INTRODUCTION TO AND INSTALLATION OF THE **ARDUINO UNO**

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Created: June 2011

Last Update: 22 August 2013

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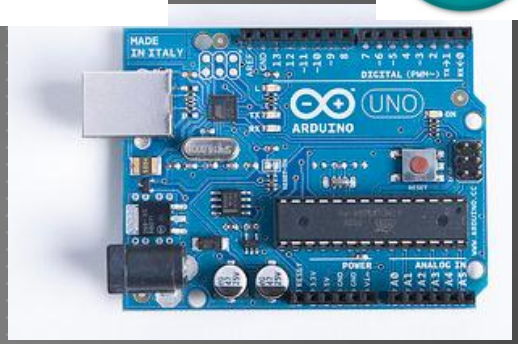
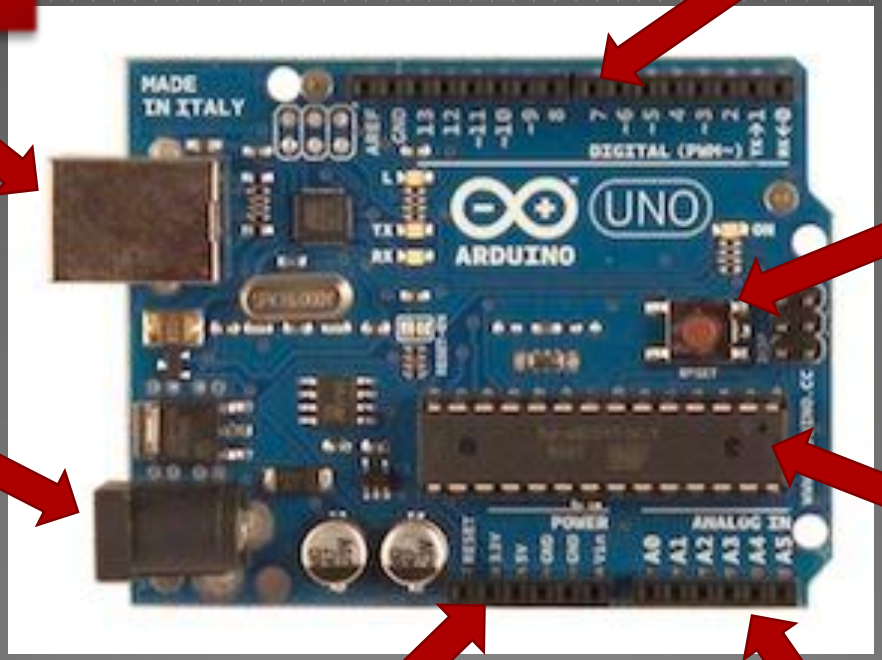
ARDUINO UNO OVERVIEW

- Open-source single-board electronics prototyping and design platform

- Atmel ATmega328p microcontroller
  - 32 KB Flash Memory
  - 2 KB SRAM
  - 1 KB EEPROM
  - 16 MHz CPU clock
  - 14 Digital I/O Pins
  - 6 Analog Input Pins



