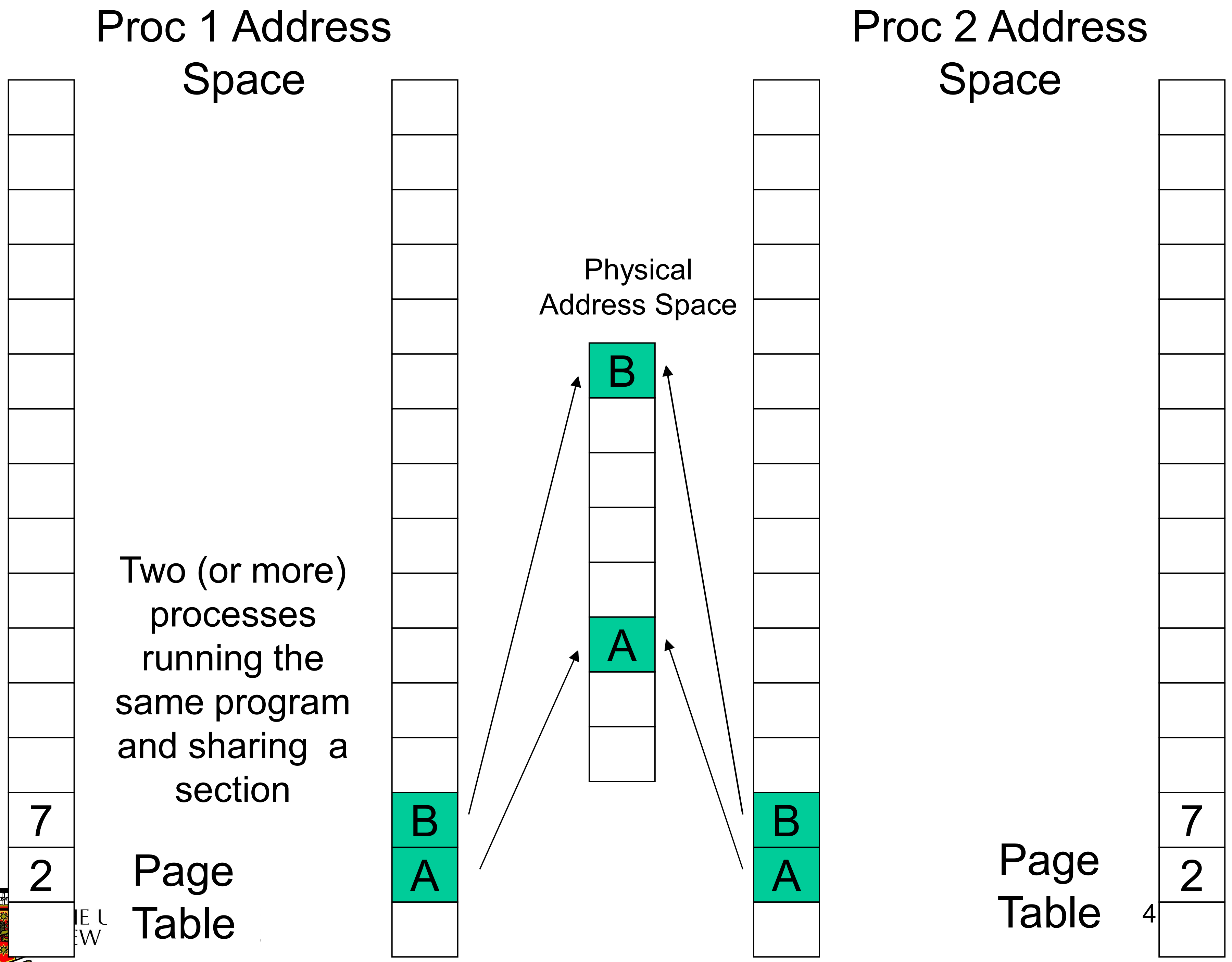
Assignment 3 Adv

Advance Assignment

- Shared pages and copy-on-write
- sbrk()
- Demand loading and mmap
- Paging

Shared pages and Copy-on-write

- What are they
- Why are they useful
- What they are not
  - Shared memory



