Galileo - Getting Started

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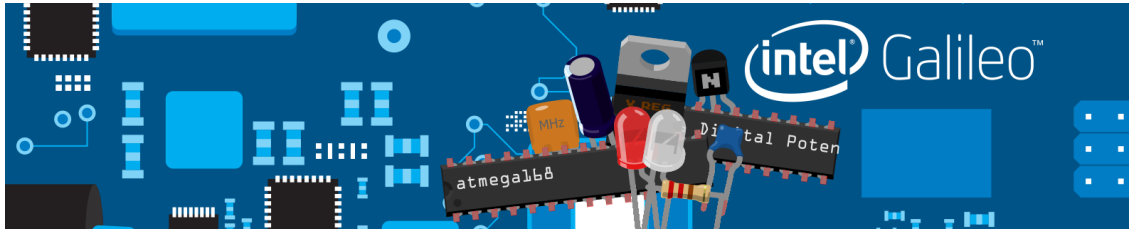
CST131 Computer Organization
Saturday December 6 2014 // {9-11am,11am-1pm,2-4pm}
Lab 1 & 2, Level 3, School of Computer Science, USM



Accessability

Account: Workshop

Password: “workshop123”

Definition

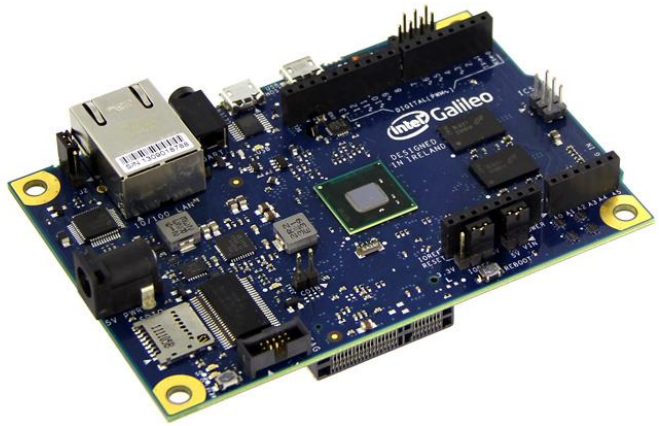

Google
define microcontroller
Web
Images
Videos
Maps
More
Search tools
About 4,660,000 results (0.50 seconds)
microcontroller
/ˈmʌɪkrə(ʊ)kənˌtrəʊlə/
noun COMPUTING
noun: microcontroller; plural noun: microcontrollers; noun: micro-controller; plural noun: micro-controllers
1. a control device which incorporates a microprocessor.
Translate microcontroller to
Choose language
Use over time for: microcontroller
Mentions
1800
1850
1900
1950
2010

So a microcontroller huh..so what's a big deal??

- It is a big deal!

Intel Galileo

- Intel Quark processor (SoC) 400MHz
- 256 MB of DRAM
- Connectivity
  - Mini-PCIe slot, 100MB ethernet port, Micro SD slot, Serial RS232, USB host and client ports.

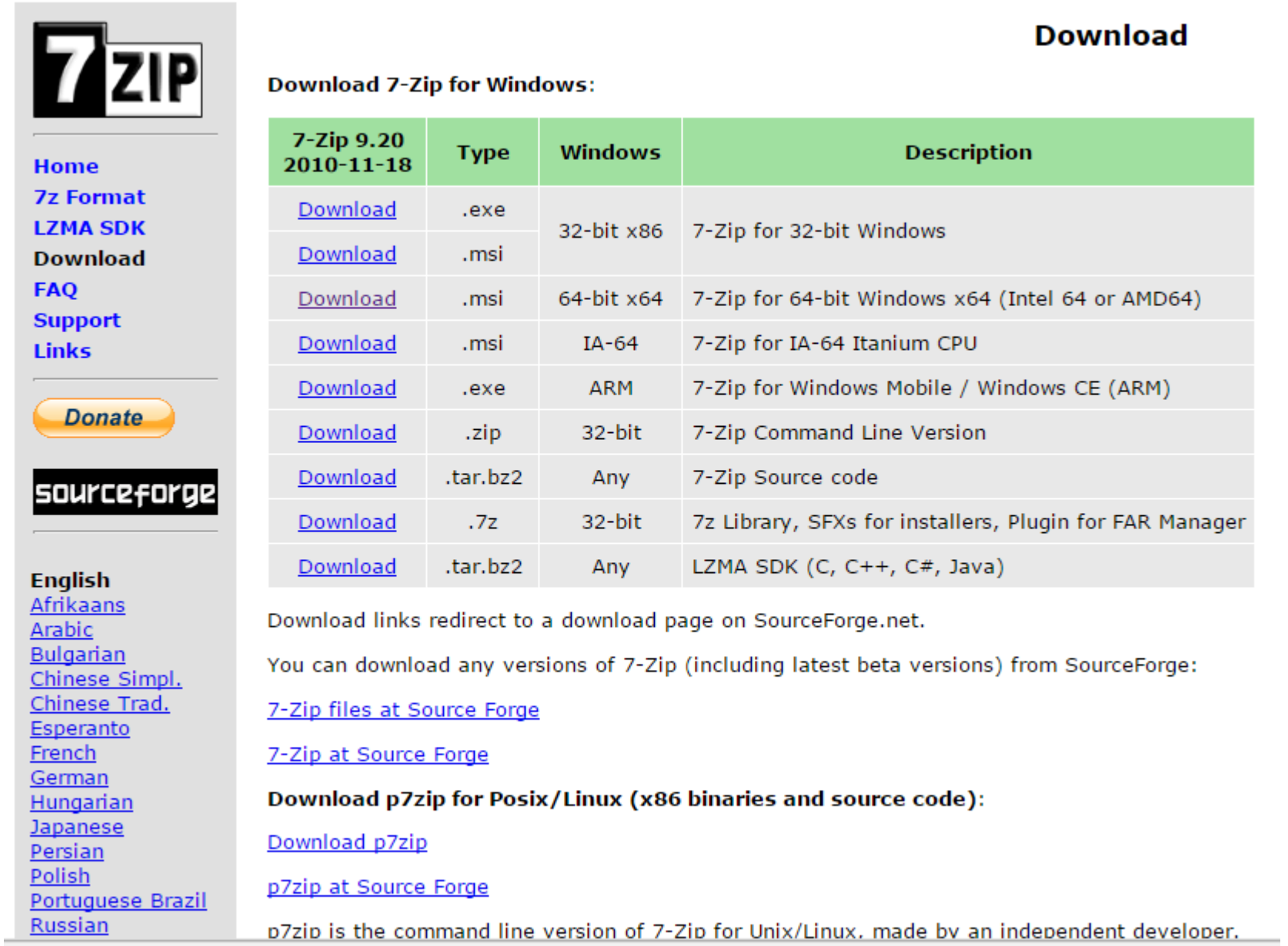


Galileo

First time installation & quick troubleshooting

7zip

- Download and install



Download Intel Galileo Software

link : https://communities.intel.com/docs/DOC-22226

Galileo Software Downloads

Version 23

created by marmstrong on Jan 7, 2014 4:29 PM, last modified by intel_jorge on Nov 15, 2014 1:47 AM

Software package release version 1.0.4.

See the Getting Started Guide for step-by-step information on installing the software.

Important: Software downloads are also found in the release notes.

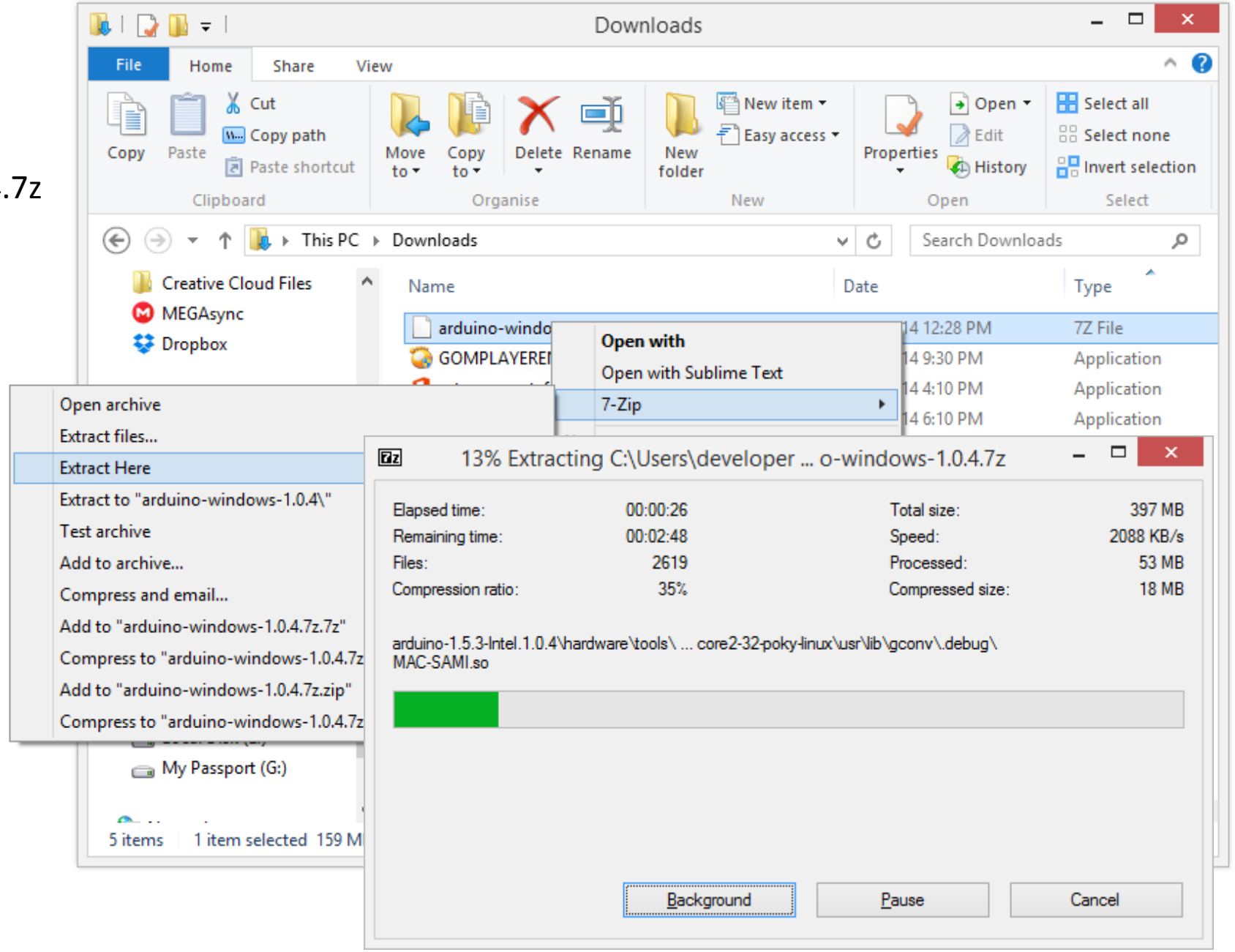
Download the zip file for your operating system (OS). Each OS zip file includes the latest firmware so you can use the IDE to update your board.

Link	Software	Operating system	Intel board	File size	File type
Download	Arduino Software 1.5.3	Linux 32 Bit	Galileo	145 MB	.tgz
Download	Arduino Software 1.5.3	Linux 64 Bit	Galileo	149 MB	.tgz
Download	Arduino Software 1.5.3	Mac OS X	Galileo	112 MB	.zip
Download	Arduino Software 1.5.3	Windows	Galileo	159 MB	.7z

Choose Windows if your system is Windows-based.

