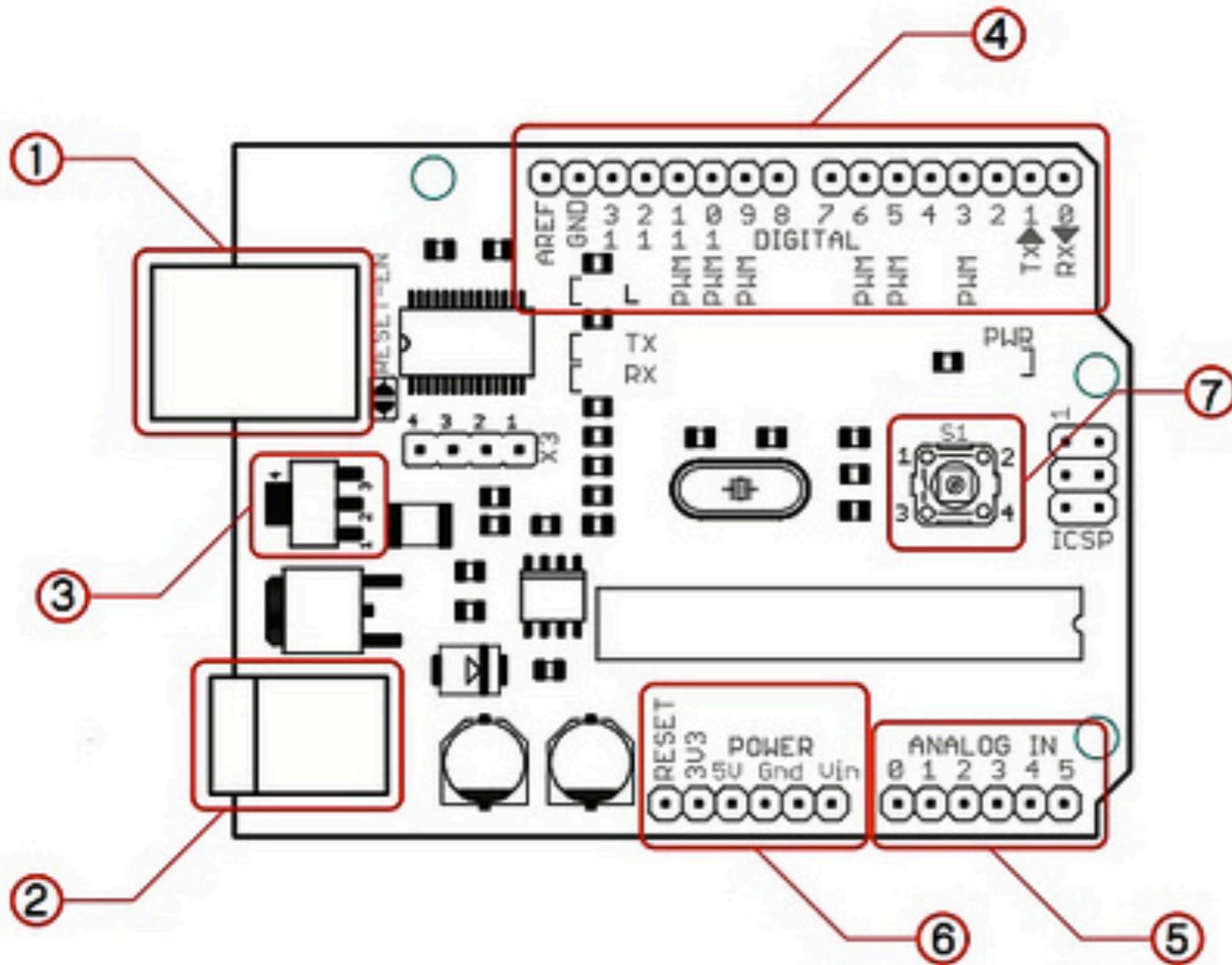


Agenda

- Schedule of remainder of semester (quick visual)
- UNIT #: Computational
 - Serial Communication
 - Component Diagram
- UNIT #: Tangible

