

# Kombinační automaty (logické obvody)

Název školy: SPŠ Ústí nad Labem, středisko Resslova

Autor: Ing. Pavel Votrubec

Název: VY\_32\_INOVACE\_01\_CIT\_05\_Logicke\_obvody

Téma: Logické obvody

Číslo projektu: CZ.1.07/1.5.00/34.10.1036

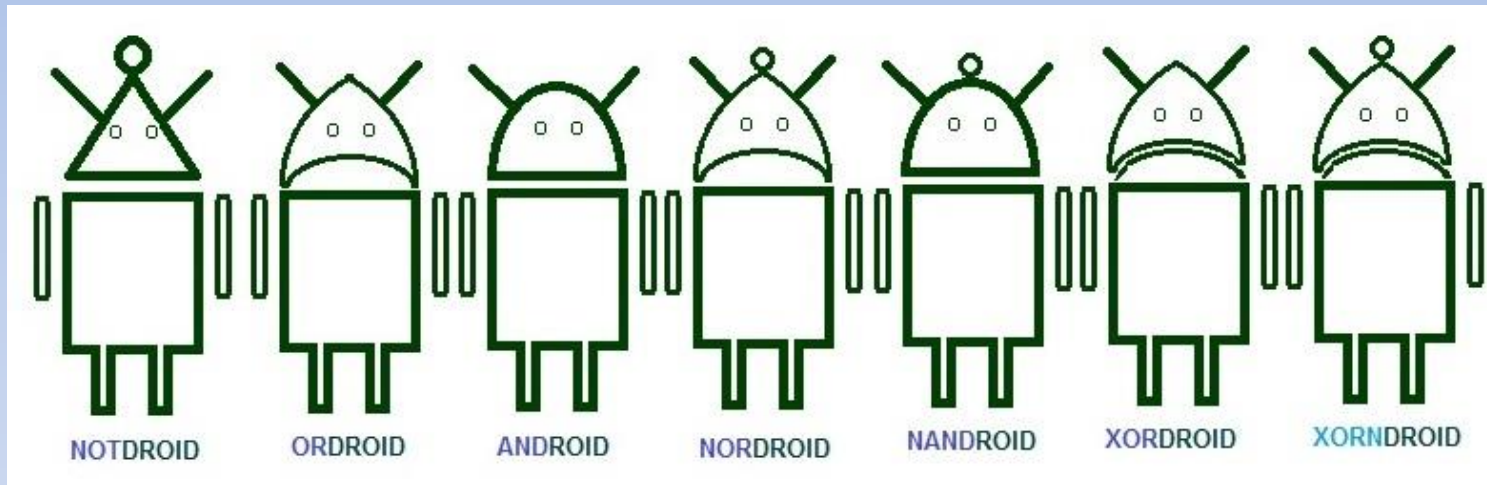


INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

# Přehled základních logických obvodů

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

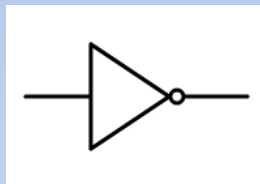
Pokus o odborný vtip



# NOT (negace)

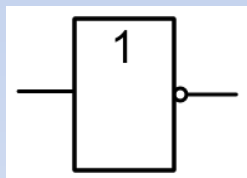
A	f
0	1
1	0

$$f = \bar{A}$$



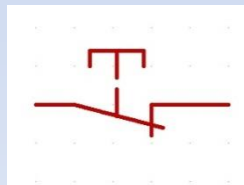
americká norma ANSI (do roku 1966 ASA)

