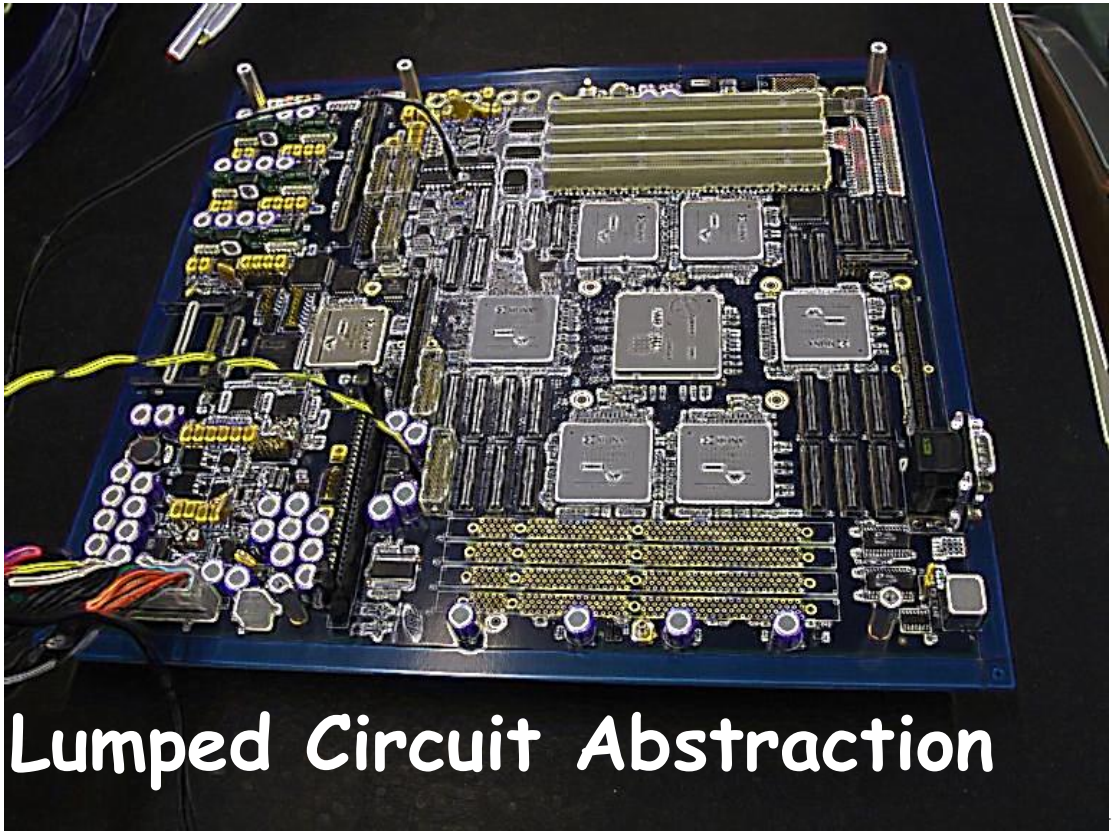
6.002x CIRCUITS AND ELECTRONICS

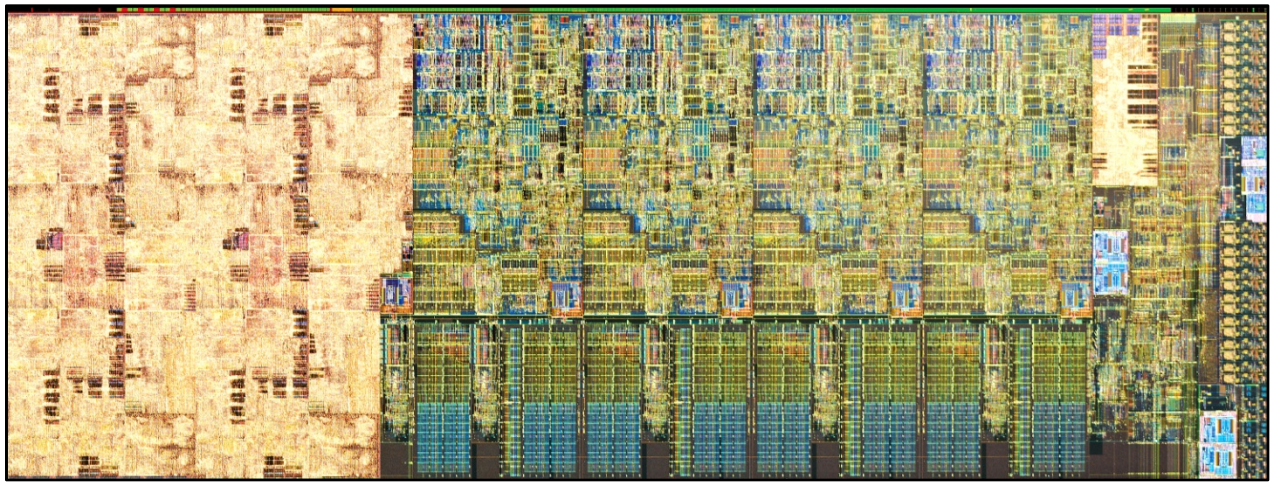


Introduction and Lumped Circuit Abstraction

6.002x is Exciting!

What's behind this?

…and this



Chip photo of Intel's 22nm multicore processor codenamed Ivy Bridge

Photograph courtesy of Intel Corp.

What is engineering?

Purposeful use of science

What is 6.002x about?

Gainful employment of Maxwell's equations

