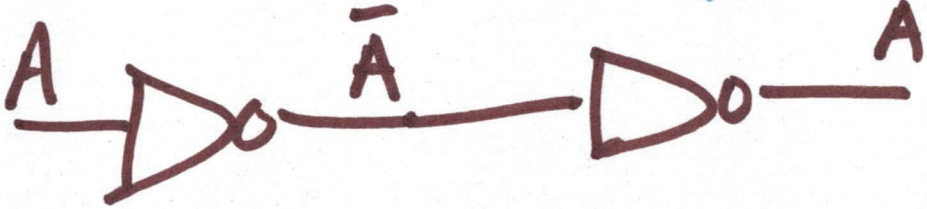
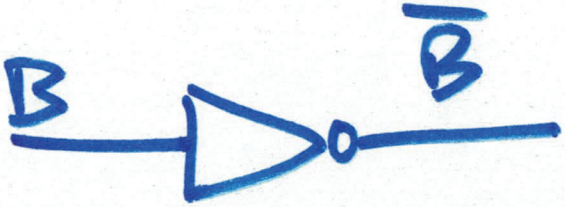
# CPE 100 Digital Logic Design

## Lecture 6

2/8/21



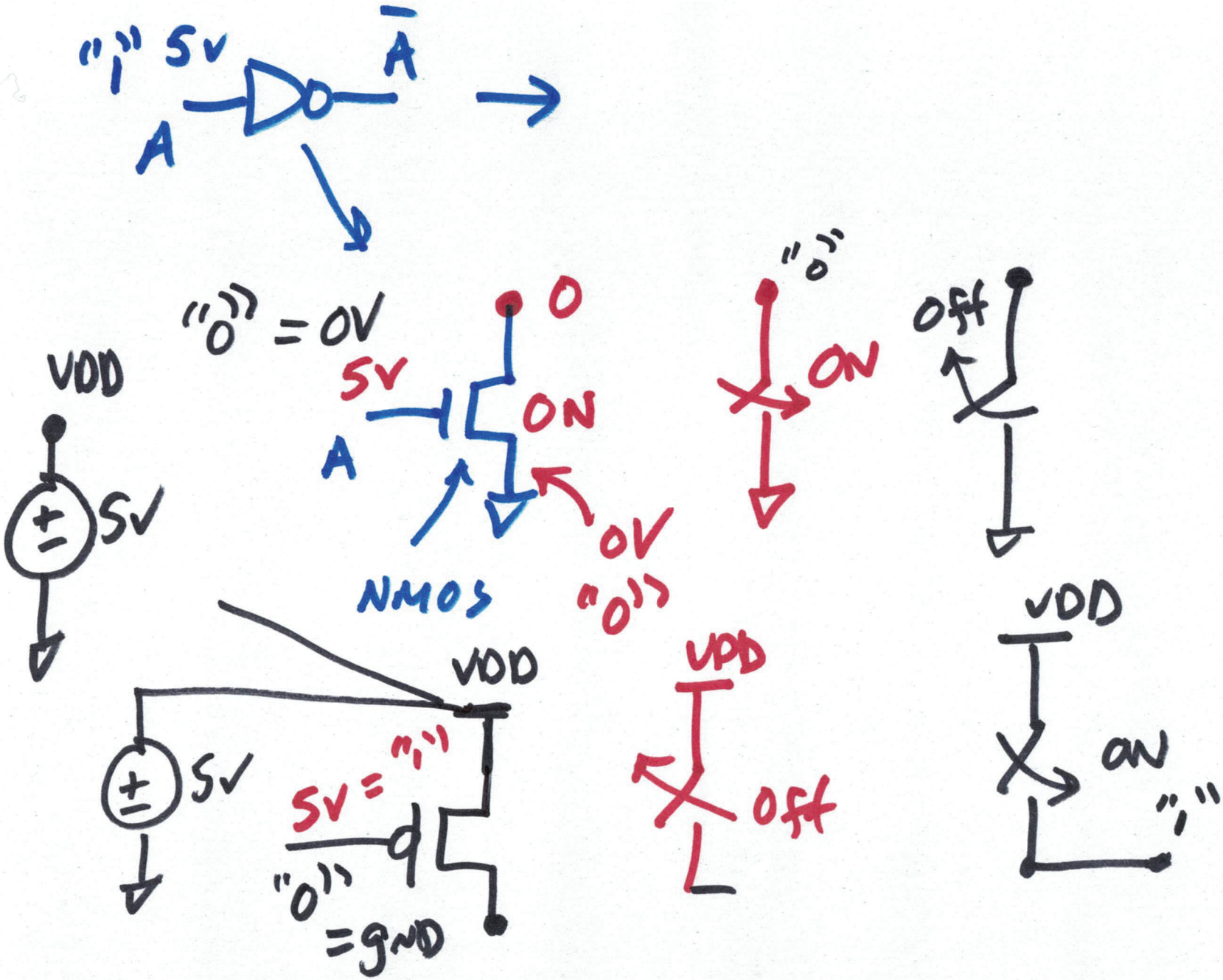



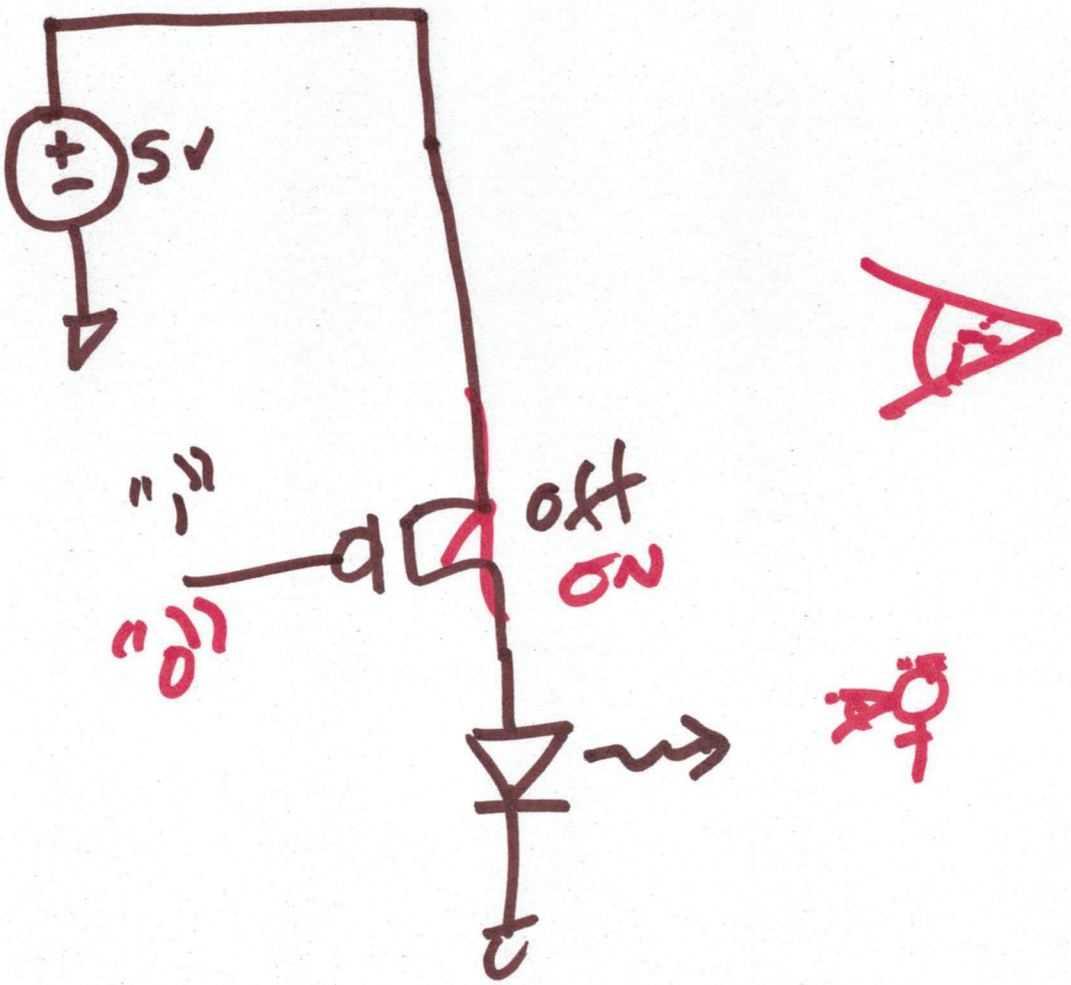

"1" → 5V

$A\bar{B}+C$

↑

* INVERT *

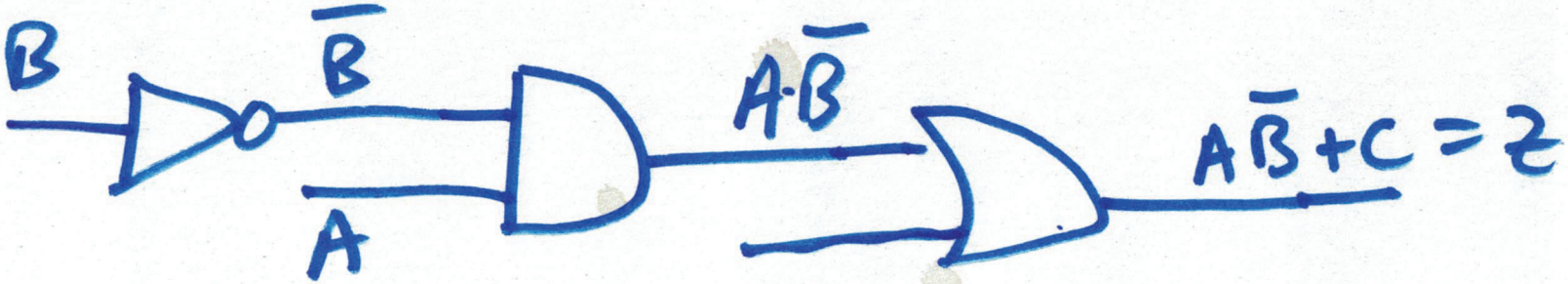

"1" 5V
A
$\bar{A}$
"0" = 0V
VDD
5V
0
5V
