Uke 44

Logiske porter
Kretser

11:11PM

Addisjon (199)

- FETCH
  - Hent instruksjon og øk program telleren
- DECODE
  - Splitt instruksjonen og hent fra minne
- EXECUTE
  - Utfør instruksjon
- WRITE-BACK
  - Lagre data

Big Man





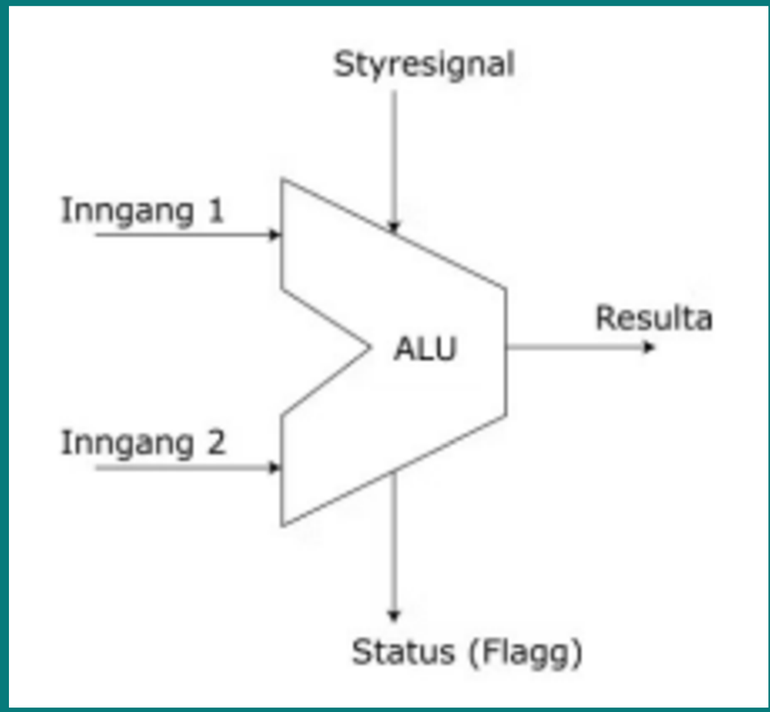



Home

ALU

- Aritmetiske funksjoner
- Logiske funksjoner
- Styresignal som velger operasjon
- Resultat
- Status (flagg)

Big Man



Home

Binær addisjon

$$\begin{array}{rr} & \color{red}{1} \\ & 0\quad 5 \\ +\,& 0\quad 6 \\ \hline & 1\quad 1 \end{array}$$

$$\begin{array}{rr} & \color{red}{1} \\ & 0\quad 1\quad 0\quad 1 \\ +\,& 0\quad 1\quad 1\quad 0 \\ \hline & 1\quad 0\quad 1\quad 1 \end{array}$$

