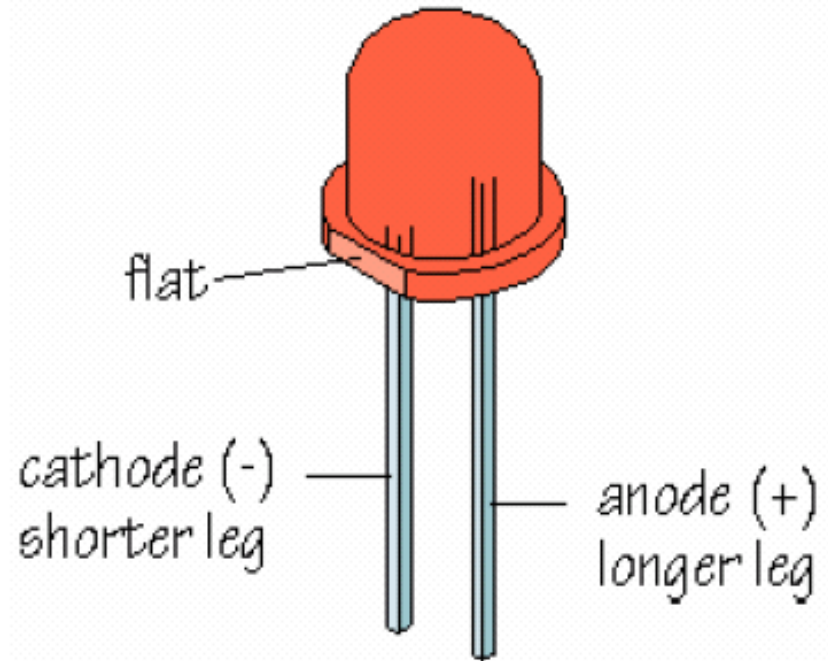


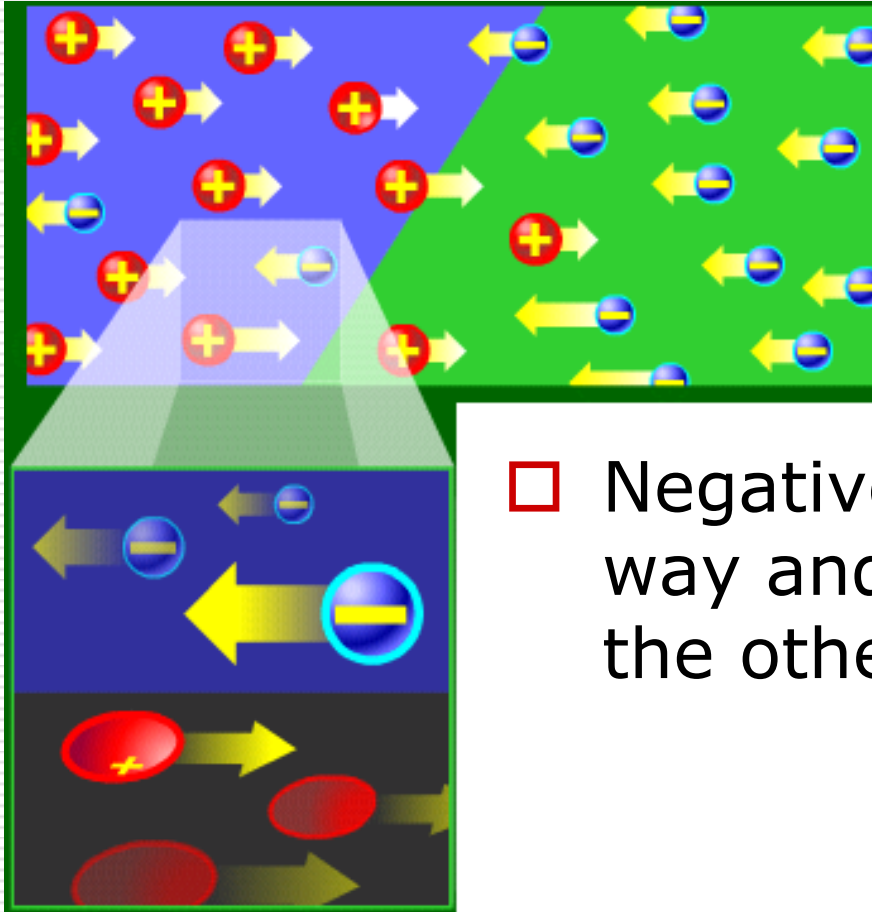
Light Emitting Diode: LED

What is an LED?