Zdroj: <http://mikrokontrolery-pic.cz/wp-content/uploads/NOT.gif>

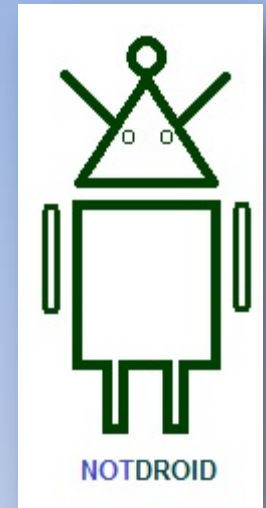


evropská norma IEC

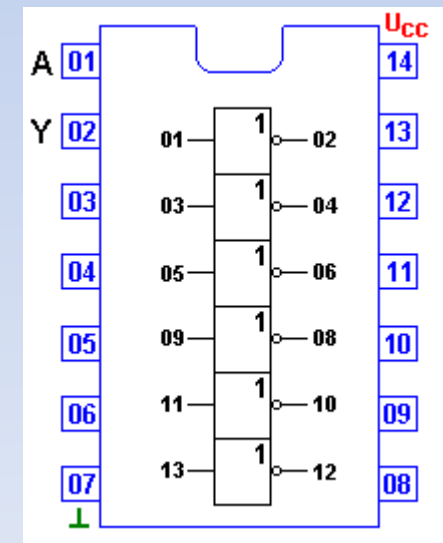
Zdroj: <http://mikrokontrolery-pic.cz/wp-content/uploads/NOT-IEC1.gif>



*Poznámka: IO je zkratka pro Integrovaný Obvod*



IO 74LS04

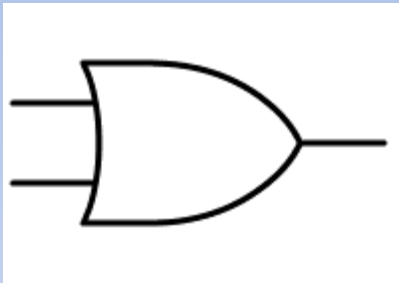


Zdroj: <http://telefon.unas.cz/e/integrované%20obvody/mh7404.gif>

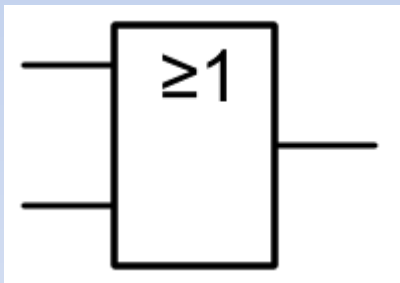
A	B	f
0	0	0
0	1	1
1	0	1
1	1	1

# OR

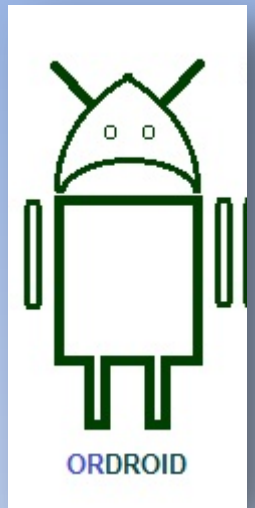
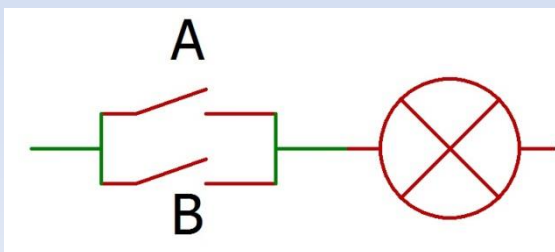
$$f = A + B$$



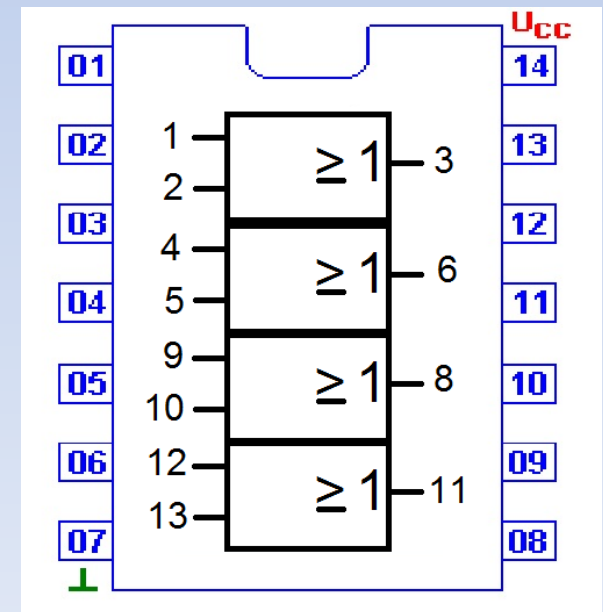
Zdroj: <http://mikrokontrolery-pic.cz/wp-content/uploads/OR.gif>



