

THE BEST THING SINCE SLICED BREADBOARDS

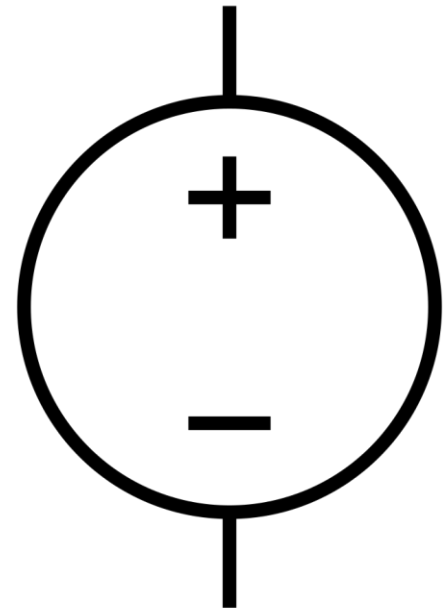
GETTING STARTED IN OURC

OHM'S LAW

$$V = IR$$

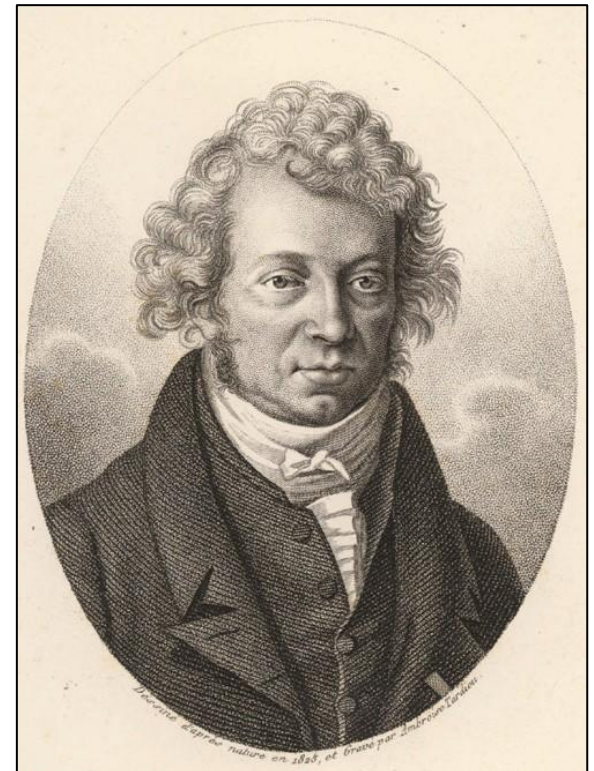
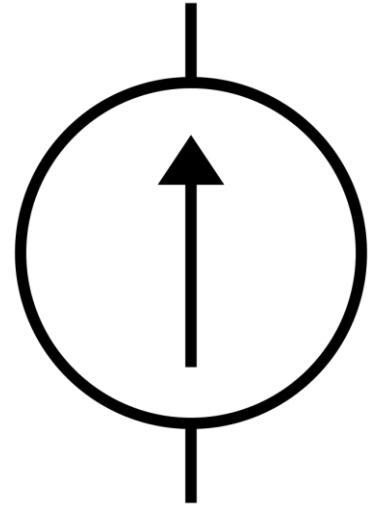
VOLTAGE

- Voltage is difference in electric potential
- Units: Volts, V
- Named for Alessandro Volta



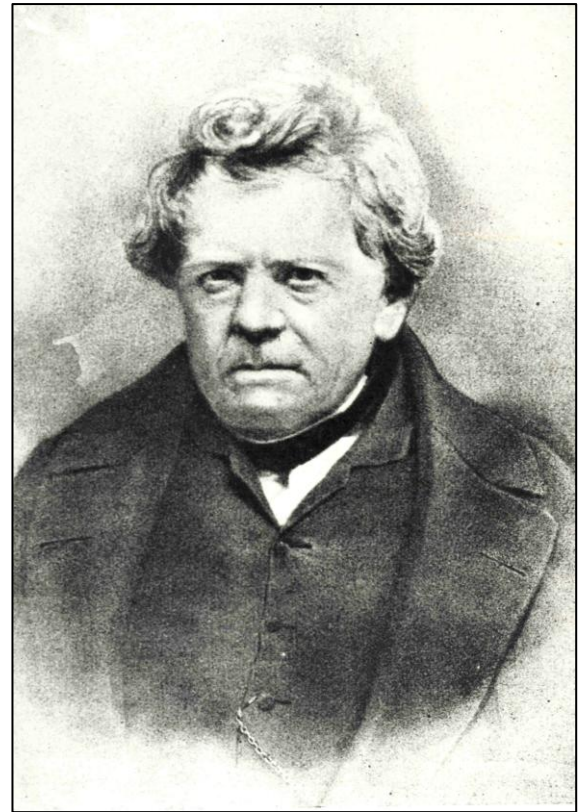
CURRENT

- Amount of charge flowing per unit time
 - Flow of electrons
- Units: Amperes, A
- Named for Andre Marie Ampere