- ❑ Light-emitting diode
- ❑ Semiconductor
- ❑ Has polarity



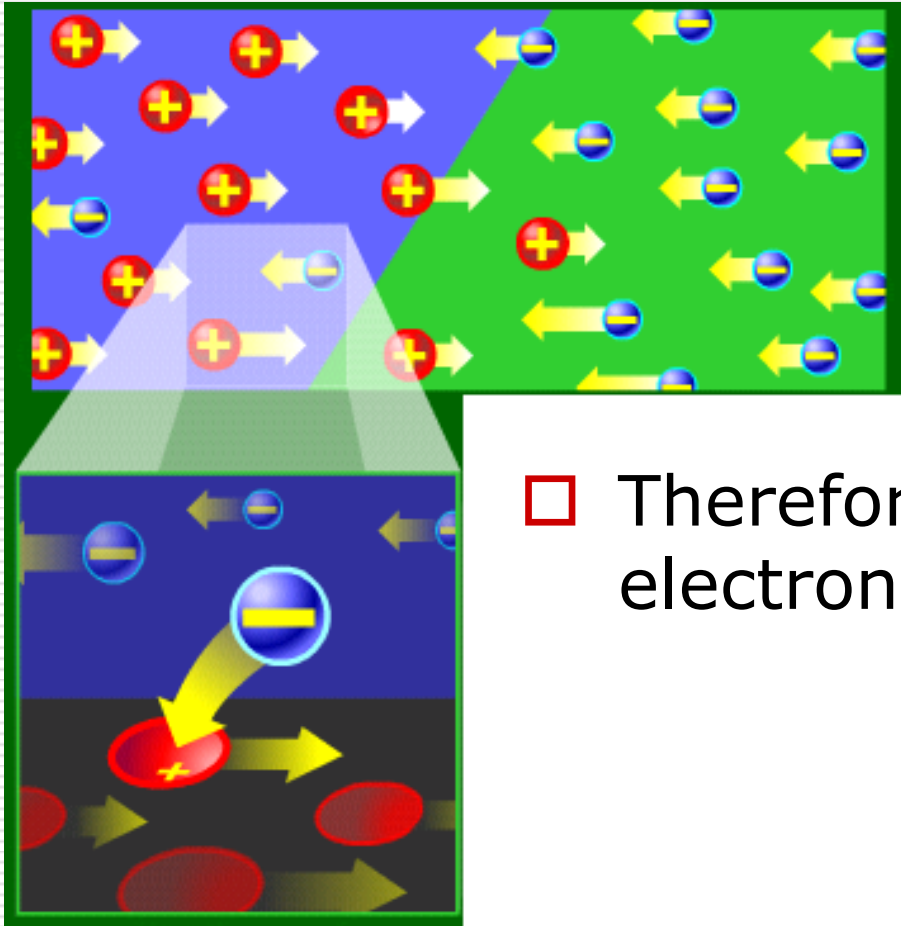
LED: How It Works



□ When current flows across a diode

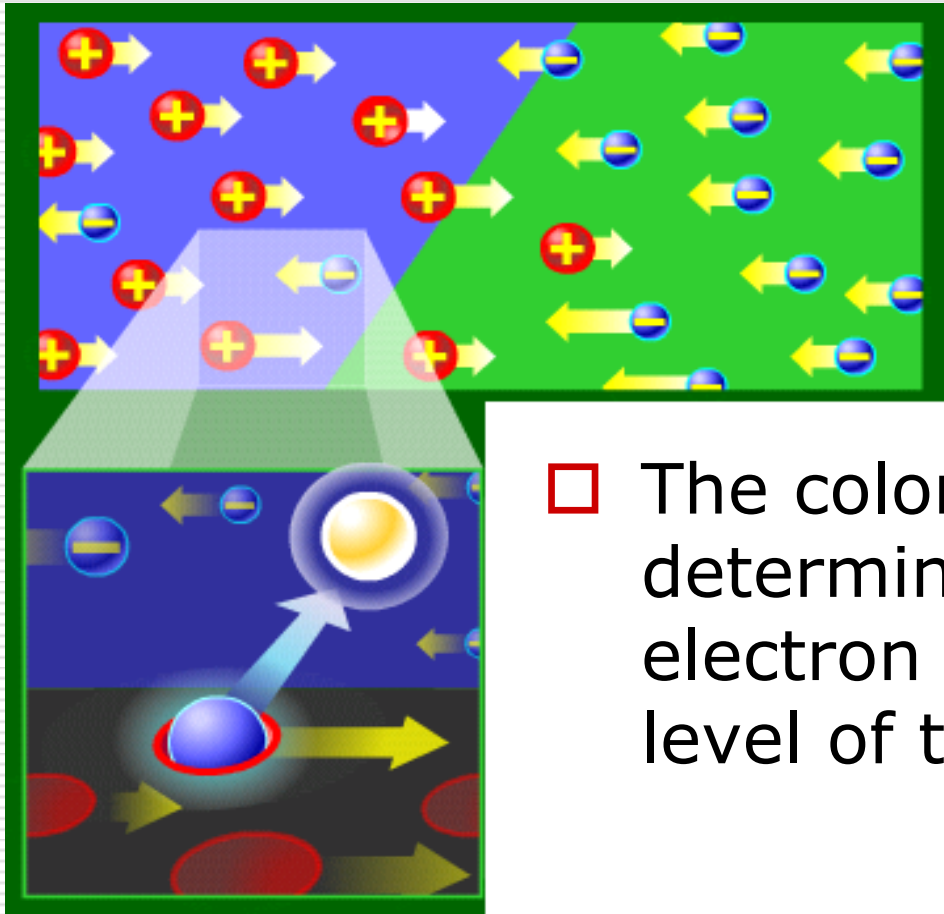
□ Negative electrons move one way and positive holes move the other way

LED: How It Works



- The holes exist at a lower energy level than the free electrons
- Therefore when a free electrons falls it losses energy