Zdroj: <http://mikrokontrolery-pic.cz/wp-content/uploads/OR-IEC.gif>



## IO 74AHCT32

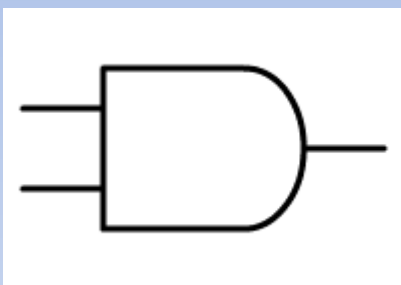
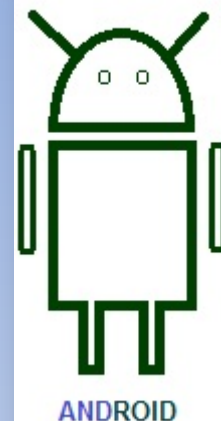


Zdroj: <http://www.ti.com/lit/ds/symlink/sn54ahct32.pdf>

A	B	f
0	0	0
0	1	0
1	0	0
1	1	1

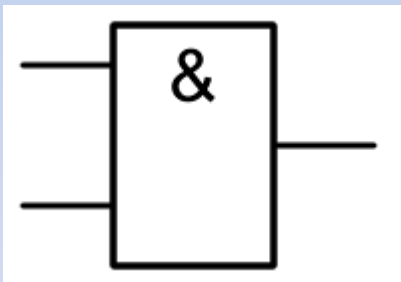
# AND

$$f = A * B$$



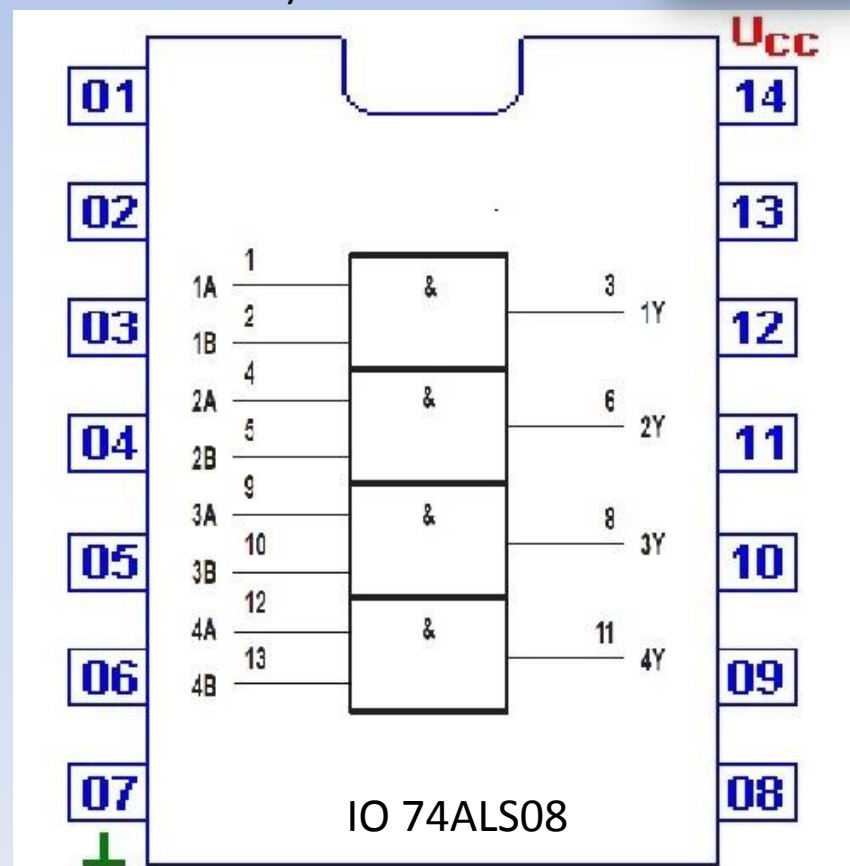
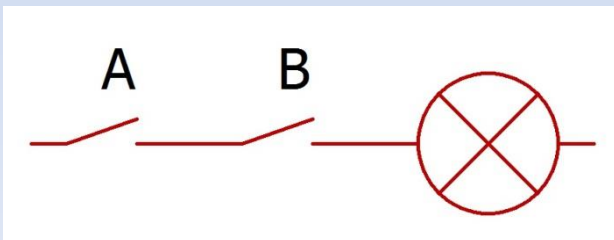
Zdroj: <http://mikrokontrolery-pic.cz/wp-content/uploads/AND.gif>

