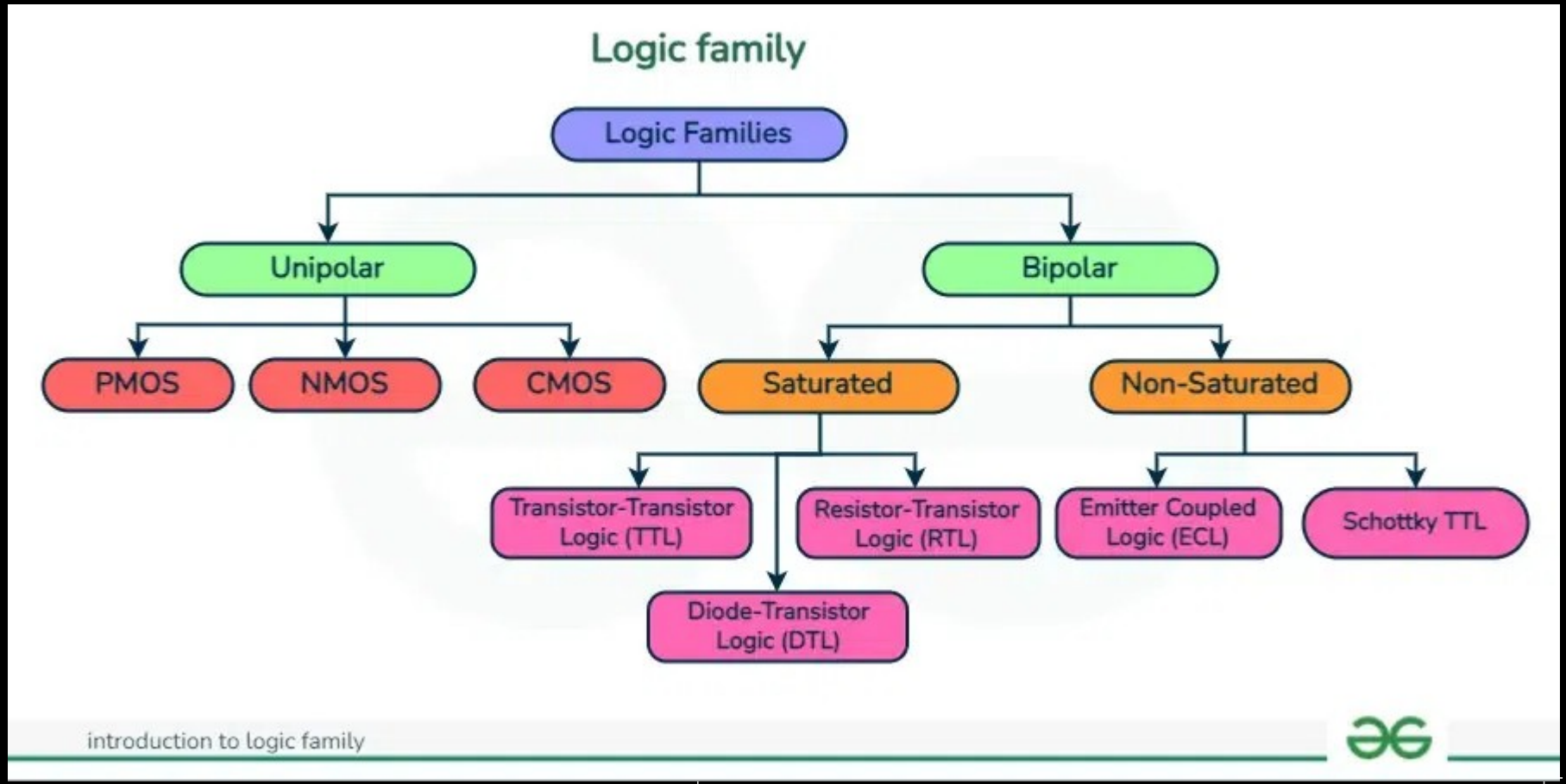
Switching Circuit & Logic Design

Lecture 1 : Introduction

Things to cover

- Digital Logic Families
- Switching theory
- Logic circuits
- Sequential Circuits
- ASM chart

