

Section 3 - Transistors

Wednesday, June 19, 2019 11:00 AM

• SECTION 3 • TRANSISTERS • • •

"CIRCUITS DON'T HAVE BROTHERS, THEY HAVE TRANSISTERS"

VOLTAGE • POTENTIAL FOR CURRENT TO MOVE

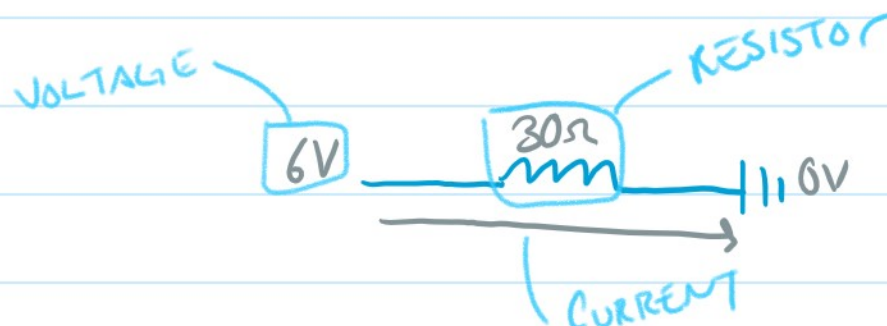
- MEASURED IN VOLTS

CURRENT • AMOUNT OF CHARGE FLOW

- MEASURED IN AMPS

RESISTANCE • WIRE'S OPPOSITION TO FLOW

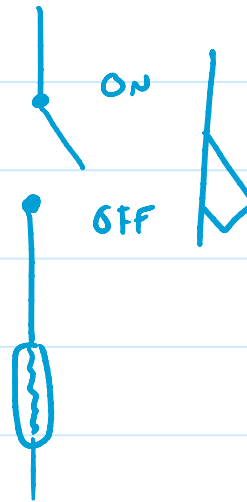
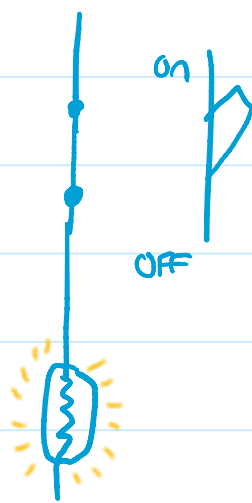
- MEASURE IN OHMS



OHM'S LAW • $V=IR$

SWITCH • TURNS ON AND OFF

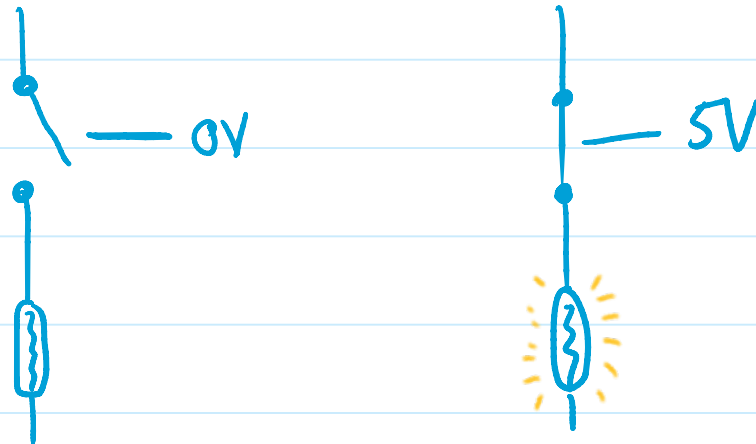
- RESTRICTS CURRENT FLOW
- SEE LIGHT SWITCH BELOW



- WE CAN THINK OF 1 + 0 AS ON + OFF, RESPECTIVELY
- WHEN THE SWITCH IS 1, THE LIGHT IS ALSO 1
- WHEN SWITCH IS 0, LIGHT IS 0

ELECTRONICALLY CONTROLLED SWITCH

- INSTEAD OF A HUMAN FLICKING A SWITCH, THE ELECTRONICS DOES
- THE CONTROL INPUT CONTROLS THE SWITCH



- ONCE AGAIN, WHEN CONTROL = 0 LIGHT = 0
- WHEN CONTROL = 1, LIGHT = 1
- THESE SWITCHES ARE CALLED TRANSISTERS

SOME NOTES ON CIRCUITS

- CIRCUIT IS A GROUP OF CONNECTED DEVICES
- TWO TYPES OF VOLTAGE
 - HIGH: NOT 0V
 - LOW: 0V

DIGITAL • IN A DIGITAL SYSTEM ONLY HIGH AND LOW VOLTAGE

- HIGH DENOTED BY 1
- LOW DENOTED BY 0

ANALOG • USES MANY DIFFERENT VOLTAGES

- NO HIGH OR LOW, ONLY VALUES OF VOLTAGES

A DIGITAL CIRCUIT IS A CIRCUIT OF SWITCHES

CMOS TRANSISTORS

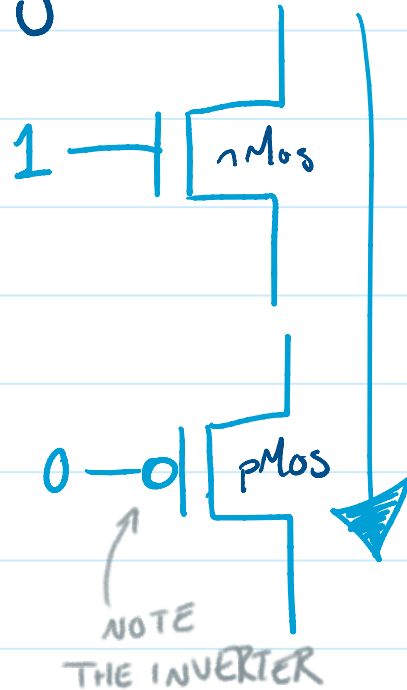
- Two TYPES

- pMos

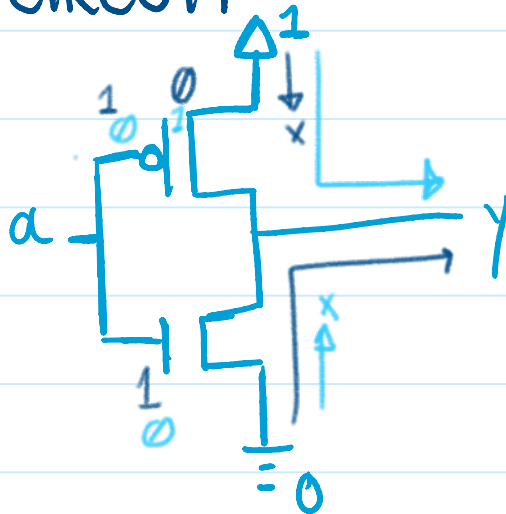
- nMos

- nMos conducts when the control is 1

- pMos conducts when control is 0



IN A CIRCUIT



$a=1 ; y=0$
 $a=0 ; y=1$