From electrons to digital gates and op-amps

6.002x

Nature as observed in experiments

V	1	0.2	0.3	0.4	3	4	...

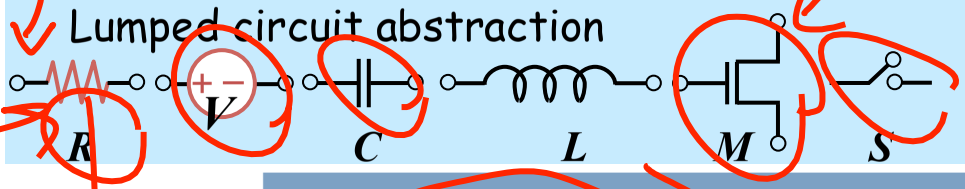
Physics laws or "abstractions"

- Maxwell's
- Ohm's

$V = R\,I$

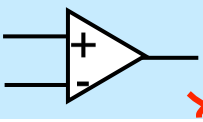
→ abstraction for tables of data

Lumped circuit abstraction

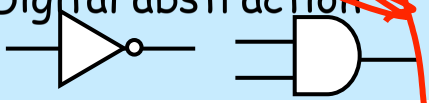


Simple amplifier abstraction

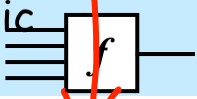
Operational amplifier abstr.