Two (or more) processes running the same program and sharing a section

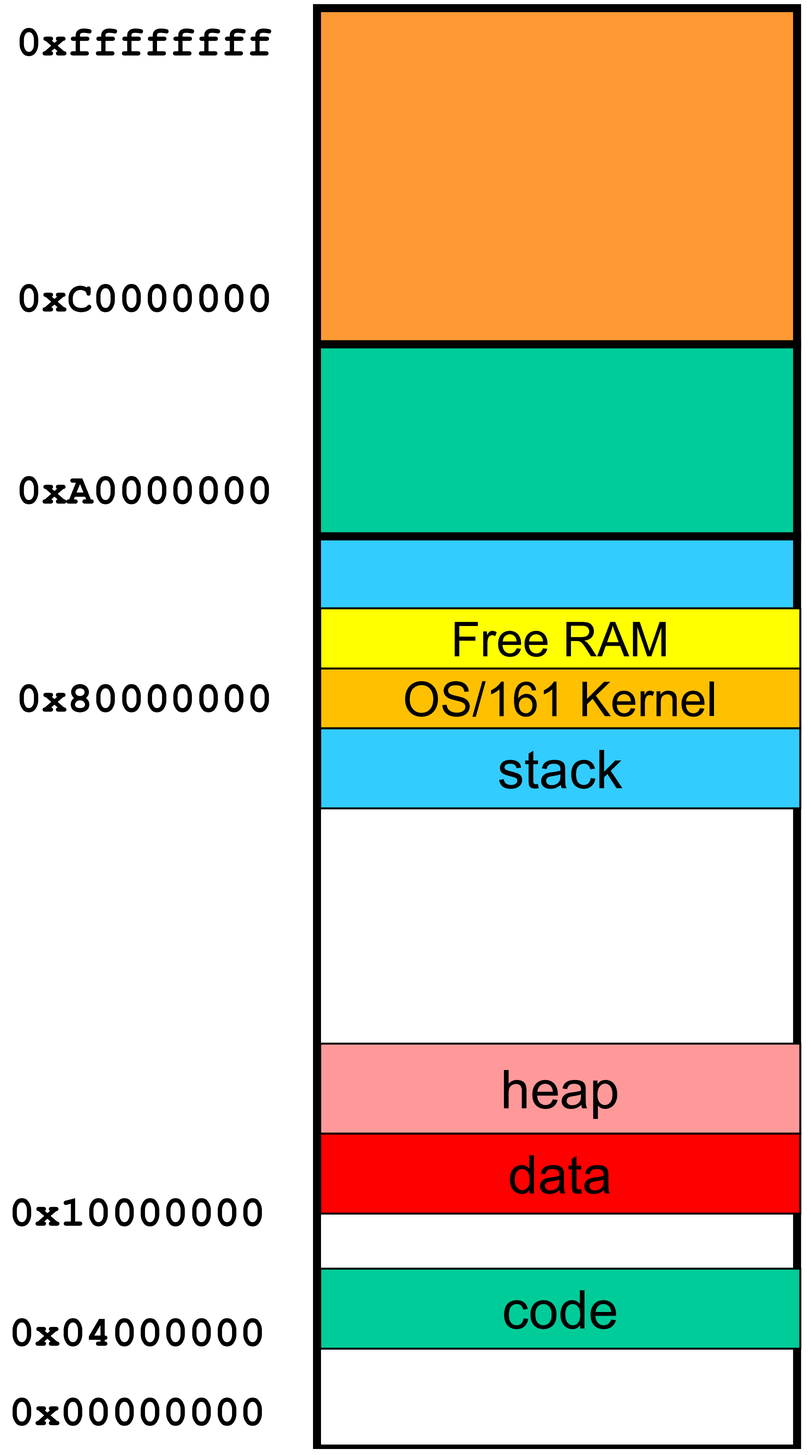
COW

- fork() can be more efficient
- as_copy is underlying routine
- set pages read_only
  - Keep reference count in frame table
  - On write-fault, vm_fault copies, decrement count.