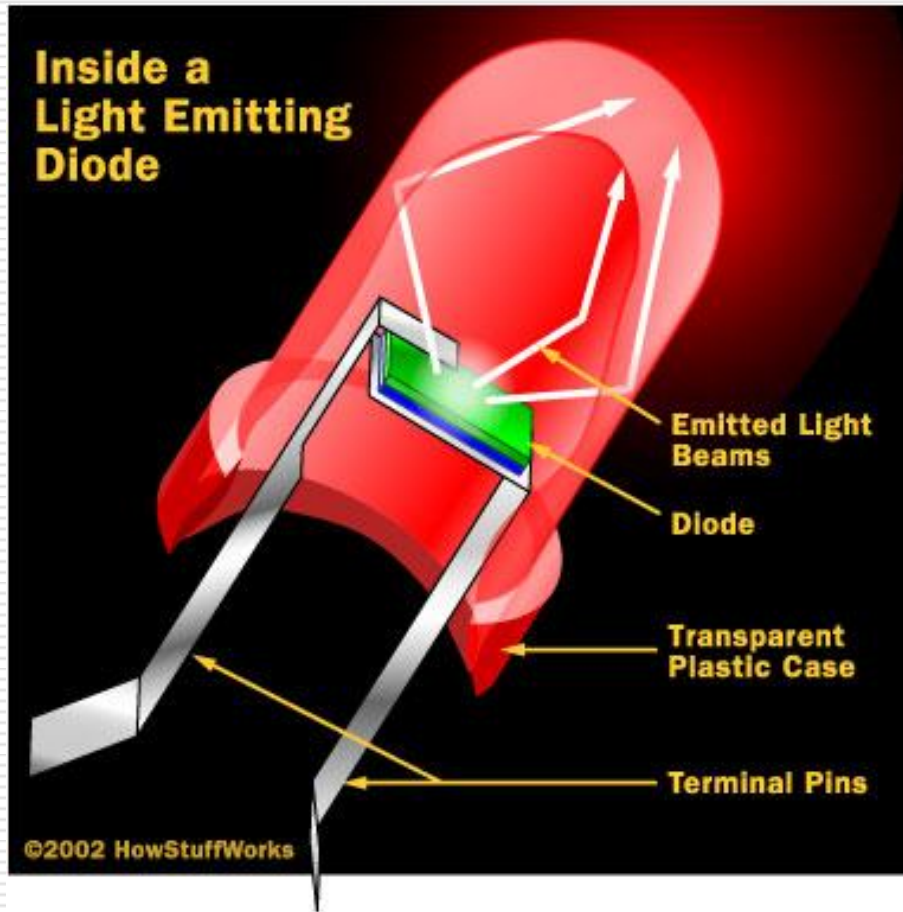
LED: How It Works



□ This energy is emitted in a form of a photon, which causes light

