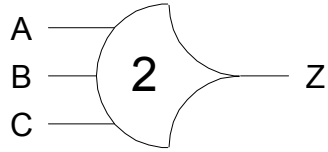
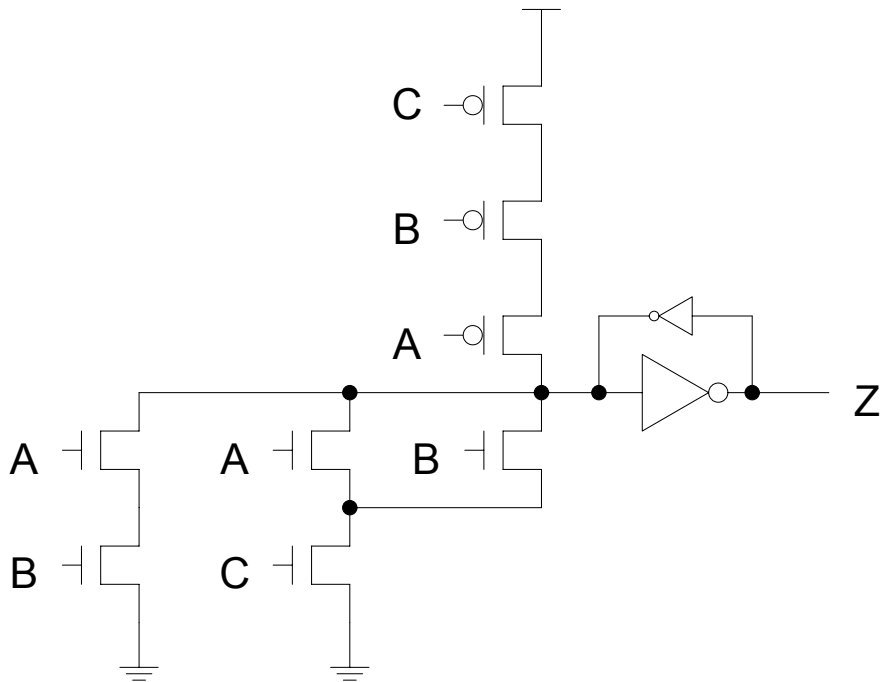


# TH23 Implementation



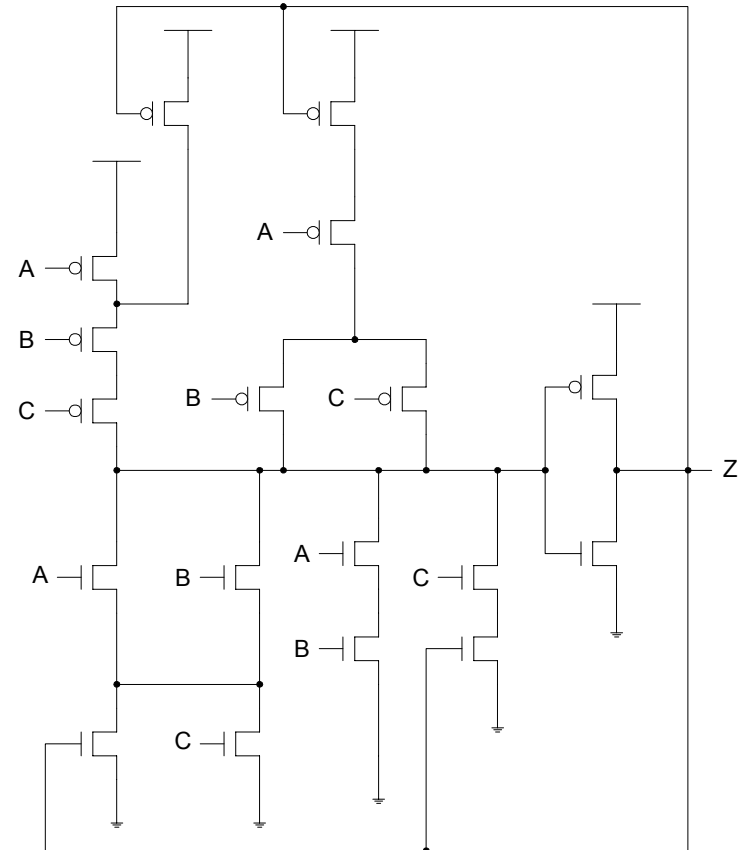
$$Z = AB + AC + BC$$

## Semi-Static



- $Z = \text{set} = AB + AC + BC$
- $Z' = \text{reset} = \text{hold}' = A'B'C'$

## Static



- $Z = \text{set} + (Z' \bullet \text{hold})$
- $Z' = \text{reset} + (Z' \bullet \text{set}')$
- $\text{hold} = A + B + C$
- $\text{set}' = A'B' + A'C' + B'C'$

# 27 Fundamental NCL Gates

NCL Gate	Boolean Function	Transistor Count (static)	Transistor Count (semi-static)
TH12	$A + B$	6	6
TH22	$AB$	12	8
TH13	$A + B + C$	8	8
TH23	$AB + AC + BC$	18	12
TH33	$ABC$	16	10
TH23w2	$A + BC$	14	10
TH33w2	$AB + AC$	14	10
TH14	$A + B + C + D$	10	10
TH24	$AB + AC + AD + BC + BD + CD$	26	16
TH34	$ABC + ABD + ACD + BCD$	24	16
TH44	$ABCD$	20	12
TH24w2	$A + BC + BD + CD$	20	14
TH34w2	$AB + AC + AD + BCD$	22	15
TH44w2	$ABC + ABD + ACD$	23	15
TH34w3	$A + BCD$	18	12
TH44w3	$AB + AC + AD$	16	12
TH24w22	$A + B + CD$	16	12
TH34w22	$AB + AC + AD + BC + BD$	22	14
TH44w22	$AB + ACD + BCD$	22	14
TH54w22	$ABC + ABD$	18	12
TH34w32	$A + BC + BD$	17	12
TH54w32	$AB + ACD$	20	12
TH44w322	$AB + AC + AD + BC$	20	14
TH54w322	$AB + AC + BCD$	21	14
THxor0	$AB + CD$	20	12
THand0	$AB + BC + AD$	19	13
TH24comp	$AC + BC + AD + BD$	18	12