sbrk

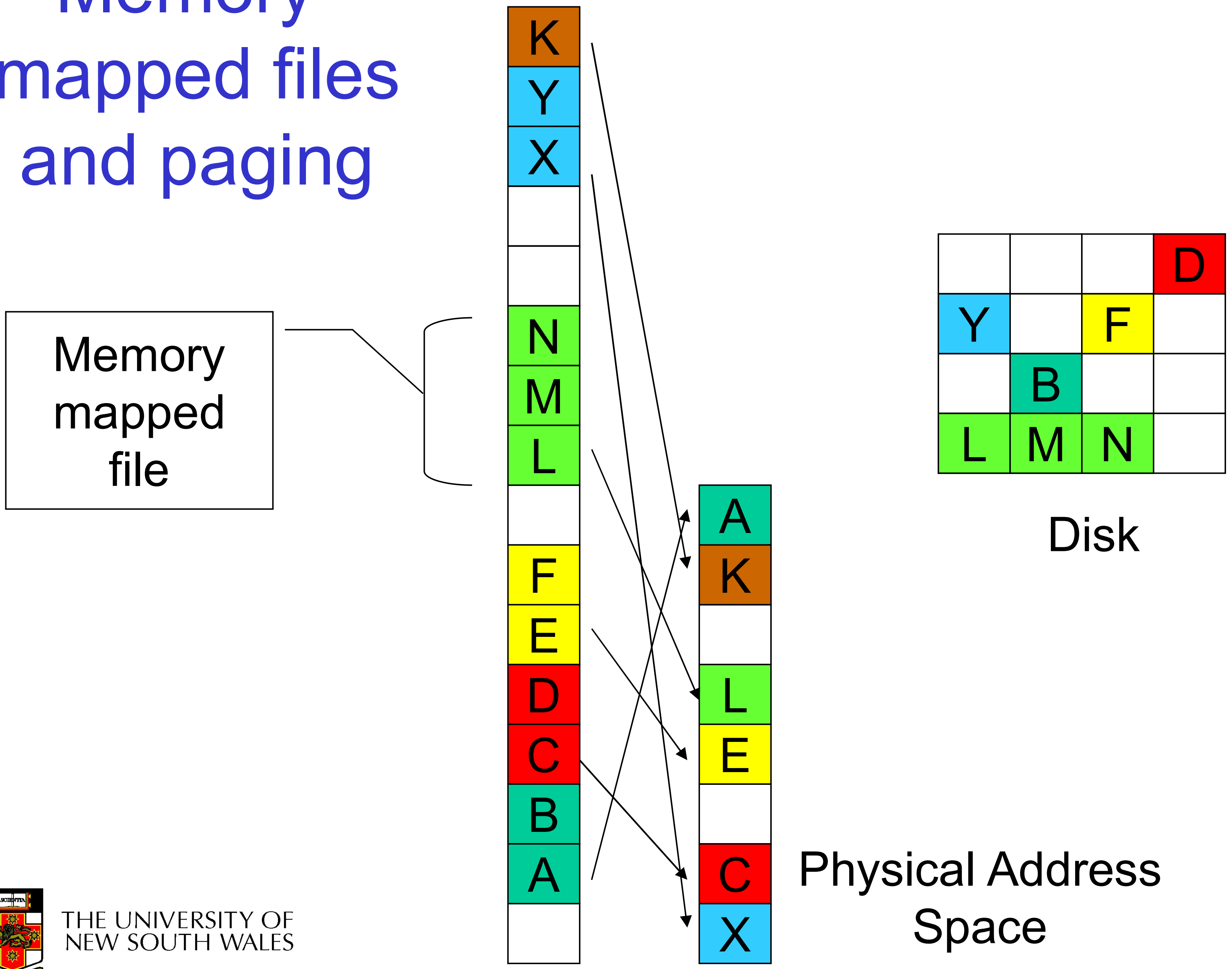
- The "break" is the end address of a process's heap region.
- The sbrk call adjusts the "break" by the amount.
- It returns the old "break". Thus, to determine the current "break", call sbrk(0).

- The heap region is initially empty, so at process startup, the beginning of the heap region is the same as the end and may thus be retrieved using sbrk(0).