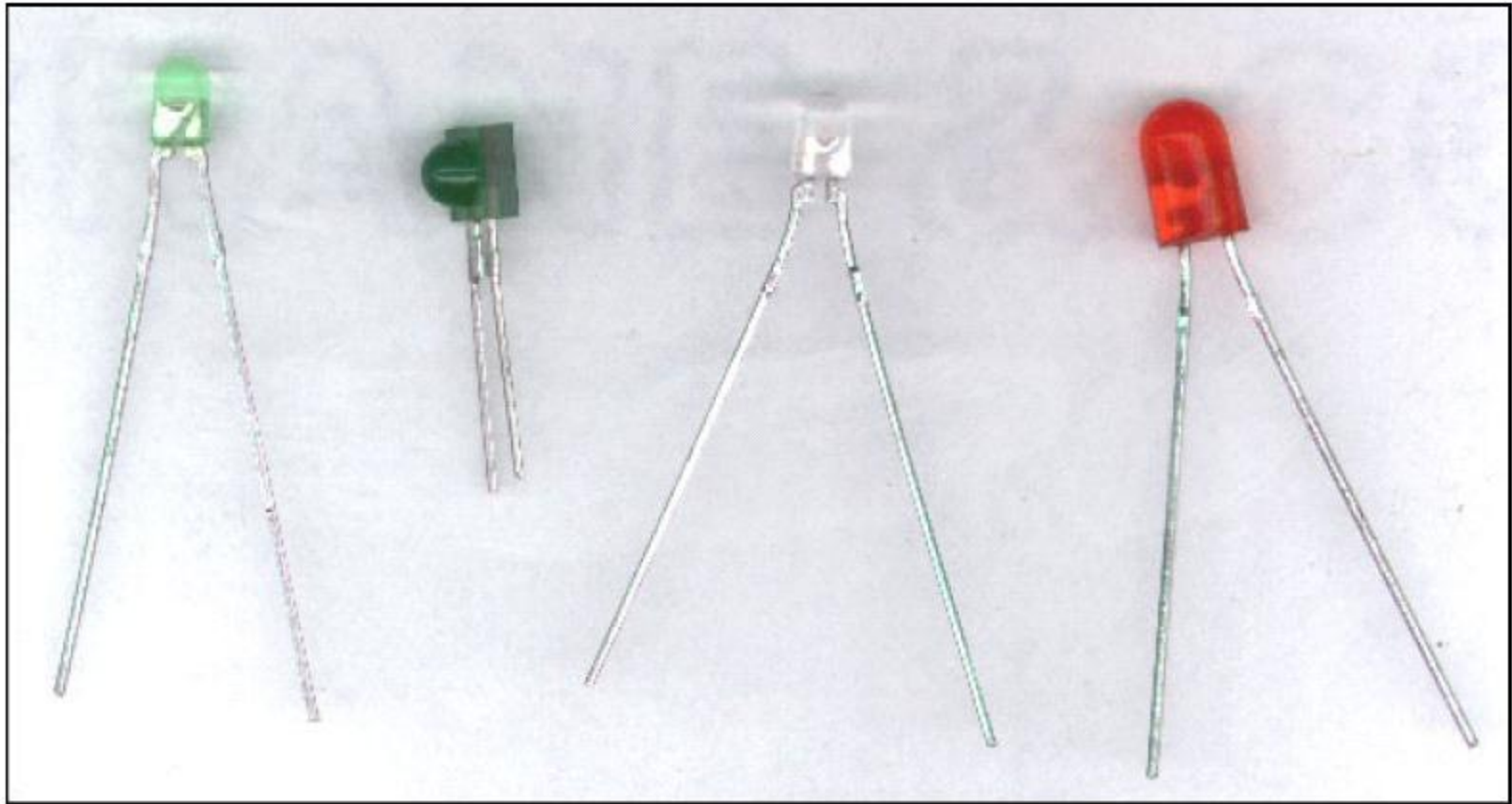
□ The color of the light is determined by the fall of the electron and hence energy level of the photon