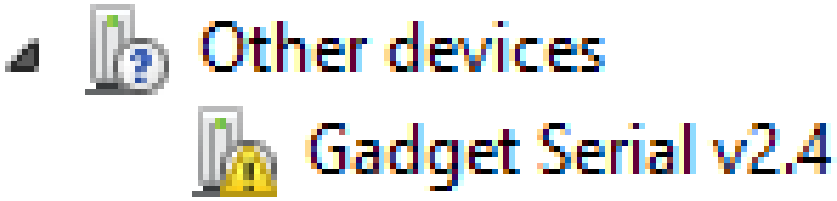
Extract

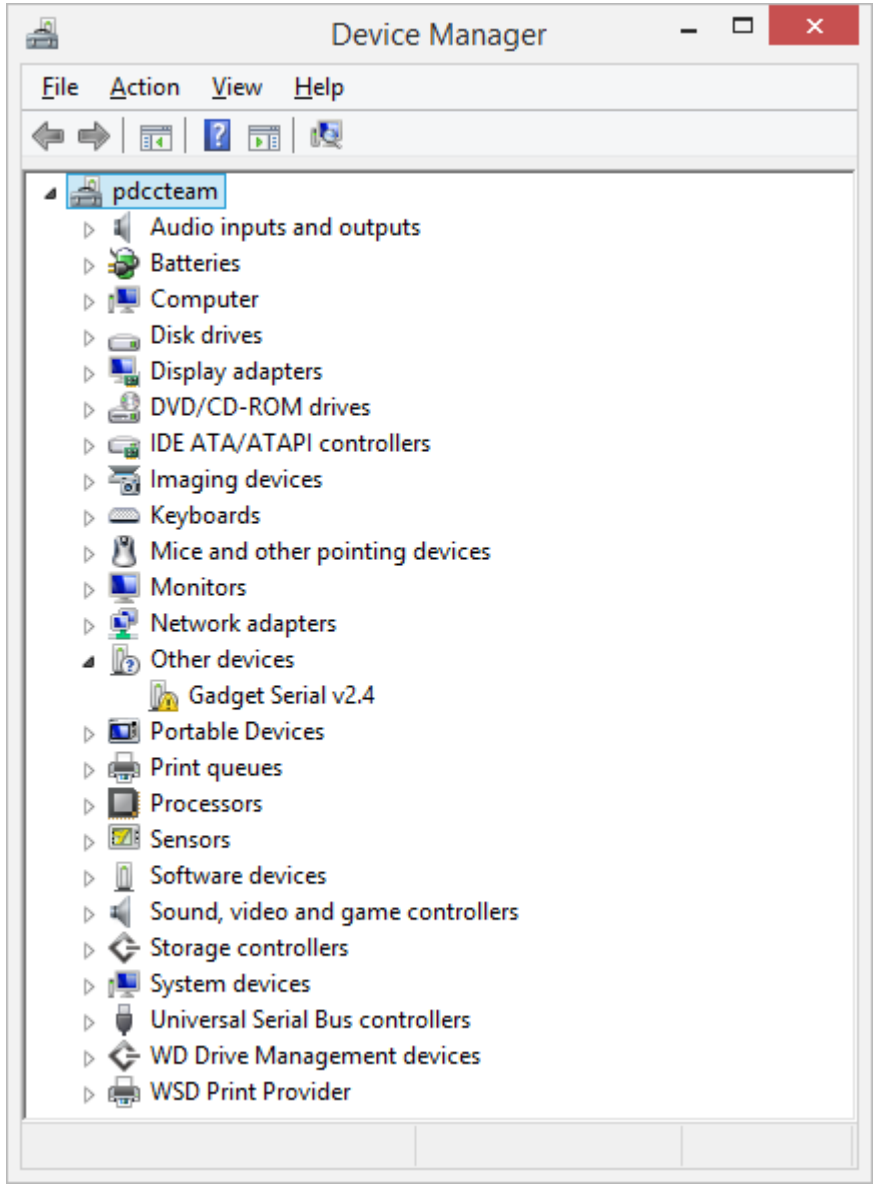
arduino-windows-1.0.4.7z



Connect Galileo to PC

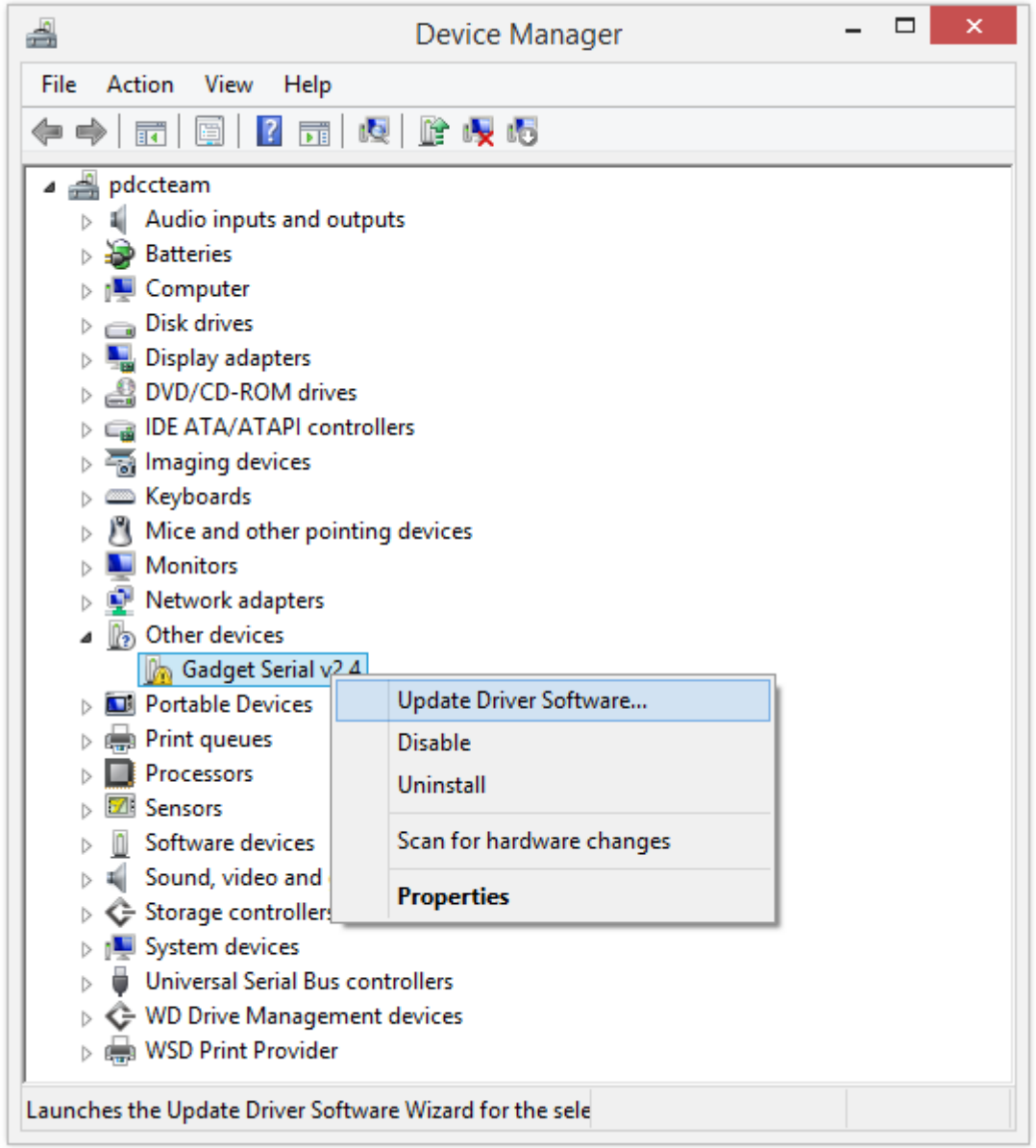
- Check Device Manager
  you may find “Gadget Serial v2.4”





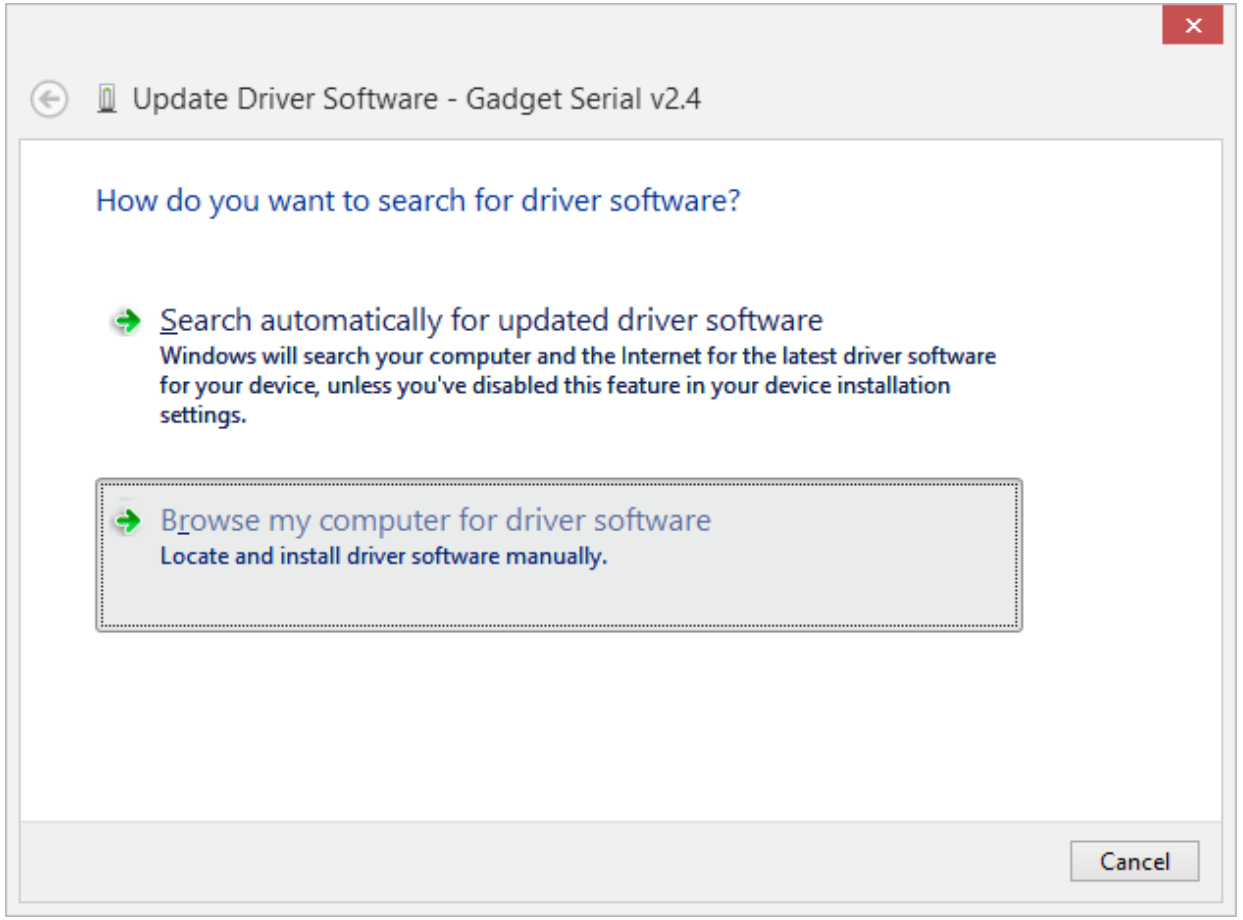
Install Galileo Driver

- Right click at
  “Gadget Serial v2.4” and choose
  “Update Driver Software…”



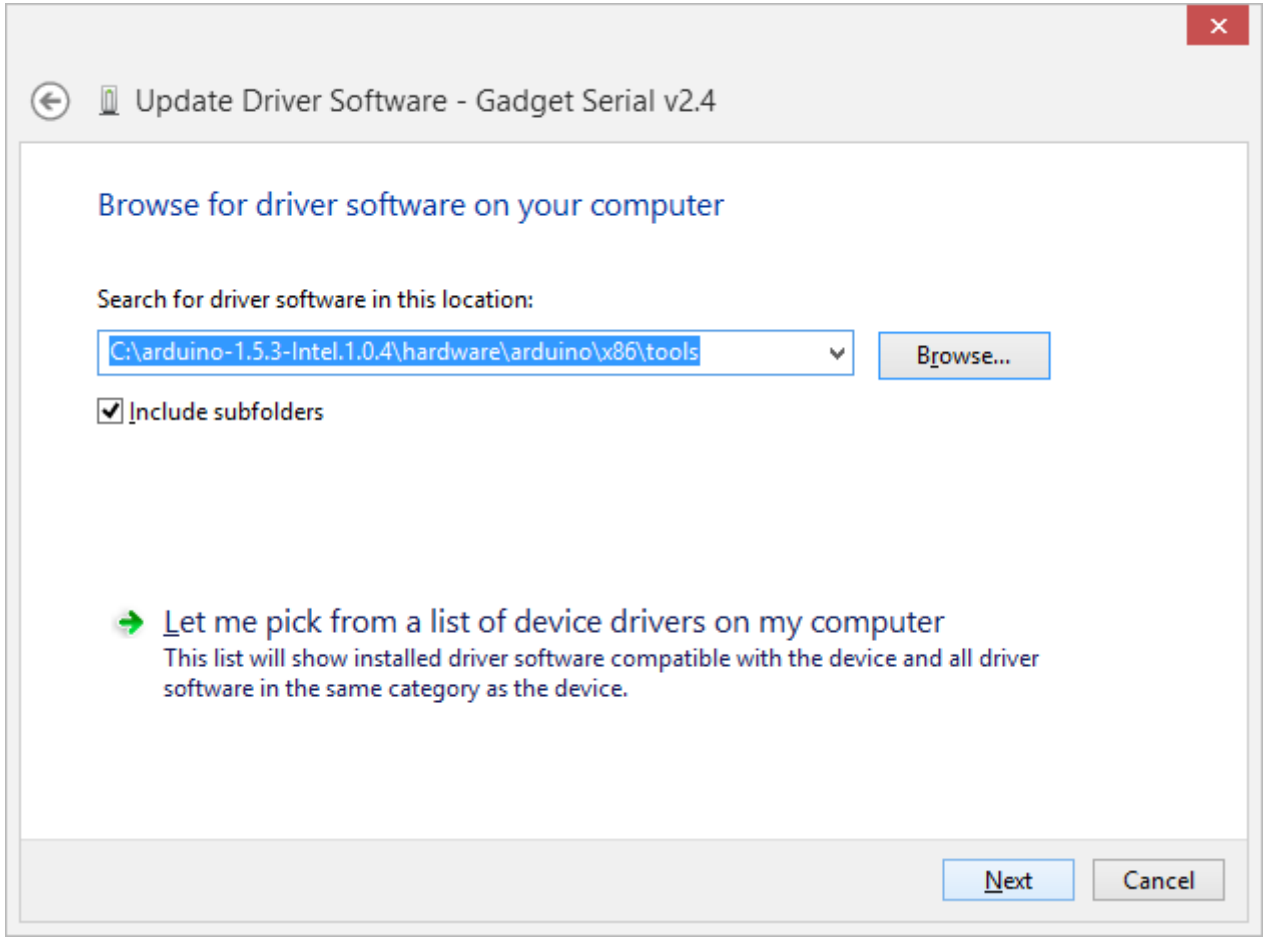
Install Galileo Driver (cont.)

