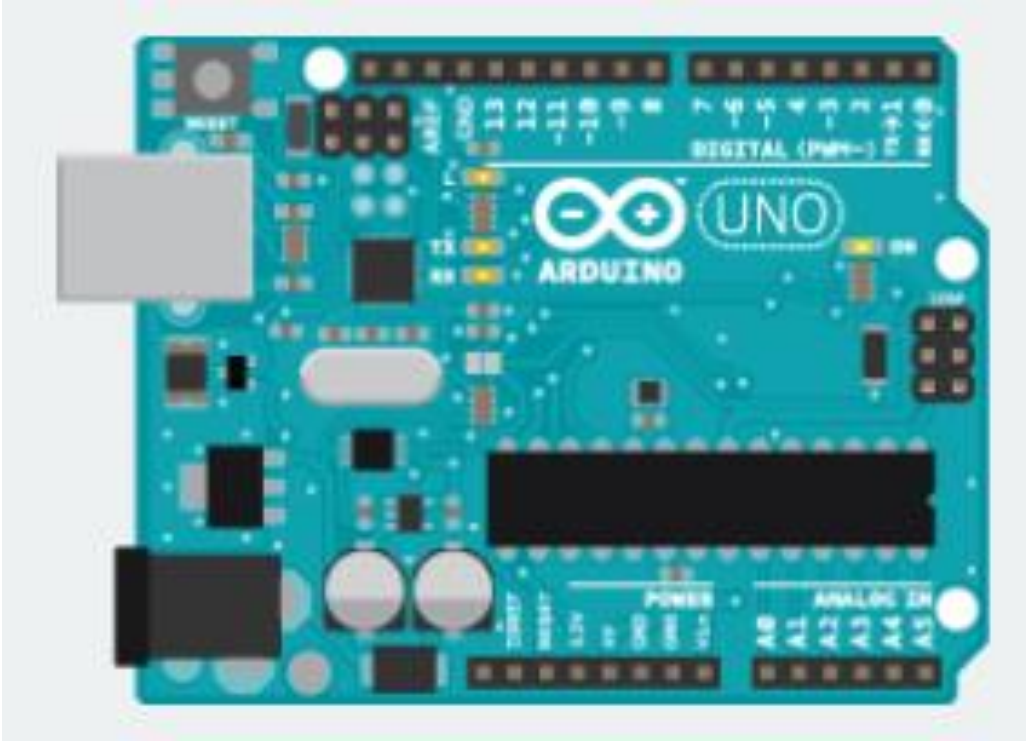
Balloon Satellite – Lesson 2

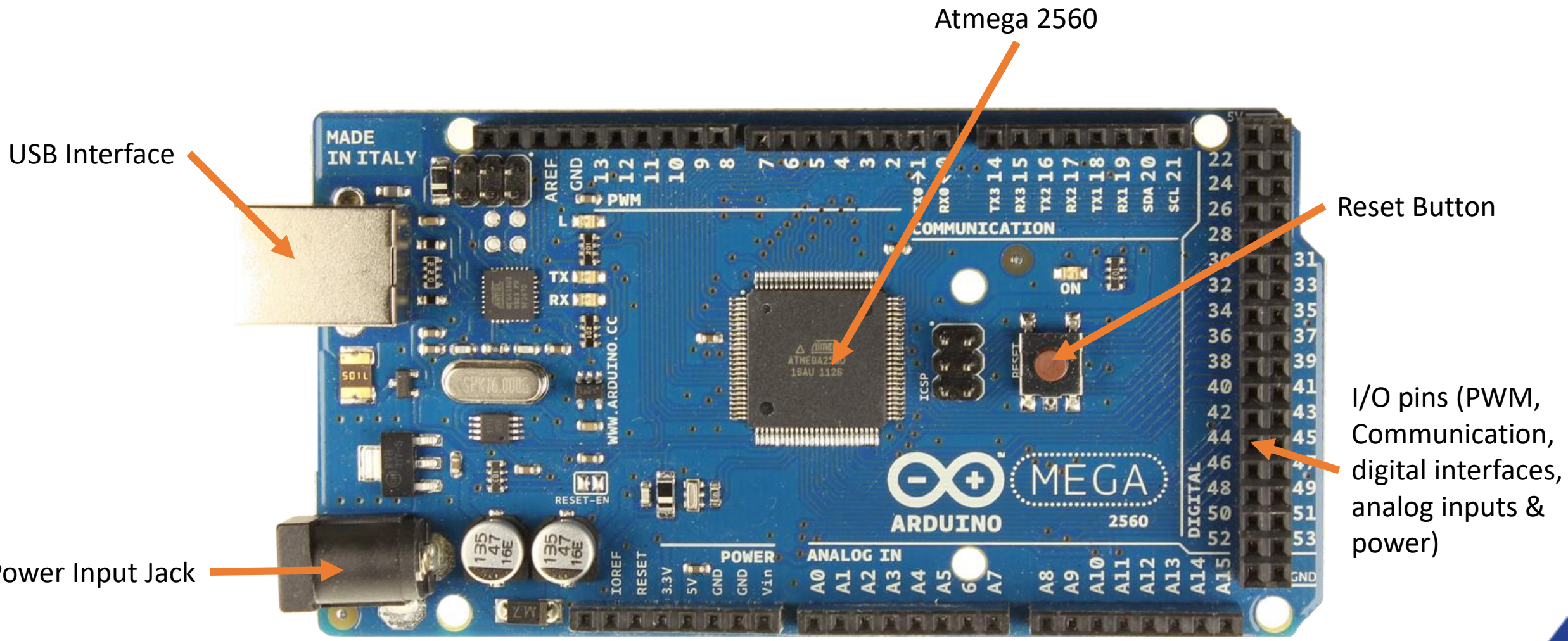
Refresher to Arduino

What is Arduino

- Arduino is an open-source electronics prototyping platform based on flexible, easy-to-use hardware and software. It's intended for artists, designers, hobbyists and anyone interested in creating interactive objects or environments
- http://www.arduino.cc