mmap() and demand loading

Memory-mapped files and paging

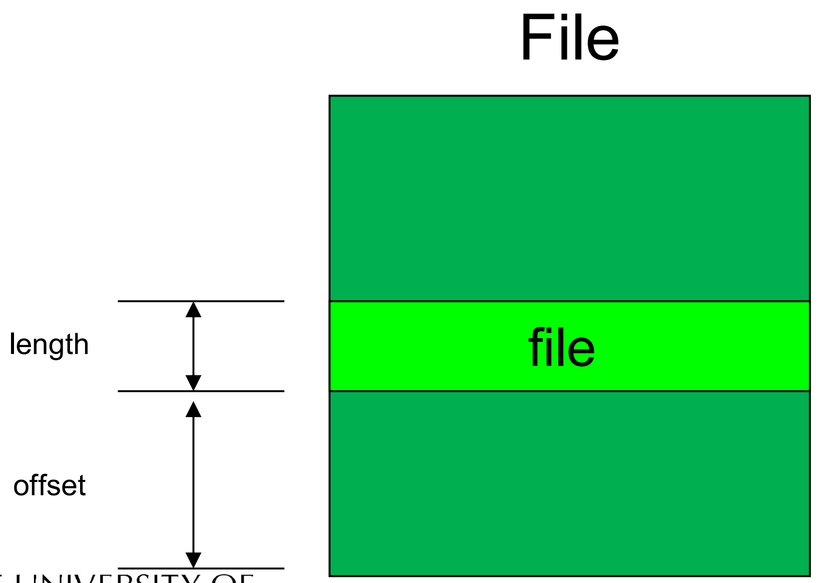


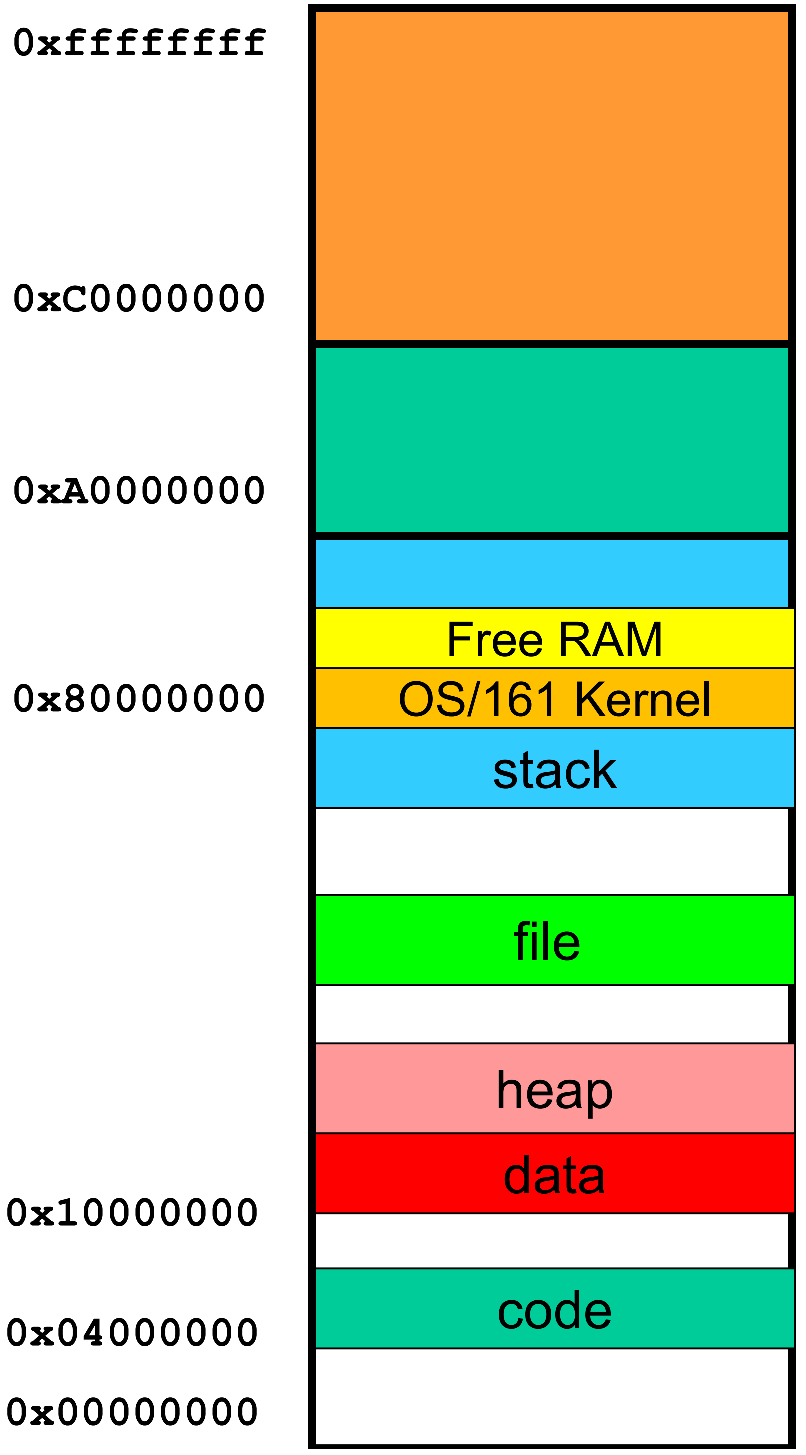
mmap/munmap semantics

```
void *mmap(size_t length, int prot, int fd, off_t offset);
 int munmap(void *addr);
```

