

Project 1 up this Friday

CSC104 fall 2012

Why and how of computing
week 7

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BA4270 (behind elevators)

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

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Text: **Picturing Programs**

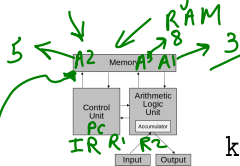
Outline

hardware architecture

Notes

what Von Neumann looks like

data programs.



both data and program crowded into 32, 64 bits
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

Program Counter PC [5]
Instruction ← IR
[HALT.]

- Find the next instruction, update
- decode.
- carry out.

R1 [3]
R2 [5]
R3 [8]

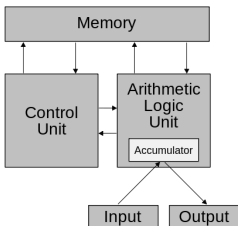
where Von Neuman's going

There are some issues

- ▶ Von Neumann bottleneck) speed & size
choke at bus.
- ▶ mortality of Moore's Law } hotter. as gets smaller,
wires resolved by light
photo lithography
limited wire length.

input, output

for geezers

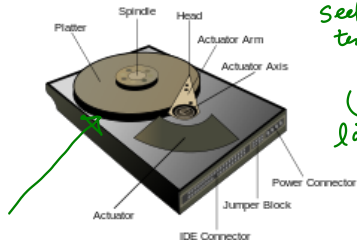


lots of real estate
to get ideas in, out
doesn't fit in pocket

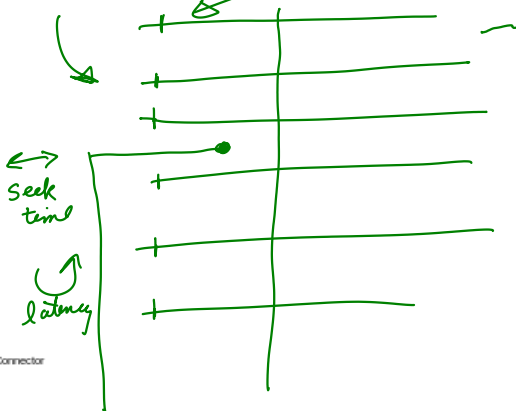


storage
hard drive

1024 ~~kb~~



MBTF \sim 5 years. cylinder.



ms seconds.

7200 rpm
15000

Comparison RAM reads/writes nano second.

storage

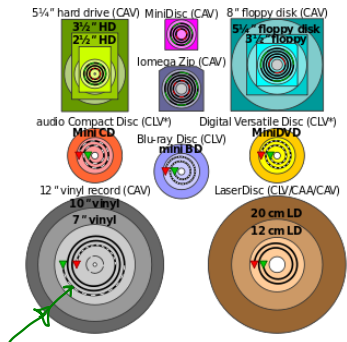
compact disc

[information
stored + read.
laser changes disc
surface.



another laser
shines/reflects
+ "pit" can
be detected.

before the 90s
700 mb looked
big.



storage

flash drive

usb, SSD solid state drives



flash memory
replace RAM.

— slow, changes large portions of memory with each

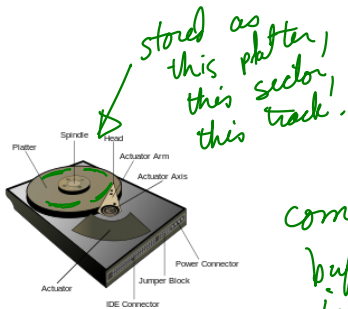
↔ no moving parts (except for electrons)

information stored in electron chamber.

bits, files, buffers

protect us from the machine and it from us!

"buffer" between humans + machine.



computer
buffers
information
in RAM

Shakespeare.



files contain text (or numbers)
they also contains names + coordinates
of other files.

Notes