



The Canadian Satellite Design Challenge Management Society presents...

# The CanSat Kit

for

# DUMMIES

Future Space Scientists & Engineers!

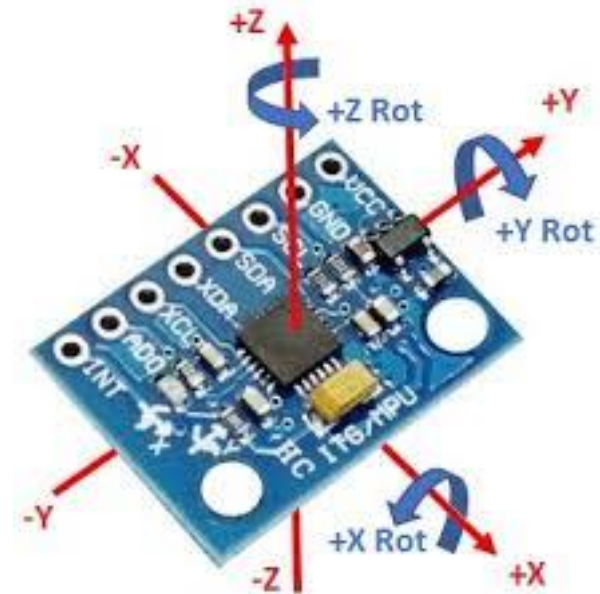
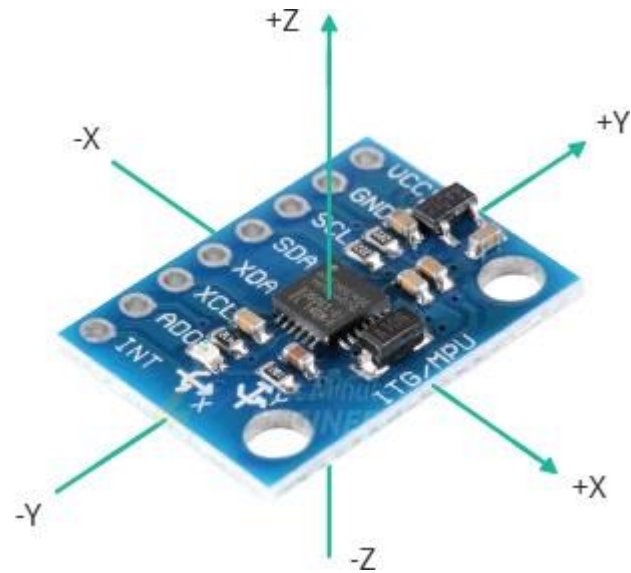
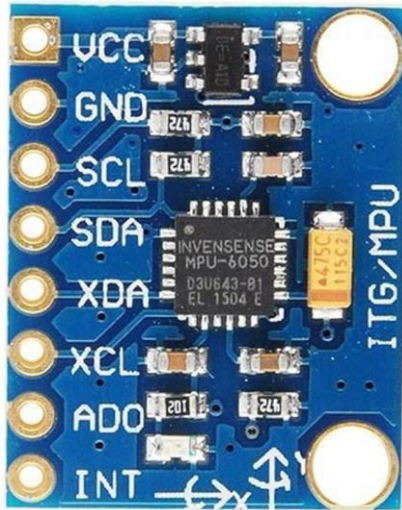
Episode #6: Connecting the MPU-6050 Accelerometer & Gyroscope

