UVOD U RAČUNARSTVO

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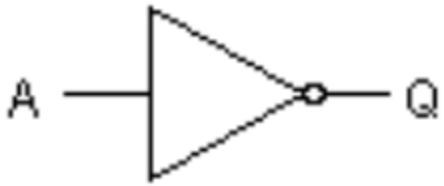
Logički NE-sklop (NOT) - invertor

Invertor je sklop s jednim ulazom, koji daje izlaz čije je stanje suprotno stanju ulaza.

Tablica istine

A	B
0	1
1	0

Simbol:



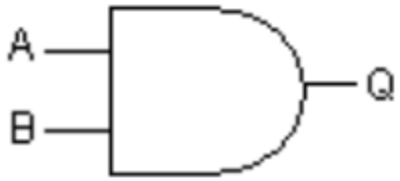
Logički I-sklop (AND)

Sklop I ima dva ili više ulaza.

Tablica istine

A	B	A&B
0	0	0
0	1	0
1	0	0
1	1	1

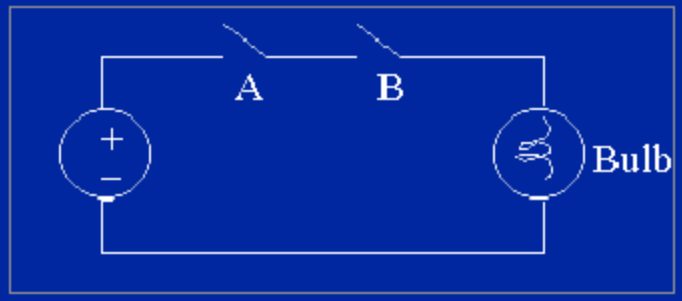
Oznaka:



Ekvivalentna elektronička shema logičkog I sklopa

Logic Gates

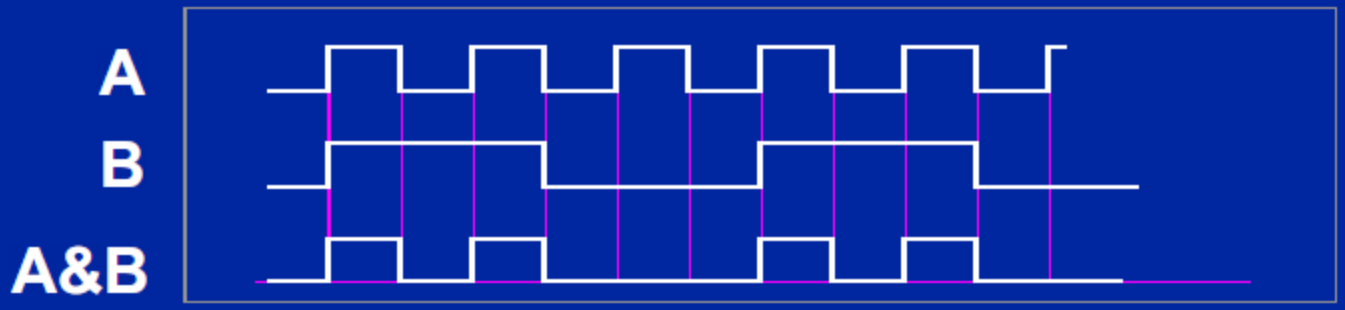
- The AND logic operation
- Consider the following circuit



- The bulb = ON = TRUE when A AND B are TRUE (i.e. closed)

Logic Gates

- The AND Gate - An example
- Determine the output waveform when the input waveforms A and B are applied to the two inputs of an AND gate



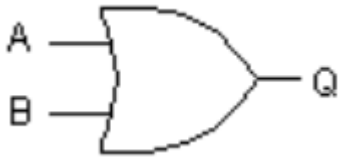
Logički ILI-sklop (OR)

Sklop ILI ima dva ili više ulaza.

