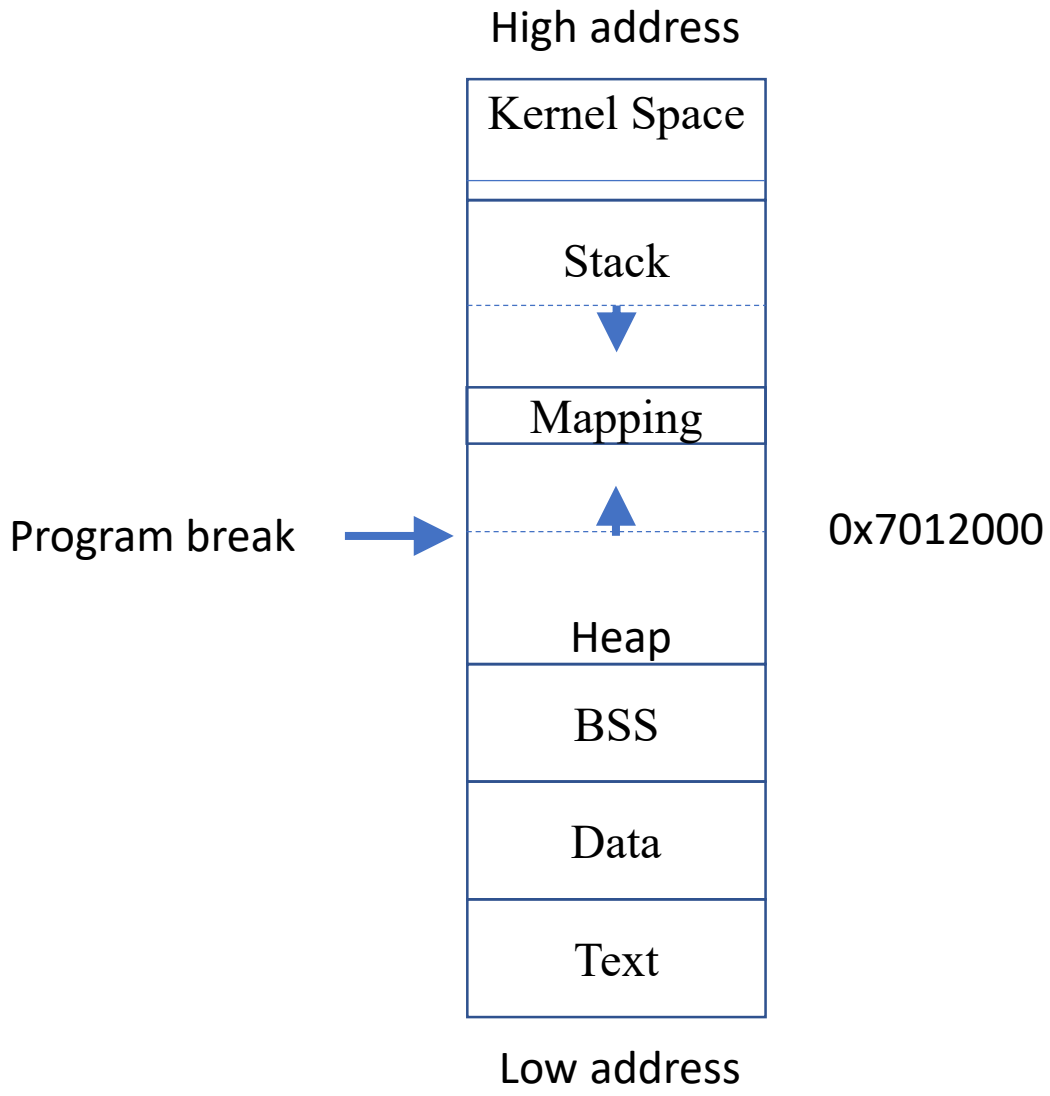