ARDUINO UNO LAYOUT



USB Connector

Digital I/O Pins

Reset

DC Power

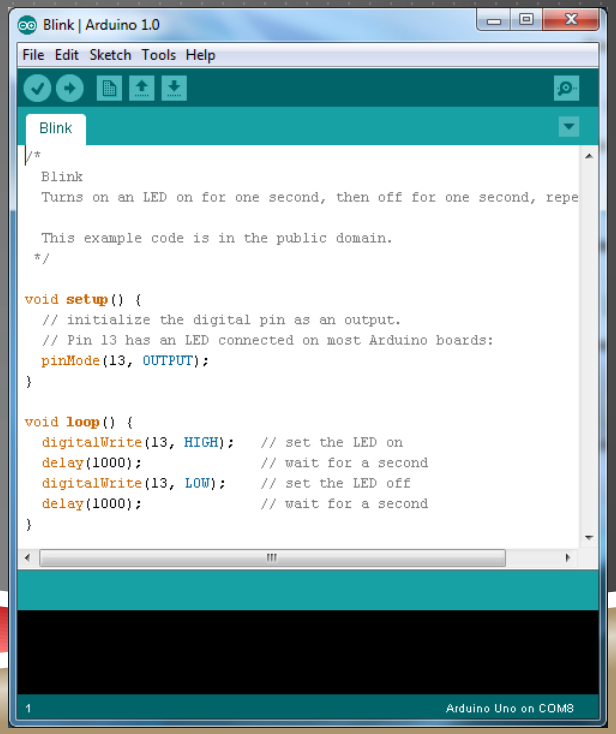
ATmega328p

Power/GND Connections

Analog Input Pins

PROGRAMMING – *OPTION 1*

- Arduino IDE
  - Compiles programs and uploads to UNO board
- "Wiring" language – a C/C++ hybrid
- Programs are called "sketches"



PROGRAMMING – ***OPTION 2***

- WinAVR + Eclipse IDE
- Can program in C or C++
- Can upload programs to microcontroller board
- Allows full control of microcontroller subsystems

INSTALLATION OVERVIEW

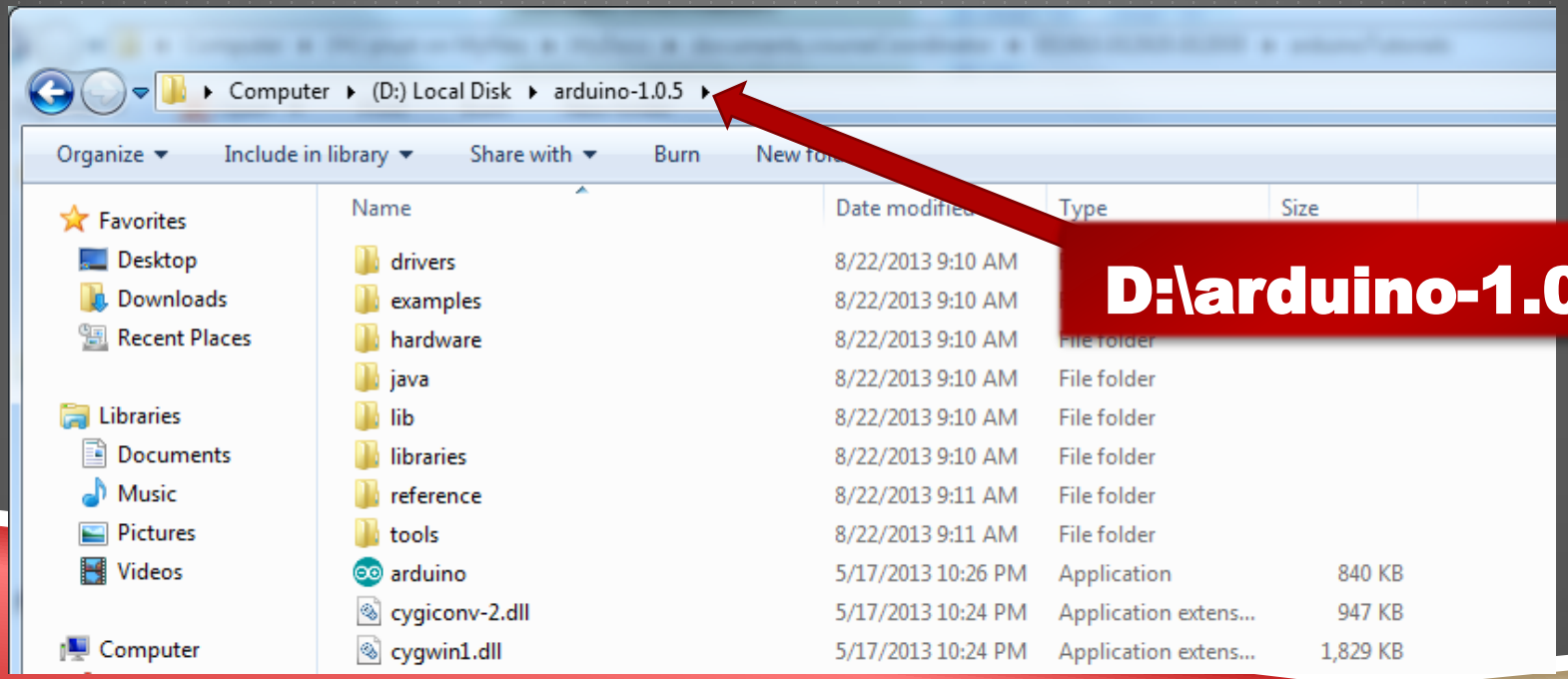
- **Step 1**: Installing the Arduino IDE
- **Step 2**: Connecting the Arduino to your PC
- **Step 3**: Driver installation
- **Step 4**: Testing the UNO

