

CSC104 winter 2013

Why and how of computing week 8

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BA4270 (behind elevators)

<http://www.cdf.toronto.edu/~heap/104/F12/>

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Text: **Picturing Programs**

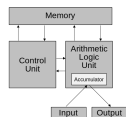
Outline

Modern hardware architecture

operators and operating systems

Notes

what Von Neumann looks like



bus connects ALU/control to memory (RAM) and I/O keyboard, monitor, storage, etc.



1. LOAD A1 R1
2. LOAD A2 R2
3. ADD R1 R2 R3
4. STORE R3 A3
5. HALT

where Von Neuman's going

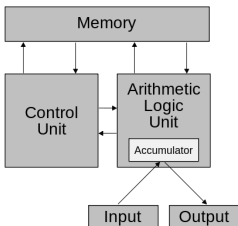
There are some issues

- ▶ Von Neumann bottleneck

- ▶ mortality of Moore's Law

input, output

for geezers

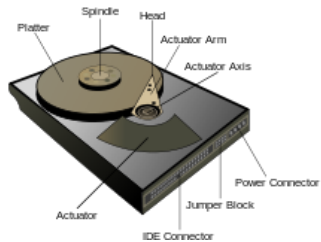


lots of real estate
to get ideas in, out
doesn't fit in pocket



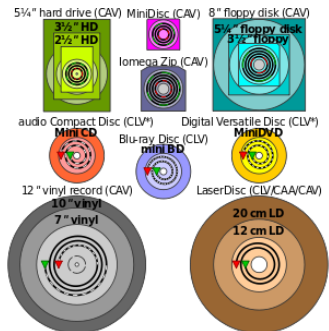
storage

hard drive



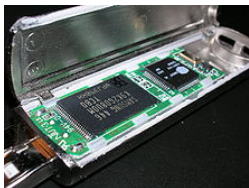
storage

compact disc



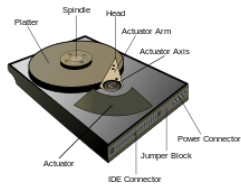
storage

flash drive



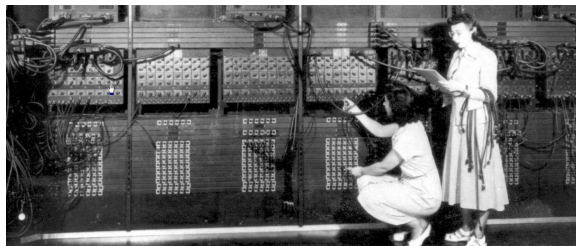
bits, files, buffers

protect us from the machine



machines take over in batches

Machines began to take over setting the program counter to a new job, collecting the output, fetching memory... but it was still one job at a time.



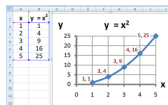
time sharing, version 0.1



one user, one program, one computer



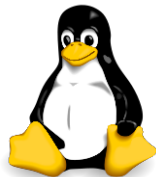
task-switching to time-splitting, v 1.0



Does one task stop, or only appear to stop, for the other?

unix (mostly) to the desktop

GUIs, time-sharing, networking, flame-wars



an operating system should have

- ▶ kernel (shell, shielded access to hardware, referee sharing)

- ▶ utilities

Notes