Quiz 1 Review

Circuits

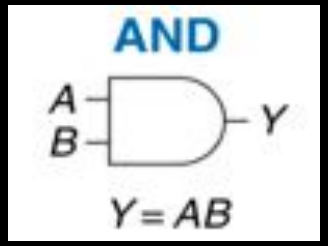
Storage

Architecture

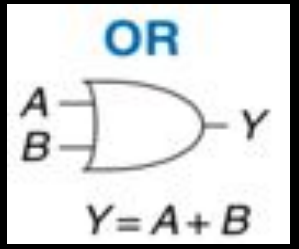
Logic Gates

Simple digital circuits that takes 1 or 2 binary input and produce a binary output. (Usually construct out of transistors)

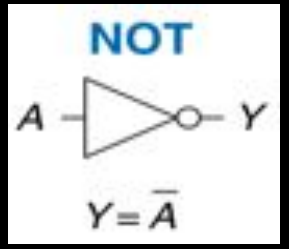
A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1



A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1



A	Y
0	1
1	0

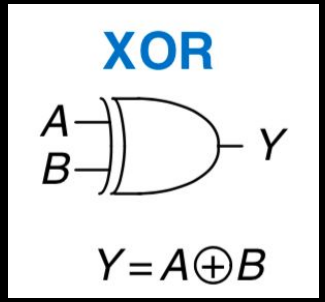


Circuits

Storage

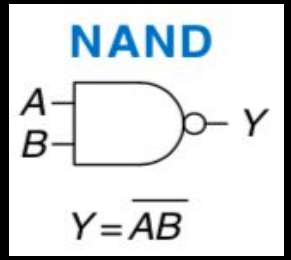
Architecture

XOR



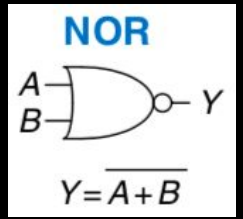
A	B	Y
0	0	0
0	1	1
1	0	1
1	1	0

NAND



A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

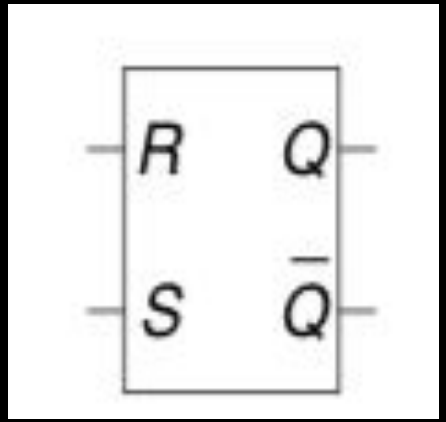
NOR



A	B	Y
0	0	1
0	1	0
1	0	0
1	1	0

Circuits

SR Latch



Storage

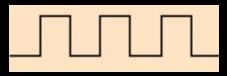
Architecture

Circuits

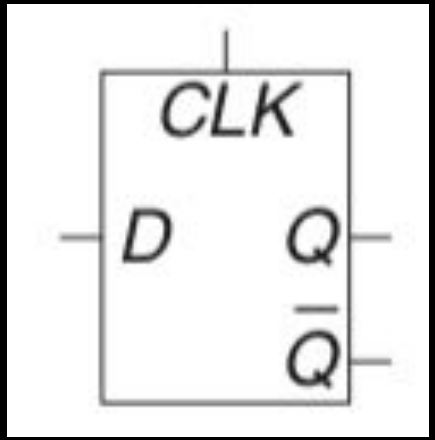
Storage

Architecture

D Flip-flop



CLK

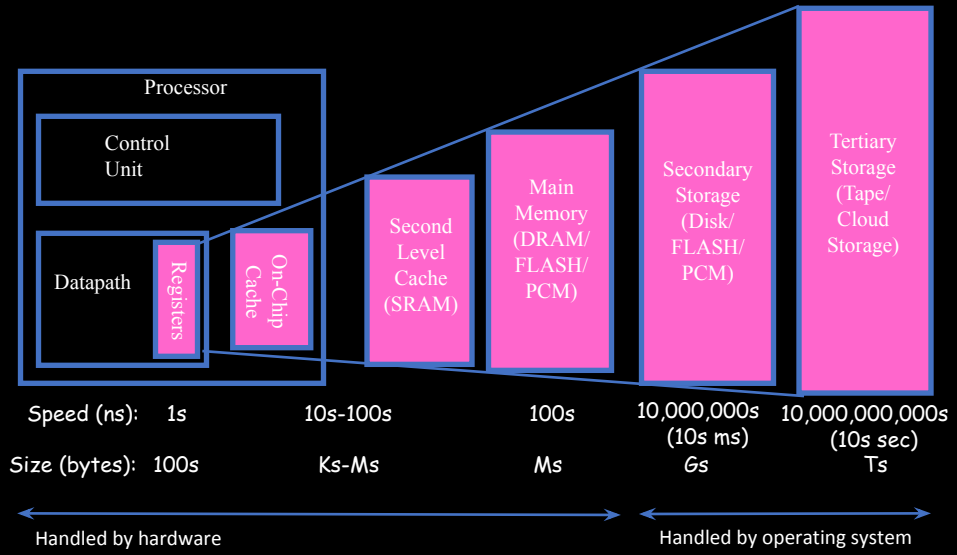


Circuits

Storage

Architecture

Memory hierarchy



Circuits

Storage

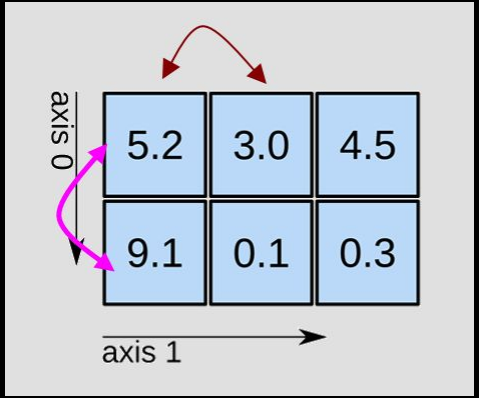
Architecture

Locality

Nearby = Fast (nearby also loaded in cache)