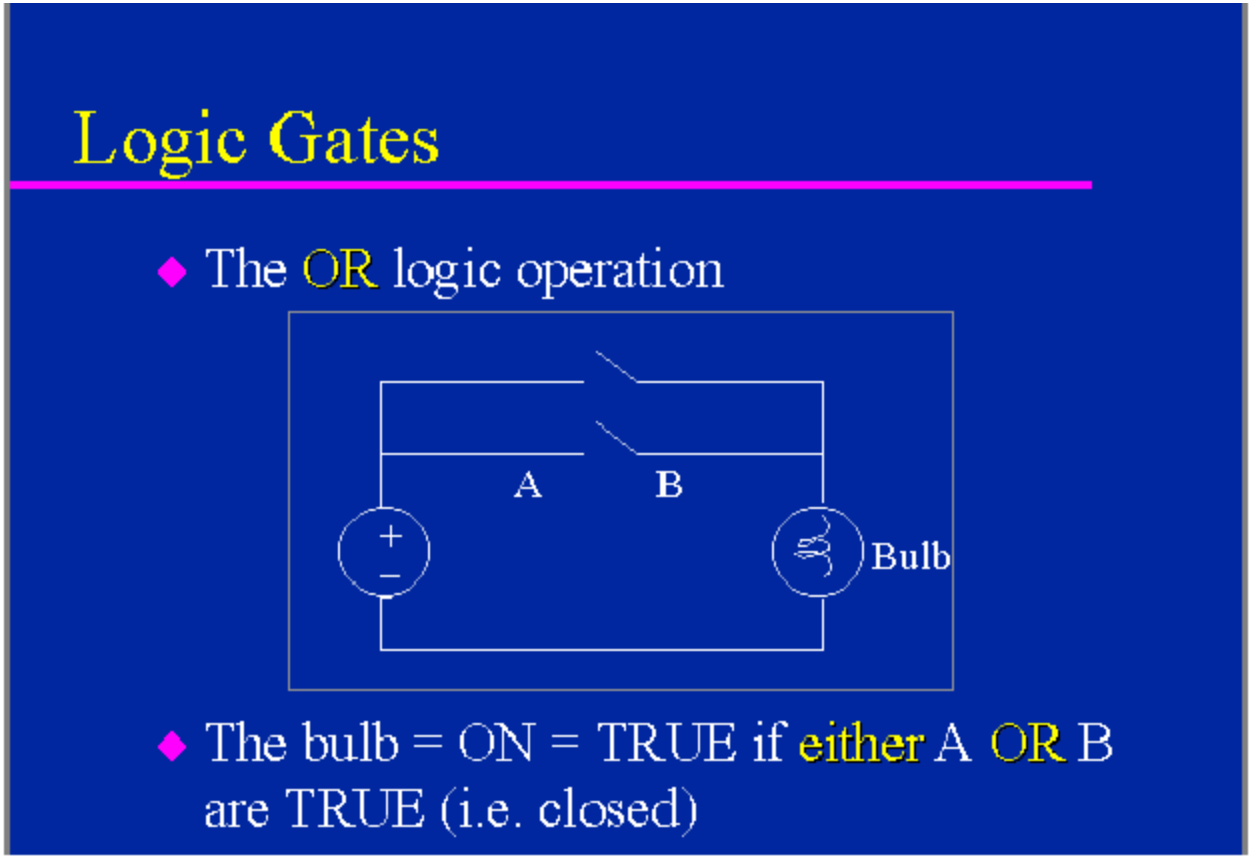
Tablica istine

A	B	AvB
0	0	0
0	1	1
1	0	1
1	1	1

Oznaka:



Ekvivalentna elektronička shema: logičkog ILI sklopa



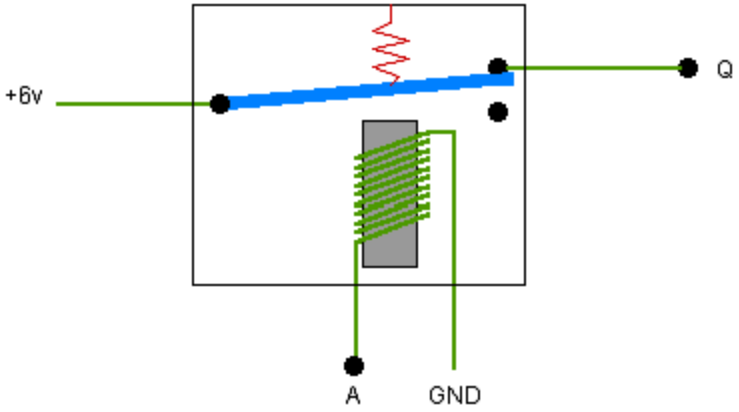
Tablica istine za logičke sklopove: AND, NAND, OR i NOR

