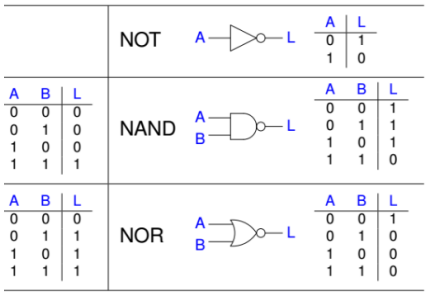
A	B	$\overline{A}$	$A+B$	$A\cdot B$	$\overline{A+B}$	$\overline{A\cdot B}$	$A\oplus B$
0	0	1	0	0	1	1	0
0	1	1	1	0	0	1	1
1	0	0	1	0	0	1	1
1	1	0	1	1	0	0	0

NOT OR AND NOR NAND XOR



BB=B

Relationship	Dual form	Name
$AB = BA$	$A+B = B+A$	commutative (1)
$1A = A$	$0+A = A$	identity (2)
$A\overline{A} = 0$	$A+\overline{A} = 1$	complement (3)
$A(B+C) = AB+AC$	$A+BC = (A+B)(A+C)$	distributive (4)
$\overline{AB} = \overline{A}+\overline{B}$	$\overline{A+B} = \overline{A}\cdot\overline{B}$	DeMorgan (5)

ASSEMBLY CODE:

MOV target,source

BRNE k waar k de relatieve jump is en BRNE regel meetelt.

SUB→BRNE alleen als resultaat

SUB niet 0 is

Negative

The three possibilities from the previous slide are:

A. Use first bit for the minus sign
B. 1's complement: invert all bits when negative
C. 2's complement: continue counting after +7 with –8.

decimal	A	B	C
–8			1000
–7	1111	1000	1001
–6	1110	1001	1010
–5	1101	1010	1011
–4	1100	1011	1100
–3	1011	1100	1101
–2	1010	1101	1110
–1	1001	1110	1111
0	1000 / 0000	1111 / 0000	0000
+1	0001	0001	0001
+2	0010	0010	0010
+3	0011	0011	0011
+4	0100	0100	0100
+5	0101	0101	0101
+6	0110	0110	0110
+7	0111	0111	0111

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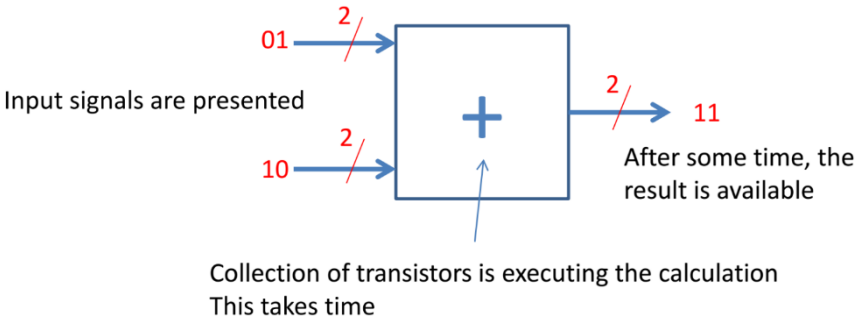
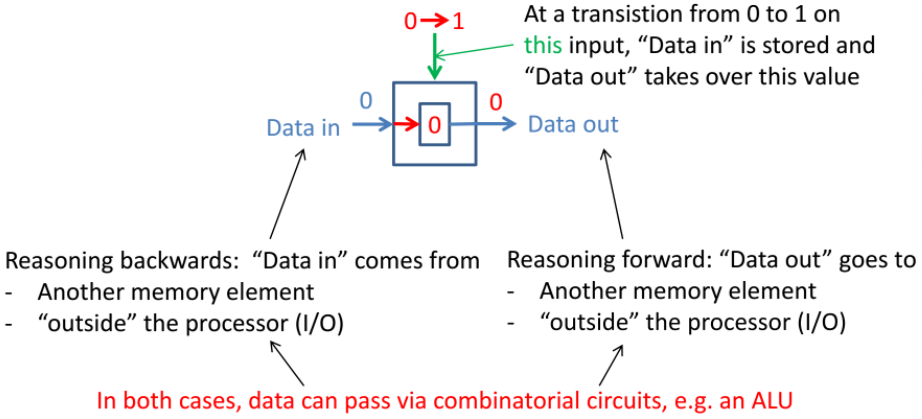
Combinatorial circuits

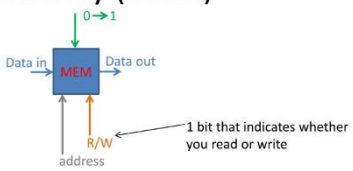


In programs operations are coded by 'Mnemonics'. For example '+' = ADD, '*' = MUL.