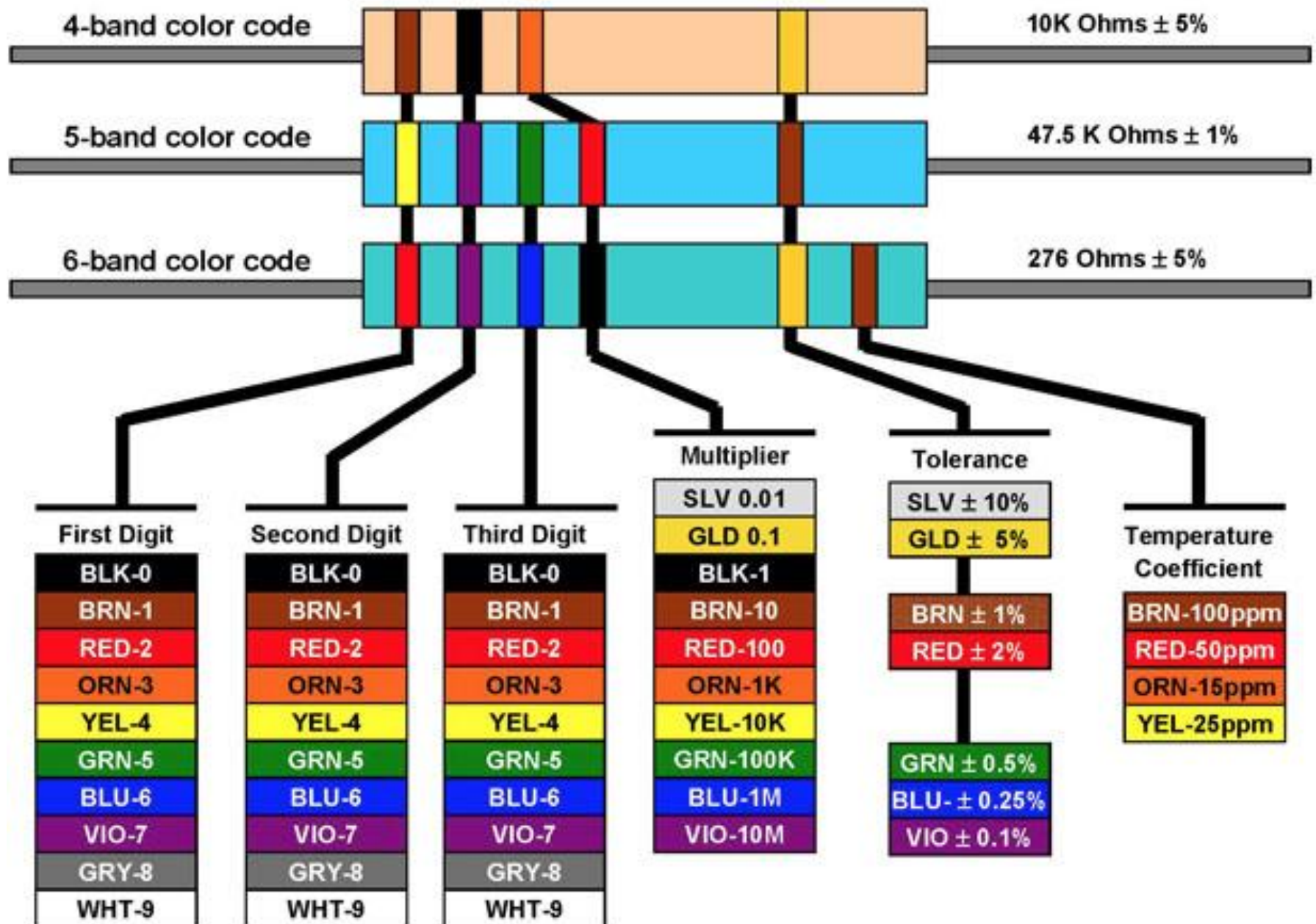


RESISTANCE

- Units: Ohm, Ω
- Unit named for Georg Ohm
- Limits flow of electrons



Resistor Color Code



BREADBOARDS

- **Using solderless breadboards**
 - Good for prototyping
 - Good for learning
 - Good for you
- **Why the name?**
- **How do they work?**