- Choose
  “Browse for driver software on your computer”



Install Galileo Driver (cont.)

- Select the path of driver
  "C:\arduino-1.5.3-Intel.1.0.4\hardware\arduino\x86\tools"

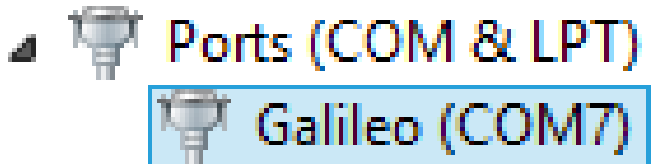


Info : the path may vary therefore make sure you know the path of extracted arduino IDE (arduino-1.5.3-Intel.1.0.4).

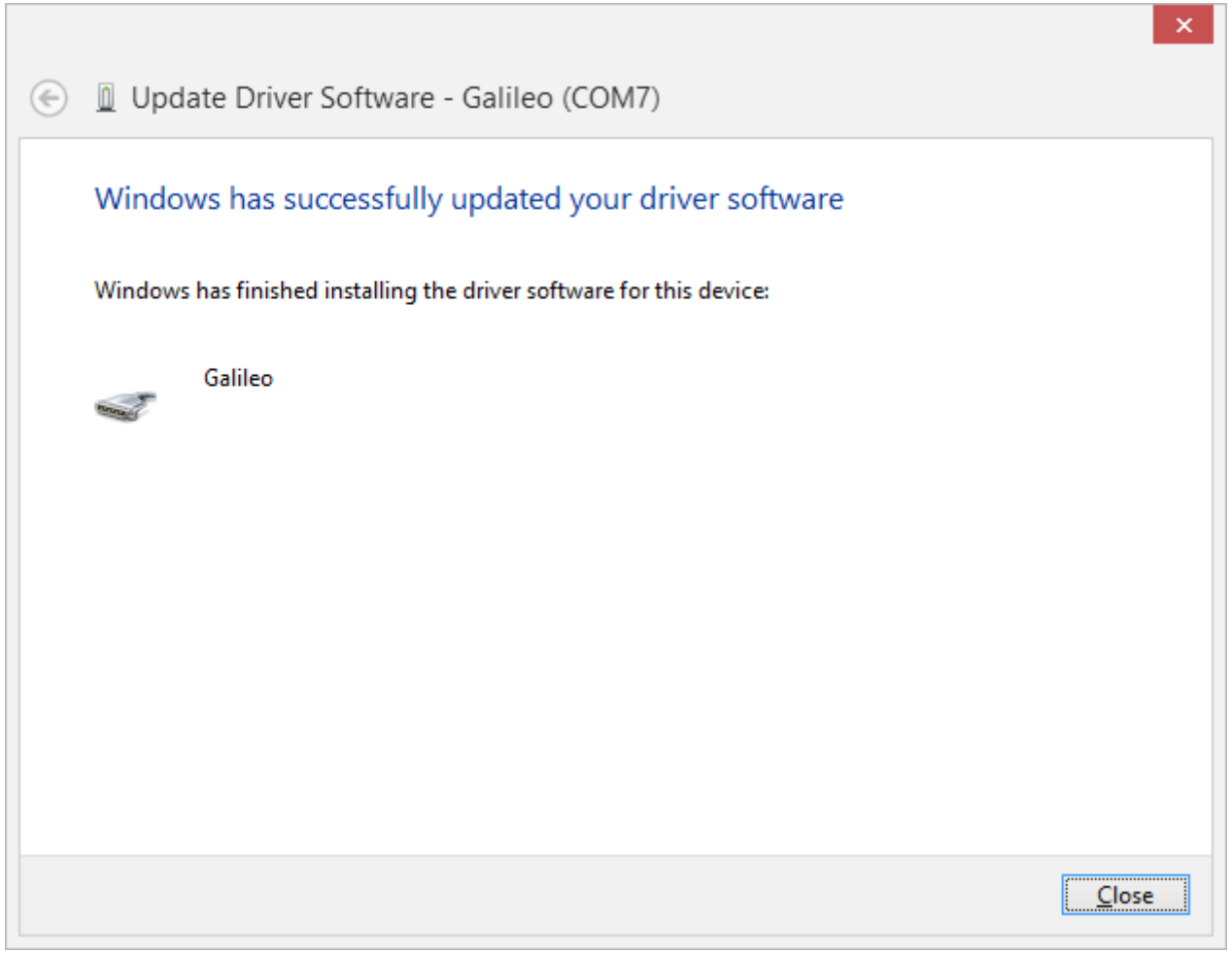
Galileo driver is located here:
arduino-1.5.3-Intel.1.0.4\hardware\arduino\x86\tools

Install Galileo Driver (cont.)

- Upon successful installation

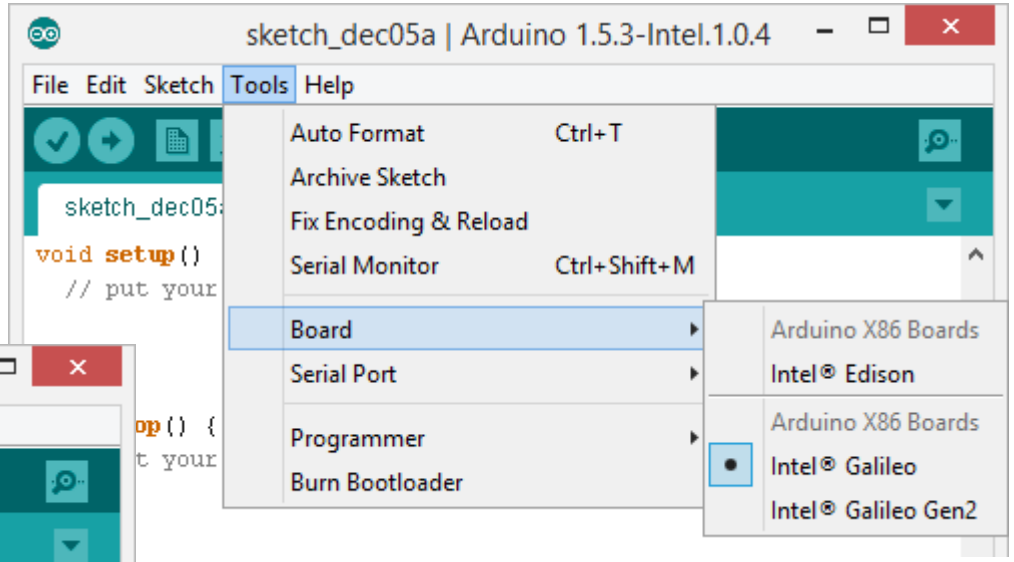


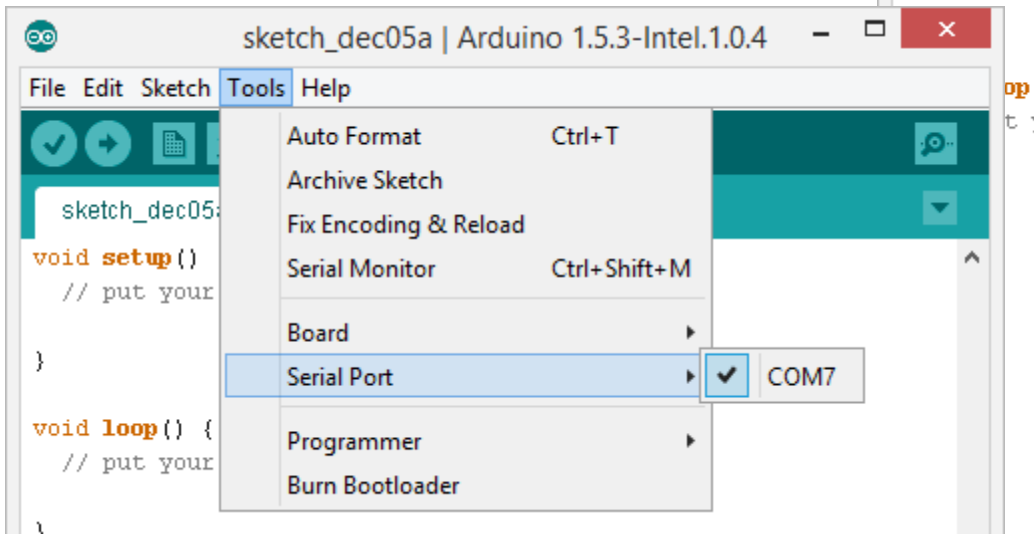
Galileo port will appear in Device Manager



Install Galileo Driver (cont.)

- Verify Galileo with Arduino IDE





Make sure you choose the correct board and port before you start uploading a new sketch.

