

CSC104 fall 2013
Computational thinking
week 4

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Text: **Picturing Programs**

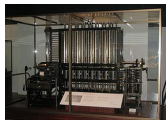
Looms and engines

industrial revolution



Jacquard loom combined steam and punch cards for automatic patterns

Babbages difference engine would have evaluated polynomials like $3x^3 + 5x^2 - 7x + 9$



gears, pins, and electricity

digital and analog before tubes



data stored in punched cards
manipulated by pins and
electricity last for decades

analog computers model world
using smoothly-varying quantities
such as water



programmable or electronic...

...but not both?



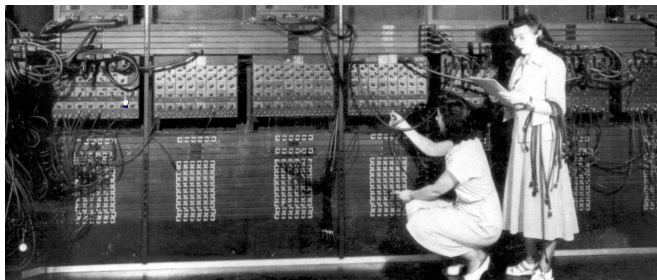
“programmable” (cards) but
not electronic (relays)
the Zuse Z1

electronic but not programmable
dedicated to one calculation
the Atanosoff-Berry



when computers were women

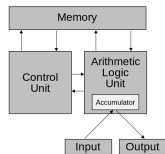
for a while



Eniac's first programmers were women
known for clear-thinking, manual dexterity, and speed
... human labour was cheaper than computer cycles
dozens of cubic metres, programmed by connecting pins

stored programs, faster switches

getting modern



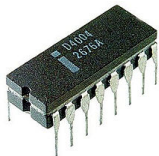
the same memory for data and programs is now the typical design

tubes were big, hot, slow
compared to transistors
... which just keep shrinking



your (grand)parent's computer

smaller, faster ...



perhaps thanks to sputnik
the computing power of eniac
fits in your hand by 1970

mass-produced desktops
landed with a clunk
by 1980s