Big Man





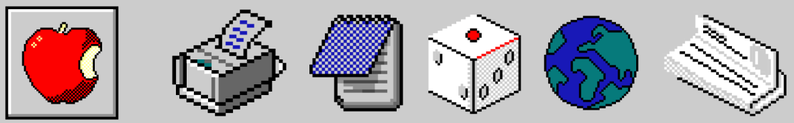



Home

Logiske porter

- NOT
- AND
- OR
- XOR
- NAND, NOR, XNOR

Big Man

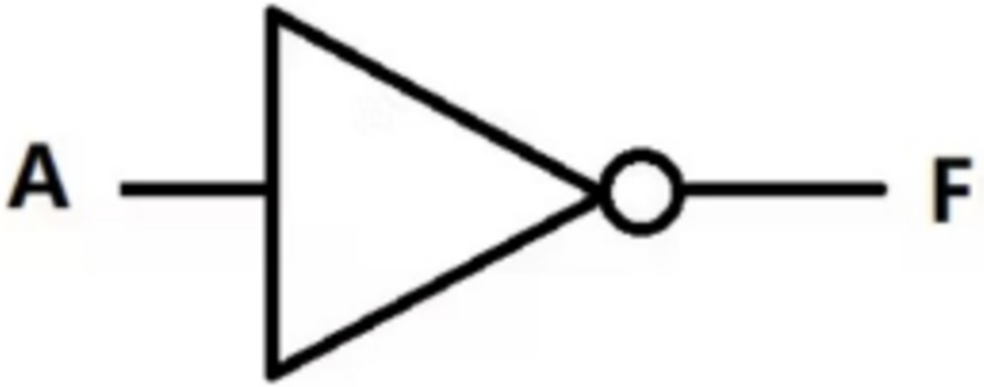


Home

NOT - Inverter

$$F = A' \; or \; F = \overline{A}$$

A	F
0	1
1	0



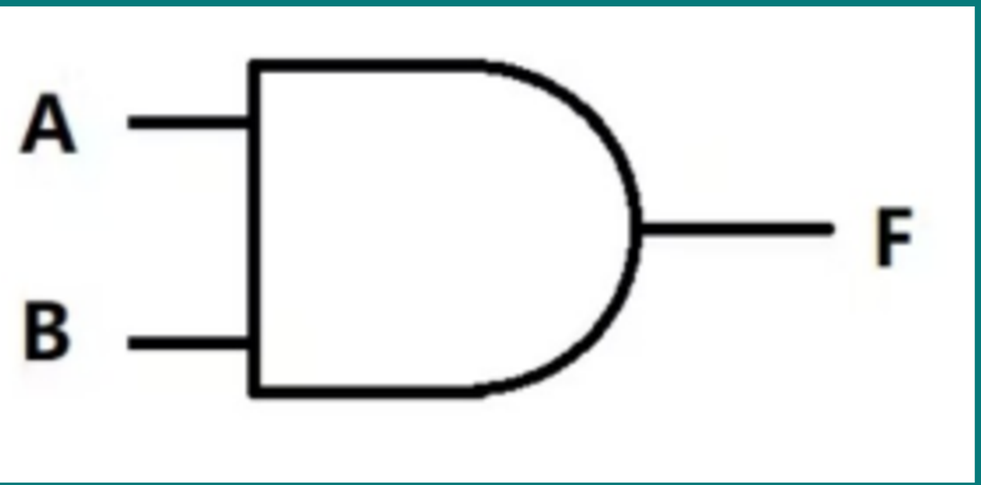
Big Man

Home

AND

$$F = AB \; or \; F = A \cdot B$$

A	B	F
0	0	0
0	1	0
1	0	0
1	1	1



Big Man

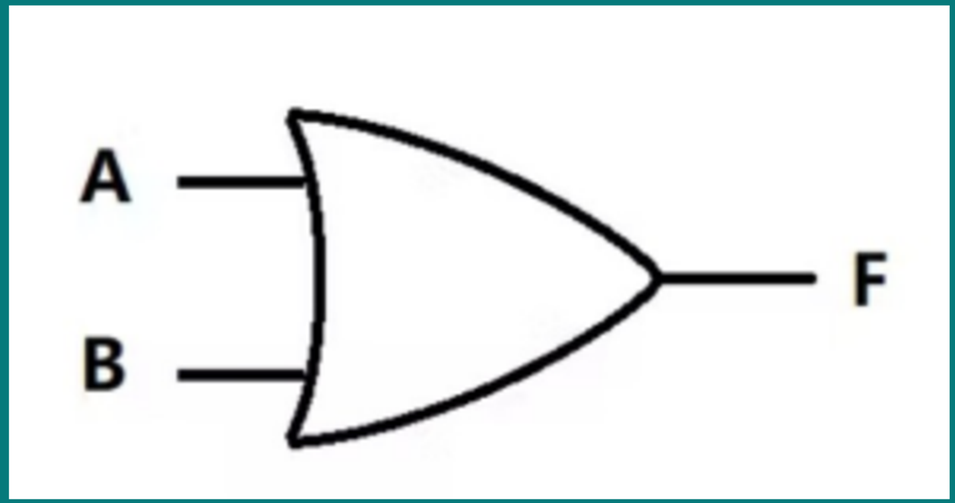
Home

OR

$$F = A + B$$

A	B	F
0	0	0
0	1	1
1	0	1
1	1	1

Big Man



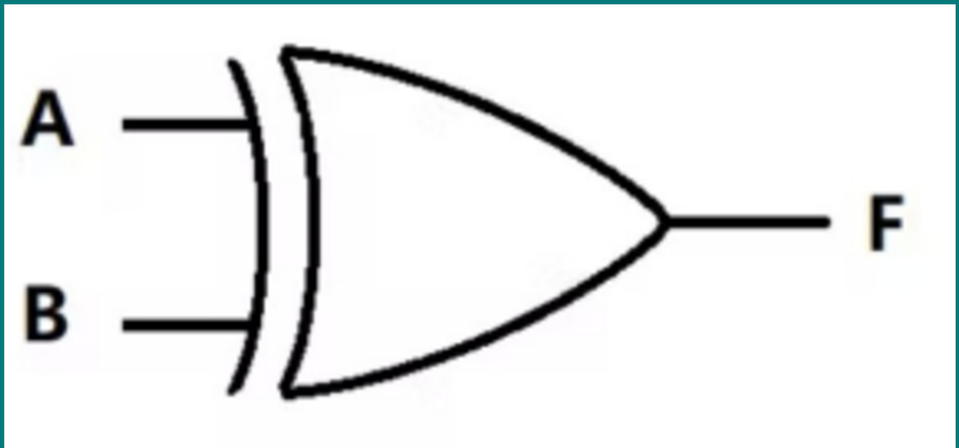
Home

XOR

$$F = A \oplus B$$

A	B	F
0	0	0
0	1	1
1	0	1
1	1	0

Big Man