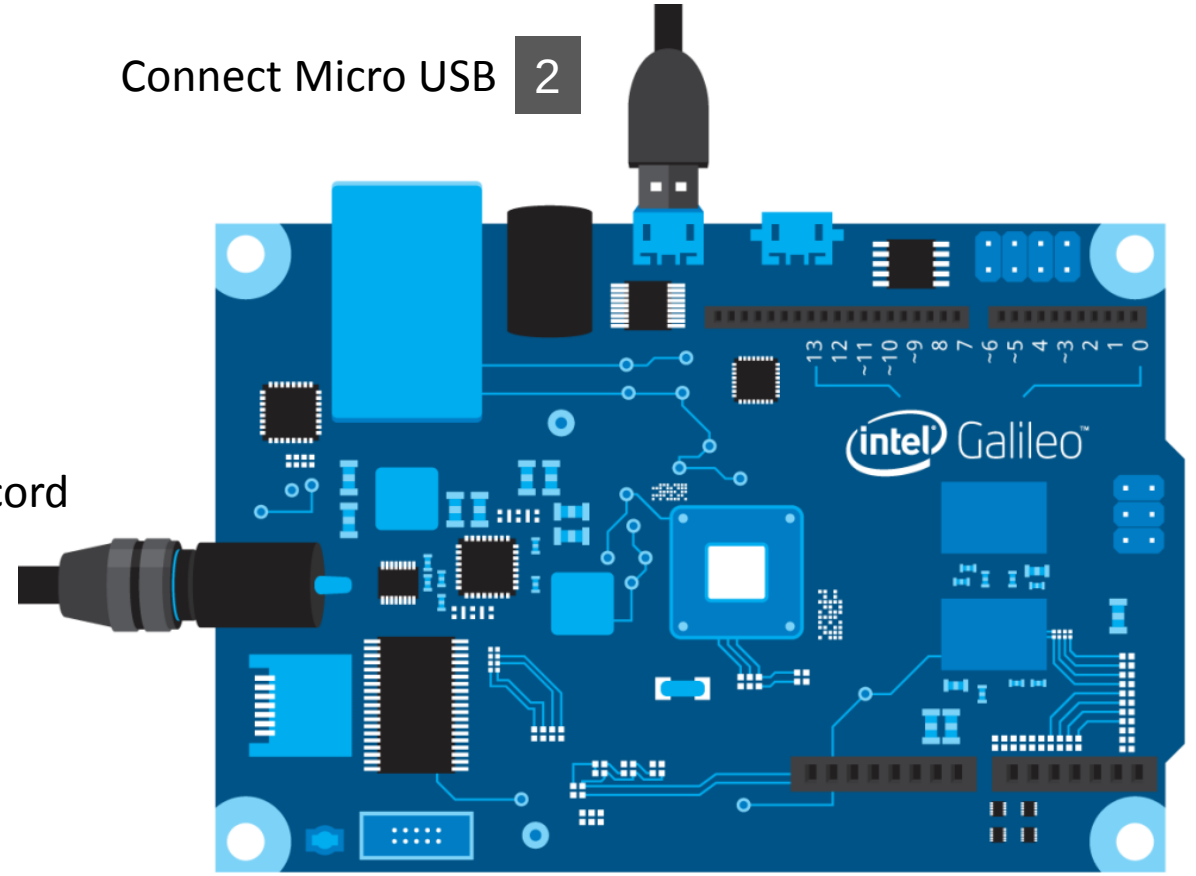
Quick Start

How to power on Intel Galileo board and verify connectivity

Connect Galileo

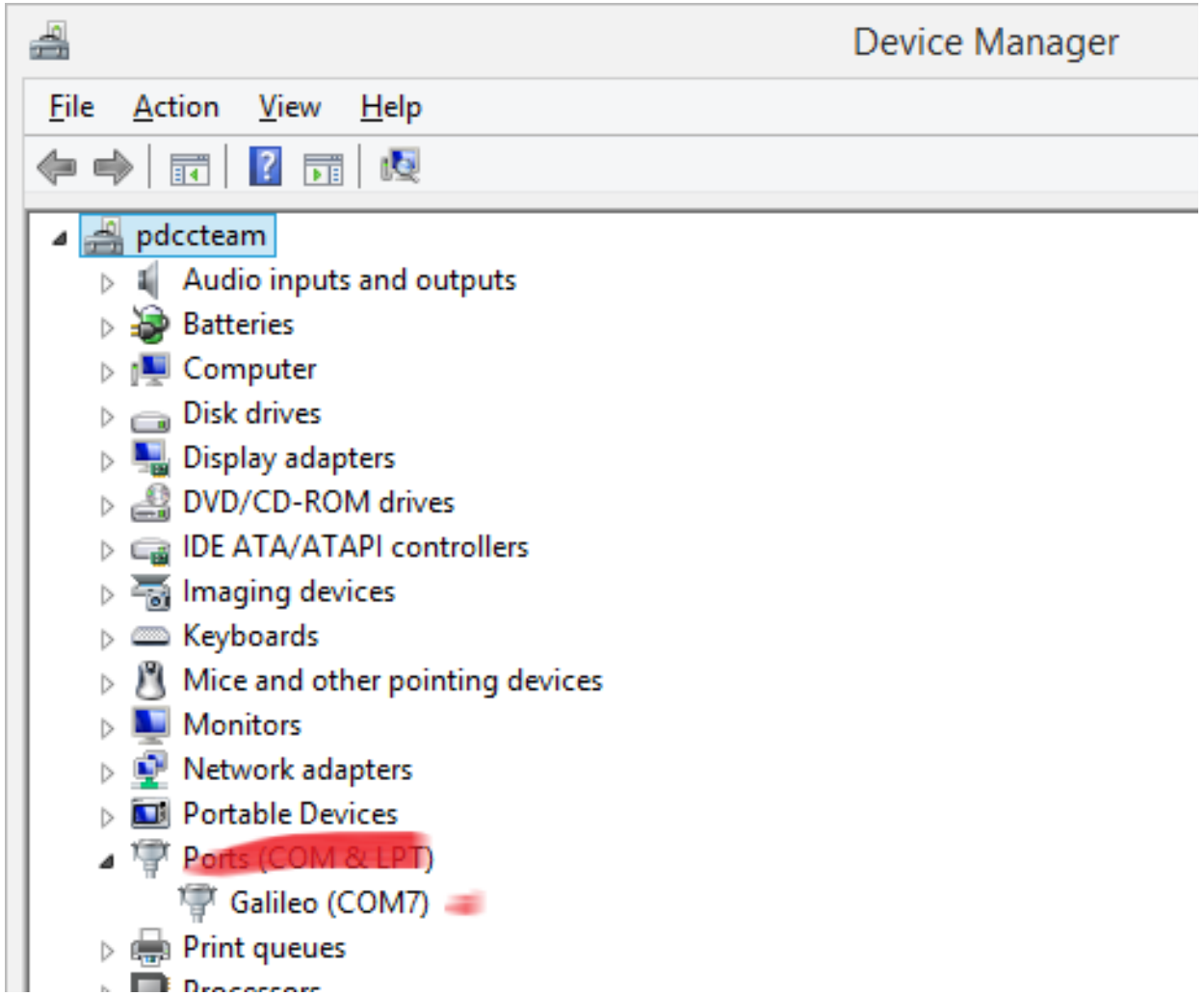
Connect Micro USB 2

Attach power cord to Galileo 1

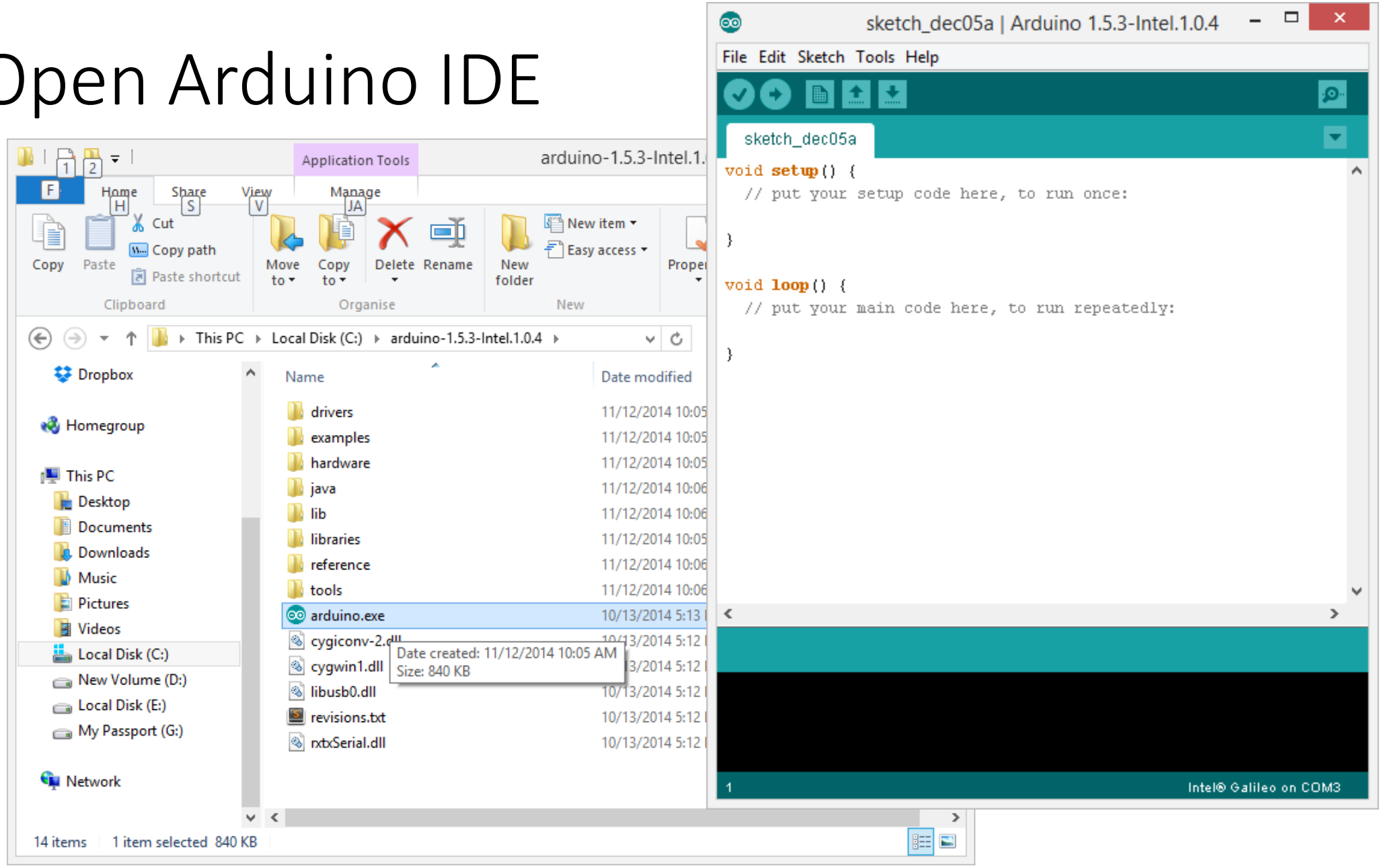


Check Device Manager

- Make sure Galileo port is presented

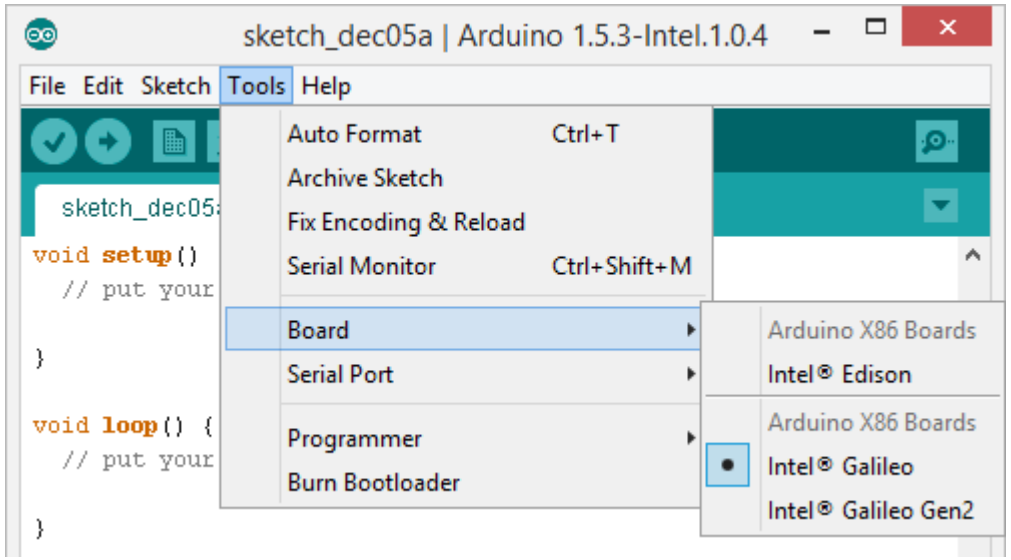


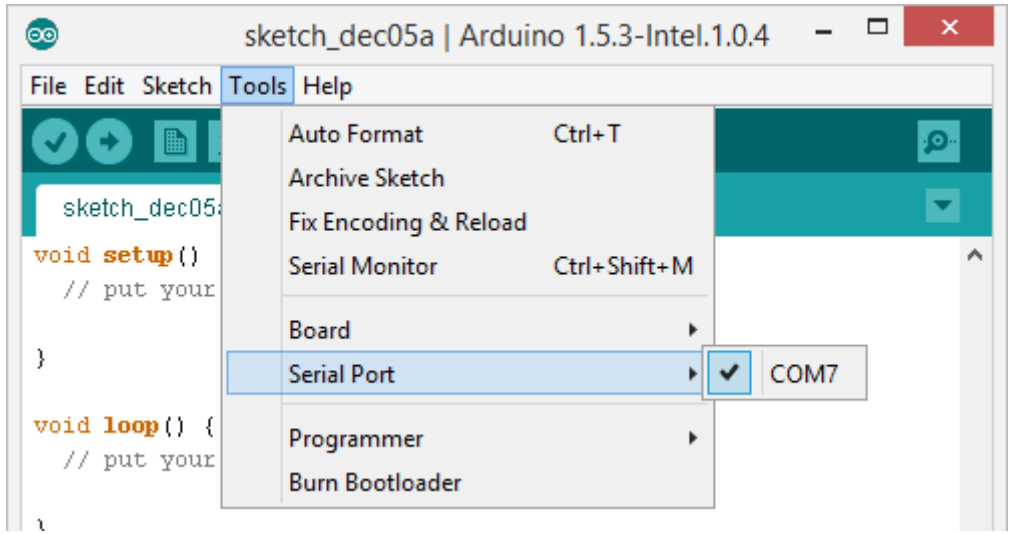
Open Arduino IDE



Verify

Choose correct Galileo board

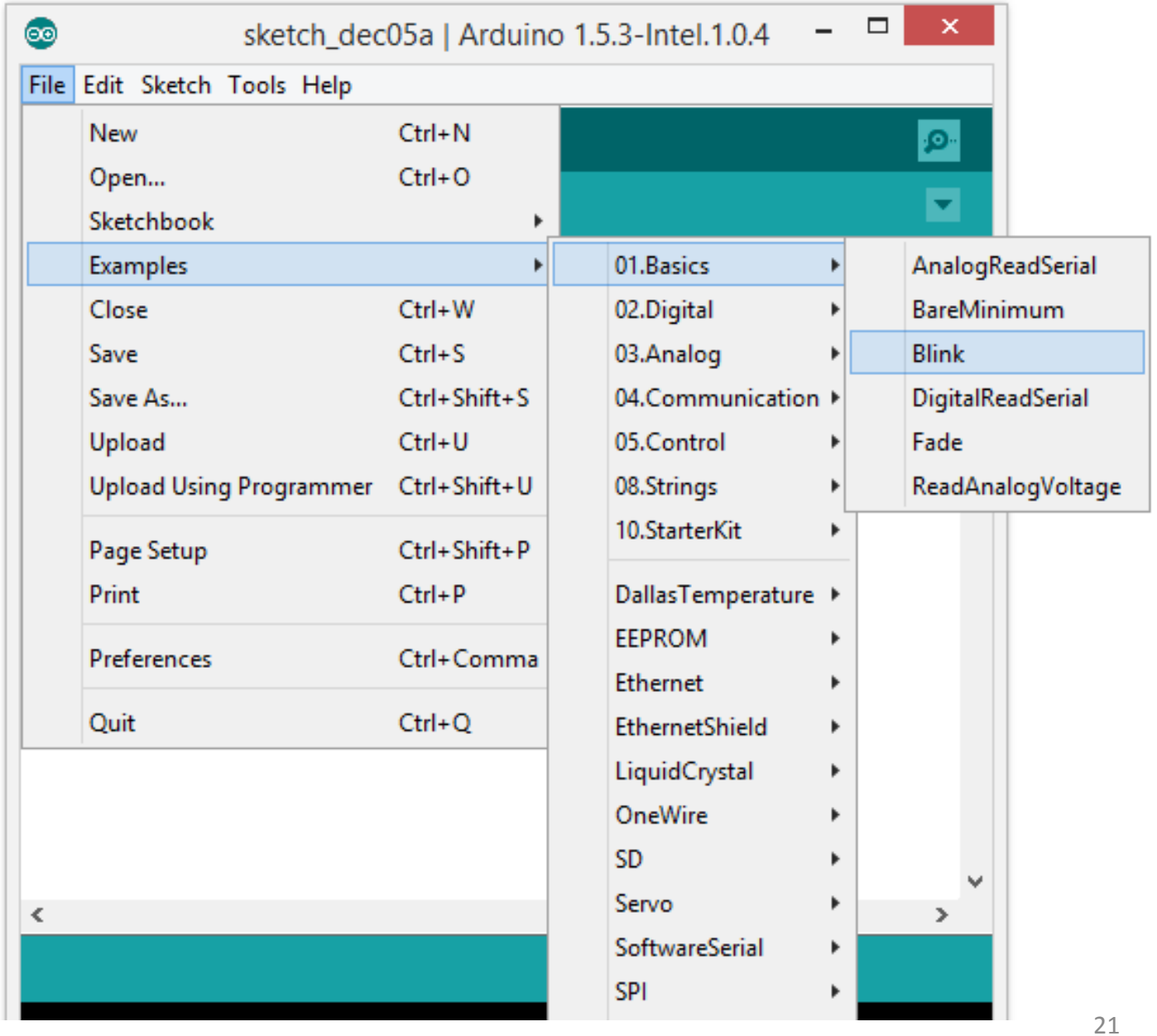




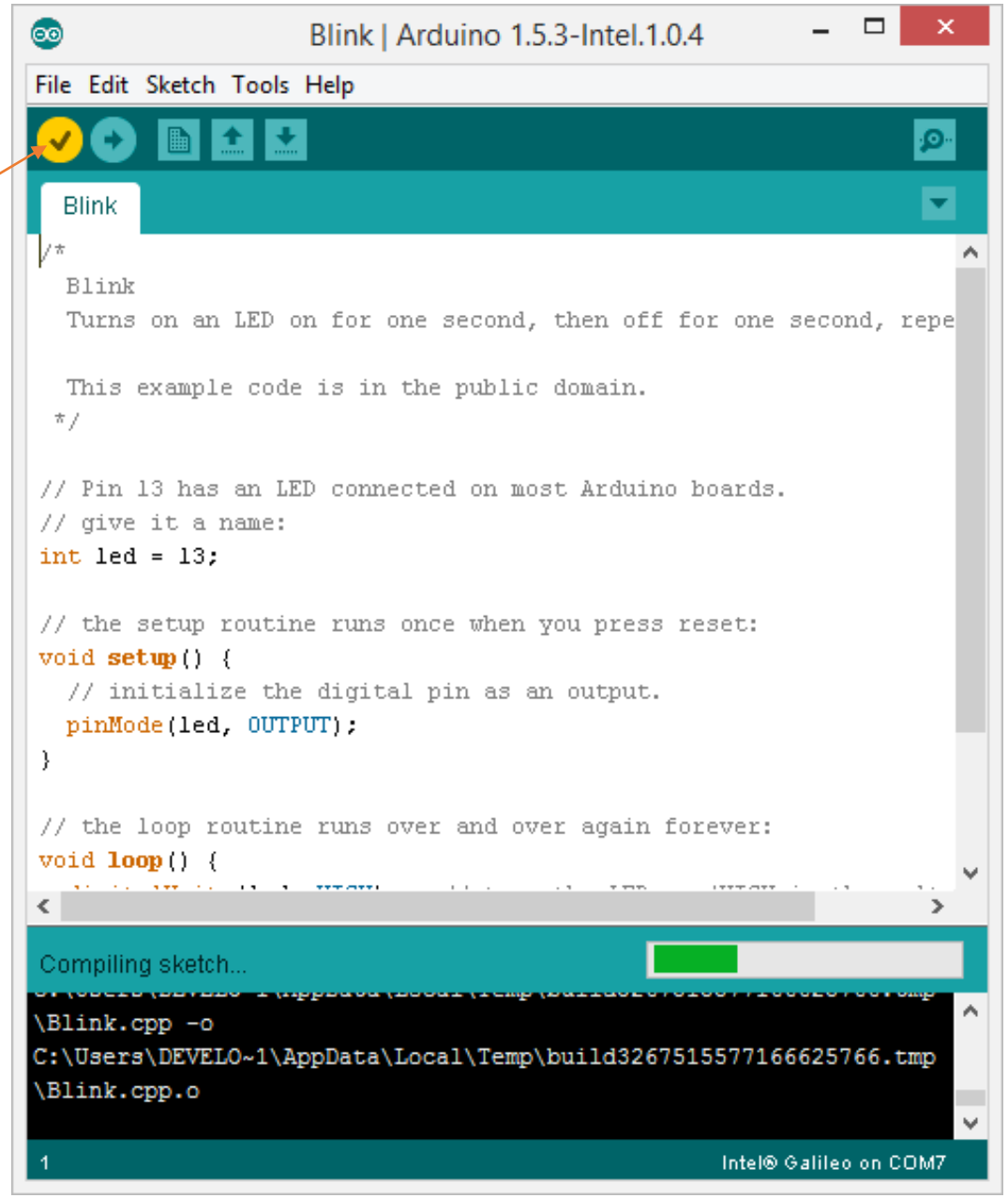
Make sure port number same with the one presented in Device Manager

Open
Blink Example

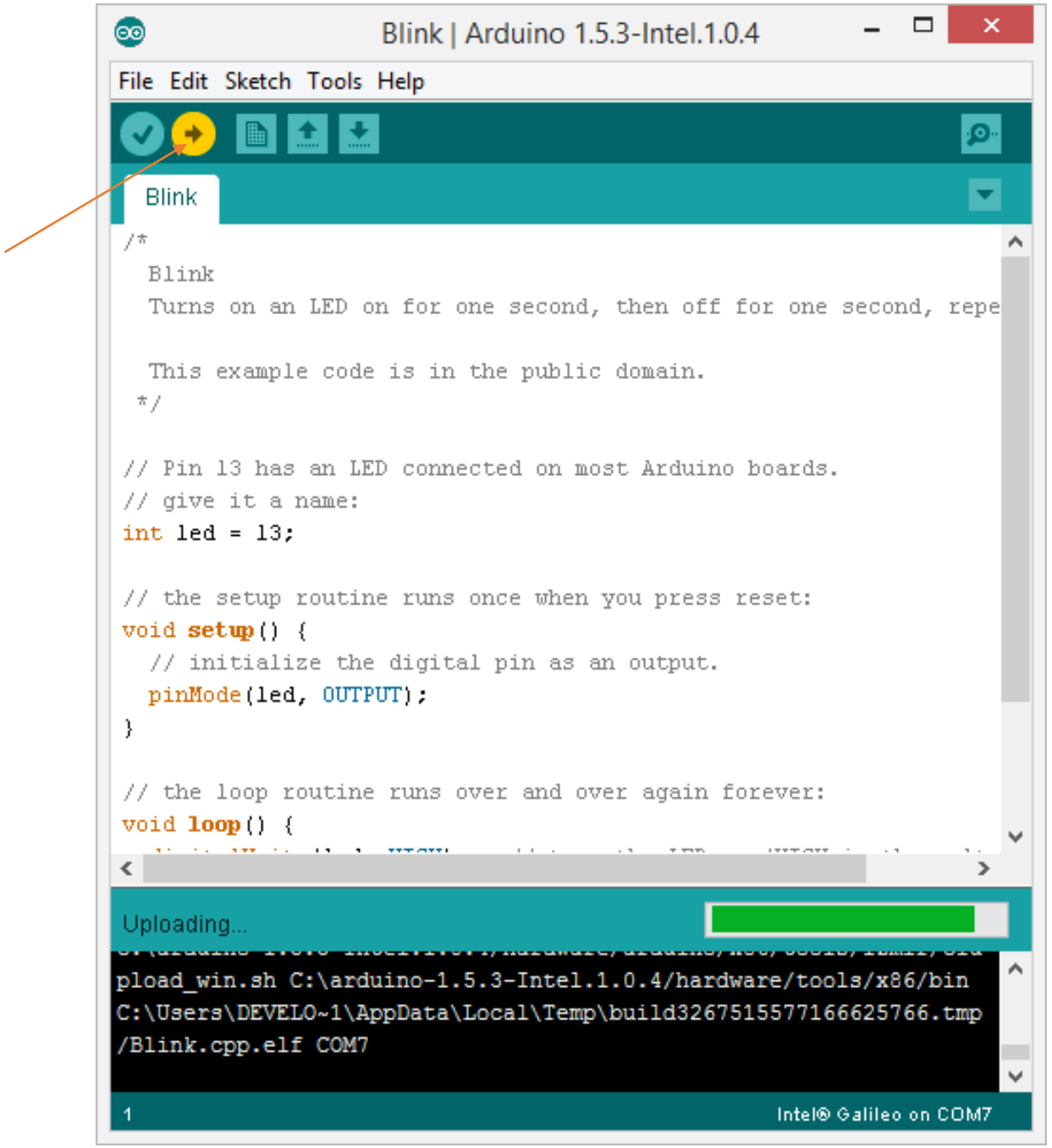
File > Examples > 01.Basic > Blink



Compile


Blink | Arduino 1.5.3-Intel.1.0.4
File Edit Sketch Tools Help
Blink
/*
Blink
Turns on an LED on for one second, then off for one second, repe
This example code is in the public domain.
*/
// Pin 13 has an LED connected on most Arduino boards.
// give it a name:
int led = 13;
// the setup routine runs once when you press reset:
void setup() {
// initialize the digital pin as an output.
pinMode(led, OUTPUT);
}
// the loop routine runs over and over again forever:
void loop() {
Compiling sketch...
\Blink.cpp -o
C:\Users\DEVELO~1\AppData\Local\Temp\build3267515577166625766.tmp
\Blink.cpp.o
1
Intel® Galileo on COM7

