ARDUINO: LESSON: BLINK!

Part A: RUN THE BLINK PROGRAM!

Get a laptop, an Arduino and a USB cable. Connect the Arduino to the laptop with the USB cable. _____

On the laptop, find the Arduino icon and double click it. _____

You must tell the software which USB slot (port) you used.
To do this: **Click on Tools --> Port --> COM3 (Arduino Uno)**
Note: it is not always "COM3", but could be "COM4" or "COM7" or any other number -- but only one will say "Arduino" -- choose *that* one! _____

Click on: **File -> Examples -> Basics -> Blink** _____

Click on **Upload**. It's second icon from the left on the top row of icons and looks like a right arrow in a circle. When you mouse over it the word "Upload" will appear. _____

Observe the Arduino board: the tiny LED next to pin 13 should now be blinking: 1 second on and 1 second off! _____

CONGRATULATIONS! YOU HAVE SUCCESSFULLY RUN YOUR FIRST ARDUINO PROGRAM!!! _____

Part B: OBSERVE THE PROGRAM "SOURCE CODE"

It's the "code" or computer language that is the "source" or cause of the program!

Look at the program on your screen. Scroll down to near the end and find the main loop. It should look like this:

```
void loop() {
  digitalWrite(13, HIGH);
  delay(1000);
  digitalWrite(13, LOW);
  delay(1000);
}
```

_____

"Void loop()" is computer language to start the loop. We will learn more about that later. The loop is a group of lines of code, like a paragraph, which is run by the computer over and over again. The open brace, **{**, begins the loop and the close brace on the last line, **}**, ends it. Everything in between them is done over and over again.

Note the first line: **`digitalWrite(13, HIGH);`**

This turns ON the LED next to pin 13. Here, "HIGH" means "ON". _____

The second line is: **`delay(1000);`**

This tells the Arduino to wait 1000 milliseconds, that is, 1 second. The LED stays on while it is waiting. _____

The third line is: **`digitalWrite(13, LOW);`**

This turns the LED off. Here, "LOW" means "OFF". _____

And finally, the fourth line is: **`delay(1000);`**

This tells the Arduino to wait another 1 second. The LED stays off while it is waiting. Then comes the ending brace or **}**, which ends the loop, only to be immediately restarted at the beginning again. _____

In English, the program is basically this:

1. TURN THE LED ON
2. WAIT 1 SECOND
3. TURN THE LED OFF
4. WAIT 1 SECOND
5. LOOP BACK TO #1

_____

Thus, the LED blinks! Review the above and sign off this line when when it makes sense to you. _____

Part C: PLAY WITH THE NUMBERS!

The second and fourth lines of the loop program both say "***delay(1000)***". Change both of them to say "***delay(250)***" instead. _____

Click the "**Upload**" icon again and observe the LED. Does it do what you expected? _____

Change both delays to 50 milliseconds and re-upload. Now what occurs? _____

Change both delays to 25 milliseconds and re-upload. Now what occurs? _____

Change both delays to 10 milliseconds and re-upload. Can you still see that it is blinking? _____

Try other numbers. What is the smallest number you can use for which you can still tell it is blinking?
What happens if you do 50 for the first delay and 950 for the second? 950 for the first and 50 for the last?
What happens if you make both numbers just 1? 0? _____

Report all your observations from the above steps to your Supervisor for a Supervisor pass! _____
_____

THE END