Digital Logic Families



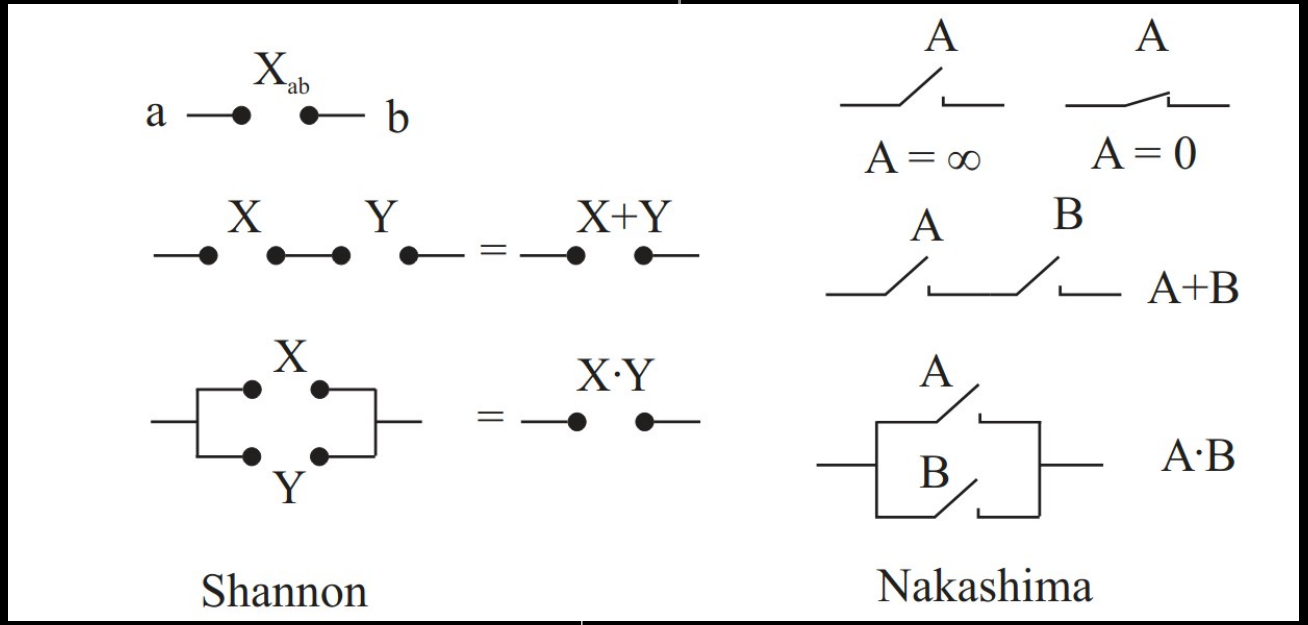
Taken from here

Switching Theory

Akira Nakashima from Japan (1936)

Claude Shannon from US (1938)

Victor Sheshtakov from Soviet Union (1938 Ph.D. Thesis published in 1941)

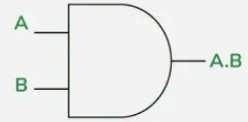


Link

Logic Circuits

Decoder
Multiplexer
ROM
PLA
FPGA
Etc.

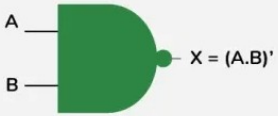
Two Input AND Gate



Truth Table

A (Input 1)	B (Input 2)	X = (A.B)
0	0	0
0	1	0
1	0	0
1	1	1

Two Input NAND Gate



Truth Table

Input A	Input B	X = (A.B)'
0	0	1
0	1	1
1	0	1
1	1	0

Sequential Circuits

Synchronous vs. Asynchronous
Flip-flop
Latch
Counter
Shift Register
Finite-state machine
Etc.