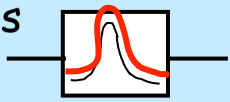
Digital abstraction



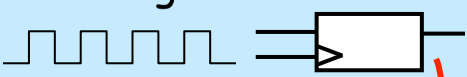
Combinational logic



Filters



Clocked digital abstraction



Instruction set abstraction

Pentium, MIPS 6.004, 6.846

Programming languages

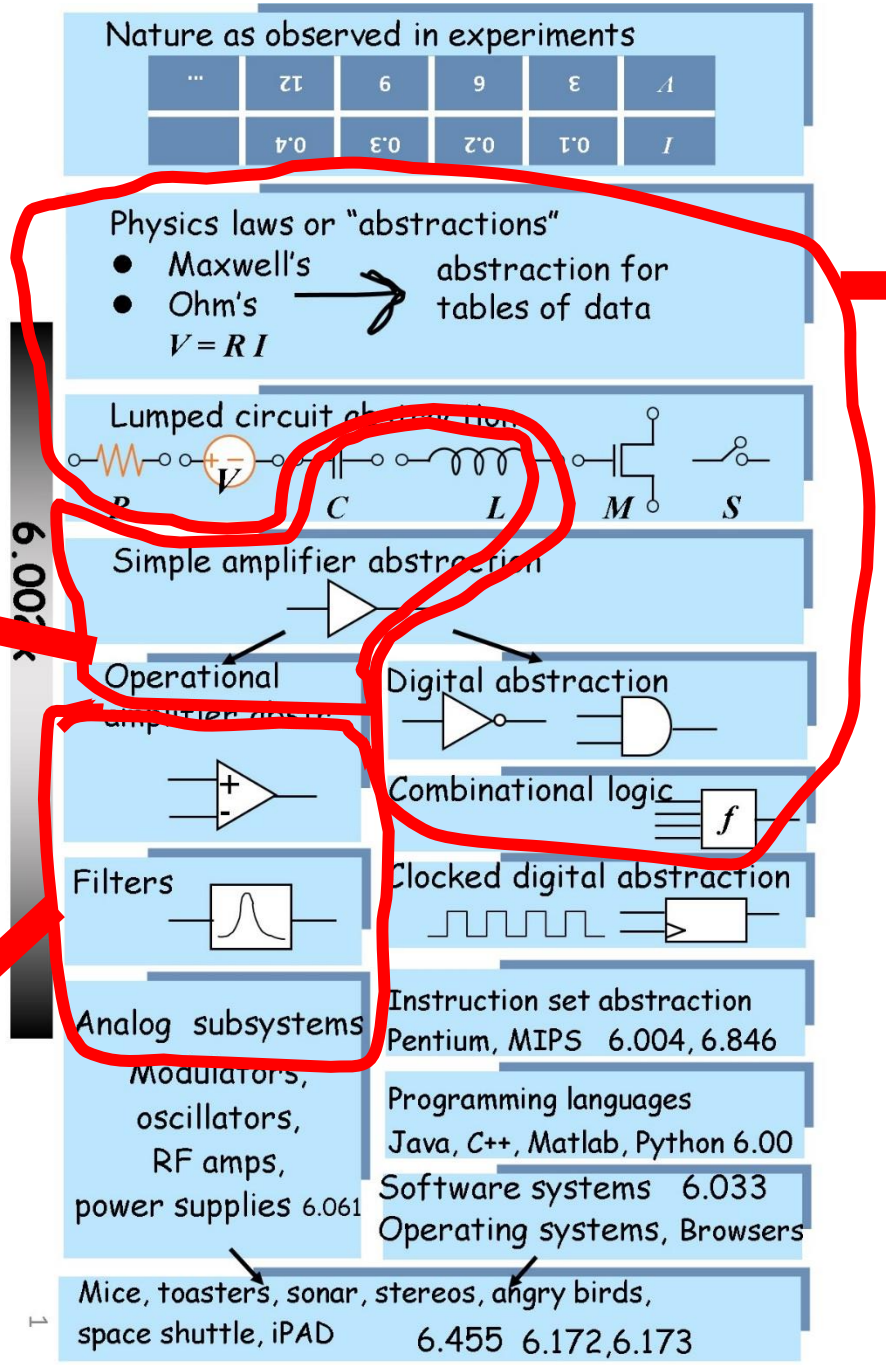
Java, C++, Matlab, Python 6.00

Analog subsystems

Modulators, oscillators, RF amps, power supplies 6.061

Software systems Operating systems, Browsers 6.033

Mice, toasters, sonar, stereos, angry birds, space shuttle, iPAD 6.455 6.172, 6.173



6.002.1x
Circuits and Electronics 1

6.002.2x
Circuits and Electronics 2

6.002.3x
Circuits and Electronics 3