INSTALLING THE ARDUINO IDE

- Download the latest release of the Arduino IDE from

  https://faculty-web.msoe.edu/prust/arduino

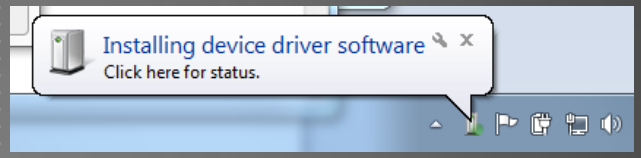
- Extract the .zip file to your D:\ drive. After extraction, your directory structure should appear as follows:



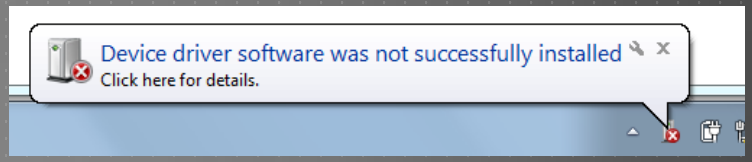
CONNECTING THE ARDUINO

- Using an A-to-B type USB cable, connect the Arduino to your computer.
  - The green power LED (labeled "ON") should turn on

- Windows will attempt the driver installation process, but will most likely be ***unsuccessful***
  - This process may take several minutes



- We will manually install the driver



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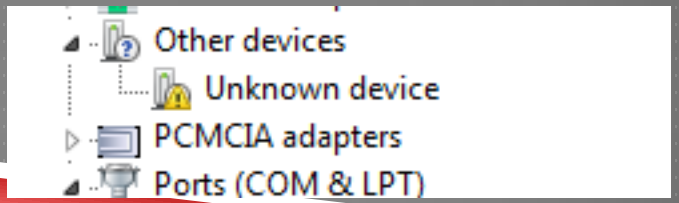
DRIVER INSTALLATION

- In Windows, click on the **Start Menu** and open the **Control Panel**

- Choose **System and Security** and then, under **System**, open the **Device Manager**

- You should see an "Unknown device" (or possibly "Arduino UNO"). Right-click on it and choose the "Update Driver Software" option



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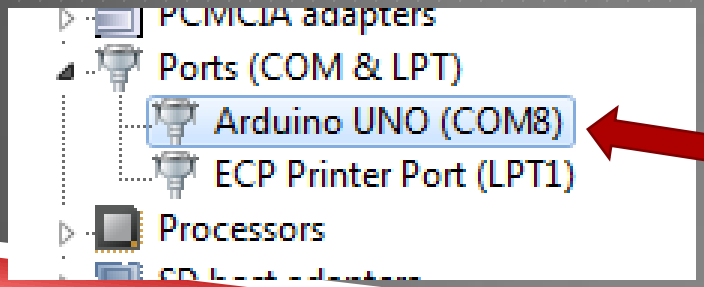
DRIVER INSTALLATION

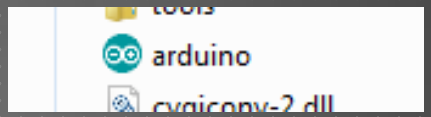
- Choose the "Browse my computer for driver software" option
- Navigate to "D:\arduino-1.0.5\drivers" and select "Next".
- The installation should proceed successfully.