Arduino Mega 2560

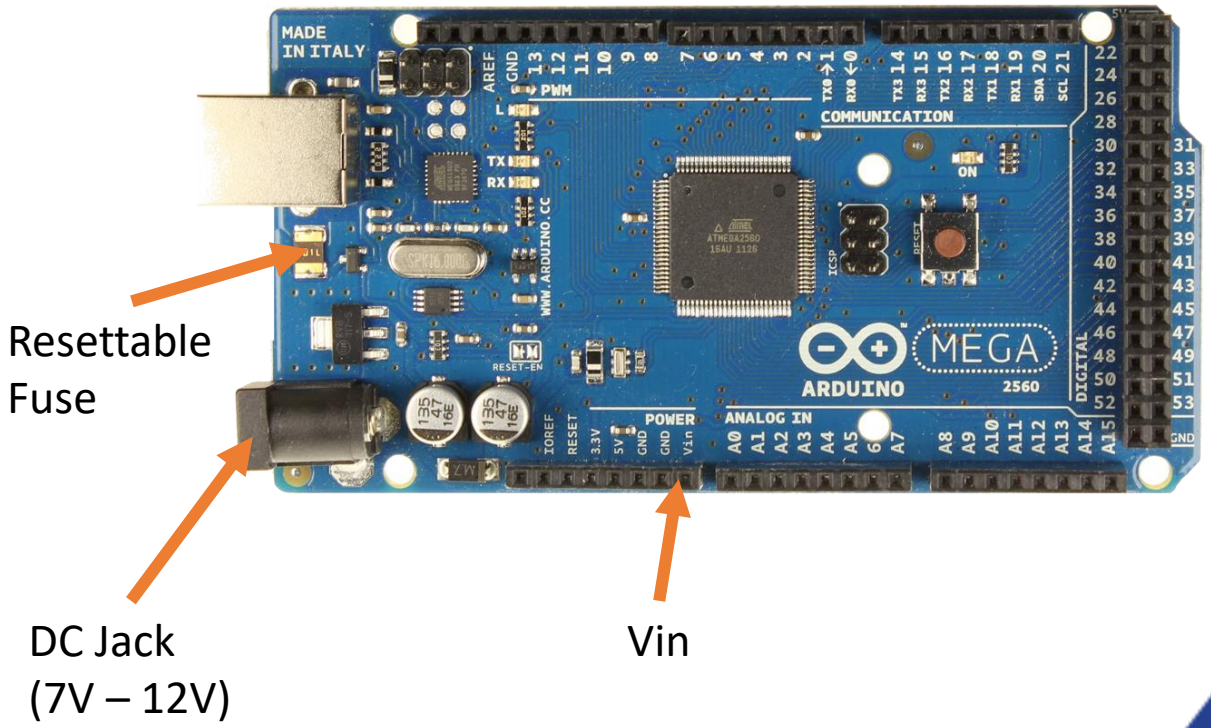


Technical Specifications – Arduino Mega 2560

Operating Voltage	5V (4.5V – 5.5V)
Input Voltage (DC Jack)	7V – 12V
Digital (I/O) pins	54 (including PWM & Communication)
PWM Output	15 Output Pins
Analog Input	16 Input Pins (10-bit ADC)
UART	4 Channels (8 I/O pins)
Two-wire Serial Communication (I2C)	1 Channel (2 I/O pins)
SPI Serial Communication	1 Channel (4 I/O pins)
DC Current per I/O pin	< 40mA
DC Output Current for 3.3V pin	< 50mA
DC Output Current for 5V pin	< 500mA

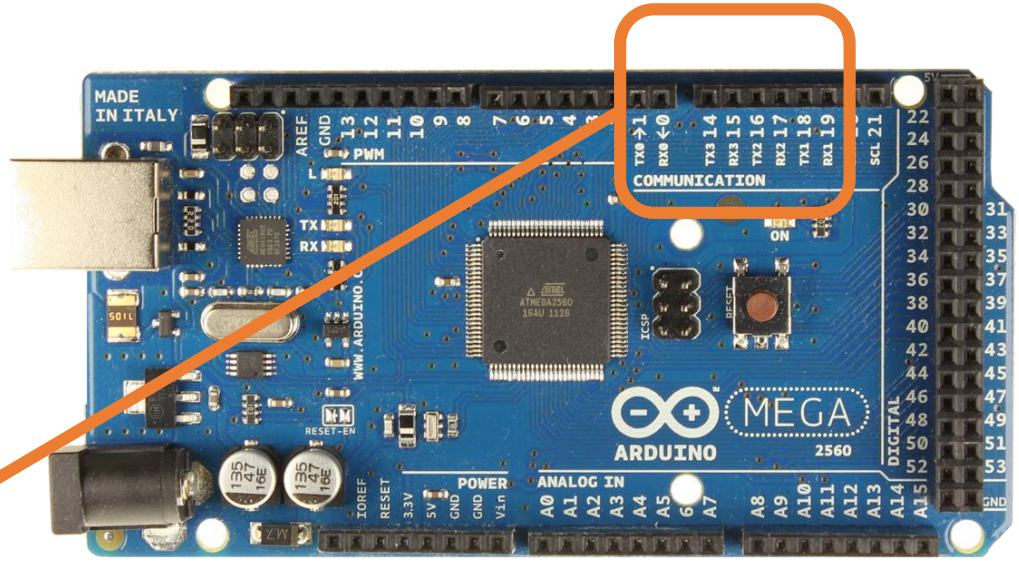
Power Supply

- 2 power supply options
  - USB
  - External Power Supply
- Resettable fuse on board for USB power to prevent Arduino board from damaging PC that is powering it. Fuse limit, 500mA.
- External power is fed to the board through DC Jack or Vin pin. Recommended input Vin range, 7V – 12V.
- 5V Supply (Max 500mA output)
- 3.3V Supply (Max 50mA output)