A	B	A&B	$\overline{A\&B}$	AvB	$\overline{AvB}$
0	0	0	1	0	1
0	1	0	1	1	0
1	0	0	1	1	0
1	1	1	0	1	0

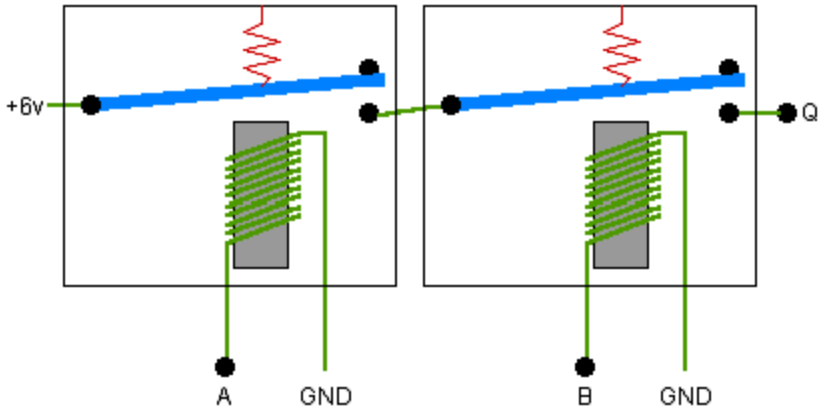
NOR

NAND

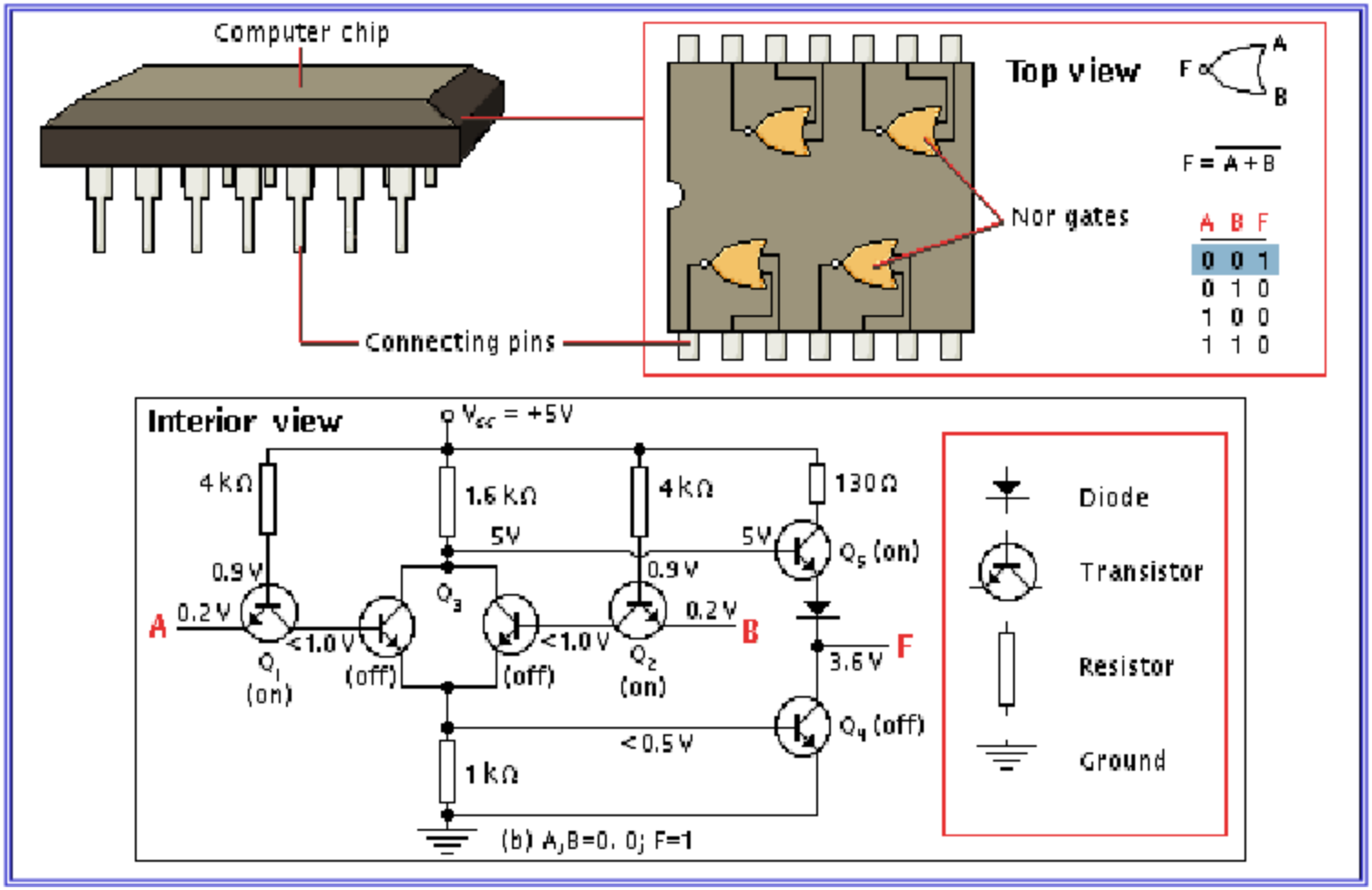
Invertor



AND

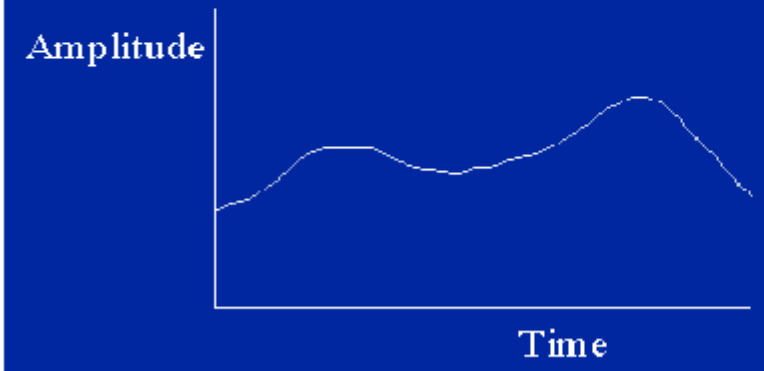


Logički sklop NILI–NOR
- elektronička izvedba -

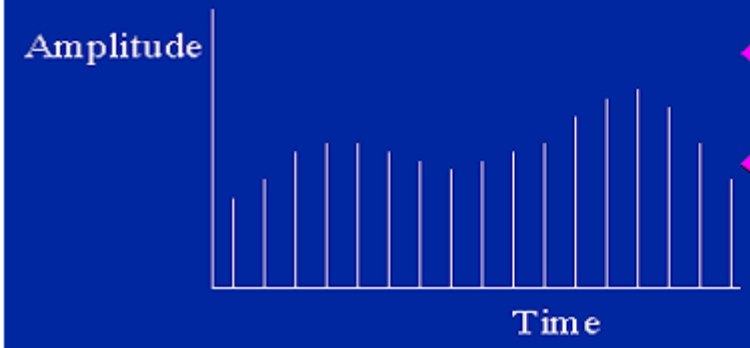


Analogue and Digital Signals

- An analogue signal
- The amplitude is defined at all moments in time



Analogue and Digital Signals



- A digital signal
- It is a sampled version of the analogue signal
- Only defined at certain discrete times
- DISCRETE TIME SIGNAL

Analogue and Digital Signals

- Calculation with numbers is usually done in base 10 arithmetic
- Easier to effect machine computation in base 2 or binary notation
- We can also use base 2 or binary notation to represent logic values: TRUE and FALSE
- Manipulation of these (digital) logic values is subject to the laws of logic as set out in the formal rules of Boolean algebra

Boolean Algebra

- Definition: a logic variable x can have only one of two possible values or states

  $x = \text{TRUE}$

  $x = \text{FALSE}$

- In binary notation, we can say

  $x = \text{TRUE} = 1$

  $x = \text{FALSE} = 0$

- This is called positive logic or high-true logic

Boolean Algebra

- We could also say

  $x = \text{TRUE} = 0$

  $x = \text{FALSE} = 1$
- This is called negative logic or low-true logic
- Usually we use the positive logic convention

Boolean Algebra

- Electrically,
  - 1 is represented by a more positive voltage than zero and
  - 0 is represented by zero volts
- x = TRUE = 1 = 5 volts
  x = FALSE = 0 = 0 volts

Logic Gates

- Logic gates are switching circuits that perform certain simple operations on binary signals
- These operations are chosen to facilitate the implementation of useful functions

Corresponding Digital Circuit