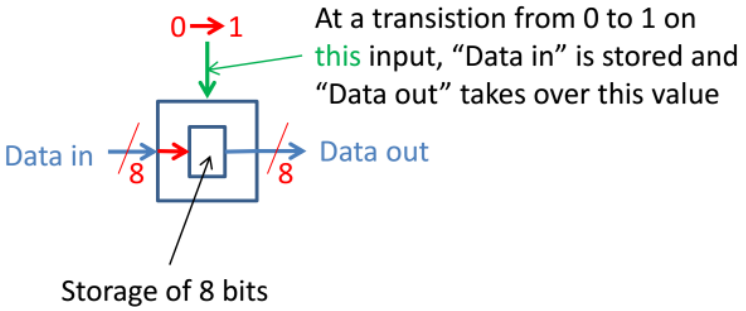
Register



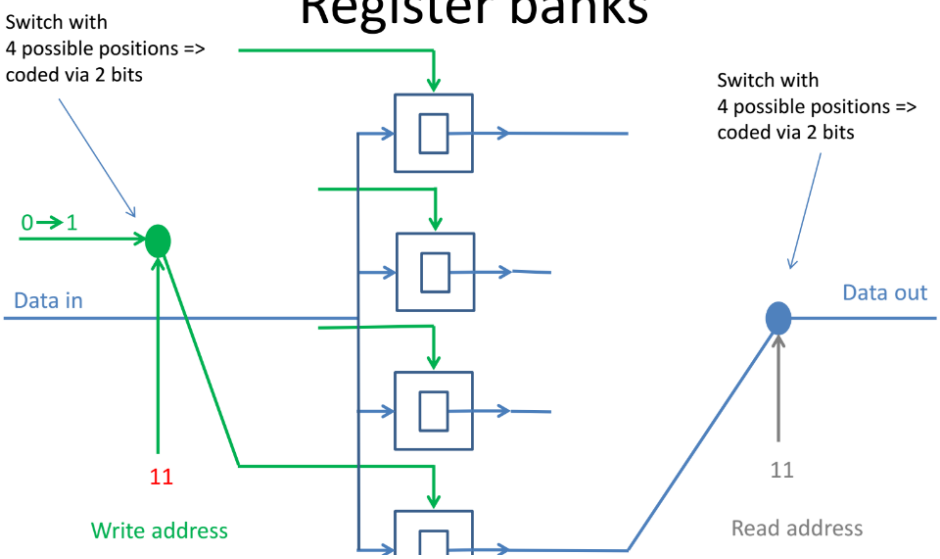
Memory (MEM)

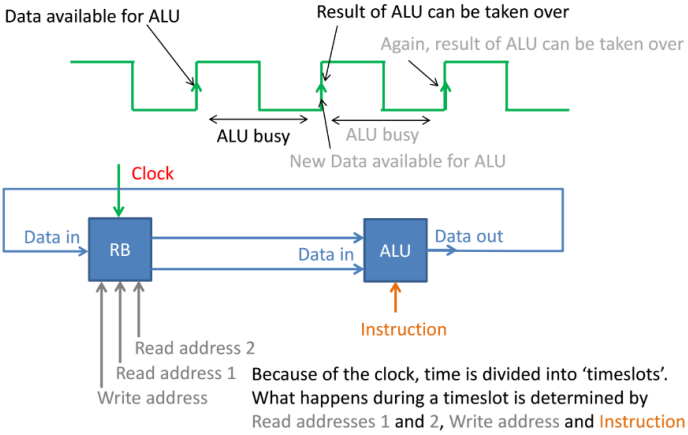


- Same functionality as Registerbank
- Read and Write not simultaneously => 1 address input + additional line that indicates read or write
- Consists of a lot more memory elements (larger address range)



Register banks





CLOCK SIGNAL: