Logic Design Lecture 2

Παρασκευή, 8 Οκτωβρίου 2021 09:25

Καλημέρα

Τι είπαμε την προηγούμενη φορά

Δυαδικό Σύστημα αναπαράστασης

$(11010)_2 = 1\cdot 2^4 + 1\cdot 2^3 + 0\cdot 2^2 + 1\cdot 2^1 + 0\cdot 2^0$

$= 26_{10}$

$\frac{41}{2} = 20 + \frac{1}{2}$ $a_0 = 1$

$\frac{20}{2} = 10 + \frac{0}{2}$ $a_1 = 0$

$\frac{10}{2} = 5 + \frac{0}{2}$ $a_2 = 0$

$\frac{5}{2} = 2 + \frac{1}{2}$ $a_3 = 1$

$\frac{2}{2} = 1 + \frac{0}{2}$ $a_4 = 0$

$\frac{1}{2} = 0 + \frac{1}{2}$ $a_5 = 1$

$(101001)_2$

$41 = 20\cdot 2 + 1 = (20+0)\cdot 2 + 1$

$= 2\cdot 20 + 0\cdot 2 + 1 =$

$= 2\cdot 2\cdot 10 + 1 \quad = 2\cdot 2\cdot 2\cdot 5 + 1$

$2\cdot 2\cdot 2\cdot(2\cdot 2 + 1) + 1$

$2^5 + 2^3 + 1$

$41 = 32 + 9$

$= 32 + 8 + 1$

$= 2^5 + 2^3 + 1$

Ασκ: Να μετατραπεί ο αριθμός N σε δυαδικό N≤100

c_{i-1}

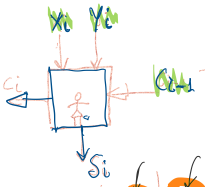
```
  1 1 1 1 1 0
  1 1 0 1 1 1     x_i
+ 0 0 1 0 1 1     y_i
1 0 0 0 0 1 0
```

S_i

55
11

Ιωάννα

```
  1
 235
 435
   0
```



Xi
Yi
Ci
Ci-1
Si

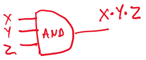
x_i	y_i	c_{i-1}	c_i	S_i
0	0	0	0	0
0	0	1	0	1
0	1	0	0	1
0	1	1	1	0
1	0	0	0	1
1	0	1	1	0
1	1	0	1	0
1	1	1	1	1

$C_i(x_i, y_i, C_{i-1}) =$

$\{0,1\}^3 \rightarrow \{0,1\}$

$S_i(x_i, y_i, C_{i-1}) =$

ΠΥΛΕΣ ΛΟΓΙΚΕΣ

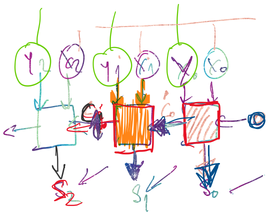


1 all x=y=z=1
0 αν έστω κ' ένα από τα inputs είναι 0

X Z Y	X·Y·Z
0 0 0	0
0 0 1	0
0 1 0	0
0 1 1	0
1 0 0	0
1 0 1	0
1 1 0	0
1 1 1	1

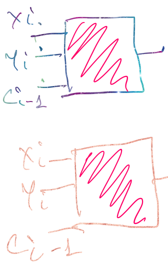
Δάφνη!

Θωμάς



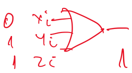
Y
X
Y
X
Y
X
C
0
S2
S1
S0

Σταύρος

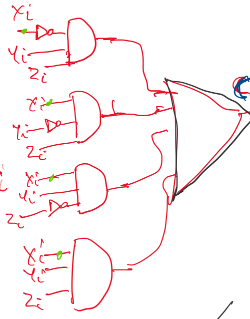


Xi
Yi
Ci-1
Ci
Xi
Yi
Si
Ci-1

ΘΑΝΑΣΗΣ



όχι γιατί είναι 1 για πολλές εισόδους



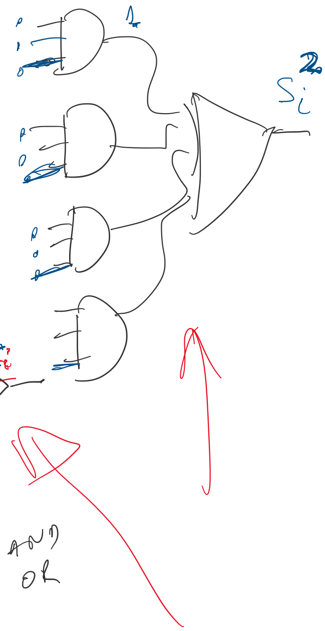
Xi
Yi
Zi
Xi
Yi
Zi
Xi
Yi
Zi
Xi
Yi
Zi
Ci

ΓΙΑΝΝΗΣ

t

$x_i y_i = 0$

S_0 α.ιι.

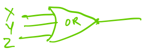


AND
OR

1msec

επίσης από τις NOT 0 καθυστέρηση

ΠΥΛΗ OR +

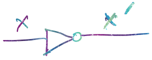


X+Y+Z = 0 αν όλα x=y=z=0

= 1 εάν έστω έν' από τα X Y Z ίσο 1

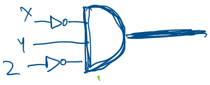
X Y Z	X+Y+Z
0 0 0	0
0 0 1	1
0 1 0	1
0 1 1	1
1 0 0	1
1 0 1	1
1 1 0	1
1 1 1	1

ΠΥΛΗ NOT



Εαν X=0 → X'=1

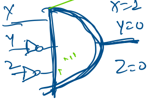
X=1 → X'=0

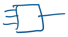


Ευαγγελια

X=0
Y=1
Z=0

ΔΗΜΗΤΡΗΣ





ΜΠΟΡΩ ΝΑ ΦΤΙΑΞΩ ΚΥΚΛΩΜΑ ΤΑ ΟΠΟΙΑ ΔΙΝΟΥΝ ΛΟΓΙΚΟ 1 ΜΟΝΟ ΓΙΑ ΕΝΑΝ ΣΥΝΔΙΑΣΜΟ ΕΙΣΟΔΩΝ

ΑΛΕΞΗΣ

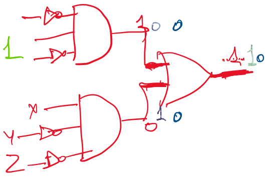
X=0
Y=1
Z=0

ή

X=1
Y=0
Z=0

→ 1

σε κάθε άλλη περίπτωση → 0


1 0 0
1 0
X
Y
Z
1 0 0
1 0

Φλάβιος

Adder N

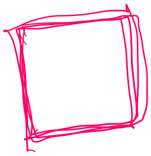
Πόσες AND OR χρειάζομαι;

Σε κάθε βαθμίδα 8 AND 2 OR

10N πύλες

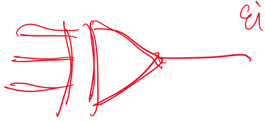
2Nε καθυστέρηση της AND, OR

ΜΙΚΡΑ

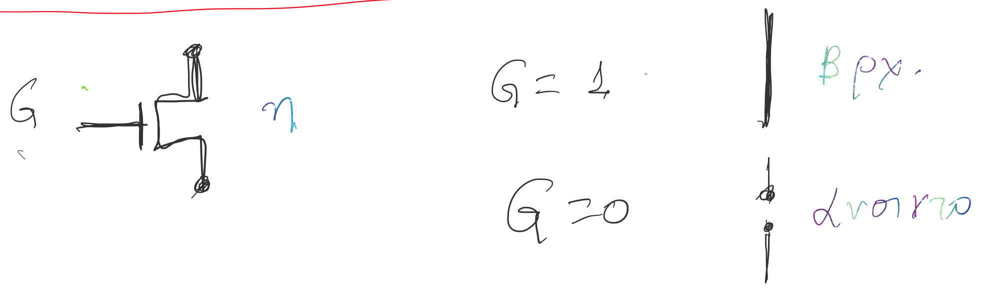


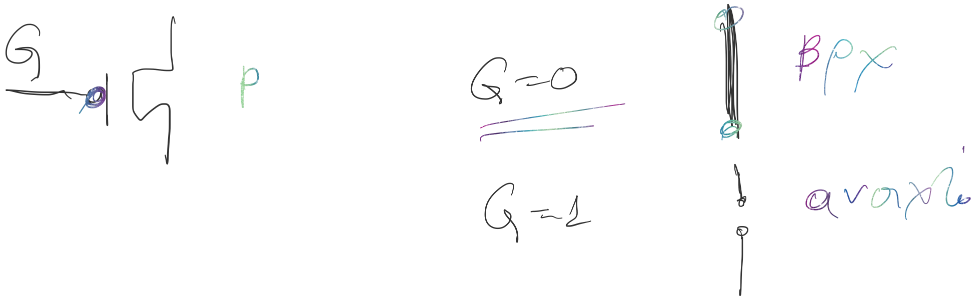
Full Adder

ΜΙΚΡΗ ΚΑΘΥΣΤΕΡΗΣΗ

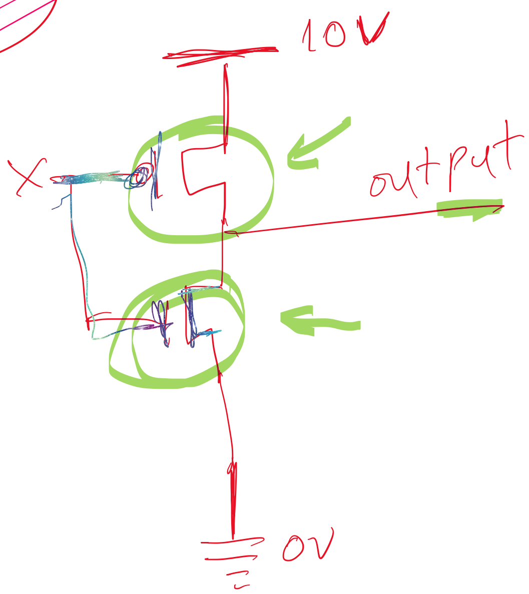


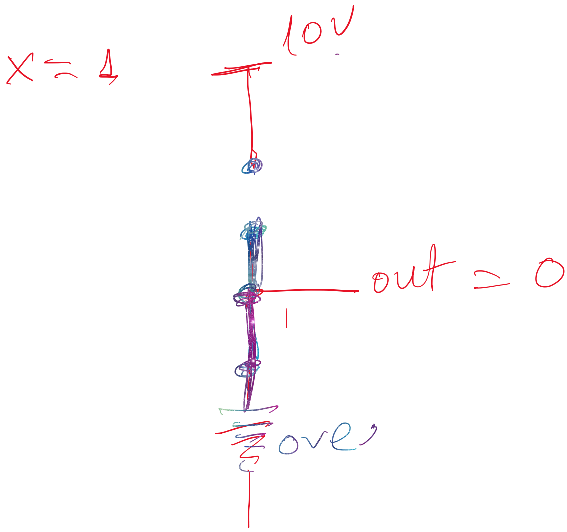
είναι 1 εάν μονός αριθμός
από inputs είναι 1
0 εάν ζυγός αριθ
από inputs είναι 1

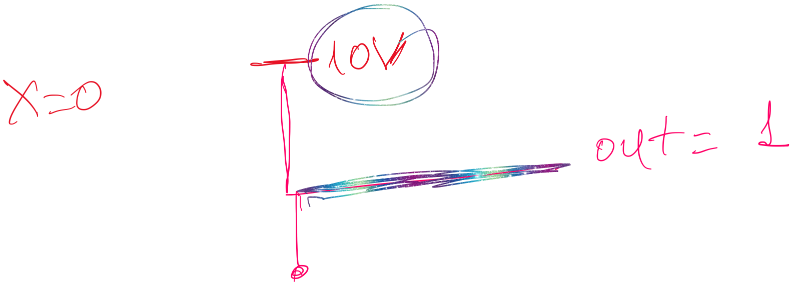

G
n
G = 1
βρχ.
G = 0
ανοιχτό

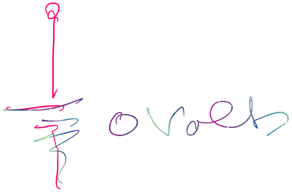

G
p
G = 0
βρχ
G = 1
ανοιχτό

NOT


10V
X
output
0V


X = 1
10V
out = 0
0V



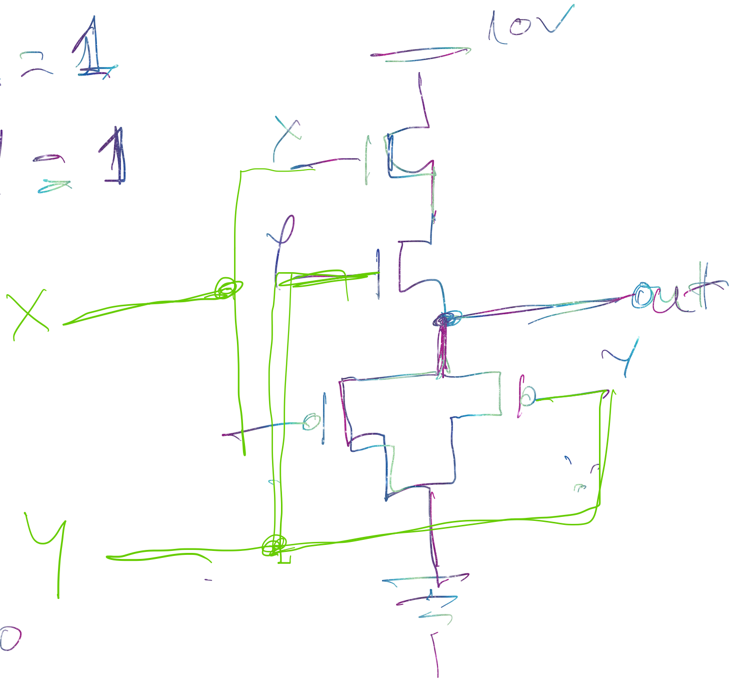


AND

מגלה

X = 1

Y = 1

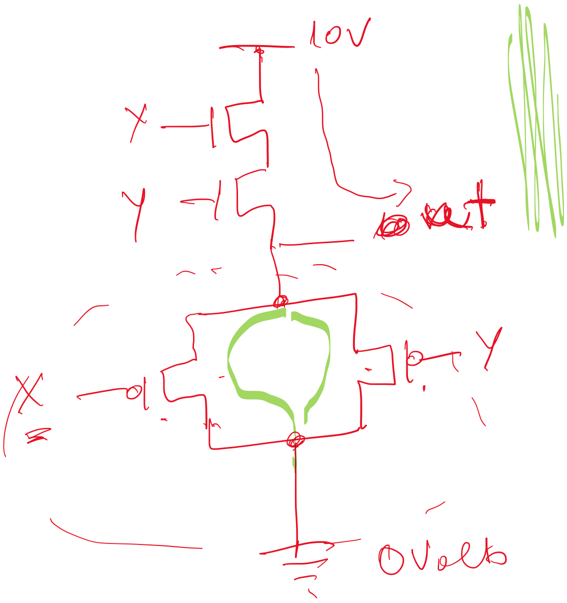

10V
X
Y
X
out
Y
Y

X=0

n

Y=0

m


10V
X
Y
out
X
Y
1
0Volt

X=1

Y=1

X=0

Y=1

X=1

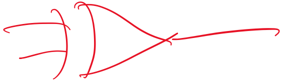
Y=0

X=0

Y=0

① OR

② XOR



ΜΟΝΟΣ ΑΡΙΘΜΟΣ
INPUTS = 1
ΤΟΤΕ OUT = 1

X	Y	XOR
0	0	0
0	1	1
1	0	1
1	1	0

Labina