Operating System-Class 2-Jan. 28th

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Homework

Set Unix account for 644 and check ulab.cs.umb.edu

Coming soon: setup access to SAPCs
Linux up to our class

Read: Comer. Chapter 1, 2.3, skip rest of Chapter 2(wrong hardware)
Lover. Chapter 1-2, but don't get source code yet.

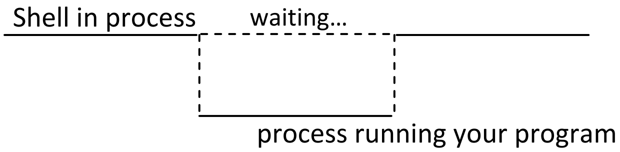
Finding the kernel

Process: a program in execution (a body of executable codes, usually stored in a file)

- live on the system
- using resources
  - memory
  - CPU
  - I/O system

Ex. of processes:

- executing a program you wrote
- running Shell (the Shell create a process to use a program)



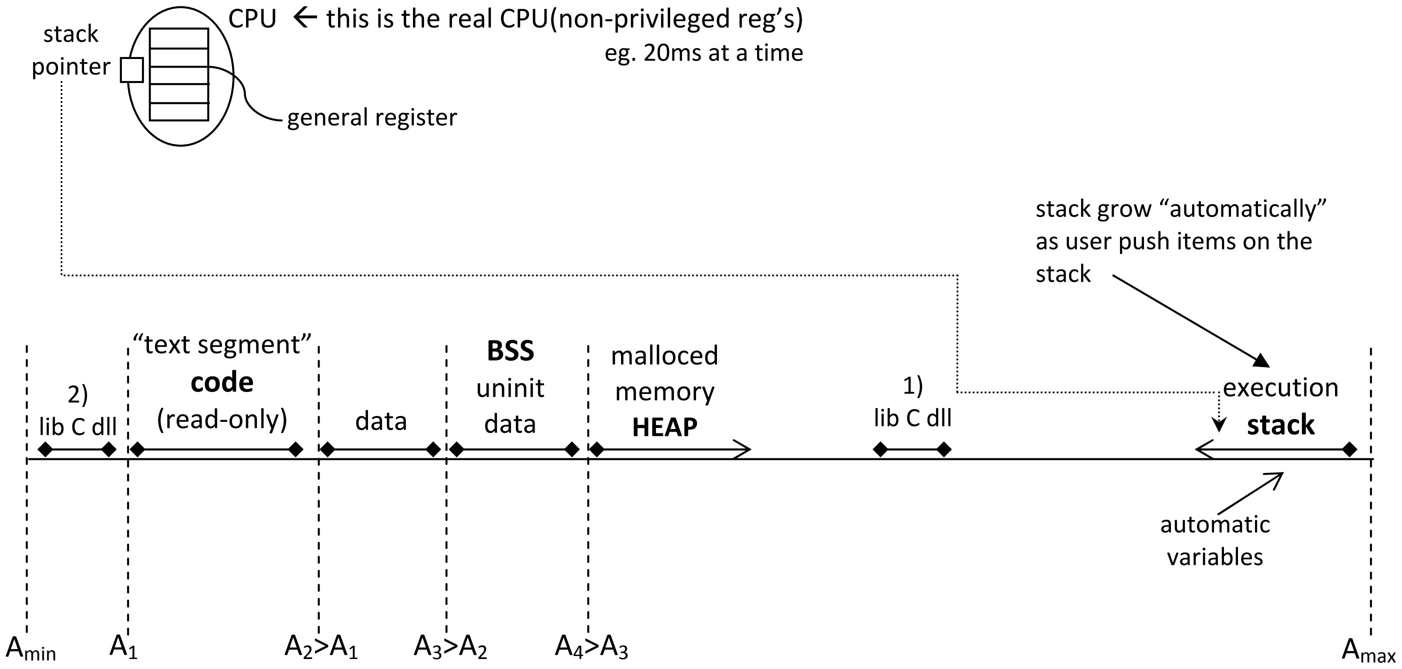
- running gcc
- httpd: web server (daemon—run without user, no user pays attention)

One system is running many processes at once

- lots are just waiting
- 0 or 1 or ... is/are running

Look at one process

- each process is given a "virtual machine" by the OS
  - virtual machine: Unix/Linux, Windows NT/2000/XP/Vista/7, ...
- flat address space
- use of CPU for intervals of time (time-sharing)
- access to I/O hardware via OS (system calls)



This is a flat address space, and all current systems use byte addressing. Here each byte of memory usable by the program running in the process gets its own unique address between A_{min} and A_{max}. Another process running at the same time sees its own private version of the address space.

Picture shows two possible locations for C library DLL, in different versions of Linux.

CPU, PC, SP register address have certain size: 32 bit or 64 bit currently.

- 16 bits – old systems (< 90s)
- 32 bit address
    - 2^32 addresses: 4GB – the max memory using at one kernel

Solaris Unix on 32 bits CPU

- provide full 4GB to a user process

Windows NT/… on 32 bits CPU

- provide 2GB to a user process
- exception: server system, special boot flag provides 3GB to user

Linux 2.6 on 32 bits CPU

- provide 3GB to a user process

64 bits CPU: should provide a much larger address space

- x84-64 can use 48 bits, in two 47-bit parts at bottom and top of 64-bit space
    - potential user space 2^47 bytes (2^7 T = 128 TB)

max address:

- 32 bits: 0xffff ffff
- 64 bits: 0xffff ffff ffff ffff