mmap

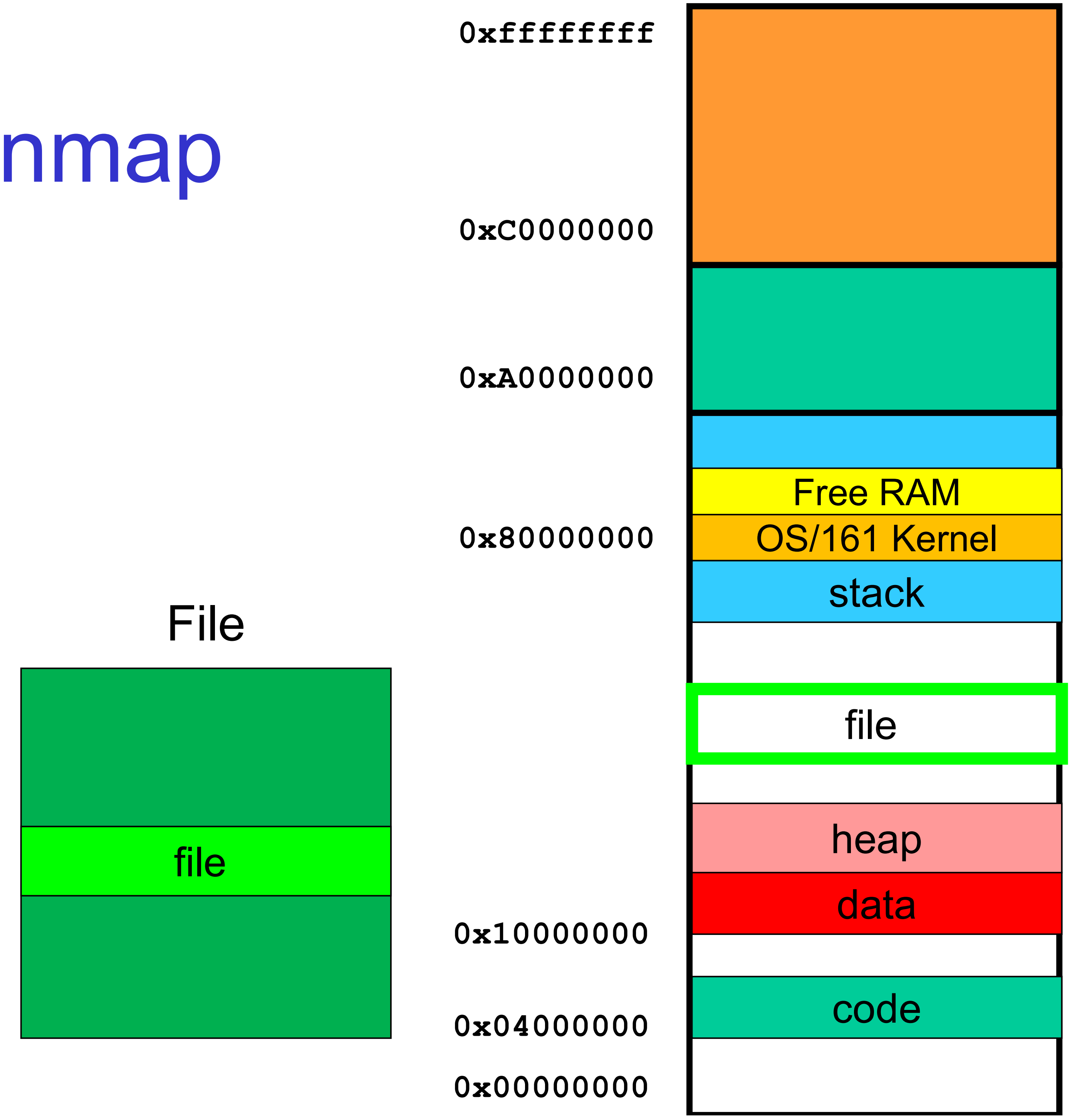
void *mmap(size_t length, int prot, int fd, off_t offset);