Upload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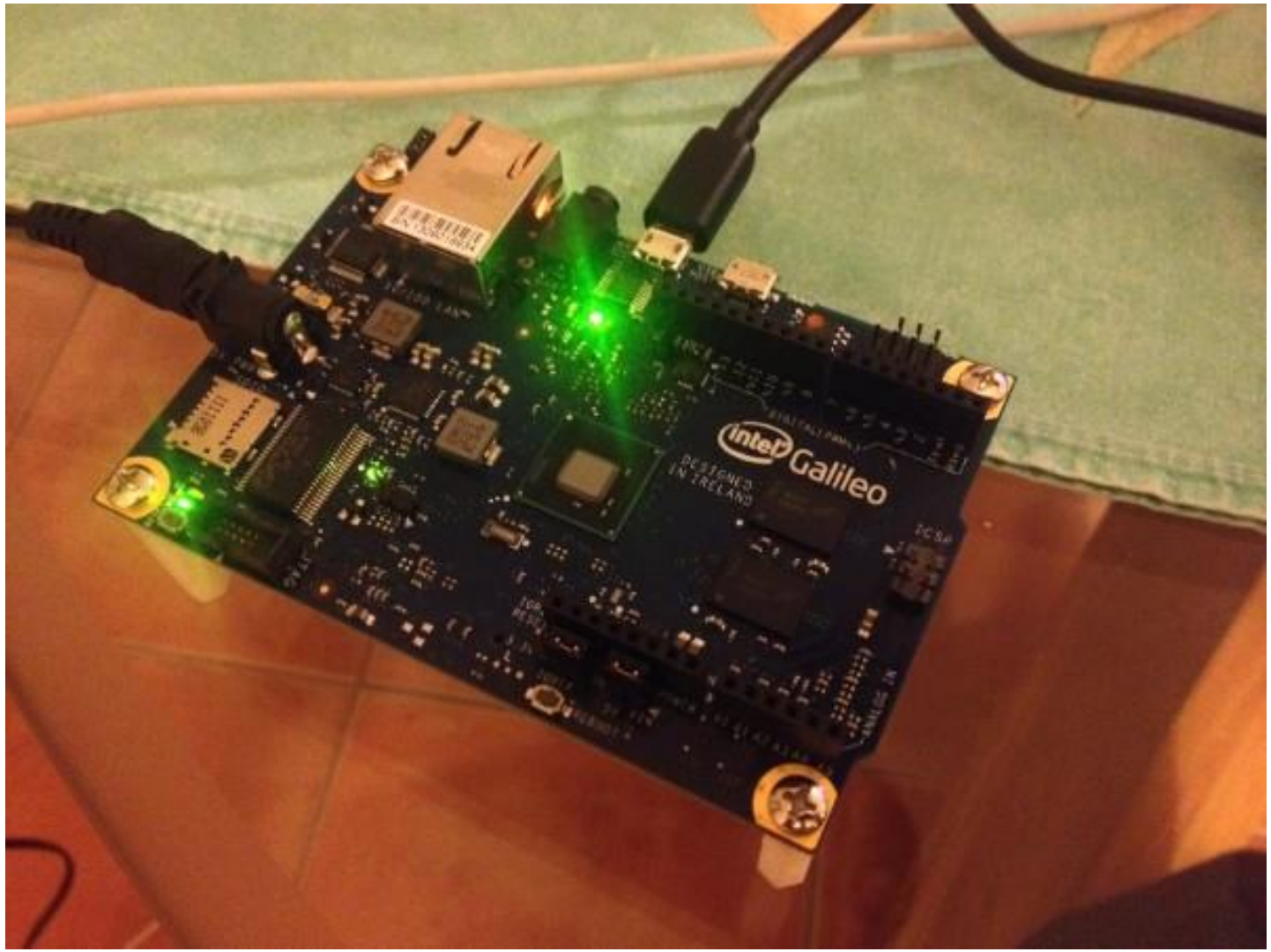
Uploading...
pload_win.sh C:\arduino-1.5.3-Intel.1.0.4/hardware/tools/x86/bin
C:\Users\DEVELO~1\AppData\Local\Temp\build3267515577166625766.tmp
/Blink.cpp.elf COM7
1
Intel® Galileo on COM7

Observe

- LED blinks



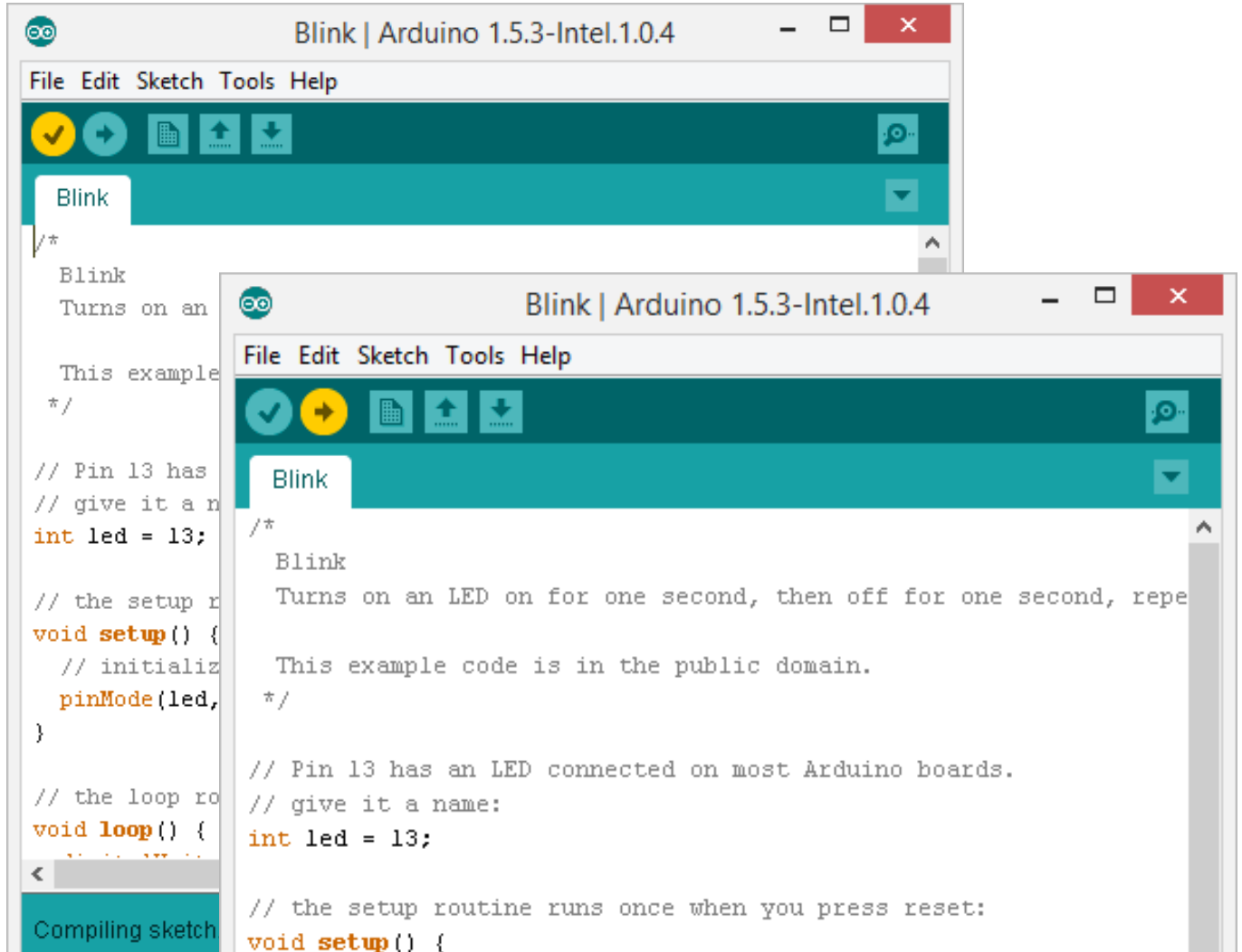
Serial Monitor

Print or display output of println, how to read Serial Monitor

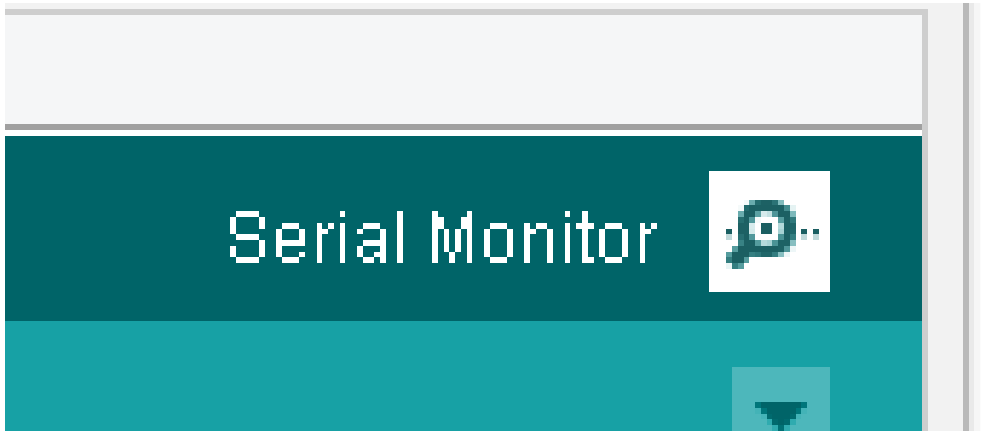
Add these Serial lines on the Sketch

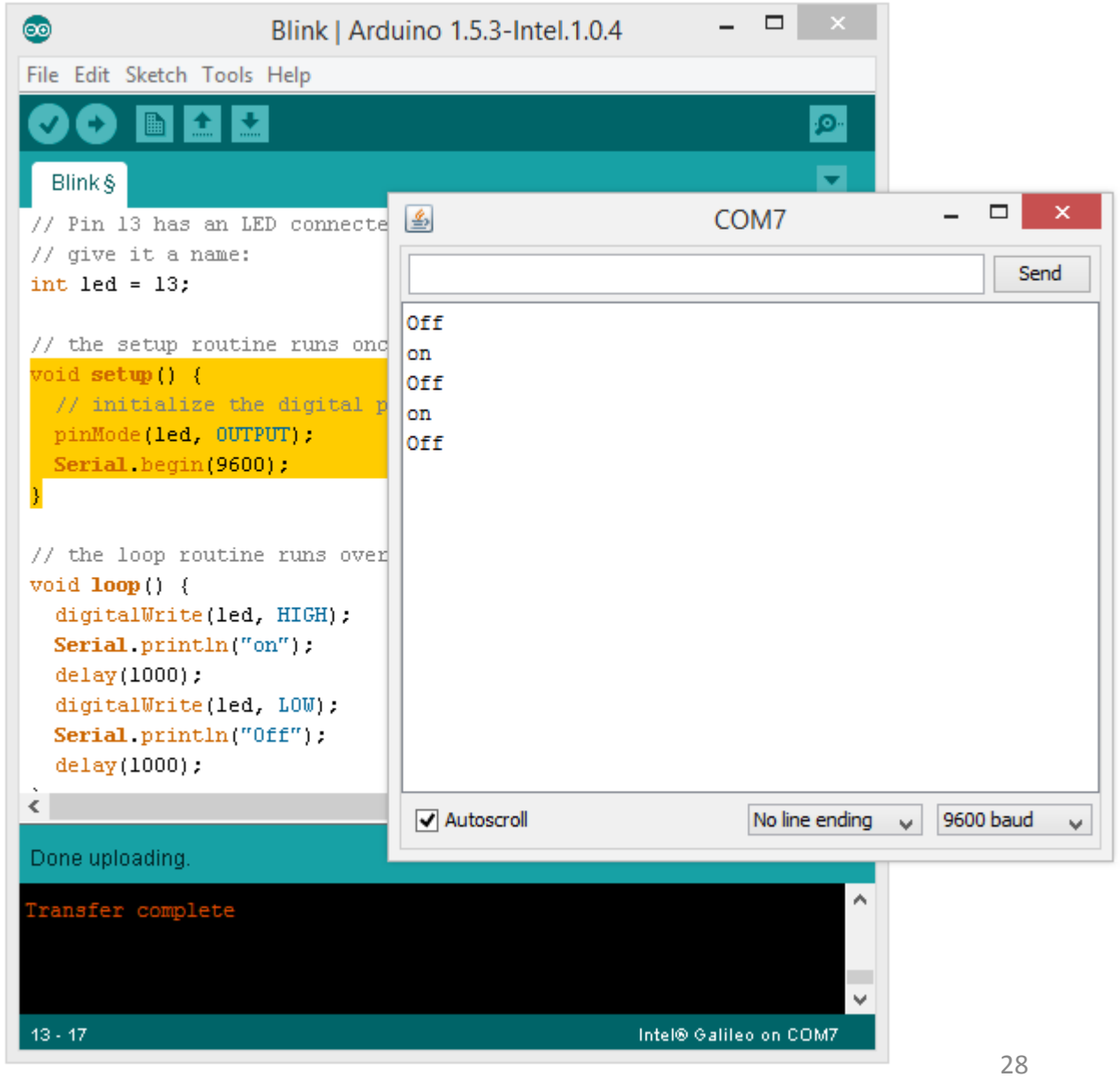
```
void setup() {
  // initialize the digital pin as an output.
  pinMode(led, OUTPUT);
  Serial.begin(9600);
}

void loop() {
  digitalWrite(led, HIGH);   // turn the LED on (HIGH is the voltage level)
  Serial.println("On");
  delay(1000);               // wait for a second
  digitalWrite(led, LOW);    // turn the LED off by making the voltage LOW
  Serial.println("Off");
  delay(1000);               // wait for a second
}
```

