

CSE 3320 Note 9.16.2019

Moore's Law: Observation, over time component speed double during time (1980-2005)

- Processor/Chip/CPU/Memory: Moore's Law ended around 2005: Chips might not be bigger...
 - o When you make chips, slice in to Wafer with some defects in the chips in patterns
 - o Yield: bigger chip, bigger defect
 - o Need to put a lot of power into the chip to get signal from one to the other end.
 - o Temperature/Size: extreme hard to dissipate heat
 - o Chip lots of power, affect battery life
- Chip Scaling: currently around 8-10nm (1000x more dense in packing)- 1000^2 in transistor/active alternator
 - o More developed than the 1980 (6-8micrometers)
 - o 1975- Inter 12K → now- 5Billion Chips
 - Chips got bigger
 - 1975: 4 mm x 3 mm
 - 2019(Now) 3-5 cm² (smaller transistor)

Indirect: faster CPU and flocs

- Power consumption, heat
- Instead of faster CPU
 - o Speed not only depend on FLOC, but number of instructions and CC. May be reduced (Super Scaling), cool up cores
 - Calm down start processes: from beginning of system
 - Multiprocesses: more security
 - Threads: lightweight processes (no overheader of regular processes)
 - Multithreading : more performance
 - OS need to know the thread or during run time

CPM Continued

Successful Mini Computer OS

- Easy to understand the utilization of memory
- ABET Processor
- System Call 1 OP, SC 2, IP

CPM Memory:

- RAM (0-low: min 256)
 - o Reserved Space
 - o Buffer
 - o To keep track of
 - o Process Block (PCB)
 - Code/Instruction [fixed]
 - Static Data[fixed]
 - Heap/Stack
 - o Heap is fixed memory- not all program have one
 - Transit Program Area
 - o User testable space
 - o Shell
 - o Reusable
 - BDOS
 - BIOS (High)
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- Program
 - Main Routine
 - o Main and dir are important
 - o May Split up/delete certain components to fit into the memory space
 - o Core: main+ Edit+E+c+p
 - o Overlay
 - Break down of large programs into sections and replace one section in memory with another as needed to use limited memory space

Microsoft Discovery System: Similar to CPM

- SC 1 same, SC2, SCe3, same as CPM
- Built into Windows
- CPM influenced tremendously

Disk System:

- #tracks
- #Sectors/Track
- Sector Size (128bytes)
- #Surfaces

May waste space with big gaps

Multiple everything to get the size

Sectors stretch out to be files

- Changes all the time: be careful with the planning
- Cant easily change
- Hard to reuse when deleted

Go to Directory (32bytes: 64 entries): Fast, Small

- 32bytes
- 64 entries
 - o Disk Capacity: not too large (limited), 64 entired for to fit small size)
 - o Information about files on the disk
 - Most important:
 - Name
 - Size
 - Permissions (Read/Write: single user- easy)
 - Location (# of block on the disk)

File Directory Area

- User Name: 1
- File Name: 8
- File Type: 3
- Extend Counter: 2
- Reserved;1
- Number of Records: 1
- Allocation: 16

Start 1

Extends 2

Extend counter: portion of a file controlled by one directory entry

- for first part of file and then sequentially numbered for each of the remaining part
- More extend in large files
- Limitation
 1. Smallest file to have: 0
 2. Smallest space taken: 128 bytes (1 sector): number of records
 3. (64xsector)

Sectors groups together into allocation blocks

User number: group number from 0-15, allow users to share disk and collect files into a group.

File names

Char (uppd/lower): Not all characters are allowed in the file name, period is to separate file name and tpe but not stored in directory (using space and period not allowed).

- Space (recent)
- Size 8.3 → 11 char
 - 1-8 characters of file name
 - 0-3 characters of file type