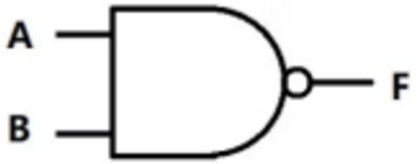
Home

NAND, NOR, XNOR

NAND - port

$F = (AB)`$

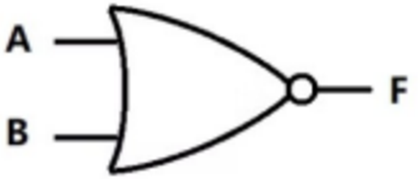
A	B	F
0	0	1
0	1	1
1	0	1
1	1	0



NOR - port

$F = (A+B)`$

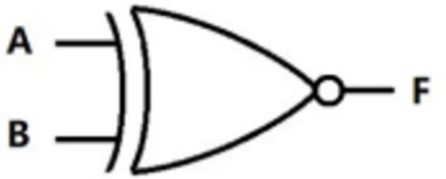
A	B	F
0	0	1
0	1	0
1	0	0
1	1	0

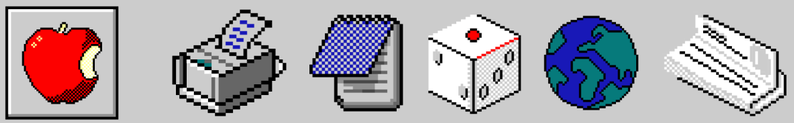


XNOR - port

$F = (A \oplus B)`$

A	B	F
0	0	1
0	1	0
1	0	0
1	1	1





Home

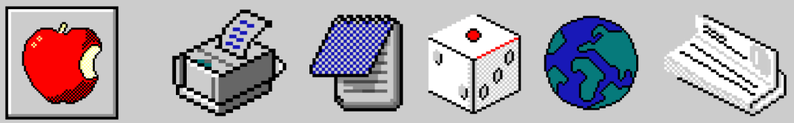
Sannhetsverditabell

- Funksjonsbeskrivelse
- Inneholder alle mulige kombinasjoner av innganger
- Én sannhetsverditabell kan ha mange funksjonsbeskrivelser
- Én funksjon har bare én sannhetsverditabell

