Soldering

- **Soldering** is the joining of metal objects together. A filler metal ("solder") is melted and flowed into the joint.

- Soldering was practiced in ancient Egypt at least 5000 years ago

- Soldering is used to attach electronic components to a board, and also for jewelry and other applications
Soldering Safety

- The iron gets hot! *Don't burn yourself.* *Careful not to splash solder*

- Solder is made of lead, which is poisonous *Wash your hands when you are done; don't eat or drink while soldering*

- Snipped component leads fly at high speeds *Close your eyes or cover board with your hands*
What is it? A “MiniPOV”

POV means “persistence of vision”

As you wave the MiniPOV, the LEDs blink out a message by turning on in a pattern.

Your eye sees the message because the image of the LEDs “persists” (stays) for a while in your eye.
How does it work?

The black thing with all the legs is a tiny computer called a *microcontroller*.

They can be programmed in C just like the Lego RCX.

They are used in lots of things around your house (microwave, stereo, TV...)

Other parts are needed too...
**Parts, Parts, Parts!**

**LED** *(light-emitting diode)*
Lights up in response to electric current

**Resistor** — limits the amount of electric current in a circuit

**Microcontroller** — tiny computer
Each leg (pin) can be controlled by a program in C

**Connector** — allows programming from a computer

**Diode** — allows current to flow in only one direction
Everything is soldered into a *printed circuit board*

The squiggly lines are printed in copper on the board like wires... they connect together the parts to make an electric circuit.
This is the schematic (wiring diagram)

- **Resistors**
- **LEDs**

The red symbols are *parts*

The green lines show how the parts are connected

**Microcontroller**

**Programing Connector**
The Code...

The message!
(if you turn it sideways, you can see the letter “E” in this example)

Header Files
define names for this microcontroller

Output the message, one group of 8 bits (8 LEDs) at a time
“PORTB” is the 8 pins which control the LEDs

Setup a timer interrupt
(something which happens automatically at a regular interval)

Change this to a larger value to slow down the blinking
(up to 65000)