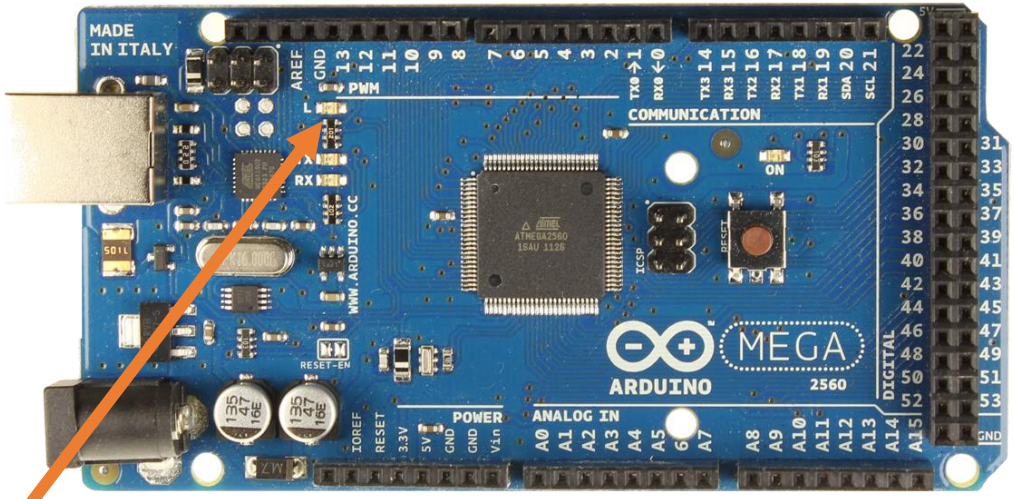
Input & Output (I/O)

- Digital pins on the board are programmable to be input or output pins. Function of pins are set by coding functions:
  - pinMode()
  - digitalWrite()
  - digitalRead()
- I/O lines operate at 5V logic level
- Each line can give out / take in max current of 40mA
- Pins with special functions
  - Serial [0 (RX0), 1 (TX0)]
  - Serial1 [19 (RX1), 18 (TX1)]
  - Serial2 [17 (RX2), 16 (TX2)]
  - Serial3 [15 (RX3), 14 (TX3)]



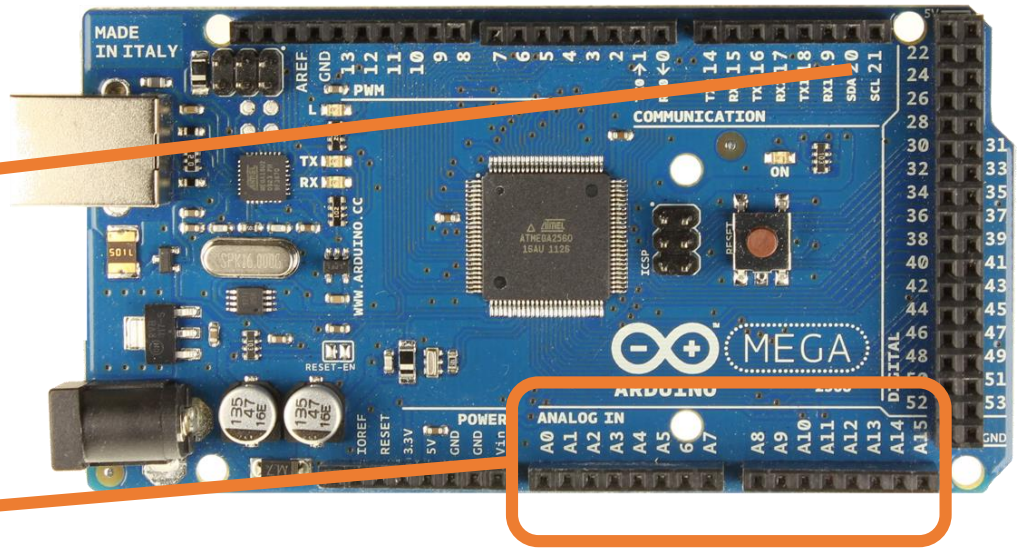
Input & Output (I/O) [cont]