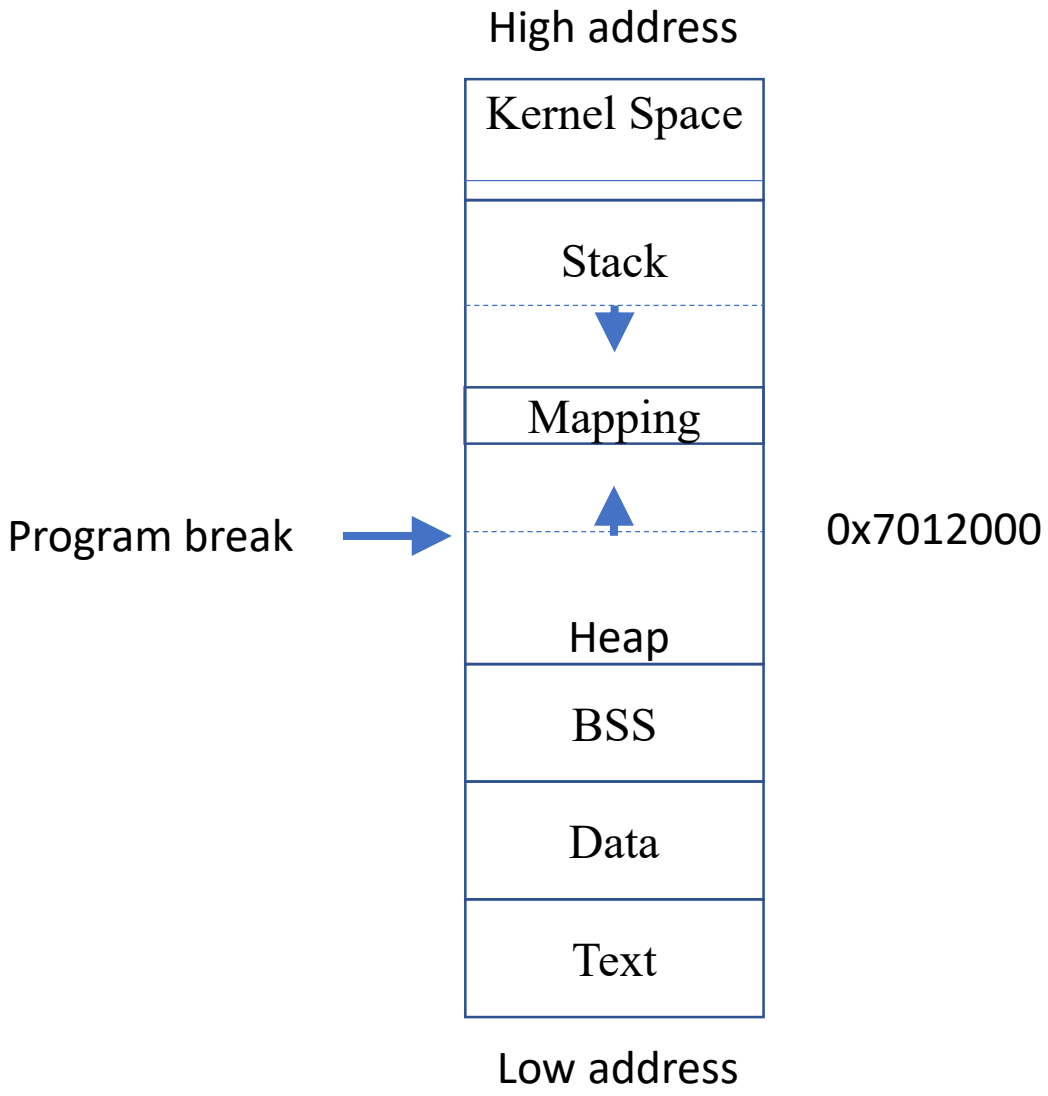