# What we're going to do:

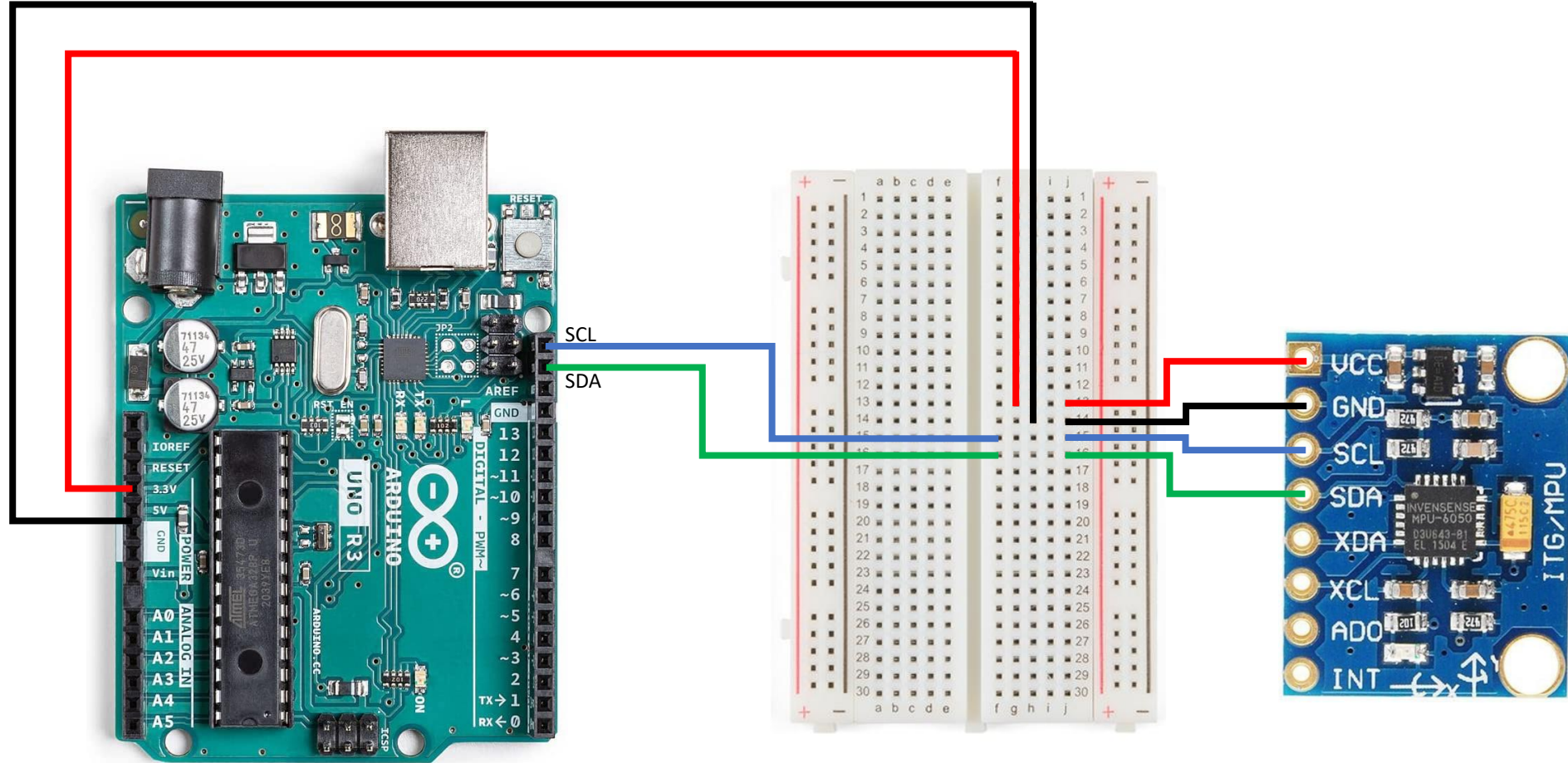
- Connect the MPU-6050 Accelerometer and Gyroscope
  - Read the acceleration in each axis (X, Y, Z)
  - Read the rotation rate around each axis (X, Y, Z)
  - Optional: it has a temperature sensor also!

# The MPU-6050

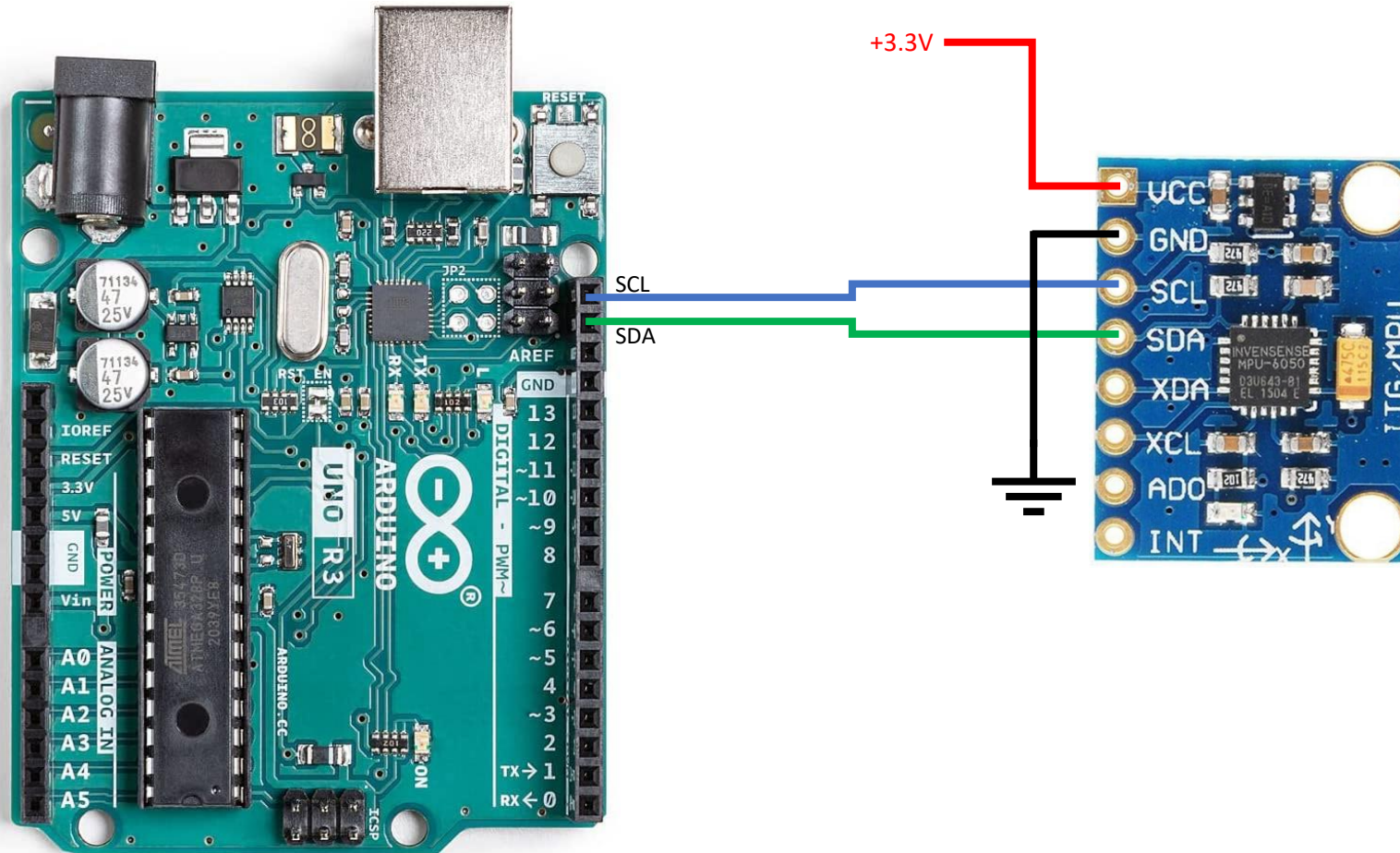
- Measures acceleration up to  $\pm 16g$
- Measures angular rotation rates up to  $\pm 2000$  deg/s



# MPU-6050 Circuit Diagram

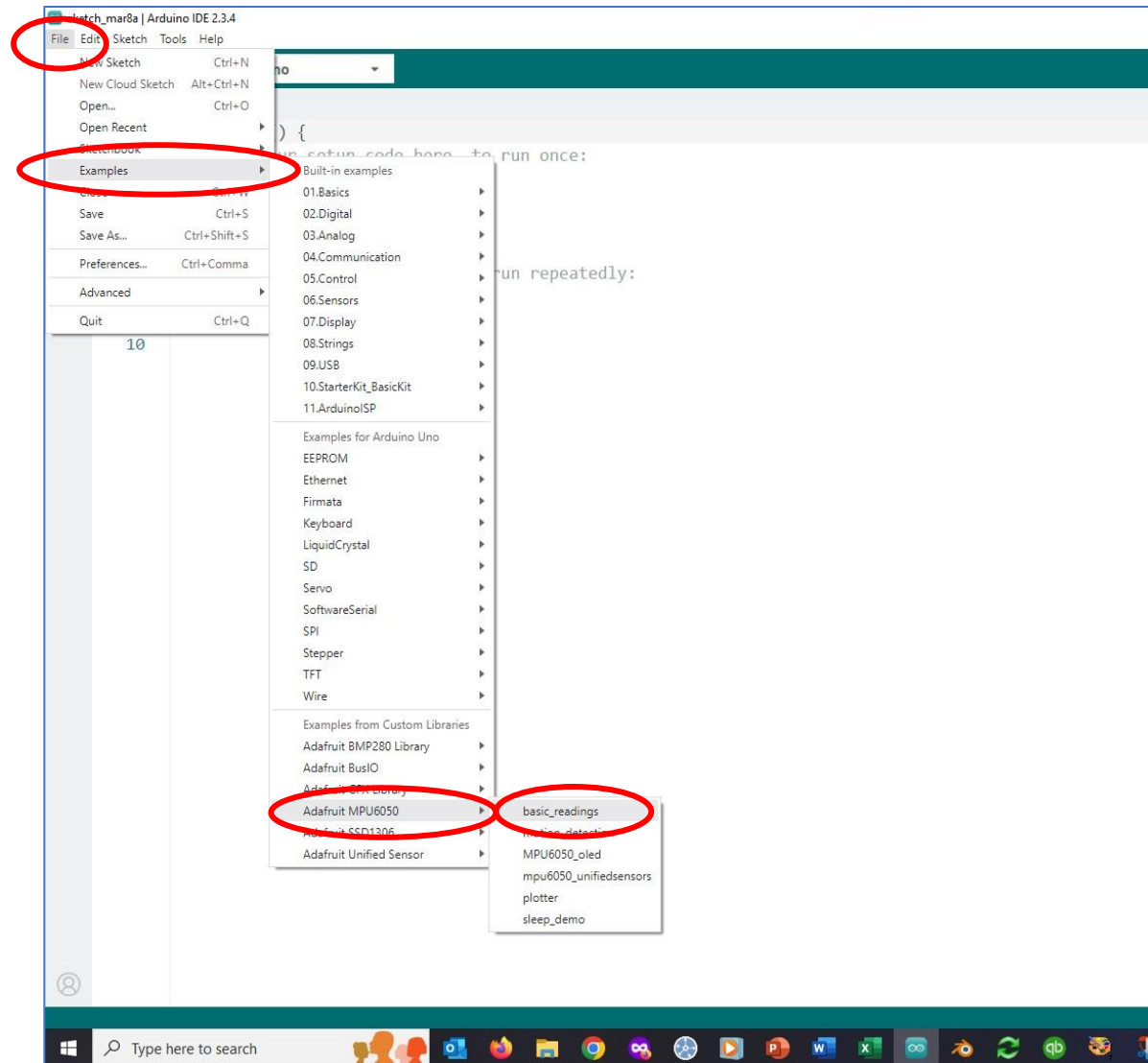


or simply...

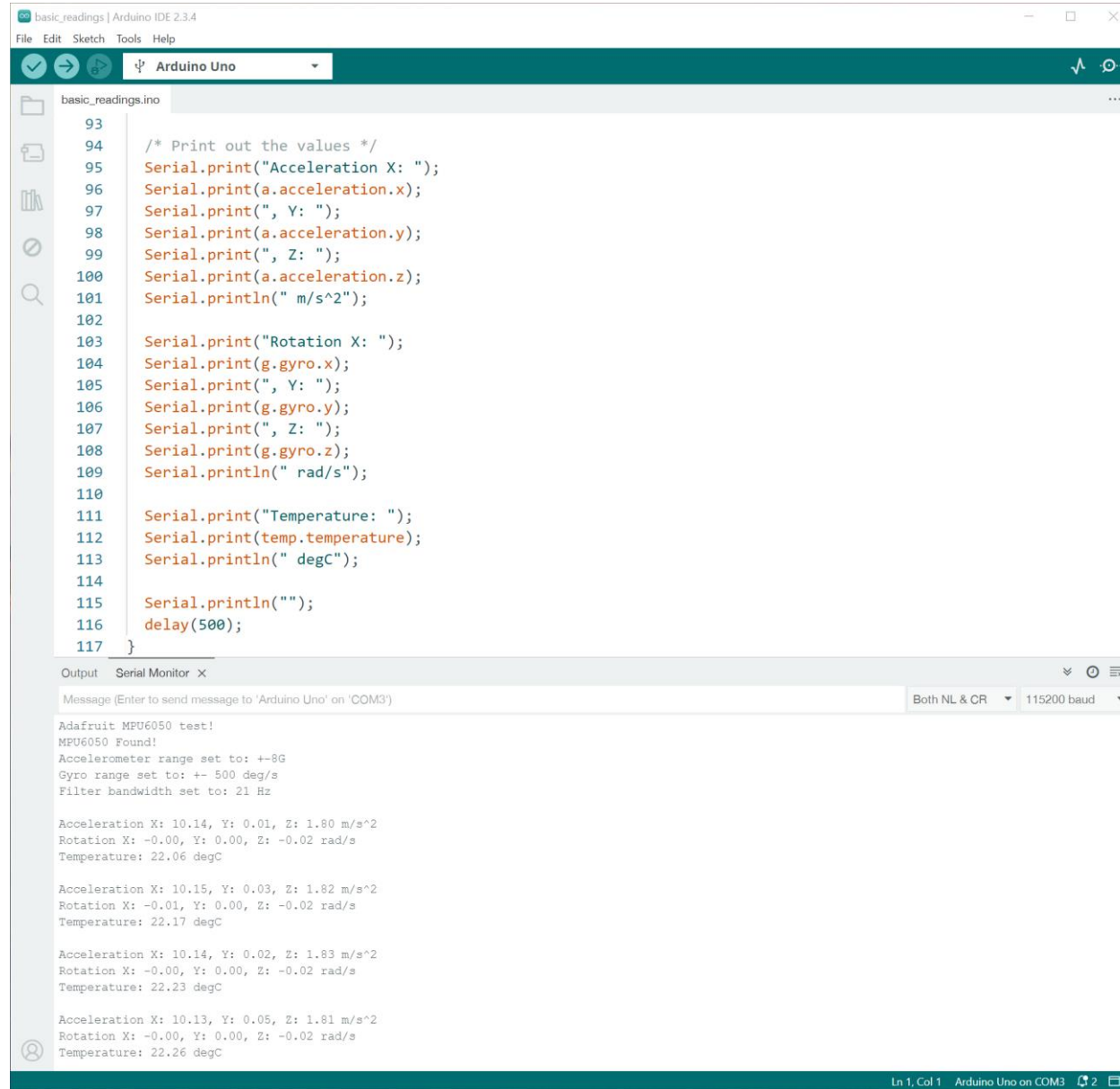


# Load the Example MPU Program

File -> Examples -> Adafruit MPU6050 -> basic\_readings



# Compile and Upload ... et voila!



The screenshot displays the Arduino IDE interface. The top menu bar includes 'File', 'Edit', 'Sketch', 'Tools', and 'Help'. The toolbar shows icons for checking, uploading, and erasing code, along with a dropdown menu for the board type, currently set to 'Arduino Uno'. The main editor window shows the sketch 'basic\_readings.ino' with the following code:

```
93
94  /* Print out the values */
95  Serial.print("Acceleration X: ");
96  Serial.print(a.acceleration.x);
97  Serial.print(", Y: ");
98  Serial.print(a.acceleration.y);
99  Serial.print(", Z: ");
100 Serial.print(a.acceleration.z);
101 Serial.println(" m/s^2");
102
103 Serial.print("Rotation X: ");
104 Serial.print(g.gyro.x);
105 Serial.print(", Y: ");
106 Serial.print(g.gyro.y);
107 Serial.print(", Z: ");
108 Serial.print(g.gyro.z);
109 Serial.println(" rad/s");
110
111 Serial.print("Temperature: ");
112 Serial.print(temp.temperature);
113 Serial.println(" degC");
114
115 Serial.println("");
116 delay(500);
117 }
```

Below the editor is the 'Serial Monitor' window, which is active. It shows the output of the sketch, including initialization messages and sensor data:

```
Adafruit MPU6050 test!
MPU6050 Found!
Accelerometer range set to: +-8G
Gyro range set to: +- 500 deg/s
Filter bandwidth set to: 21 Hz

Acceleration X: 10.14, Y: 0.01, Z: 1.80 m/s^2
Rotation X: -0.00, Y: 0.00, Z: -0.02 rad/s
Temperature: 22.06 degC

Acceleration X: 10.15, Y: 0.03, Z: 1.82 m/s^2
Rotation X: -0.01, Y: 0.00, Z: -0.02 rad/s
Temperature: 22.17 degC

Acceleration X: 10.14, Y: 0.02, Z: 1.83 m/s^2
Rotation X: -0.00, Y: 0.00, Z: -0.02 rad/s
Temperature: 22.23 degC

Acceleration X: 10.13, Y: 0.05, Z: 1.81 m/s^2
Rotation X: -0.00, Y: 0.00, Z: -0.02 rad/s
Temperature: 22.26 degC
```

The status bar at the bottom indicates 'Ln 1, Col 1' and 'Arduino Uno on COM3'.