CSE 3320 Class Note 9/25/2019

Sorting/UNIX

* Partitioning
* Sort-Merge
  + 4 steps
  + N^2/2
  + Find smallest number in each group (repeat)

Find smallest number in N items

* + Time takes: at least N times (Complexity)
  + Same time taken to find largest number

Find N item in sort

* + Time taken: Around N^2 (O(n^2))

2 cores, 2 CPU:

* (N/2)^2 + N = N^2/4 + N
* If N/2^2 grows faster, N does not do much.
  + (N/2)^2 is dominant

N = 10^6

* Find Smallest Number
  + Million Steps
* Sort: (10^6)^2 = 10^12
  + Speed CPU
  + Speed memory
  + Partition, Merge, Sort:
    - N= 10^6
    - 1 Core = 10^12 [10^12+10^6: CS]
    - 2 Cores = (10^6/2)^2 = 25E10
    - 4 Cores = (10^6/4)^2 = 6.25E110
    - 10 Cores = (10^6/10)^2 = 10E10

Two way to run new program (UNIX)

* Fork System Call
  + Two copies of things, split and clone process.
  + Identifies the Clone/Original by memory (content of memory the same)
    - Two chunks of memory: clone and original( way to create new processes)
      * Difference in processs ID
      * Creates a Child Process
      * Original keeps running, get ctime, print driver
      * When running on someone elses system, limit of how many processed you may create exist
      * Bombs/Malware: creates of multiple copies to clog up your memory
* Exec System Call
  + Replaces the program with different process

UNIX commands to see what processes running and keep track of bad ones:

Run multiple processes:

* A.out
  + May need dot slash in front of a.out to tell the execution the location if not under the path [execv]
* A.out&
  + Create separate in shell to allow something else (a fork)
* Ps-ax
  + List of processes in great detail
  + Top/monitor as alternative for some systems (ps)
* Kill
  + Stop a process, by entering process ID
  + May need to specify kind of Kill
* Bg
  + Background
* A.out|b.out|c.out
* Ls
  + List of files in dir
  + ls-ls more detailed
* Cp
  + Copy
* Mv
  + Move
* Cidir/cd
  + Change directory
* Makedir/md
* Rm
* More, less
  + Ability to look at more pieces in a file (file listers)
* Tail/head
  + Top/bottom of source file
* Car
  + Same as above
* Od
  + Dump program, look at bytes of anything
  + Od-x for hex
* Help, info, man
  + Help help
  + Help man
* Who
  + Gives name of people on the system at the time
* Top (most freq/time consuming)
  + Number of things running
* Exit
* Bg,fg
* Stat
  + Stat about htings
* Link
  + File system related
* Nice
  + Change priorities of processes

Assignment 2 USE:

Running process, ps/top, kill(error exit)

* Cant pass pointer to it for it has different memory and the memories are protected (can kill other memory with bad bug)
* Pipe/BIOS share memories

Create multiple processes divide up data, do a sort

With 1 2 and 4 and merge

Faster sort, but more data, smaller data,, loinger sort