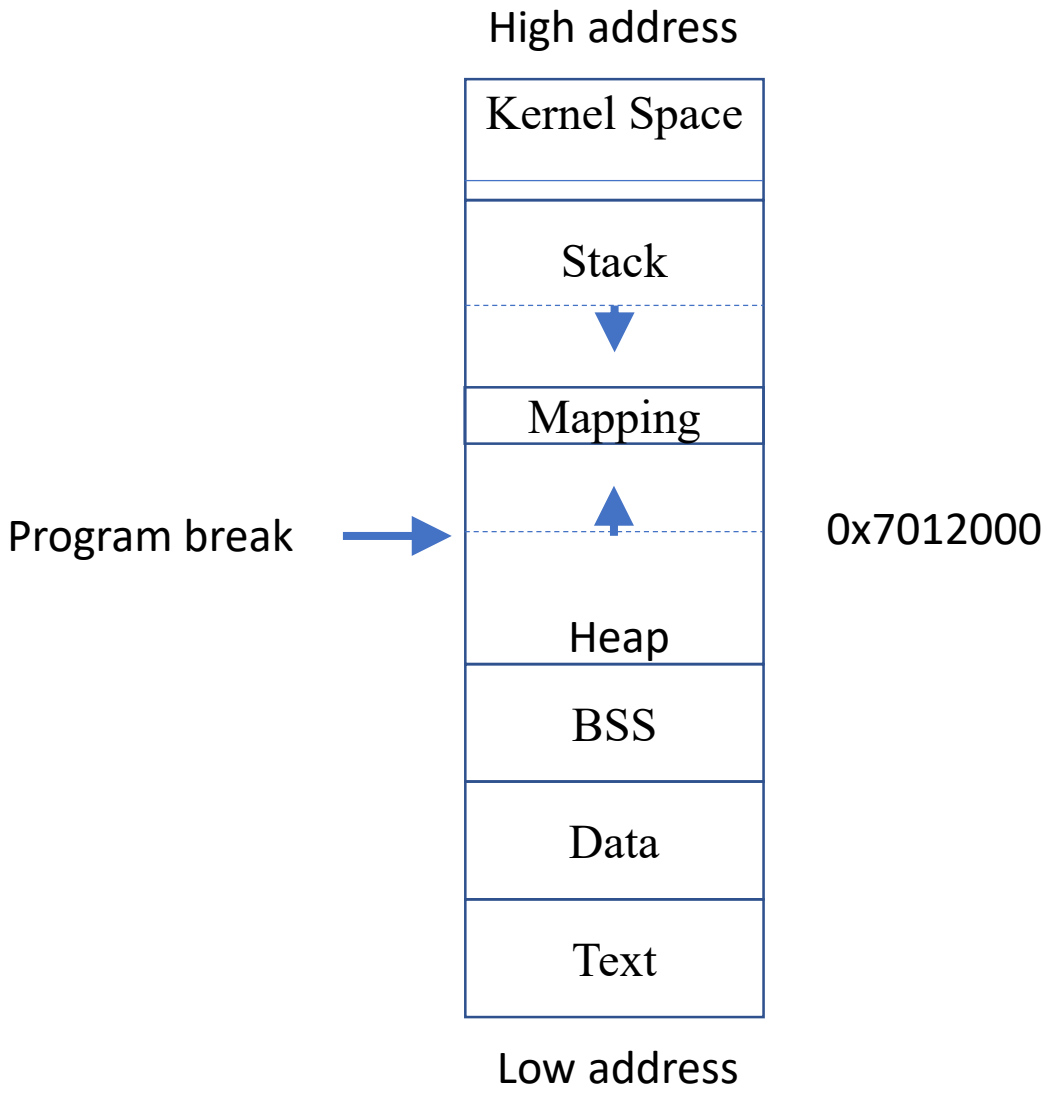
xv6 Lazy memory allocation

- When the application attempts to access memory that was not allocated



xv6 Lazy memory allocation

- When the application attempts to access memory that was not allocated
  - The **Trap** function is called with a T_PGFLT(14)



Sbrk on XV6

The **sys_sbrk()** in **sysproc.c** is the XV-6 implementation for sbrk.

…

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addr = proc->sz;
if(growproc(n) < 0)
     return -1;
return addr;
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Sbrk on XV6

The **sys_sbrk()** in **sysproc.c** is the XV-6 implementation for sbrk.

```
…
addr = proc->sz;   // get current brk
if(growproc(n) < 0)          // increase brk by n
     return -1;
return addr;
```

growproc

The growproc() in proc.c:

```
…
if(n > 0) {
        allocuvm();
} else if (n < 0) {
        deallocuvm();
}
```

growproc

The growproc() in proc.c:

```
…
if(n > 0) {                    // allocation
        allocuvm();            // allocate physical pages, update page table
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```

growproc

The growproc() in proc.c:

```
…
if(n > 0) {                    // allocation
        allocuvm();            // allocate physical pages, update page table
} else if (n < 0) {            // deallocation
        deallocuvm();          // update page table, free physical page
}
```

CS 1550 – Lab 3

- **Due**: Friday, November 2, 2018 @11:59pm
- **Late**: Sunday, November 4, 2018 @11:59pm
  - 10% reduction per late day

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Teaching Assistant

Henrique Potter