americká norma ANSI (do roku 1966 ASA)



evropská norma IEC

Zdroj: <http://mikrokontrolery-pic.cz/wp-content/uploads/AND-IEC.gif>



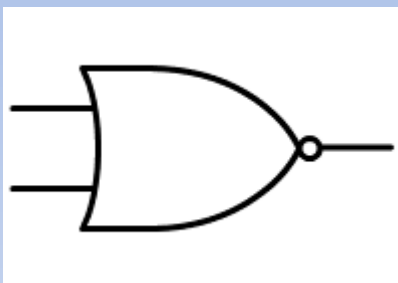
Zdroj: <http://www.ti.com/lit/ds/sdas191a/sdas191a.pdf>

A	B	f
0	0	1
0	1	0
1	0	0
1	1	0

# NOR

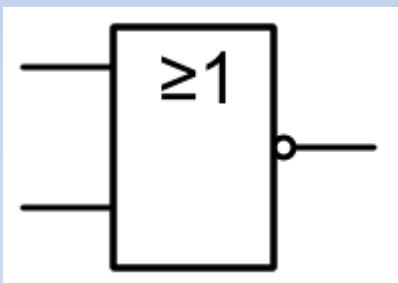
## Pierceova funkce

$$f = \overline{A + B}$$



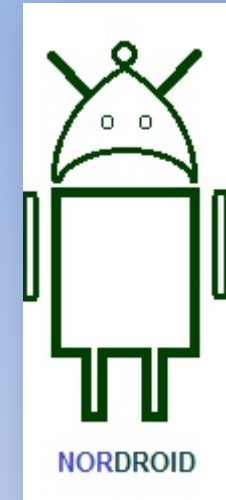
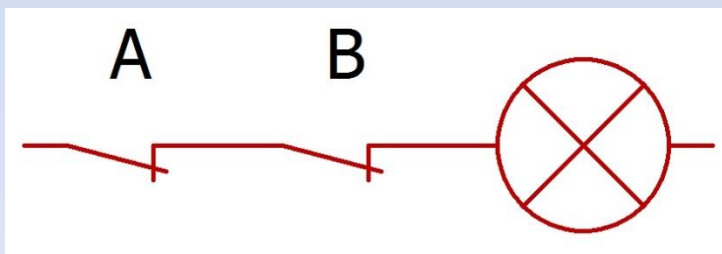
americká norma ANSI (do roku 1966 ASA)

Zdroj: <http://mikrokontrolery-pic.cz/wp-content/uploads/NOR.gif>

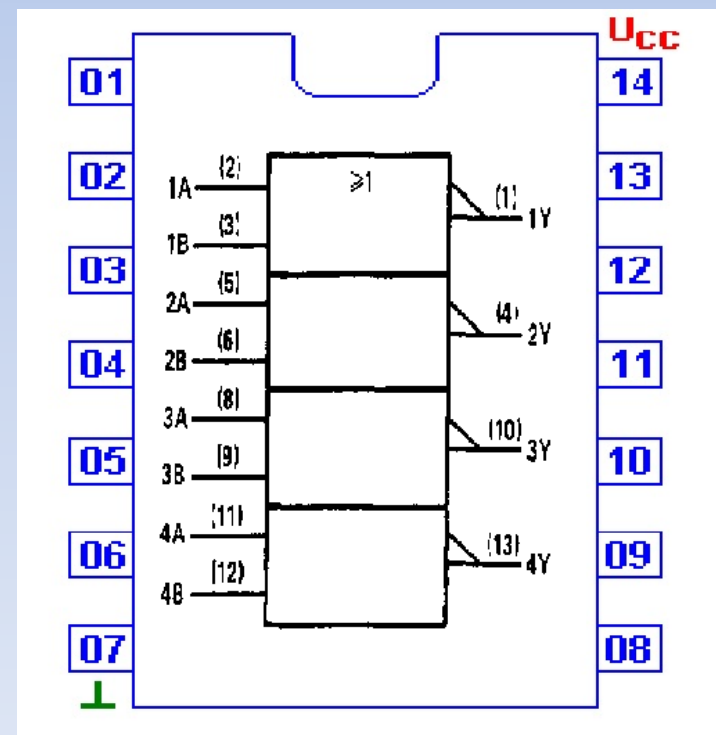


evropská norma IEC

Zdroj: <http://mikrokontrolery-pic.cz/wp-content/uploads/NOR-IEC.gif>



IO 74LS02



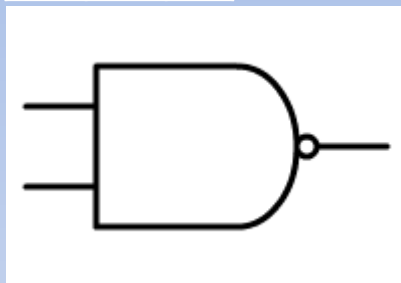
Zdroj: <http://www.ti.com/lit/ds/symlink/sn5402.pdf>

A	B	f
0	0	1
0	1	1
1	0	1
1	1	0

# NAND

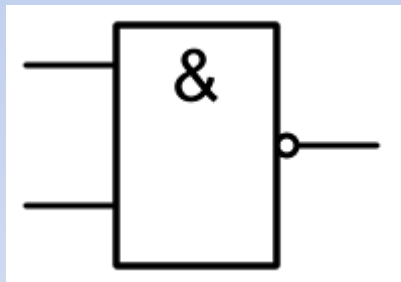
## Schefferova funkce

$$f = \overline{A * B}$$



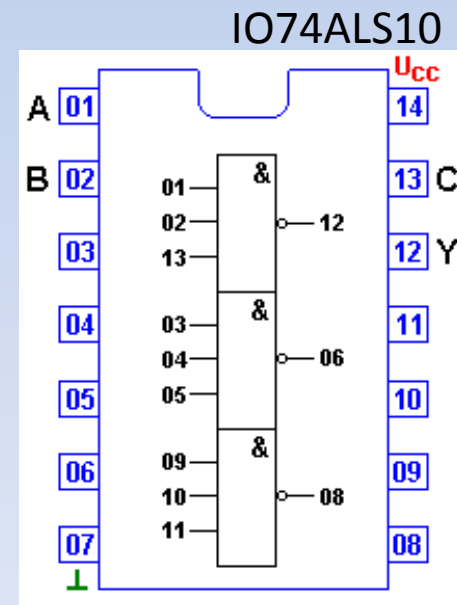
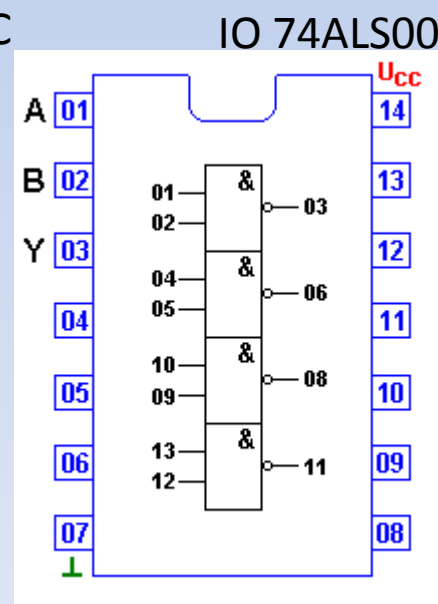
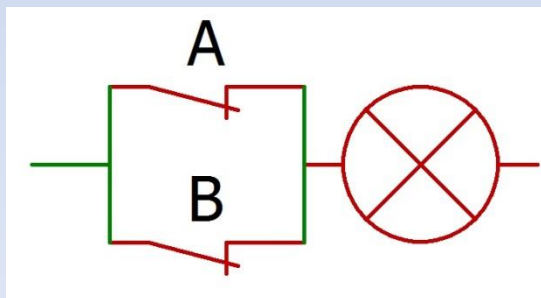
americká norma ANSI (do roku 1966 ASA)

Zdroj: <http://mikrokontrolery-pic.cz/wp-content/uploads/NAND.gif>



evropská norma IEC

Zdroj: <http://mikrokontrolery-pic.cz/wp-content/uploads/NAND-IEC.gif>



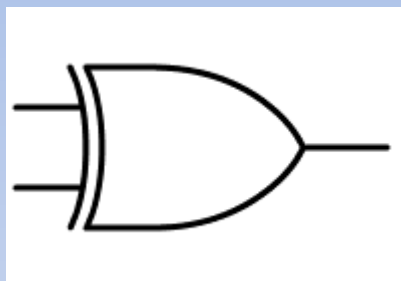
Zdroj: <http://telefon.unas.cz/e/integrované%20obvody/mh7400.gif>

Zdroj: <http://telefon.unas.cz/e/integrované%20obvody/mh7410.gif>

A	B	f
0	0	0
0	1	1
1	0	1
1	1	0

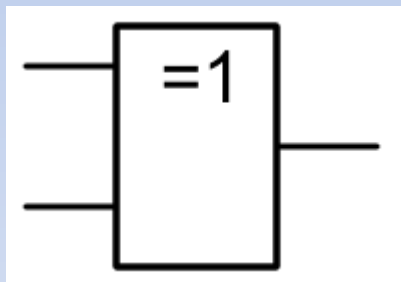
# XOR

$$f = \bar{A} * B + A * \bar{B} = A \oplus B$$



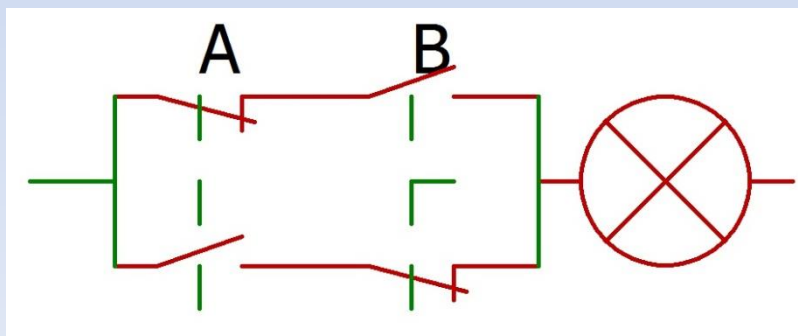
americká norma ANSI (do roku 1966 ASA)

