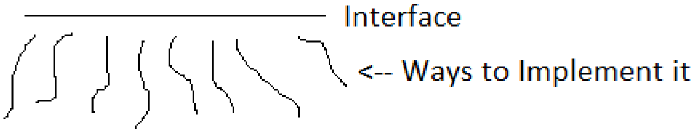
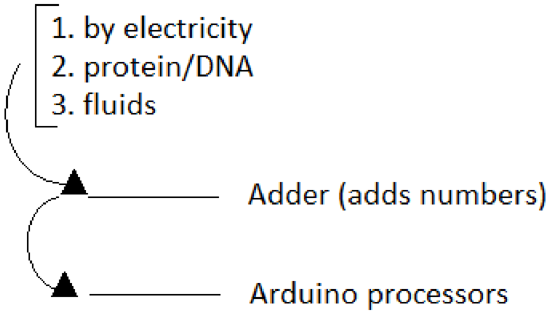
Scribe Notes (10/28/13)



*You can go around the interface but it is useful though constrainable

Ways to implement:



1. by electricity
2. protein/DNA
3. fluids

Adder (adds numbers)

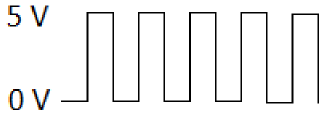
Arduino processors

*millimeter frequency

[in the case of fluids, it is used in the military when the electrical circuits get fried]

*Arduino = a cheap, primitive processor/ computer

Next level of object: register (holds information for us)

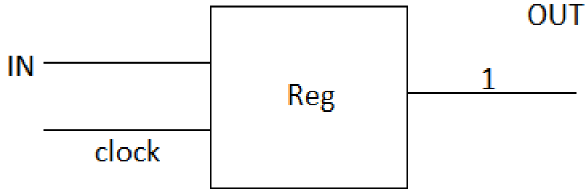


1-20 nanoseconds (up to down)

→ in that time, you are supposed to do everything you need to do

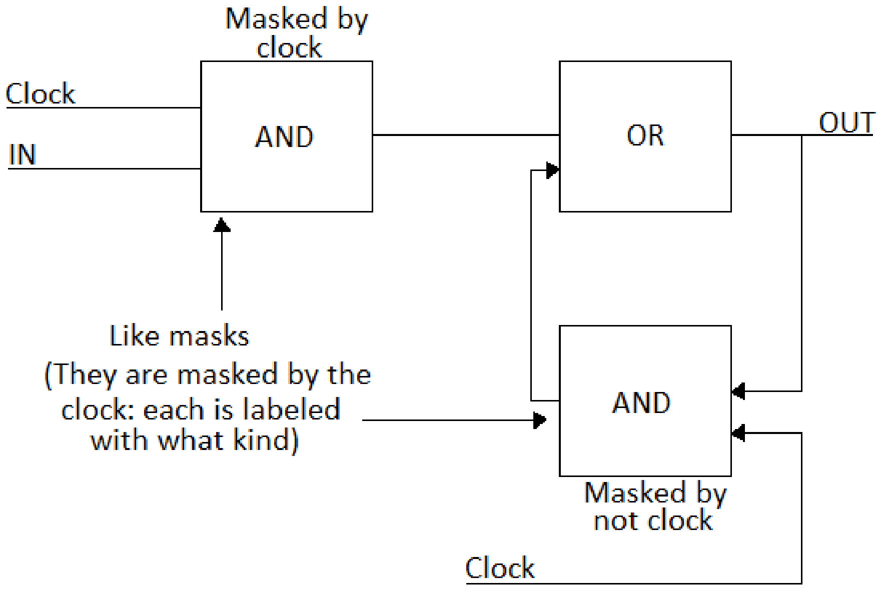
Register Cell

Value output by the cell stays the same while the clock is at zero volts (changes at 5 volts)