Review

Computational & Tangible



The most important parts on the Arduino board high lighted in red:

- 1: USB connector
- 2: Power connector
- 3: Automatic power switch
- 4: Digital pins
- 5: Analog pins
- 6: Power pins
- 7: Reset switch

Component Diagram Arduino

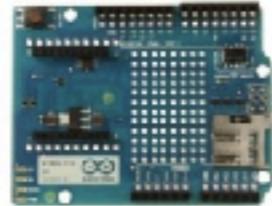
Arduino: Microcontroller



Arduino Mega ADK



Arduino Ethernet



Arduino Wireless SD Shield



USB/Serial Light Adapter



Arduino Mega 2560



Arduino Micro



Arduino Motor Shield



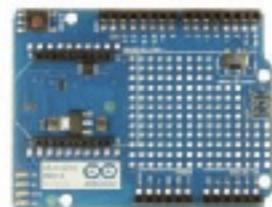
Mini USB/Serial Adapter



LilyPad Arduino USB



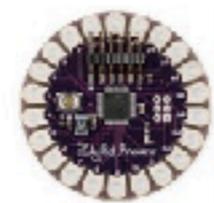
LilyPad Arduino Simple



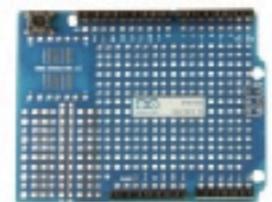
Arduino Wireless Proto Shield



LilyPad Arduino SimpleSnap



LilyPad Arduino



Arduino Proto Shield

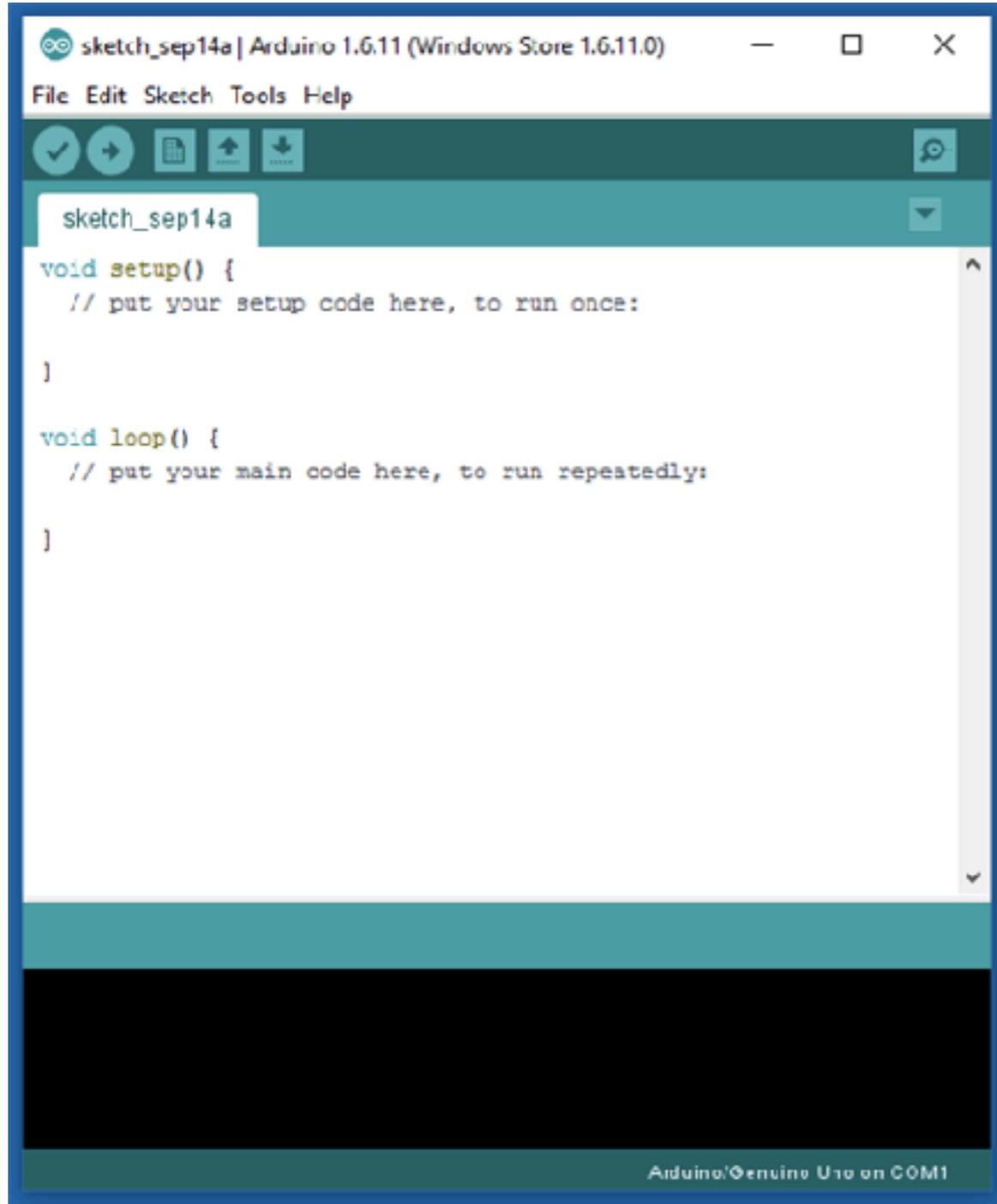
The Arduino is a microcontroller. A microcontroller is of programmable hardware that can link be programmed to perform a specific function. Tasks are transmitted and received in the form of bits (1/0's), in a single file data transmission called **serial communication.**