Big Man

A	B	F
0	**0**	
0	1	
1	0	
1	1	

Big Man

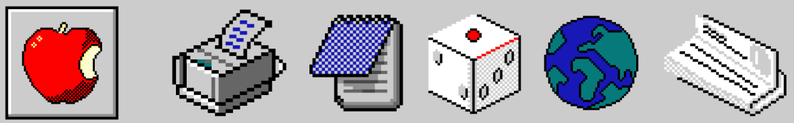


Home

Én ...

- Én port:
  - Har alltid én logisk funksjon
  - Kan ha matematisk funksjon
- Én funksjon
  - Kan være en logisk funksjon
  - Kan være en matematisk funksjon
  - Inneholder én eller flere porter

Big Man

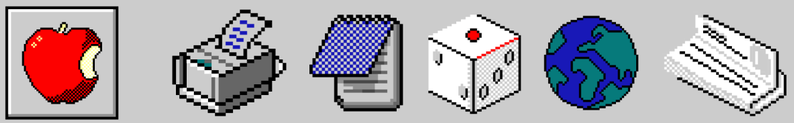


Home

Kretsanalyse

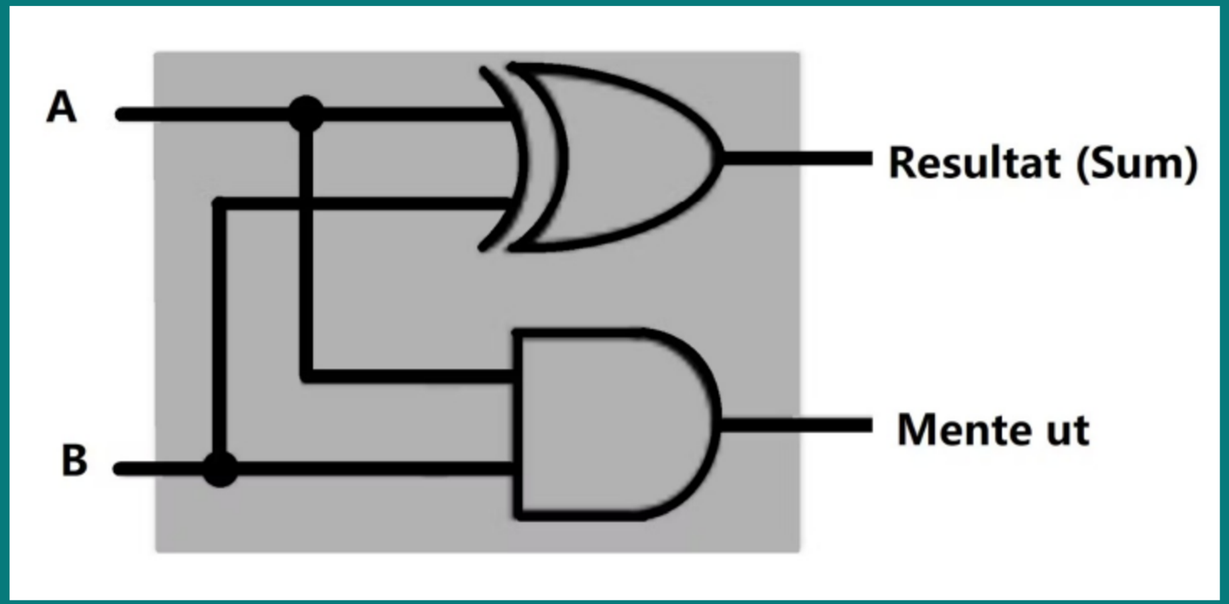
- Fra venstre til høyre
  - Fra inngang(er) til utgang(er)
- Fra høyre til venstre
  - Fra utgang(er) til inngang(er)