A
ON
0V
NMOS
"0"
"0"
ON
off
VDD
5V
5V = "1"
"0"
= GND
VDD
off
VDD
ON
"1"


5V
"1"
"0"
off
on

$Z = A\bar{B} + C$

1 0 ↑ OR

inverts
AND
OR

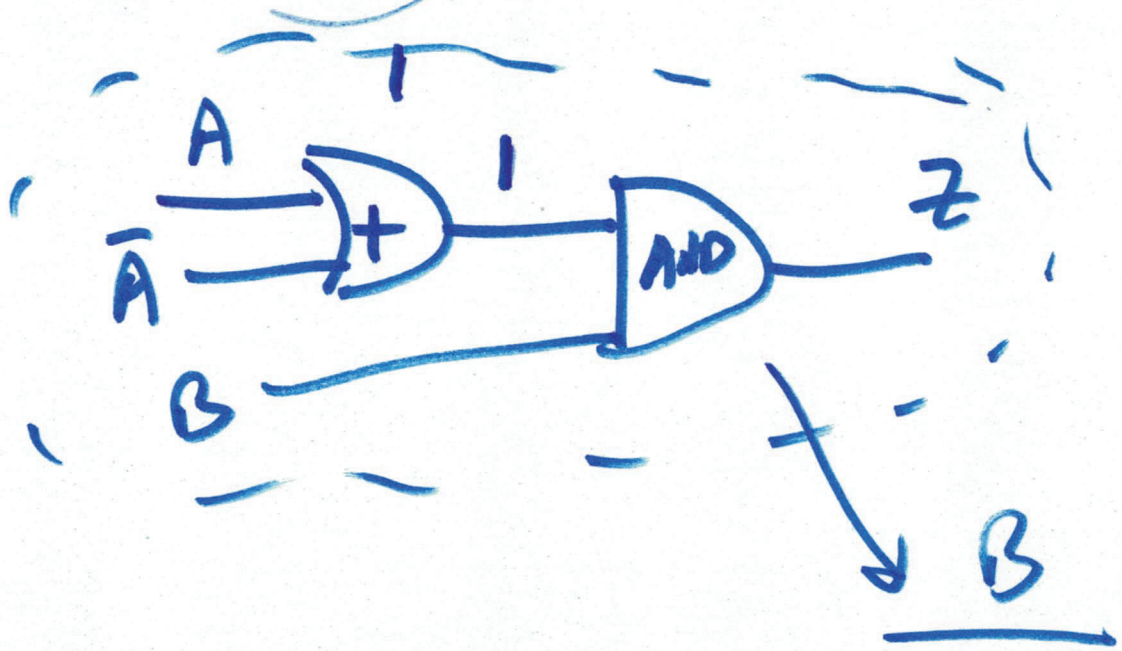



| A | B | C | Z |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 1 |
| 0 | 1 | 0 | 0 |
| 0 | 1 | 1 | 1 |
| 1 | 0 | 0 | 1 |
| 1 | 0 | 1 | 1 |
| 1 | 1 | 0 | 0 |
| 1 | 1 | 1 | 1 |

$A + \bar{A} = 1 \rightarrow A + 1 = 1$

$A\bar{A} = 0 \qquad A \cdot 0 = 0$

$B \cdot (A + \bar{A}) = Z \qquad 1 \cdot B = B$



| A | B | XOR |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 0 |

$\overline{\bar{A}\cdot B + A\cdot\bar{B}} = XOR$

Sum of products

$(A+B)\cdot(\bar{A}+\bar{B}) = XOR$

Product of sums