ARDUINO

PROCESSING

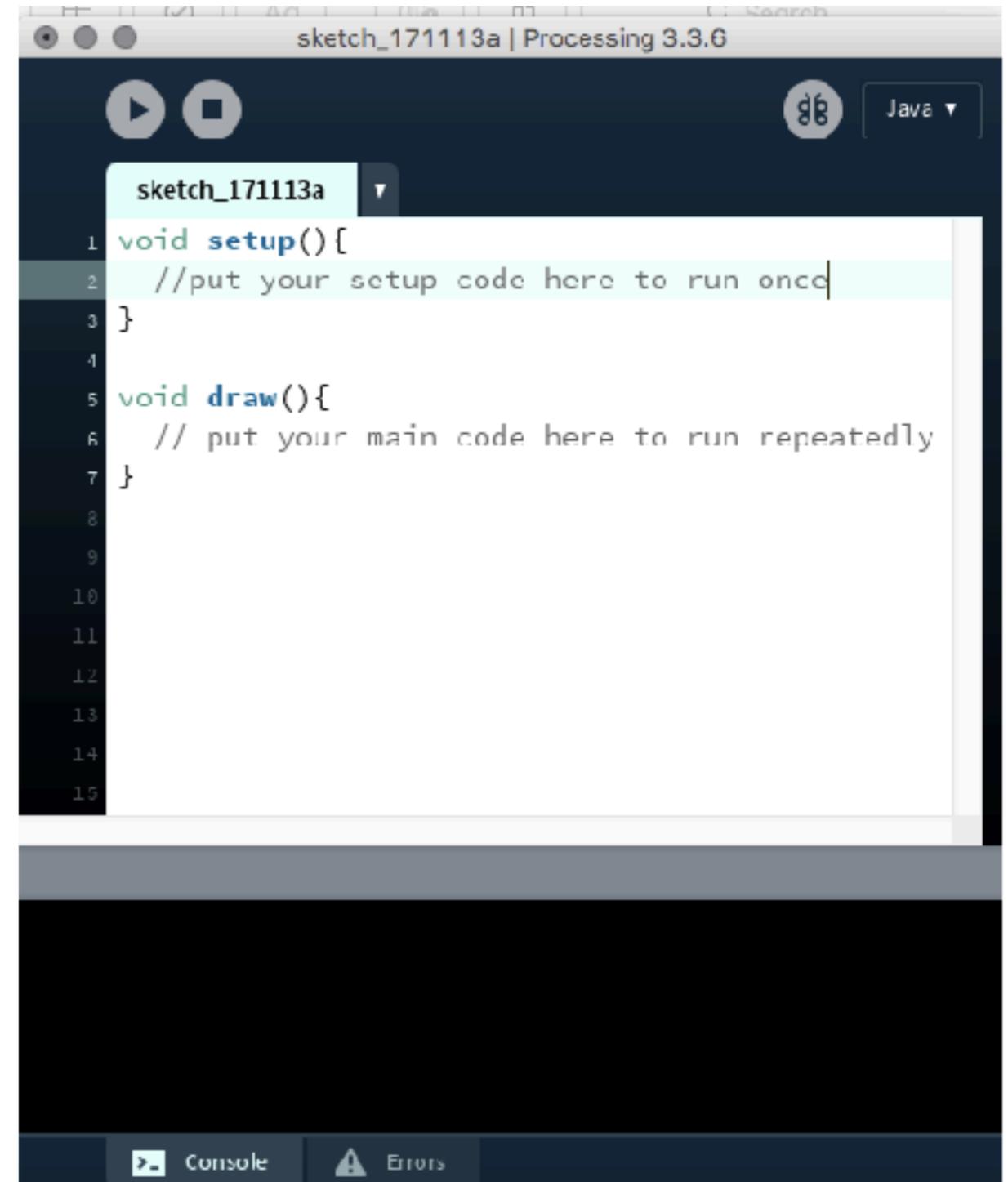
Interactive Development Environment (**IDE**) 'software'



The screenshot shows the Arduino IDE window titled 'sketch_sep14a | Arduino 1.6.11 (Windows Store 1.6.11.0)'. The menu bar includes 'File', 'Edit', 'Sketch', 'Tools', and 'Help'. Below the menu is a toolbar with icons for checkmark, play, document, upload, and download. The sketch name 'sketch_sep14a' is displayed in a teal bar. The main code editor contains the following code:

```
void setup() {  
  // put your setup code here, to run once:  
}  
  
void loop() {  
  // put your main code here, to run repeatedly:  
}
```

At the bottom of the window, a status bar indicates 'Arduino: Genuine Uno on COM1'.



The screenshot shows the Processing IDE window titled 'sketch_171113a | Processing 3.3.6'. The top bar includes a play button, a square button, and a 'Java' dropdown menu. Below this is a toolbar with a play button and a square button. The sketch name 'sketch_171113a' is displayed in a teal bar. The main code editor contains the following code:

```
1 void setup() {  
2   //put your setup code here to run once  
3 }  
4  
5 void draw(){  
6   // put your main code here to run repeatedly  
7 }  
8  
9  
10  
11  
12  
13  
14  
15
```

At the bottom of the window, there are tabs for 'Console' and 'Errors'.

Processing



Figure 1-4. Processing has a large family of related languages and programming environments.

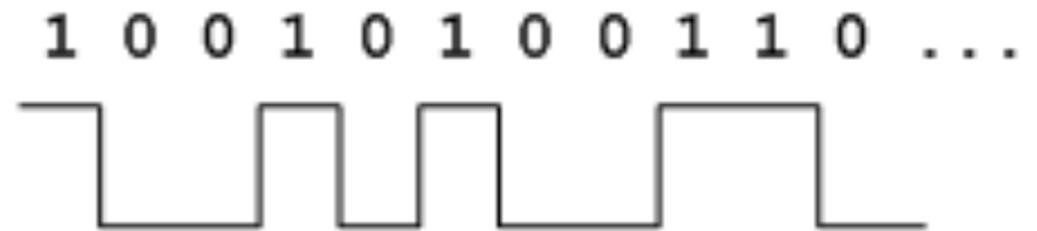
Arduino: Serial Communication

“The world isn't run by weapons anymore, or energy, or money.