Inside a Light Emitting Diode



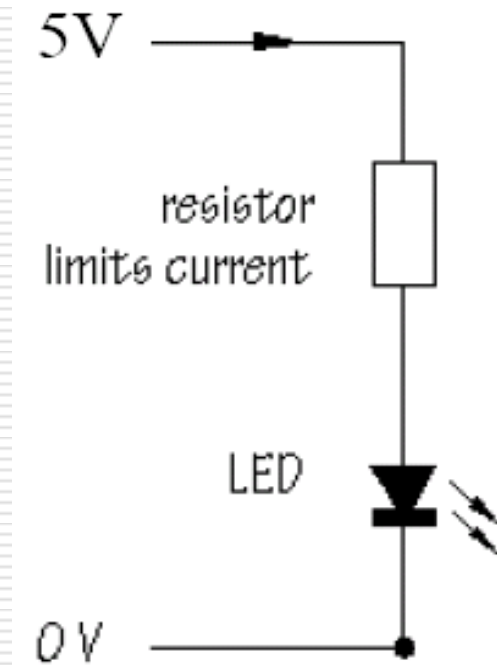
1. Transparent Plastic Case
2. Terminal Pins
3. Diode

Kinds of LEDs

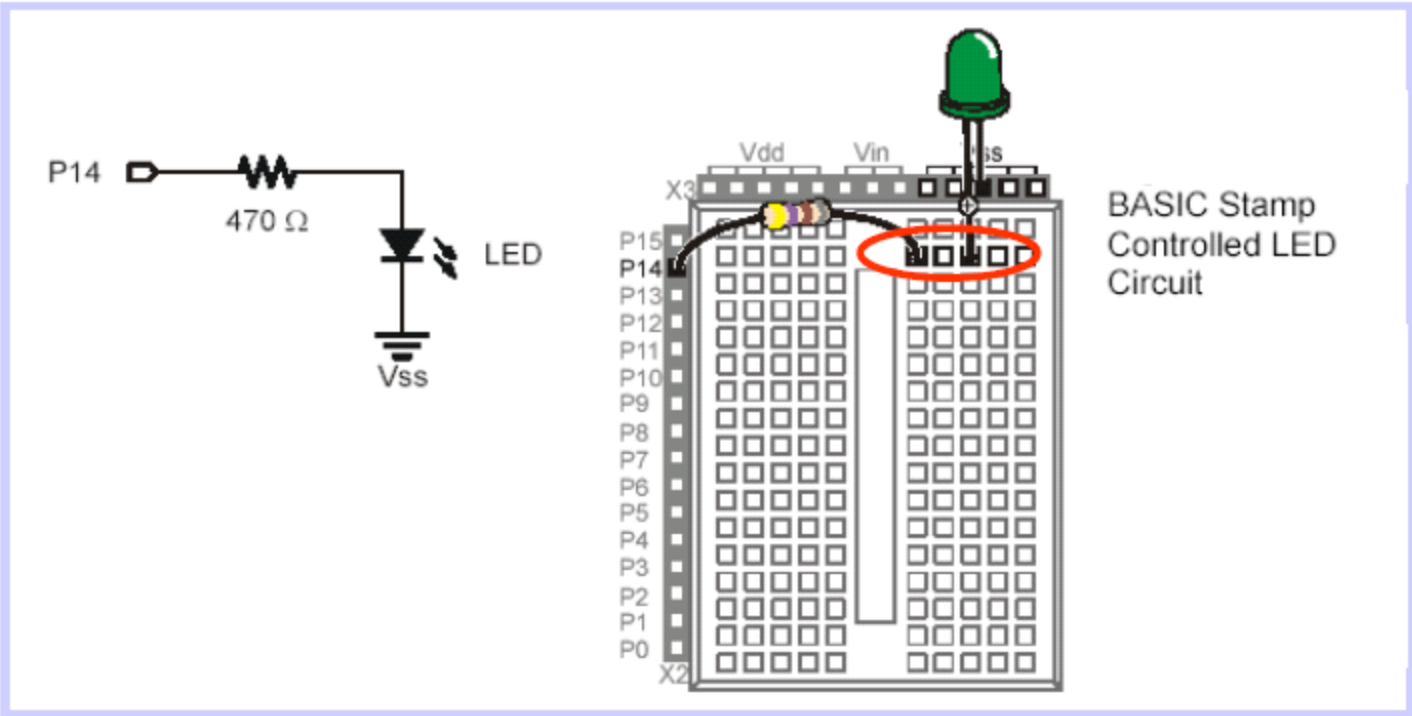


How to Connect a LED:

- ❑ Requires 1.5~2.5V and 10 mA
- ❑ To prevent overloading, use resistor 470 Ω

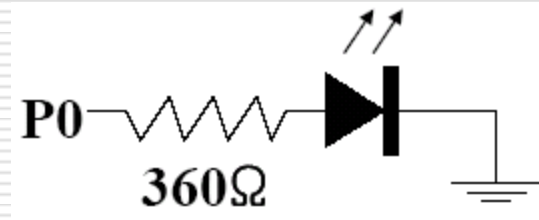


How to Connect a LED:

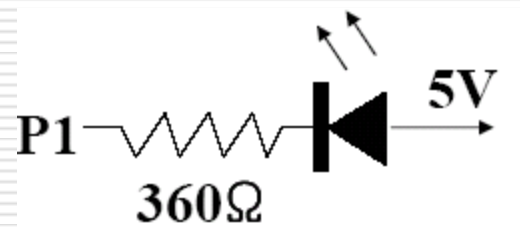


Connect LED to BS2

- LED is on when P0 is high



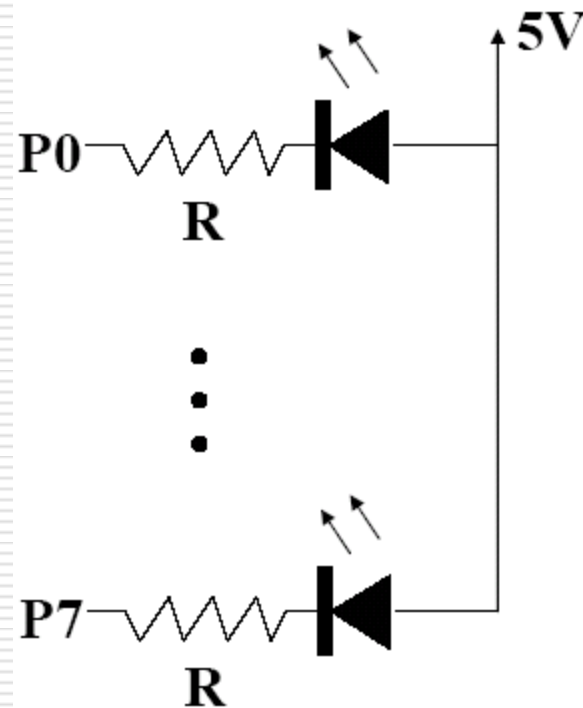
- LED is on when P1 is low



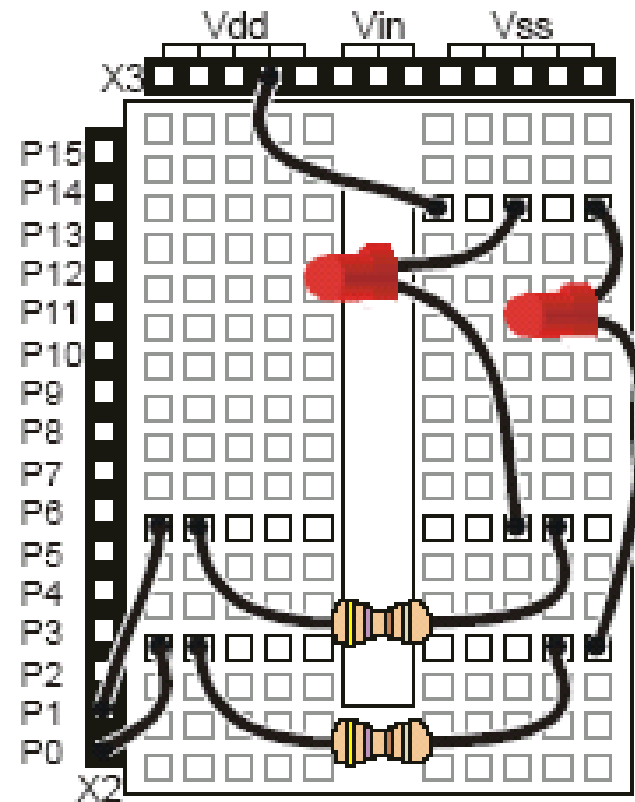
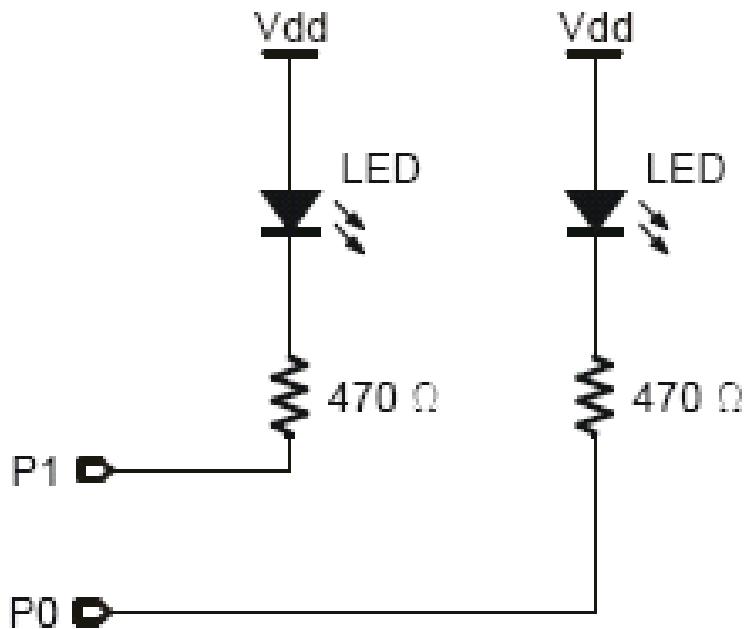
Connect Multiple LEDs to BS2

- 8 LEDs are connected to BS2 each I/O pin (P0-P7) is allowed to sink 6.25mA

$$R = \frac{V}{I} = \frac{3.6}{6.25 \times 10^{-3}} = 576\Omega$$



Case Study: Blinking LED



Case Study: Blinking LED

- Pbasic program to make an LED blink

output 0	→	Make pin0 an output
Main:	→	Loop begins here
low 0	→	Turn LED on
pause 1000	→	Pause for 1 sec
high 0	→	Turn LED off
pause 1000	→	Pause for 1 sec
goto Main	→	Go back to beginning of loop

Experiments

- Flash an LED
 1. Single LED
 2. Multiple LEDs
 - Traffic Light by use of LEDs
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