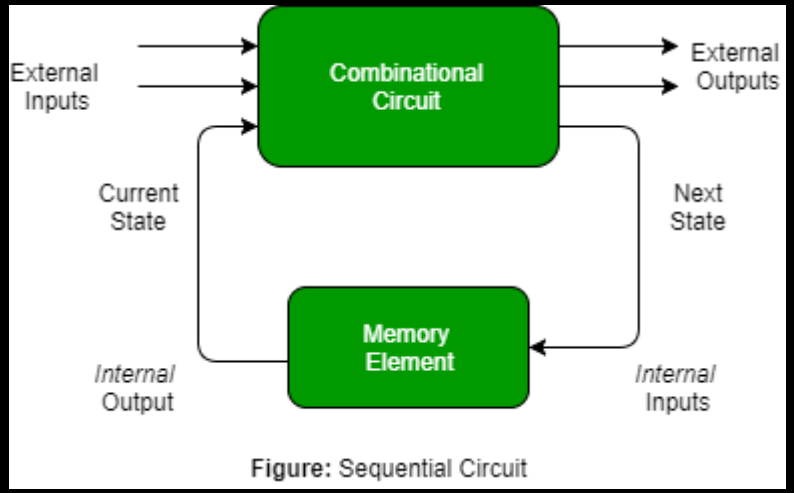
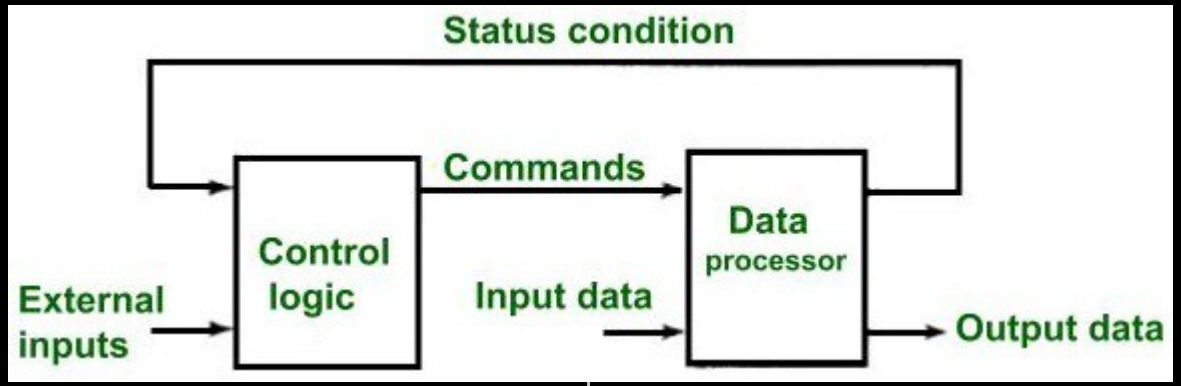
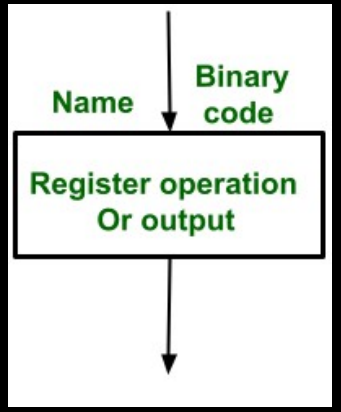


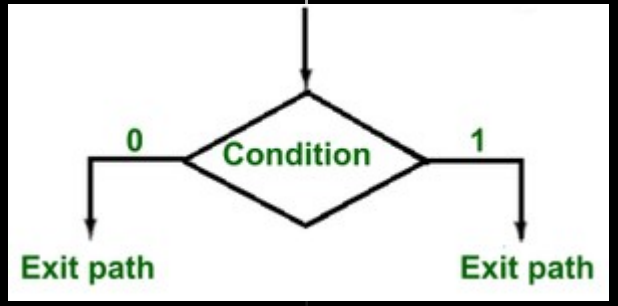
Figure: Sequential Circuit

Algorithmic State Machine charts

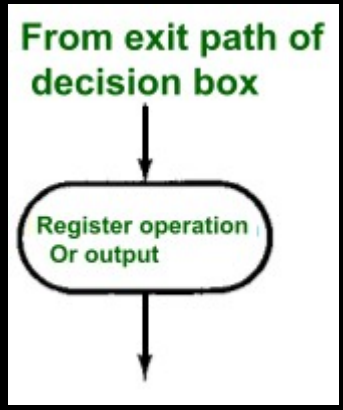




State box



Decision box



Conditional o/p box