Compile & Upload



Open Serial Monitor

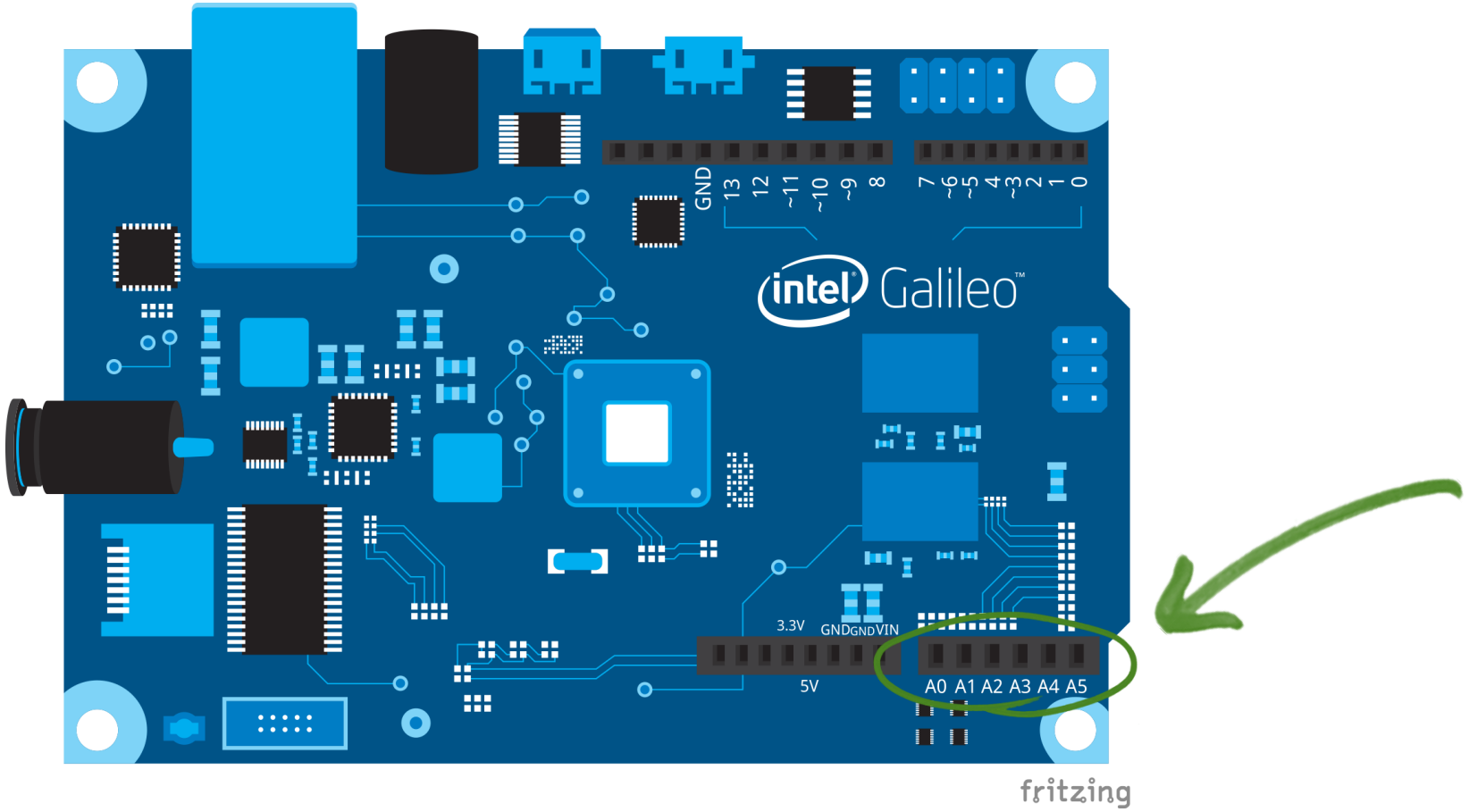




Sensor

Introduction to Input/Output, analog pins and Analog Temperature Sensor(lm35)

Analog Pins


GND 13 12 ~11 ~10 ~9 8 7 ~6 ~5 4 ~3 2 1 0
intel Galileo
3.3V GND GND VIN
5V
A0 A1 A2 A3 A4 A5
fritzing

Analog Pins API

analogRead()

Description: read Read the value from specified analog pin

Syntax:

analogRead(pin);

Parameter:

pin: the pin of analog input (0 to 5)

Returns:

int (0 to 1023)

Scale:

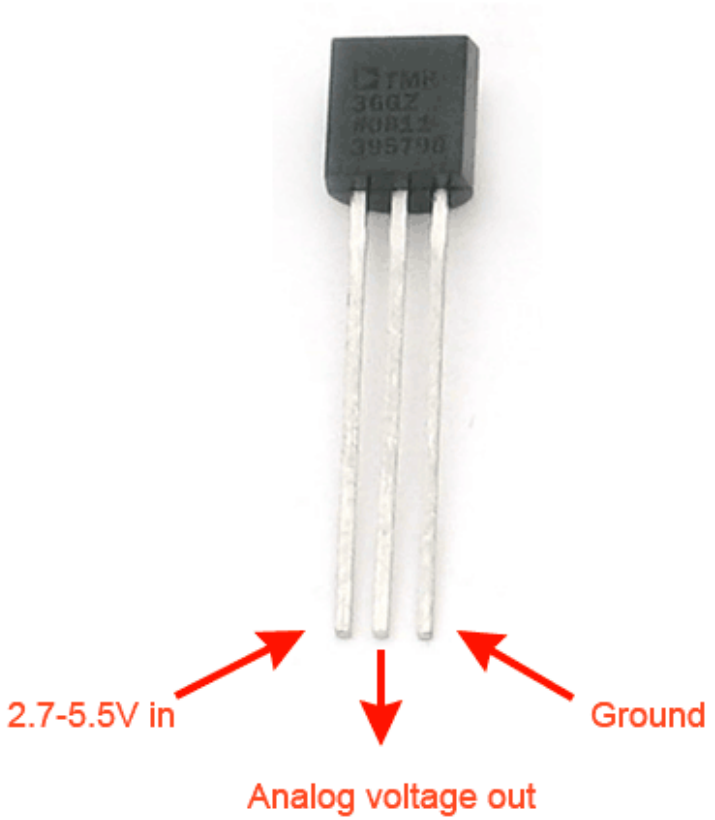
0 to 1023 = 0V to 5V

Analog Pins API (cont.)

analogWrite() (PWM)

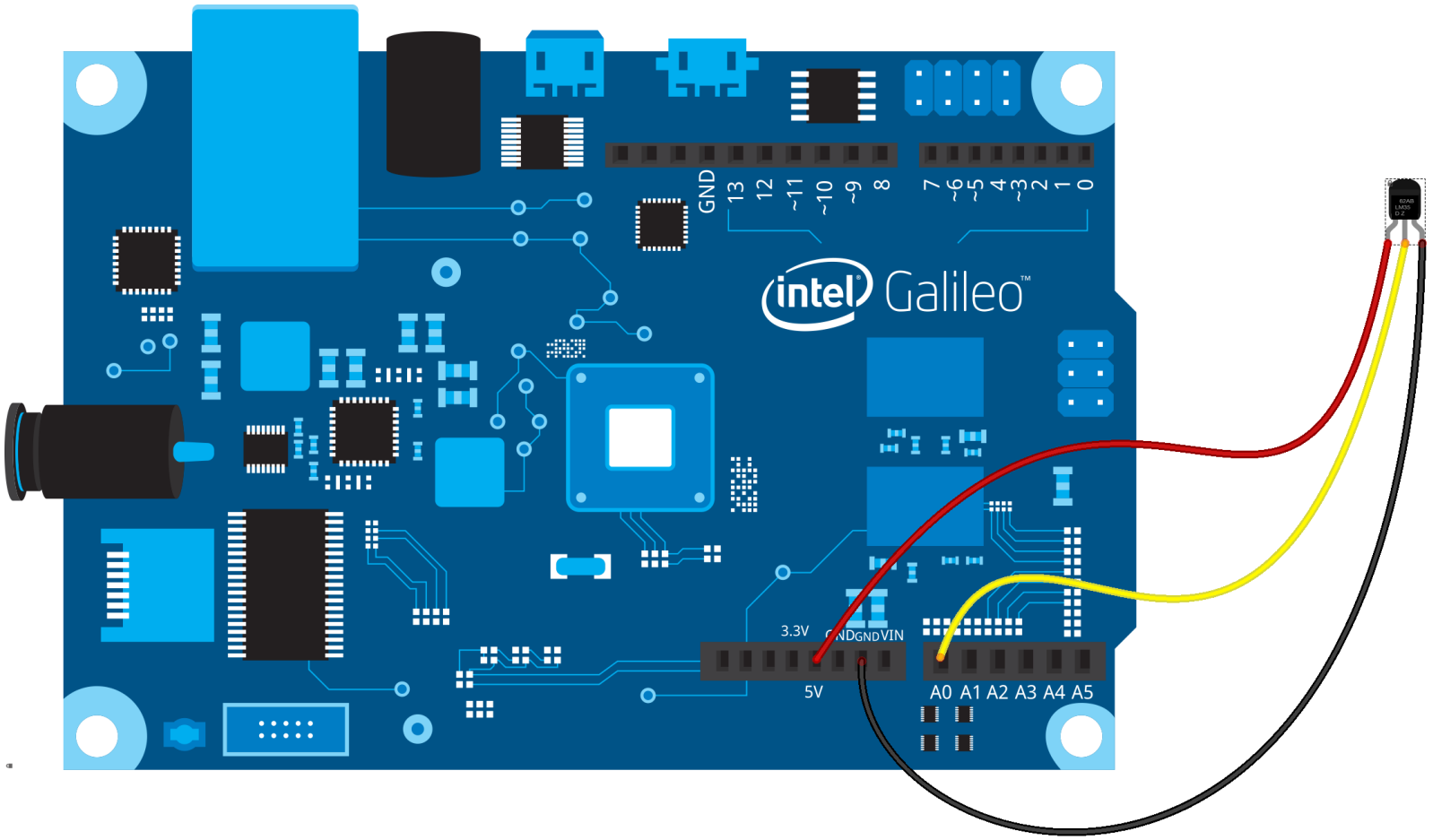
Description: Write the value to specified analog input
Syntax:
analogWrite(pin, value);
Parameter:
pin: the pin to write to
value: int (0 to 255)

Analog Temperature Sensor



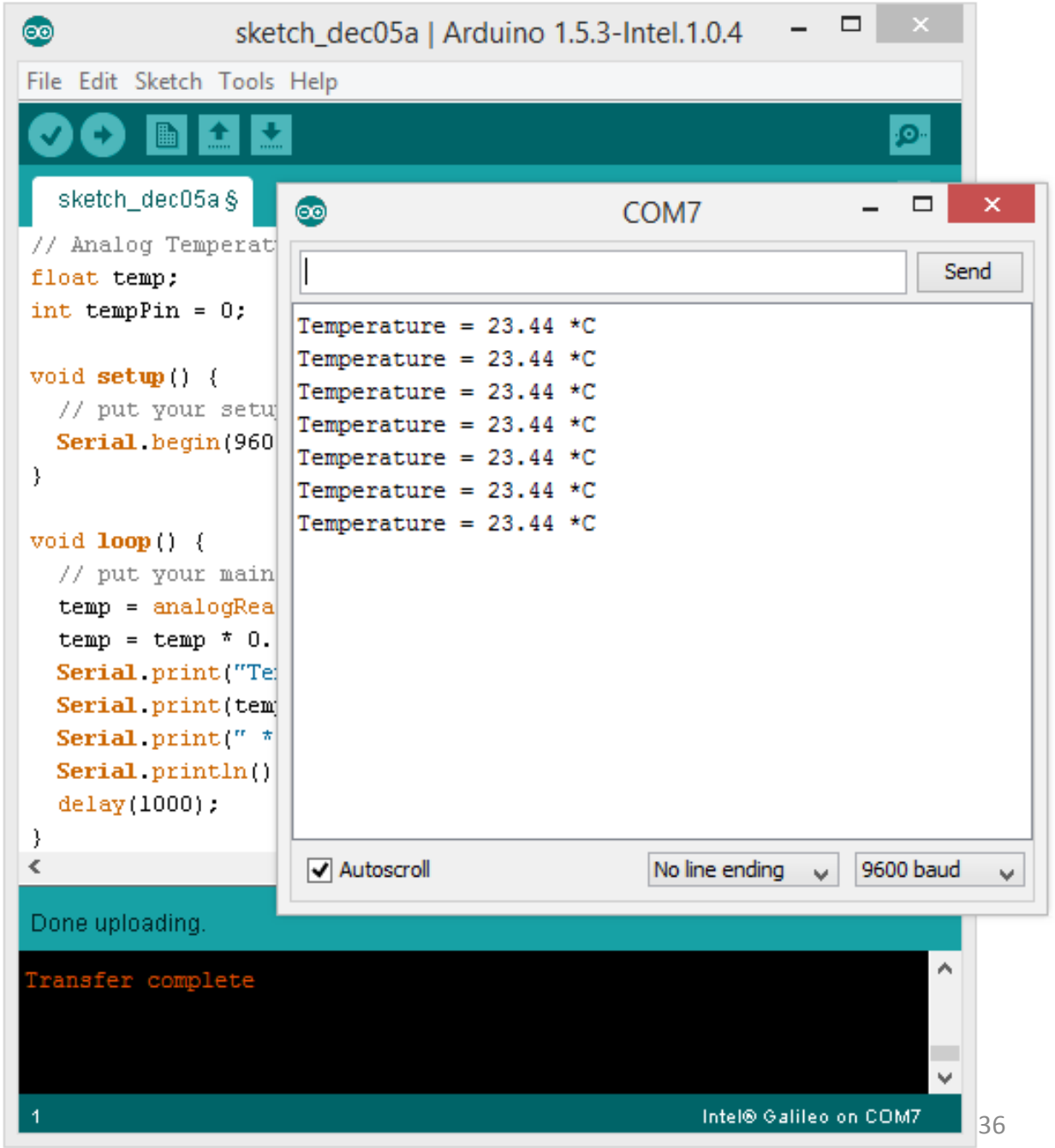
Temperature Sensor Sketch

Galileo with lm35(analog temperature sensor)