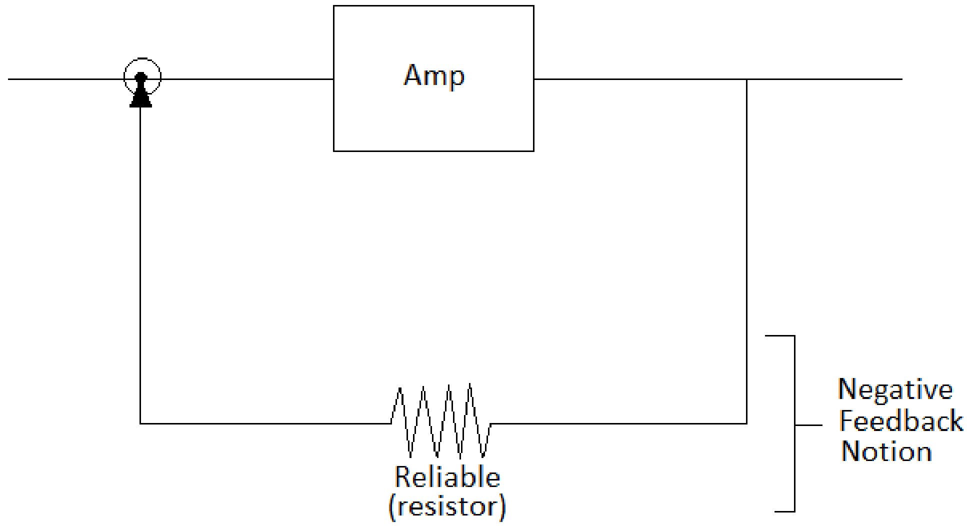
(when the clock goes to 5V, Reg <-- IN)

gets the value for N


Masked by clock
Clock
IN
AND
OR
OUT
Like masks (They are masked by the clock: each is labeled with what kind)
AND
Masked by not clock
Clock

OUT	Clock	IN	OUT
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	0
1	1	1	1

*You don't care about the reliability of an amplifier



Operation Code	Location 1	Location 2	Destination Location 3
Add			

Every instruction takes roughly one cycle (and by that time it will be ready in the destination)

Memory - circuitry to hold information

more but slower

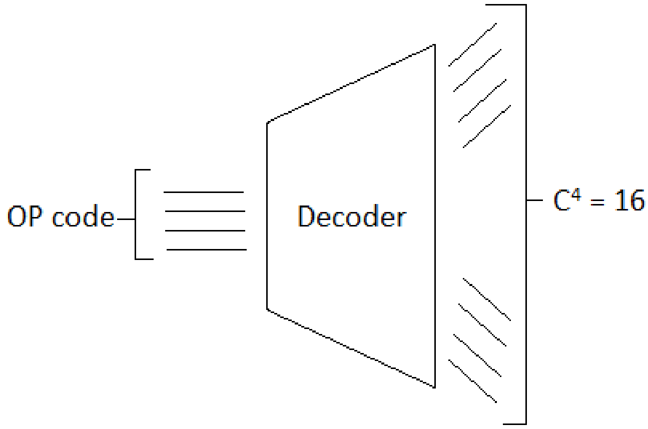
in registers --> the fastest but holds the least [nanoseconds]
cache --> almost as fast but different technology
random access memory
not permanent
flash
disk [milliseconds]
permanent

