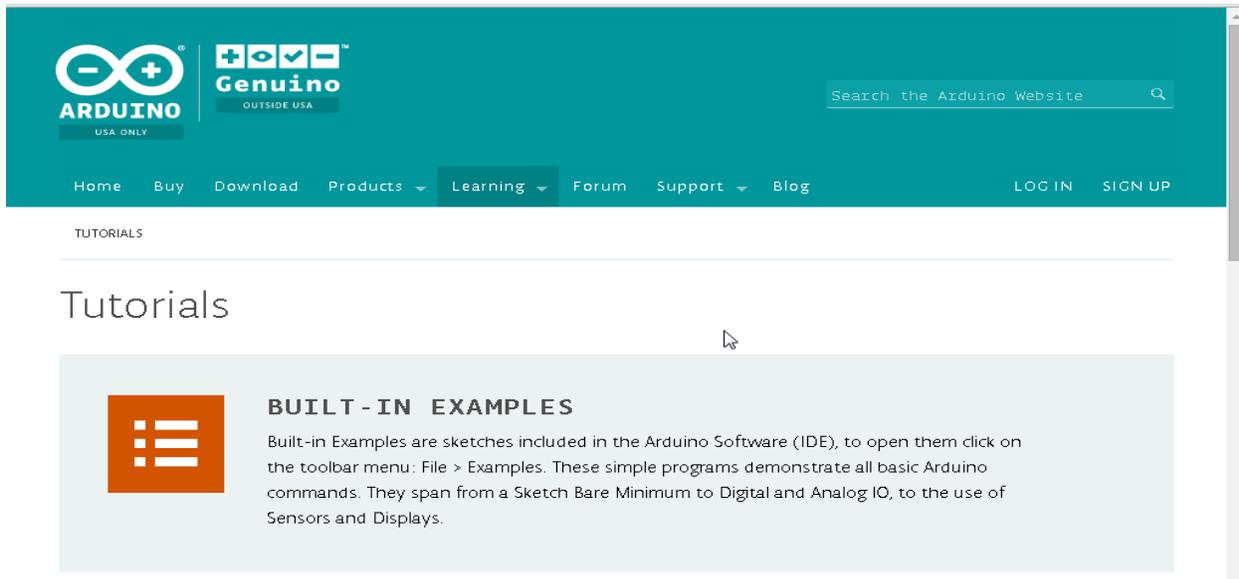


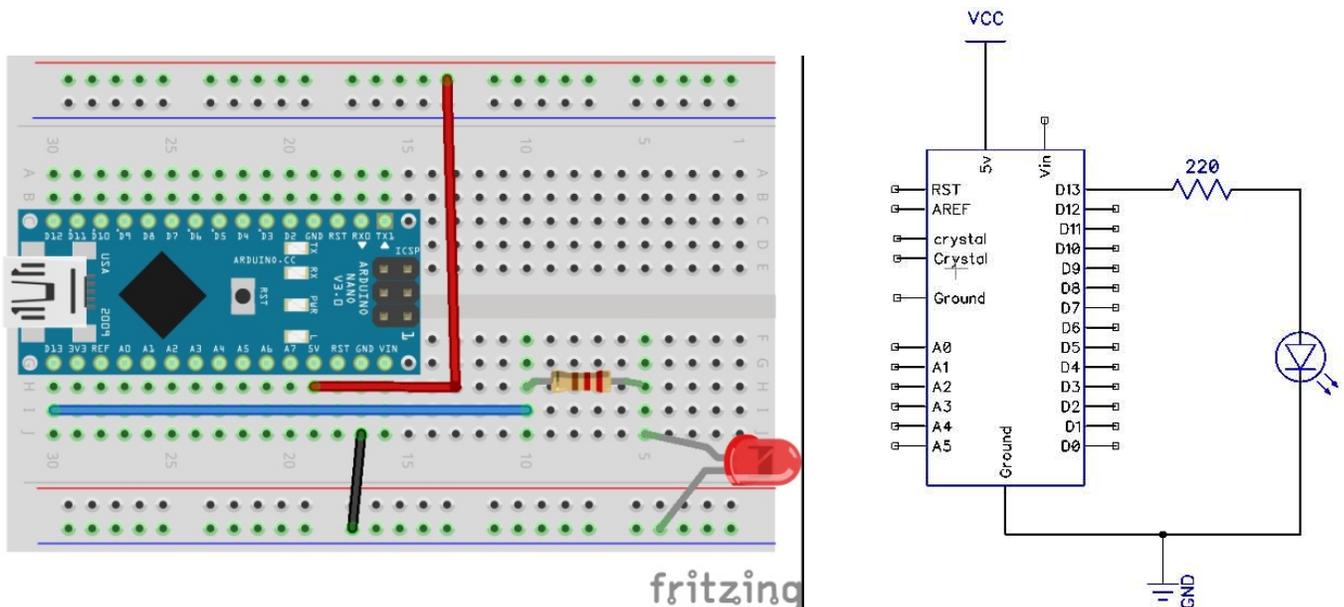
Introduction to Arduino

Blink – Your First Program

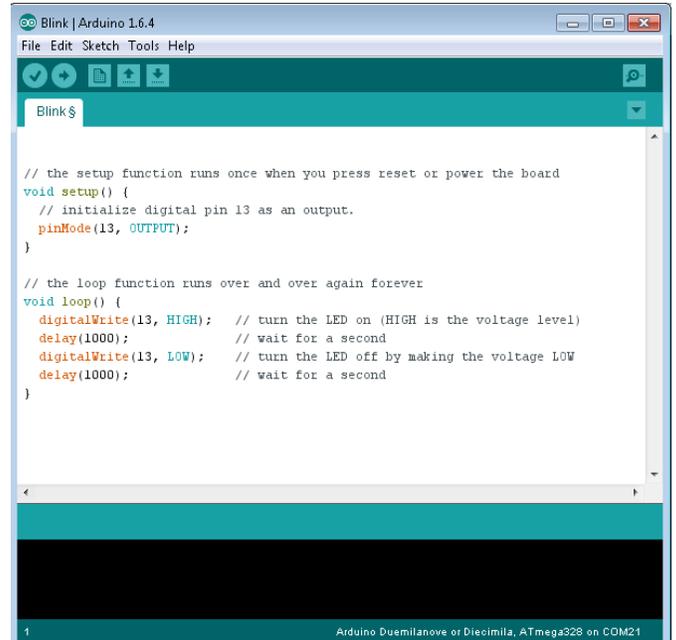
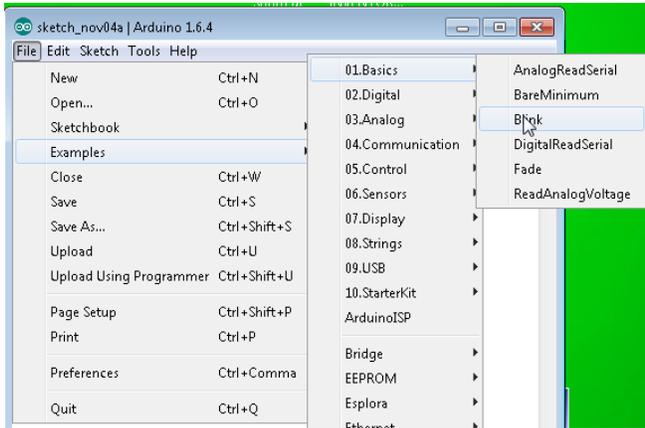
1. Your very first lab is to be able to connect the ARDUINO NANO up to the computer through the USB port and program a single LED to blink. FIRST, using the Arduino website (<http://www.arduino.cc>), click on the “Learning” tab, then click on “Tutorials” on the drop down menu. Select Built in examples and then scroll down until you find “1.Basic” and select the “Blink” tutorial. Read the contents and understand the code. This is a good website for information and you will refer to it often!!!!



2. Breadboard the LED and 220Ω resistor in the pictorial and schematic below to go along with the lab. NOTE, that the pictorial diagram is there only to get you started and eventually you will only get a schematic diagram to complete the labs. The 5V pin (VCC on some boards) will go to the top “red” rail on the breadboard and the GND (negative) will go to the bottom “blue” rail on the breadboard. Using a wire from pin D13, bring it out past the NANO and then connect the resistor to it, followed by the LED to ground as shown.

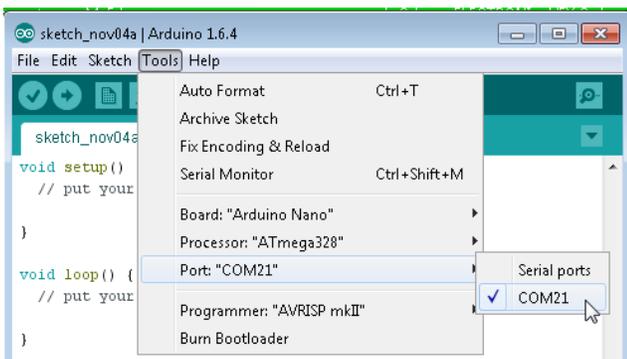
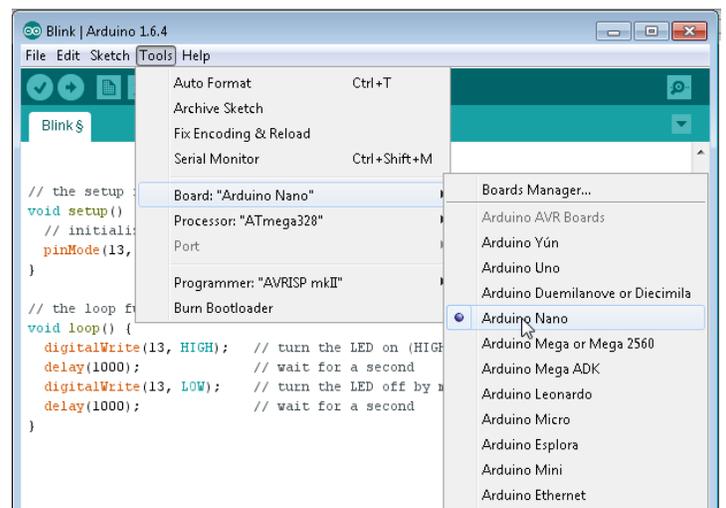
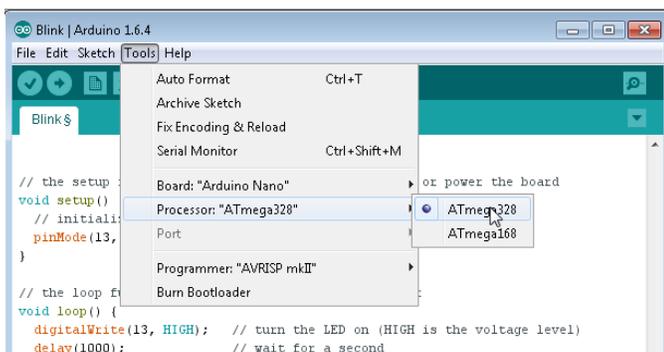


3. Open up the Arduino software off the desktop and under the “File” drop down menu, click on Examples, 01.Basics, Blink and open up the code that goes along with the tutorial.



4. Now that you have the code open and the lab breadboarded, insert the USB cable into the ARDUINO NANO and the computer. The lights on the ARDUINO NANO will come on and the software drivers for the ARDUINO NANO need to get installed. You will see this installation in the windows task bar. When it is complete you will have to do **THREE** things in the Arduino Software to be able to UPLOAD the program;

- Pick the correct board (Arduino NANO)
- Pick the correct processor (ATmega328)
- Setup the correct Serial COM Port – this may vary from machine to machine and is usually the last one on the list. **IT IS NOT COM1**. There should be a second choice usually COM 4.



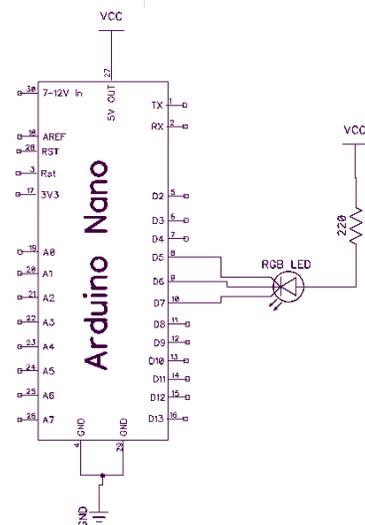
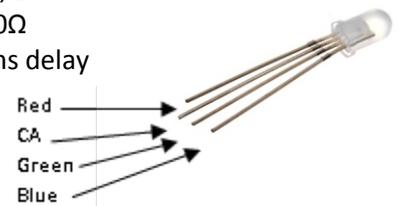
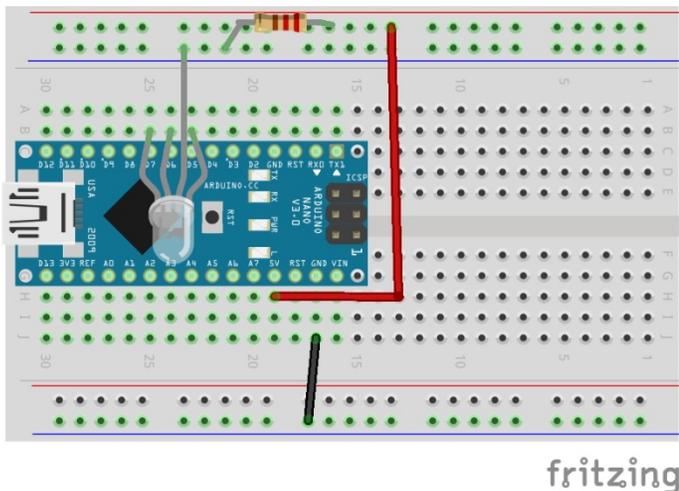
- Now that you have the settings correct, upload the program to the ARDUINO NANO. The upload will only work; IF there are no errors in the code, you have the correct board, Processor COM port. Once uploaded the LED should blink.
- Now using what you have learned, write a simple program that blinks the LED really fast twice (250ms apart), then slow once (1 second). Use the code below and the comments (two forward slashes // mean whatever is behind it is a comment) to figure out what is needed to change the program.

```
// the loop routine runs over and over again forever:
void loop() {
  digitalWrite(led, HIGH); // turn the LED on (HIGH is the voltage level)
  delay(1000); // wait for a second
  digitalWrite(led, LOW); // turn the LED off by making the voltage LOW
  delay(1000); // wait for a second
}
```

<code>digitalWrite(led, HIGH);</code>	This command sets the output of Pin 13 on the ARDUINO NANO to HIGH or 5V.
<code>digitalWrite(led, LOW);</code>	This command sets the output of Pin 13 on the ARDUINO NANO to LOW or 0V.
<code>delay(1000);</code>	This sets the delay (wait) before going onto the next command line in the program in milliseconds. <ul style="list-style-type: none"> - 1000milliseconds = 1 second - 250milliseconds = .25 second

- Replace the LED with an RGB LED (Red, Green, Blue). Connect the LED to pins D5, D6, D7. The longest leg on the LED is the Common Anode and it needs to be connected to the 220Ω resistor. Now, change your code to make the LED blink Red, Green, Blue with a 500ms delay between each. You will have to declare 3 integers at the beginning of your sketch (call them red = 5, green = 6, blue = 7) and have 3 pinMode's in the setup.

(HINT: a LOW turns on the LED 😊)



Show the teacher the working lab and code.

Marks will be taken off if the wires on the breadboard are not flat like shown above!!!!