- External Interrupt pins can be used to run a specific section of the code when trigger conditions are met. attachInterrupt()
  - Trigger Conditions
    - Low value
    - Rising Edge
    - Falling Edge
    - Change in Value
  - Pins
    - 2 [Interrupt 0], 3 [1], 21 [2], 20 [3], 19 [4], 18 [5]
- PWM pins, analogWrite()
  - 2-13, 44-46
- There is an onboard LED that is permanently linked to digital pin 13



Input & Output (I/O) [cont]

- Serial Peripheral Interface (SPI)
  - 50 (MISO)
  - 51 (MOSI)
  - 52 (SCK)
  - 53 (_SS)
- Two Wire Interface (I2C)
  - 20 (SDA)
  - 21 (SCL)
- Analog Input
  - A0 – A15
  - Each input provides 10bit of resolution (1024 steps)
  - Default measures from 0V to 5V



Arduino Software

- Follow the instructions in the links to install the Arduino IDE and drivers on your PC
  - Mac (https://www.arduino.cc/en/Guide/MacOSX)
  - Windows (https://www.arduino.cc/en/Guide/Windows)

Arduino Coding

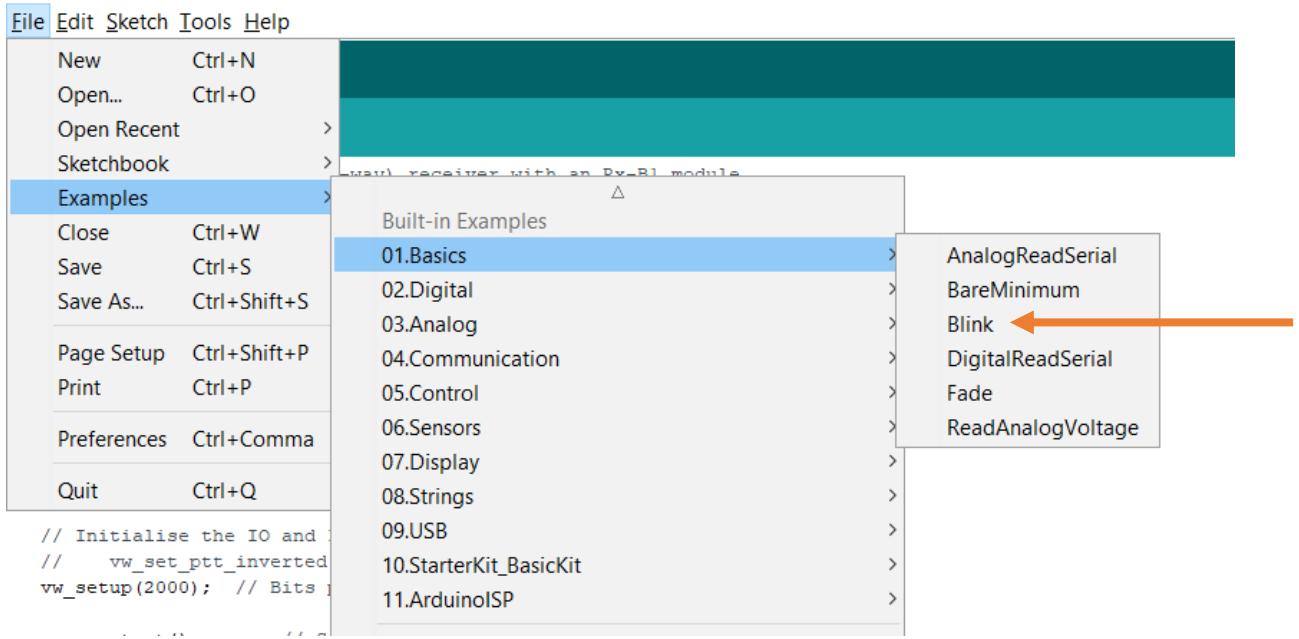
- Codes found inside void setup() only run once upon booting up
- Codes found inside void loop() runs sequentially, infinitely till system shuts down

- Reference for Arduino functions: https://www.arduino.cc/reference/en/

Try out the LED Blink Sketch Example

- You should see the LED on the board (pin 13) blink

- Notes:
  - Need to select proper board under **Tools > Board**
  - Need to select proper COM port under **Tools > Serial Port**



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Thank You

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