Recent = Fast (loaded in cache)

A[i][j+1] is closer to A[i][j] than A[i+1][j]

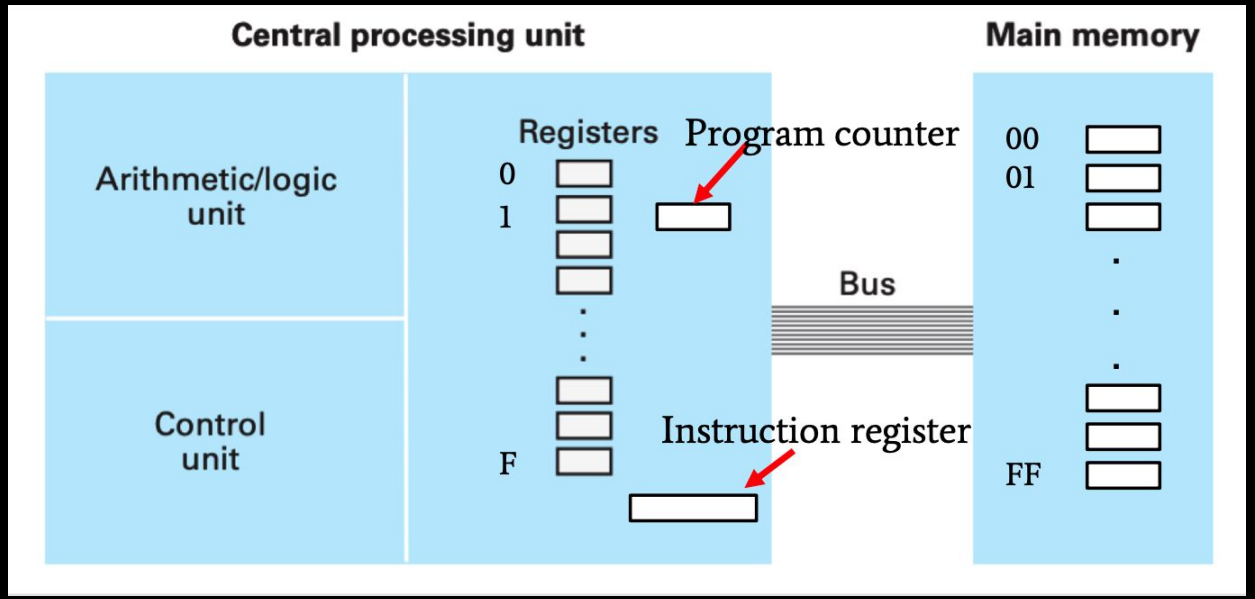


Circuits

Storage

Architecture

CPU



Programming

Circuits

Fixed-program

Storage

Stored-program

Architecture

High Level Language

Circuits

Python

Storage

C++

Architecture

Low Level Language

Circuits

Assembly Language

Storage

Machine Language

Architecture

Circuits

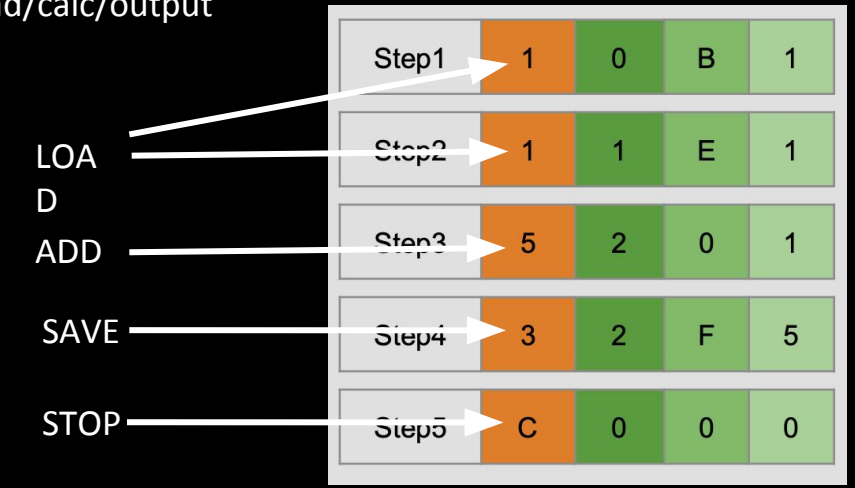
Storage

Architecture

Machine instructions

Load/calc/output

…



Circuits

Storage

Architecture

Other Key Points

6. The KISS Principle
   a) Keep it simple but stupid
   b) Keep it simple but not simpler
7. De Morgan's Law
   a) $\neg(P \vee Q) = \neg P \wedge \neg Q$
   b) $\neg(P \wedge Q) = \neg P \vee \neg Q$
8. The Moore's law
   a) Numbers on transistors on cost-effective integrated circuit double every 18 months.