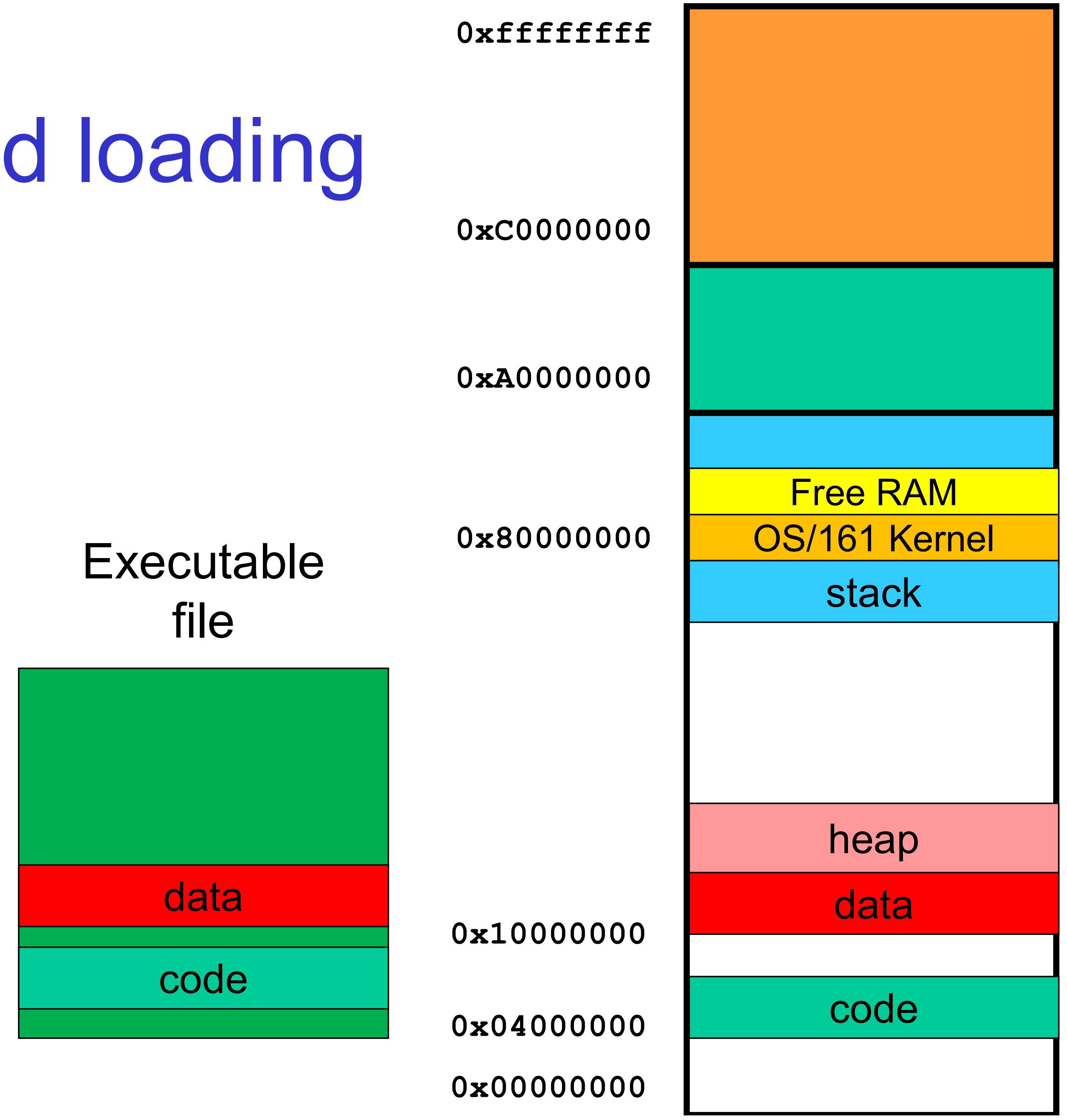
munmap

int munmap(void *addr);



THE UNIVERSITY OF NEW SOUTH WALES

demand loading


Executable file
data
code
0xffffffff
0xC0000000
0xA0000000
0x80000000
0x10000000
0x04000000
0x00000000
Free RAM
OS/161 Kernel
stack
heap
data
code