

FUZE BASIC

Worksheet: 2a "Flashing Lights"

Time for some electronics. In this project we are going to wire up an **LED** to our **input/output (I/O) board**. Follow the instructions below **very carefully** to make the circuit - don't hesitate to ask for help!

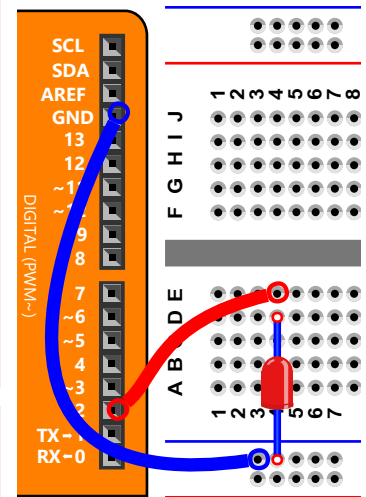
We need to add an **LED** to the breadboard. The breadboard is the plastic board with hundreds (840!) tiny little holes in it. You will also need an IO board (input output). You can use any Arduino compatible board.

Pick an **LED** from the component box and connect it as illustrated here:

NOTE: the **LED** has **one slightly longer leg**. This should be at the top.

The **red** wire connects from **IO pin 2** to the top pin of the **LED (E4)**.

The **blue** wire is connected from the **GND (ground)** pin to the first available hole along the **blue** line. The short **LED** leg goes next to the **blue** wire.



```
PINMODE ( 2, 1 )
DIGITALWRITE ( 2, 1 )
```

Press **[F2]** to go to the **FUZE BASIC** editor, write the code on the left and **RUN** the Program **[F3]**

PINMODE(2, 1) tells the computer that **IO pin 2** is set to **1 (on)** for output.

DIGITALWRITE(2, 1) sends an electrical current (**1**) to pin **2**.

```
DIGITALWRITE ( 2, 0 )
```

Turn **off** the electrical current to the **LED** by sending pin 0 an **off** signal (**0**)

```
PINMODE ( 2, 1 )
LOOP
DIGITALWRITE ( 2, 1 )
WAIT( 0.5 )
DIGITALWRITE ( 2, 0 )
WAIT ( 0.5 )
REPEAT
```

Remember the **LOOP** command from the first sheet? We're going to use that again here to make our light **flash**!

Type in the code to the left then **RUN** the program! **[F3]**

ADVANCED CHALLENGE:

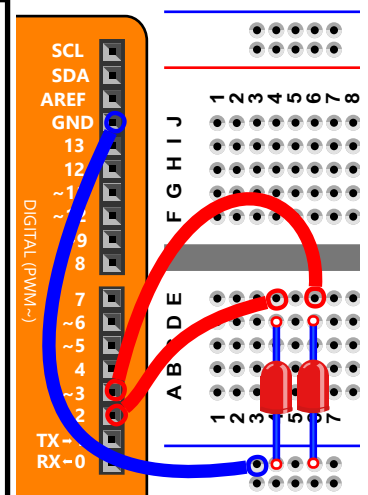
Challenge: How could you make the LED flash faster or

ADVANCED CHALLENGE:

On the right we have written the code to flash two LEDs. First you will need to connect a second LED to the IO and breadboard (see pic).

Add the BLUE lines of code to your program. Can you change things around so the LEDs flash alternately (when one is on the other is off)?

```
PINMODE ( 3, 1 )
PINMODE ( 2, 1 )
LOOP
DIGITALWRITE ( 2, 1 )
DIGITALWRITE ( 3, 1 )
WAIT( 0.5 )
DIGITALWRITE ( 2, 0 )
DIGITALWRITE ( 3, 0 )
WAIT( 0.5 )
REPEAT
```

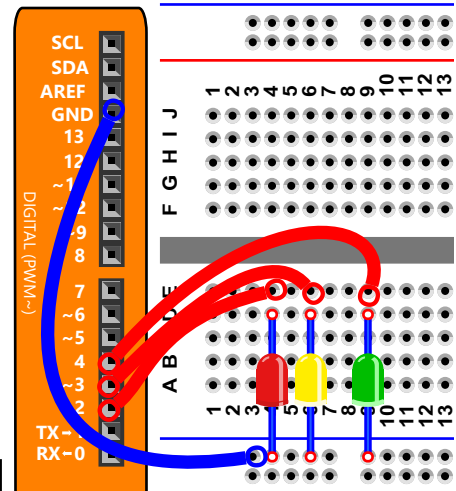


Let's combine everything we have learned into one big program. Sounds good?

We are going to make Traffic Lights! With a twist.

Set up your **IO board** and **LEDs** to look as they do in the picture to the right:

Next, go into the editor [**F2**] if you aren't already, and begin a **new** program. Copy the code below - there a couple of **new** commands - check the box on the right for their explanation.



```
PINMODE ( 2, 1 )
PINMODE ( 3, 1 )
PINMODE ( 4, 1 )

FULLSCREEN = 1

LOOP
CLS
INK = RED
PRINTAT (TWIDTH/2, THEIGHT/2); "STOP. "
DIGITALWRITE ( 2, 1 )
WAIT (1)

CLS
INK = YELLOW
PRINTAT (TWIDTH/2, THEIGHT/2); "GET READY. "
DIGITALWRITE ( 2, 0 )
DIGITALWRITE ( 3, 1 )
WAIT (1)

CLS
INK = GREEN
PRINTAT (TWIDTH/2, THEIGHT/2); "GO!!! "
DIGITALWRITE ( 3, 0 )
DIGITALWRITE ( 4, 1 )
WAIT (1)
DIGITALWRITE ( 4, 0 )
WAIT (1)

REPEAT
```

We know this one! **PINMODE** sets up our pins to receive electricity.

Okay, some new things here.

PRINTAT tells the computer we want to print words at a **specific place**.

(TWIDTH/2, THEIGHT/2) tells the computer **where** we want our words! In this case, it will be in the **middle** of the screen.

DIGITALWRITE (2, 1) turns our first light on.

CLS clears the screen each time, so that we have a fresh page to work with.

Then we repeat the process, changing the **colour** of the **ink**, the **words** we **print**, and the **LED** which comes on at each time.

Each time we repeat the sections, we are **also** turning **off** the **previous** light, and turning **on** the **next** one!

Try changing the words and colours as you like, it is **your** program, after all!