Big Man



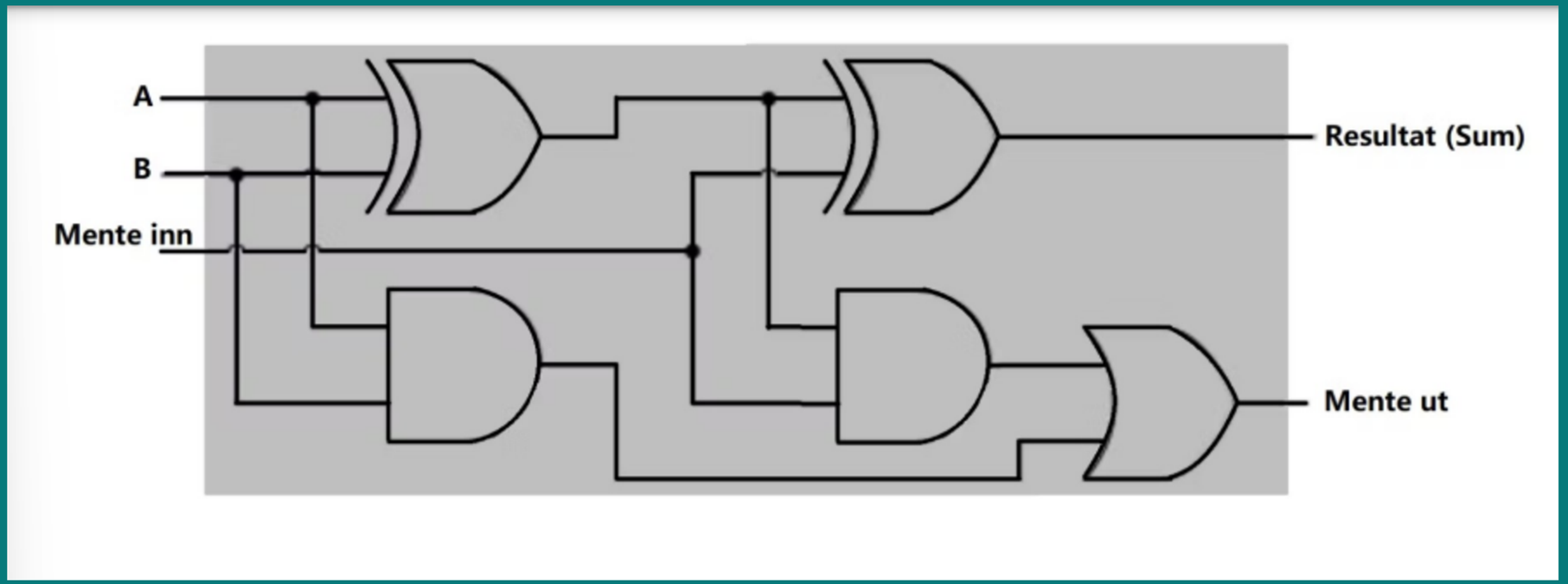
Home

Halv-adder og sannhetsverditabell for 1-bits addisjon



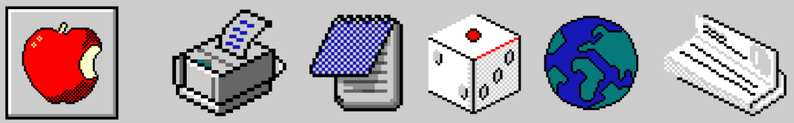
A	B	Sum	Carry
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

1-bits fulladder



Sannhetsverditabell for en 1-bits fulladder

A	B	C_{in}	Sum	C_{out}
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1
1	0	0	1	0
1	0	1	0	1
1	1	0	0	1
1	1	1	1	1



Home