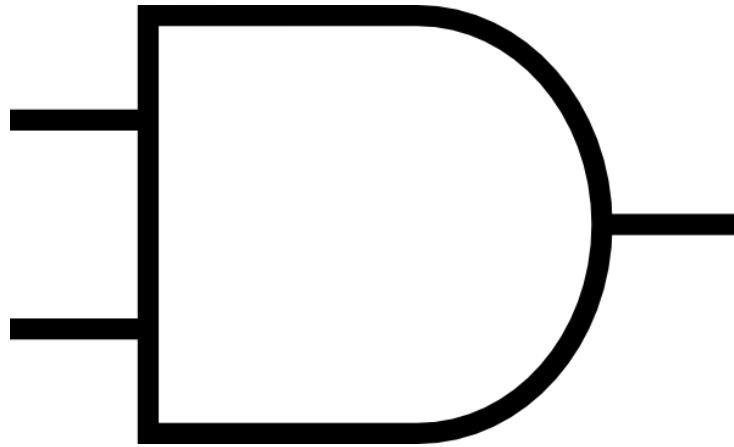


LOGIC

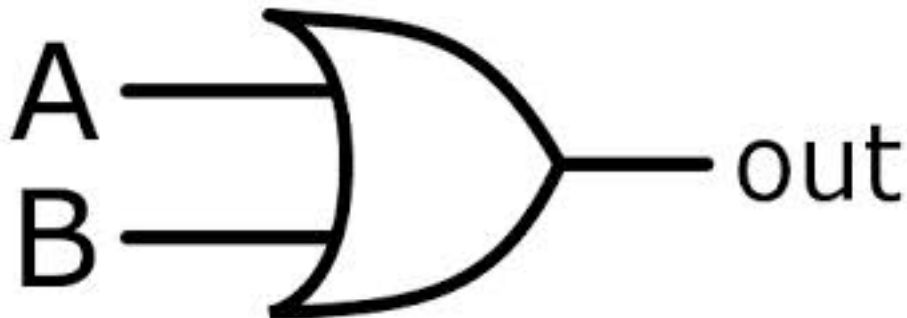
- **Three basic operations**
 - AND
 - OR
 - NOT
- **After that,**
 - NAND
 - NOR
 - XOR
 - XNOR

GATES

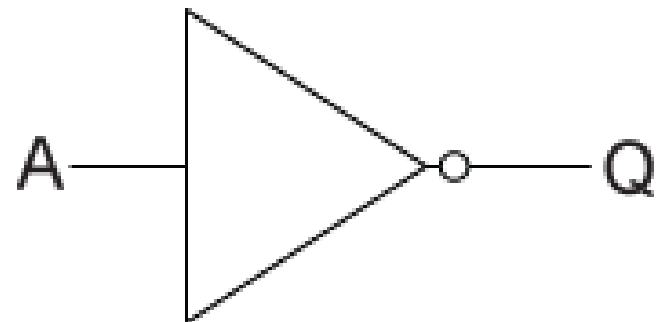
AND



OR



NOT



DATASHEETS

- **Very useful for figuring out how an IC works**
- **Examples as follows...**

TASK #1 - BEGINNER

- **Subtask 1**
 - Light an LED
 - (HINT: Use a battery, a resistor, and an LED)
- **Subtask 2**
 - Light an LED using a button
 - (HINT: exactly the same materials, just with a button)

TASK #2 - INTERMEDIATE

- **Build a majority gate**
 - Three inputs, one output
 - If a majority of the inputs are low, the output is low and vice versa
 - We have the truth table if you get stuck

TASK #3 – SLIGHTLY ADVANCED

- **Build a 2-bit binary comparator**
 - Tests to see if two inputs are higher (numerically) than the other two inputs
 - We've got the truth table for this too, and will provide the equations!

$$L_2 = (\overline{A_2} \bullet B_2) + (\overline{A_2 \oplus B_2}) \bullet (\overline{A_1} \bullet B_1)$$

$$E_2 = (\overline{A_2 \oplus B_2}) \bullet (\overline{A_1 \oplus B_1})$$

$$H_2 = (A_2 \bullet \overline{B_2}) + (\overline{A_2 \oplus B_2}) \bullet (A_1 \bullet \overline{B_1})$$