It's run by little ones and zeroes, little bits of data. It's all just electrons.”

Arduino: Serial Communication

Information is transmitted and received in the form of bits (1/0's),
in a single file data transmission called **serial communication**.

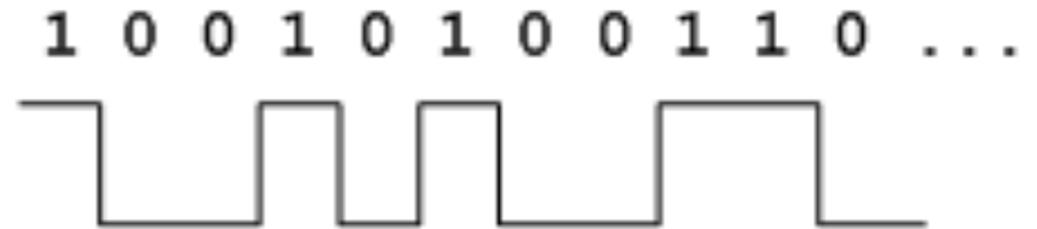


Information passes between the computer and Arduino through the USB cable. Information is transmitted as zeros ('0') and ones ('1')... also known as **bits**!

Arduino: Serial Communication

A **BYTE** is 8 bits of information

Bit = 1 for on
Bit = 0 for off



Information passes between the computer and Arduino through the USB cable. Information is transmitted as zeros ('0') and ones ('1')... also known as **bits**!

Arduino: Digital Input (on or off)