Observe

- Open Serial Monitor and observe the temperature value

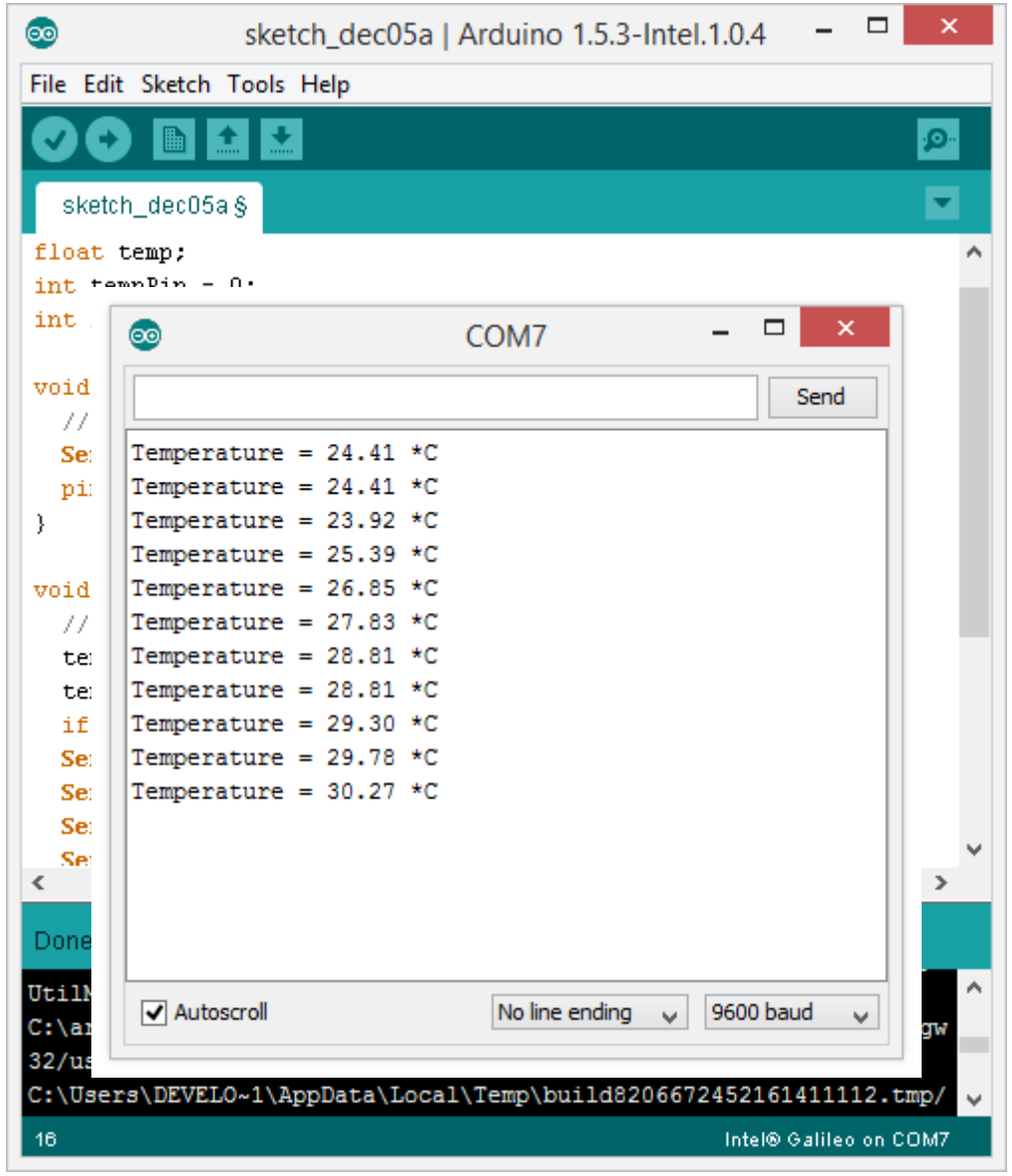


Assignment

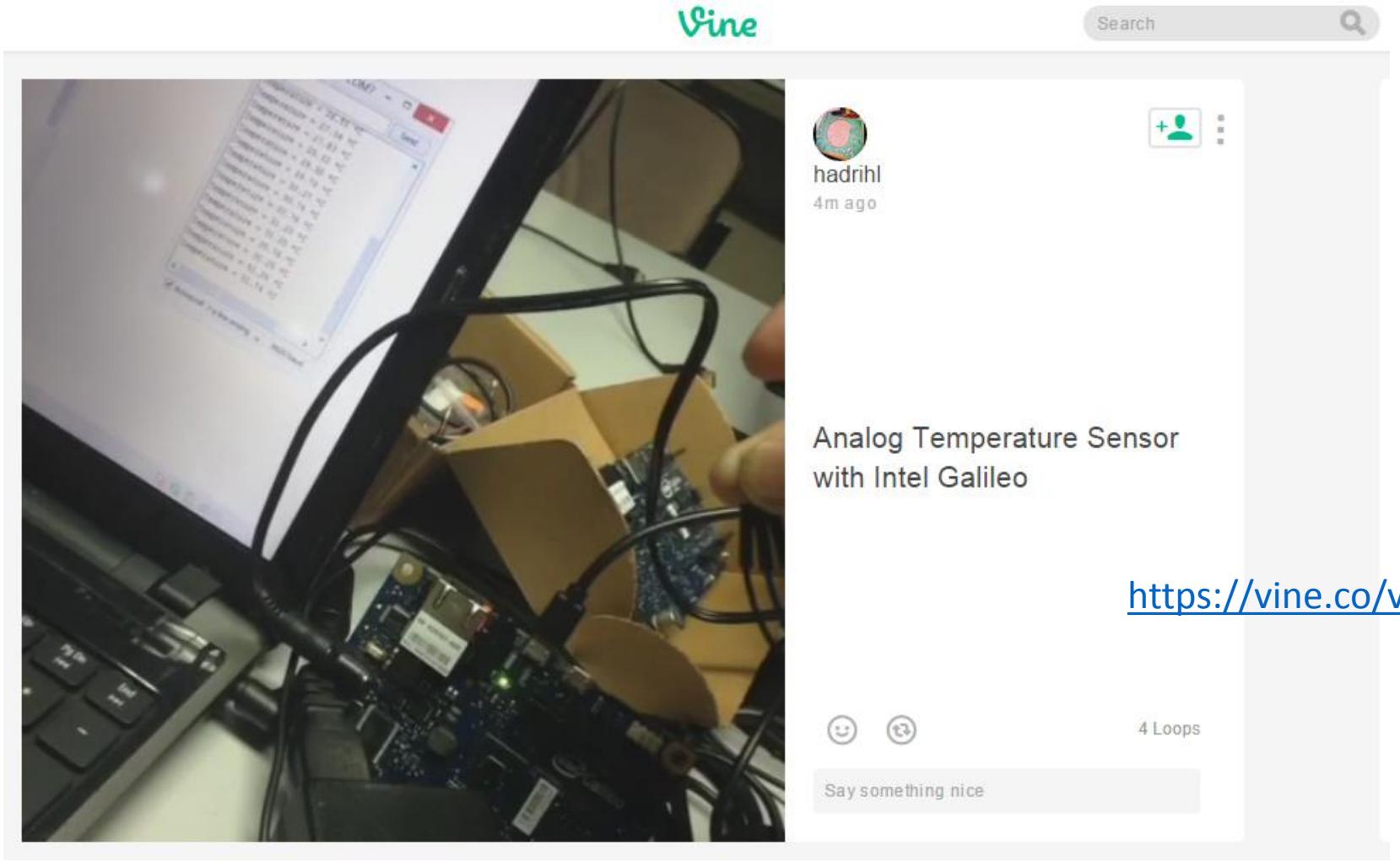
- Use analog temperature sensor with Intel Galileo board. Blink built-in led (pin13) with normal temperature (with delay 1 second). If the temperature goes above 30*C blink it a little bit faster (with delay 500ms).

Assignment(cont.)

- Example output from Serial Monitor

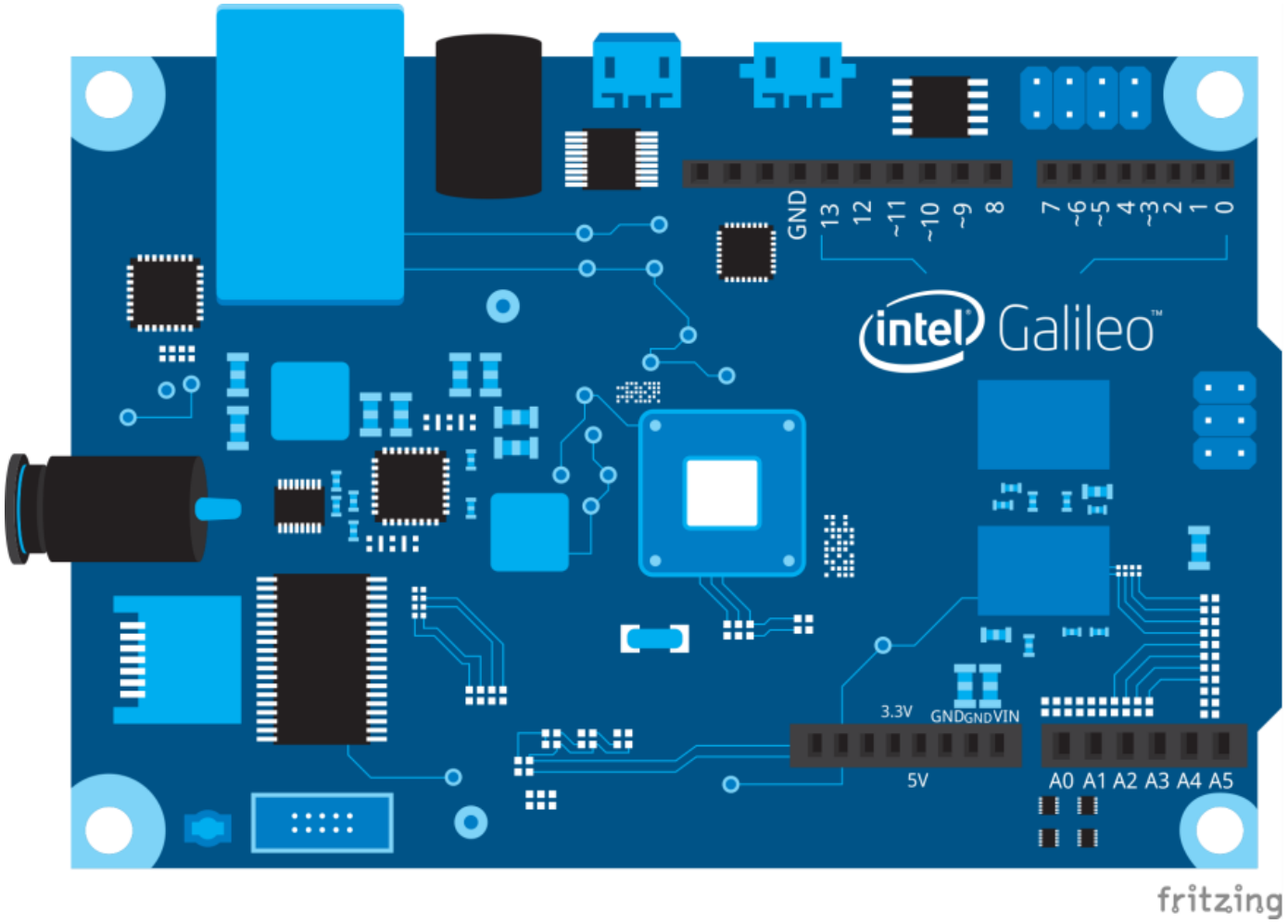


Assignment – Video



https://vine.co/v/Ov2LAqBPjDT

-end-


GND
13
12
~11
~10
~9
8
7
~6
~5
4
~3
2
1
0
intel Galileo
3.3V
GNDGNDVIN
5V
A0 A1 A2 A3 A4 A5
fritzing