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