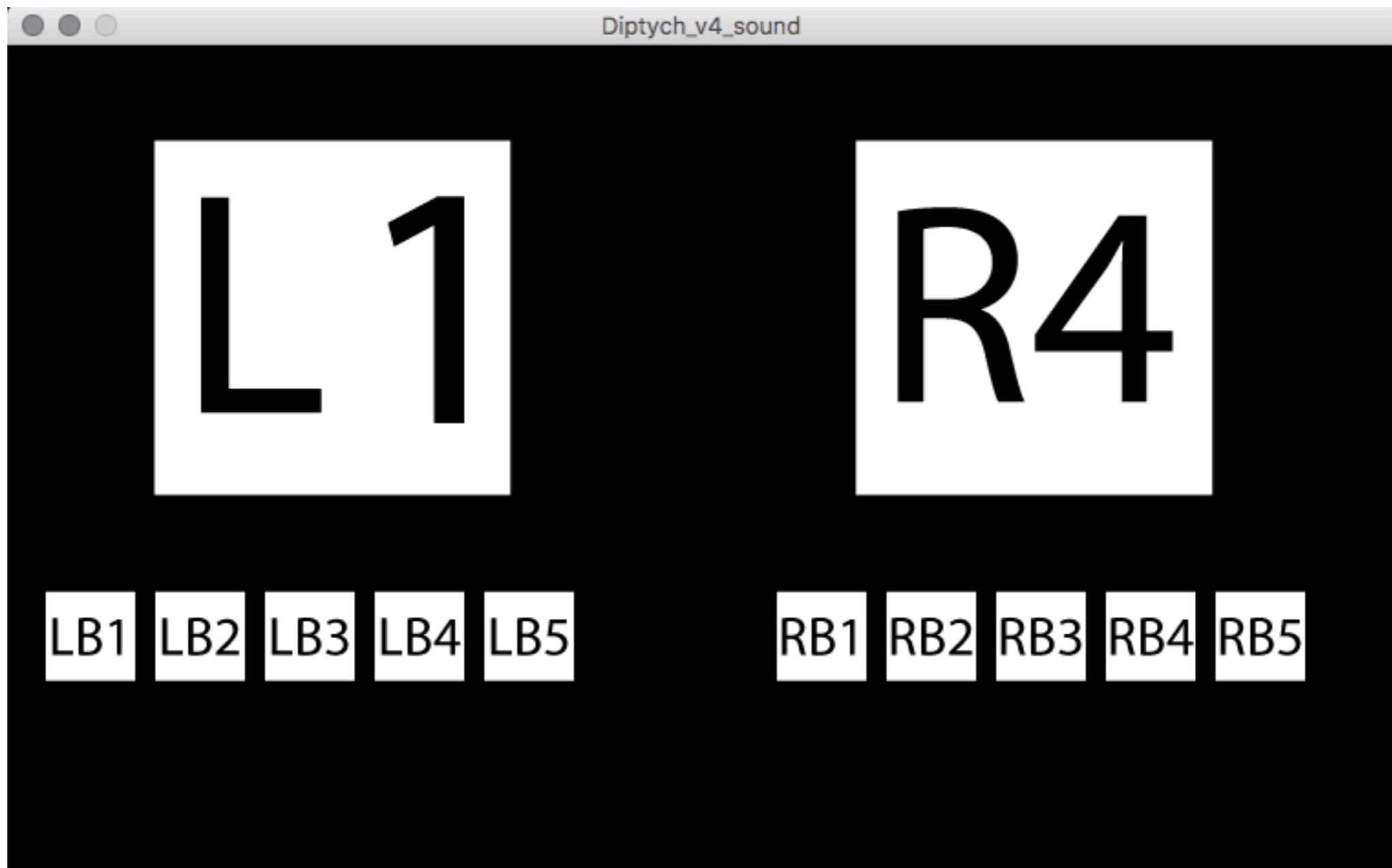
Bit = 1 for on



Bit = 0 for off



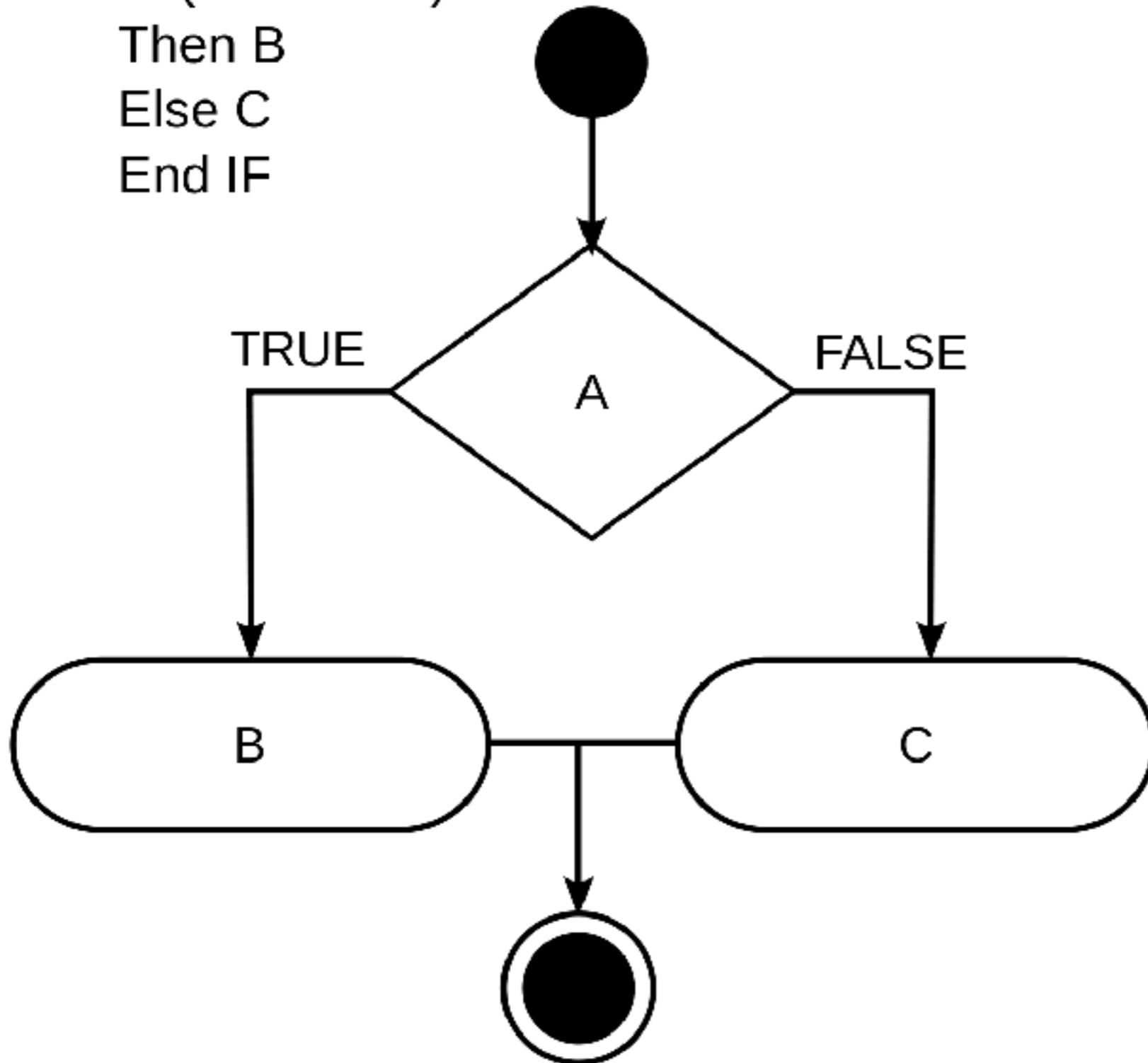
Assets: images & audio



OBJECTIVE: Students will modify the code of a functional interactive prototype replacing the default assets with their own.

Processing

```
IF (A = TRUE)  
Then B  
Else C  
End IF
```



Arduino



Processing: Input as Conditionals

Place in code: Images for OUTPUT

ABOVE
“void setup”