IMPORTANT:
Note the "COM" port
("COM8" in this example – yours may differ)

TESTING THE UNO

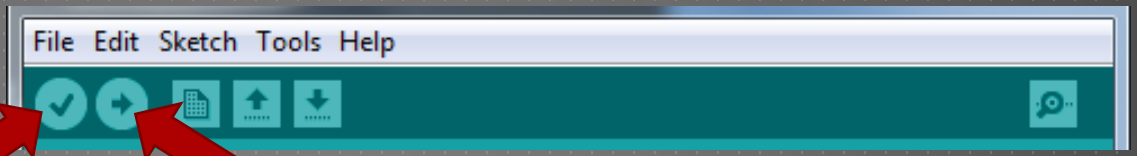
- Navigate to the ARDUINO directory (D:\arduino-1.0.5) and double-click the "arduino" program
  - For future use, you may want to create a shortcut on your desktop



- Select "File – Examples – 1.Basics – Blink"
- Select "Tools – Board – Arduino UNO"
- Select "Tools – Serial Port" and choose the correct COM port

TESTING THE UNO

- Compile the program by clicking the "Verify" button
  - When finished, you will see a "Done compiling" message
- Program the UNO by clicking the "Upload" button
  - When finished, you will see a "Done uploading" message



Verify
Checks for errors and compiles code

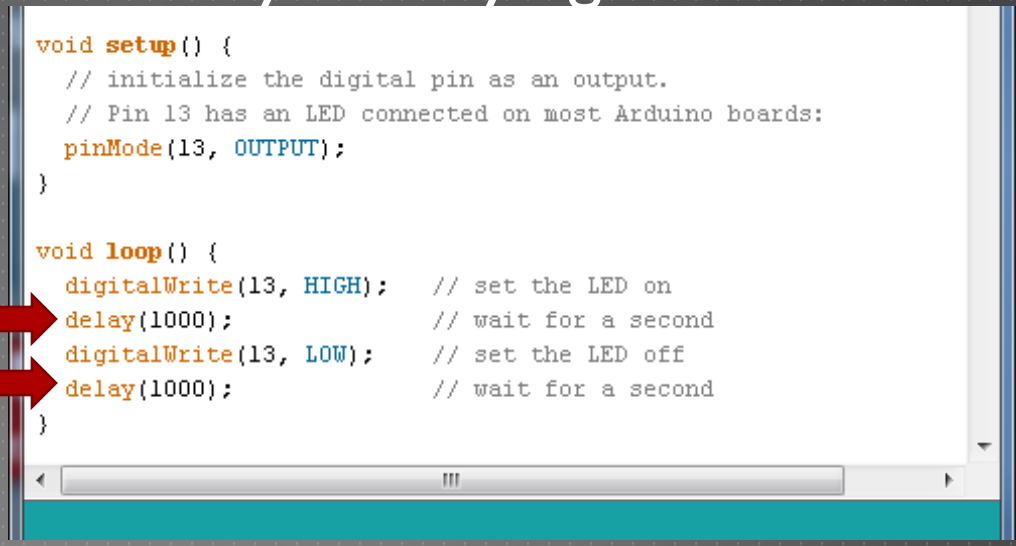
Upload
Programs the microcontroller board

- The **yellow** LED (marked "L") should be blinking!

TESTING THE UNO

- You can change the blink rate by modifying the software

Adjust the "delays"
(e.g., change "1000" to "100")



```
void setup() {
  // initialize the digital pin as an output.
  // Pin 13 has an LED connected on most Arduino boards:
  pinMode(13, OUTPUT);
}

void loop() {
  digitalWrite(13, HIGH);   // set the LED on
  delay(1000);              // wait for a second
  digitalWrite(13, LOW);    // set the LED off
  delay(1000);              // wait for a second
}
```

- After modifying the code, you must always "Verify" and "Upload" for the changes to take effect

CONGRATULATIONS!!!

- You now have a fully functioning Arduino UNO development system!
- Select "Help – Reference" to view the complete Arduino Language Reference
  - If you are curious how the "Blink" program works:
    - review the "pinMode()", "digitalWrite()", and "delay()" entries
    - review the "setup()" and "loop()" entries
- See the Arduino website for more information:

http://arduino.cc/en/