Zdroj: <http://mikrokontrolery-pic.cz/wp-content/uploads/XOR.gif>

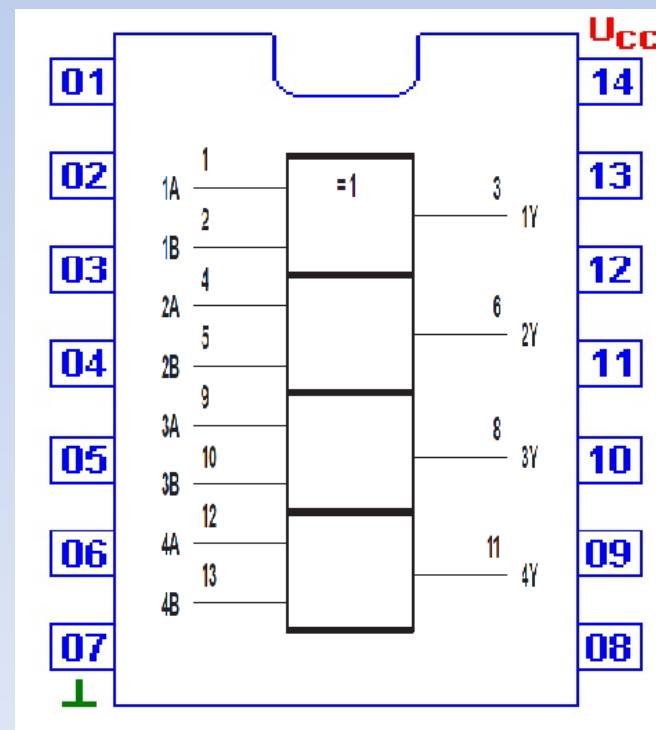


evropská norma IEC

Zdroj: <http://mikrokontrolery-pic.cz/wp-content/uploads/XOR-IEC.gif>



IO 74ALS86



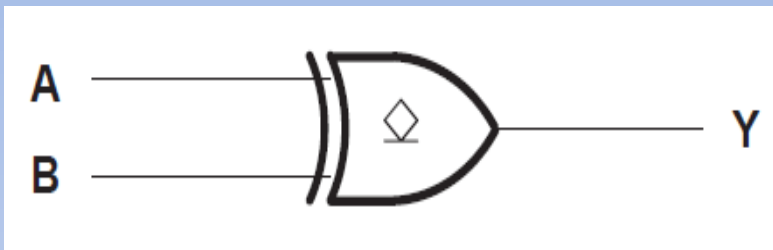
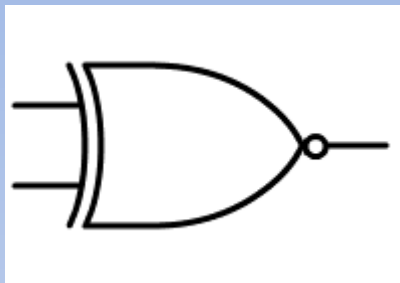
Zdroj: <http://www.ti.com/lit/ds/symlink/sn74als86.pdf>



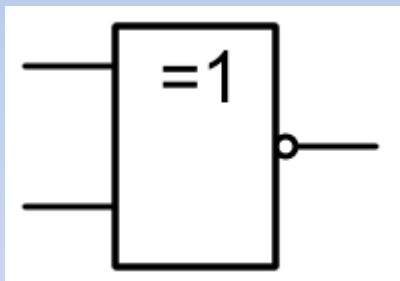
A	B	f
0	0	1
0	1	0
1	0	0
1	1	1

# XNOR

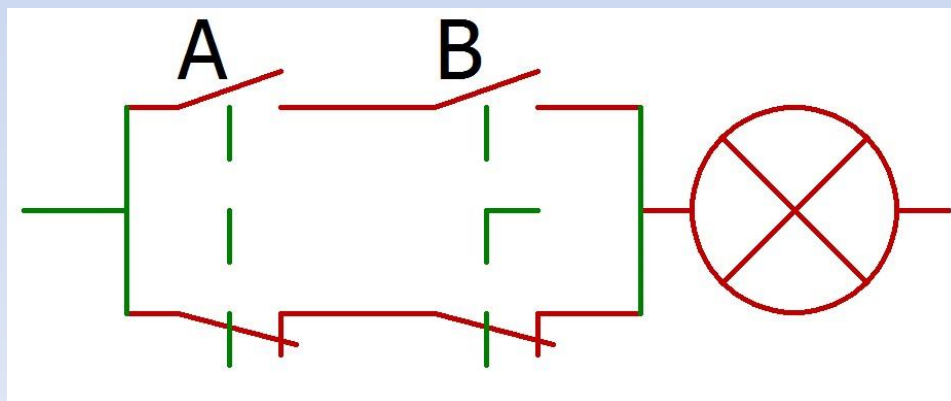
americká norma ANSI (do roku 1966 ASA)



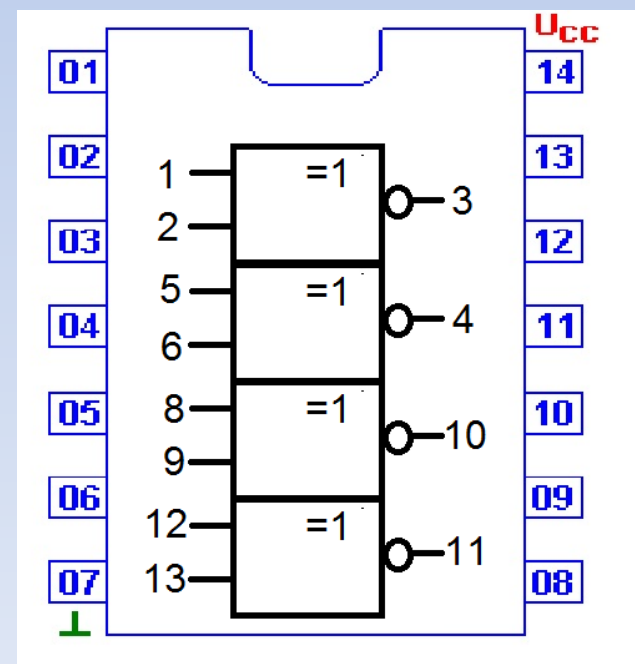
$$f = \overline{\overline{A} * B + A * \overline{B}} = \overline{A \oplus B}$$



evropská norma IEC



IO 74LS266



# Poslední změny v kreslení schématických značek logických obvodů

Místo bublinek (negací) se začaly používat trojúhelníky