1 `PImage lOne;`

WITHIN:
KeyPress
function

2

```
void keyPressed()
```

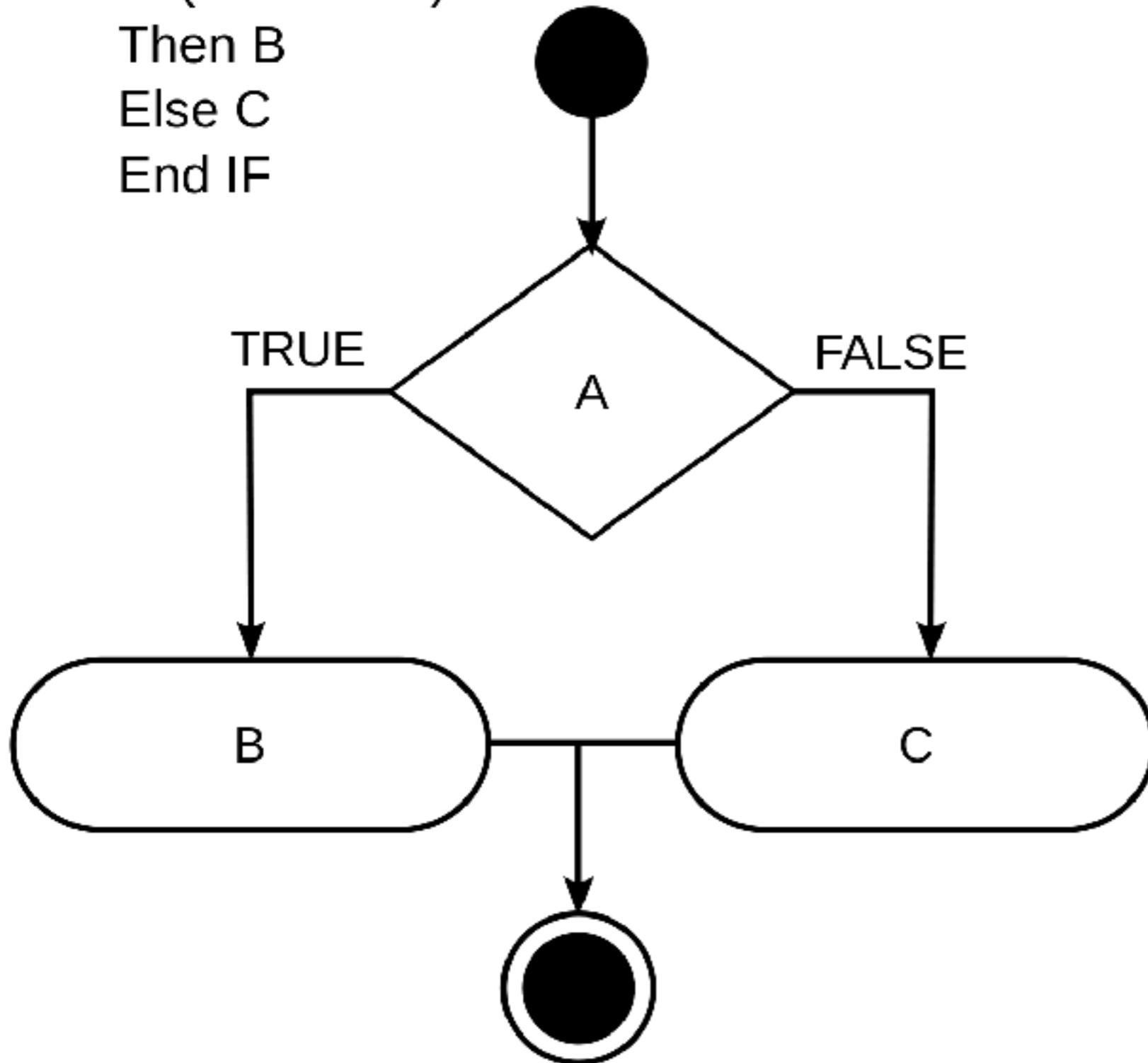
3

```
{  
  if (key=='a') {
```

```
    lOne = loadImage("lOne.png");  
    image(lOne, 80, 50);  
  }  
}
```

★ Conditional

```
IF (A = TRUE)
Then B
Else C
End IF
```



In computer programming languages, a conditional performs certain tasks or executes decisions based on predetermined parameters being met.

In our Computational project, if the user pushed the correct button (keyboard/switch) the program output correspondingly.

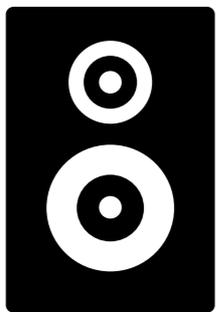
Computation H/W

Reinforcement Readings

Getting Started with Processing pages 1-33

Getting Started with Arduino 3rd ED pages 1-6
15-51

Please upload all assets to GitHub



+



Tangible H/W

H/W: ButtonCap V1 & V2
Shared via onShape

DUE: 11/13/2017

Fabrication with OnShape

V1: Basic cap

V2: Including leads

Sources

“Getting Started with Arduino and Genuino UNO.” Arduino - ArduinoUno, Arduino, 17 Jan. 2017, www.arduino.cc/en/Guide/ArduinoUno.

Getting Started with Processing 1-33

Getting Started with Arduino 3rd ED pages 1-6 15-51

“LEARNING PROCESSING.” Learning Processing 2nd Edition, learningprocessing.com/.