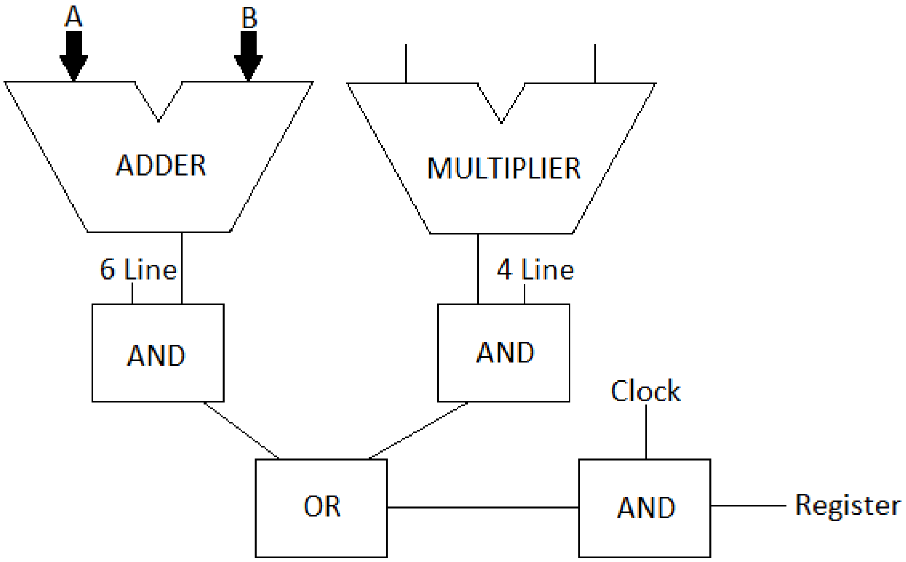
Instructor Architecture Machine
Operations allowed and their encodings

OP Code
0000 - NO-OP (do nothing)
0110 - ADD
0111 - SUBTRACT

0101 - ARC TANGENT
0100 - MULTIPLY
0010 - COMPARE SOME LOCATION TO ZERO

if A < B . . . do something
BUT you can also do B-A and compare to zero





A machine that only has 8 bits

$\boxed{00000000}$

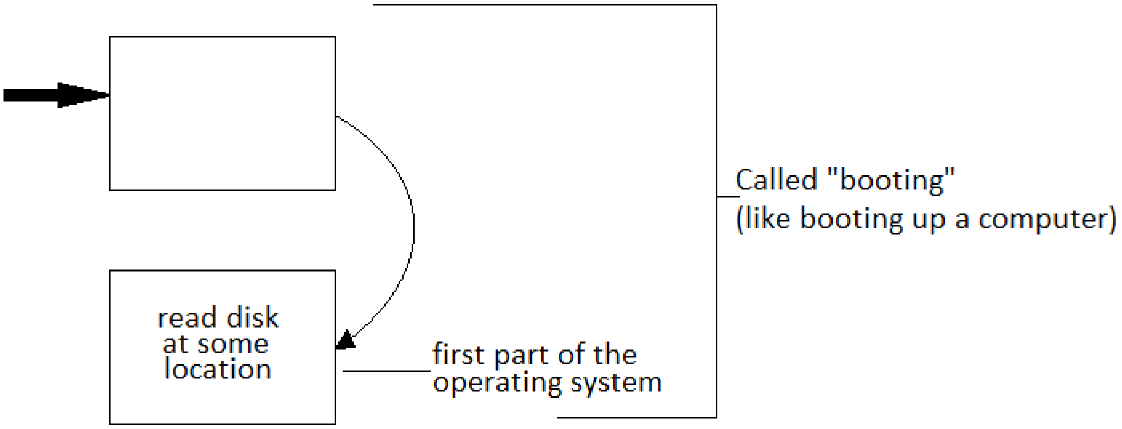
negative number $\boxed{10000000}$

+7 represented by $\boxed{00000111}$

$$\begin{array}{rl} & 11111000 \\ + & \underline{00000001} \\ & 11111001 \text{ (-7)} \end{array}$$

$$\begin{array}{rl} & 00000111 \\ + & \underline{11111001} \\ & 00000000 \text{ (we ignore the (1) that is left over)} \end{array}$$

Read only memory (permanent set of instruction that usually starts at address zero)


read disk at some location
first part of the operating system
Called "booting" (like booting up a computer)

For Monday’s Quiz:

- Next two chapters
- Look up and understand Circuits Checking Circuits puzzle
- Think of a variant on the register