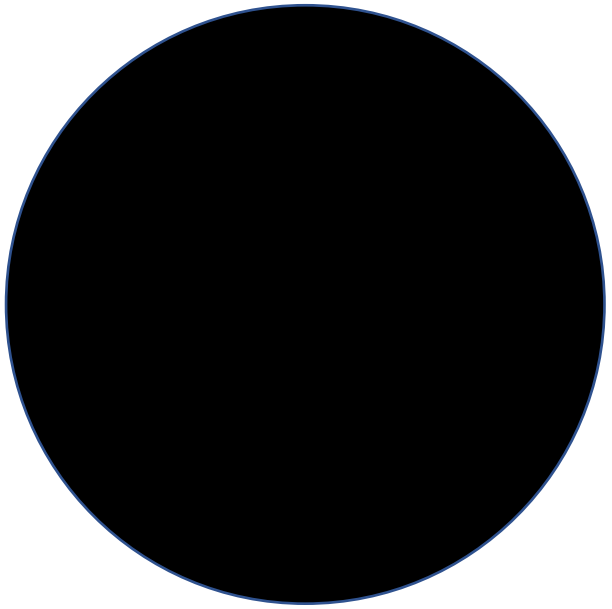
Designing a Game in C++

PRESENTS:



"Guess a Pixel"

Using the *Arduino* IDE to create an interactive game with the Adafruit neoPixel

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Conceptual Framework:

-> Create a game that requires user input to guess the pixel that will be incended on the Adafruit neoPixel 8x8 led board.

-> A randomly generated interger will be assigned and stored as the pixel to be guessed.

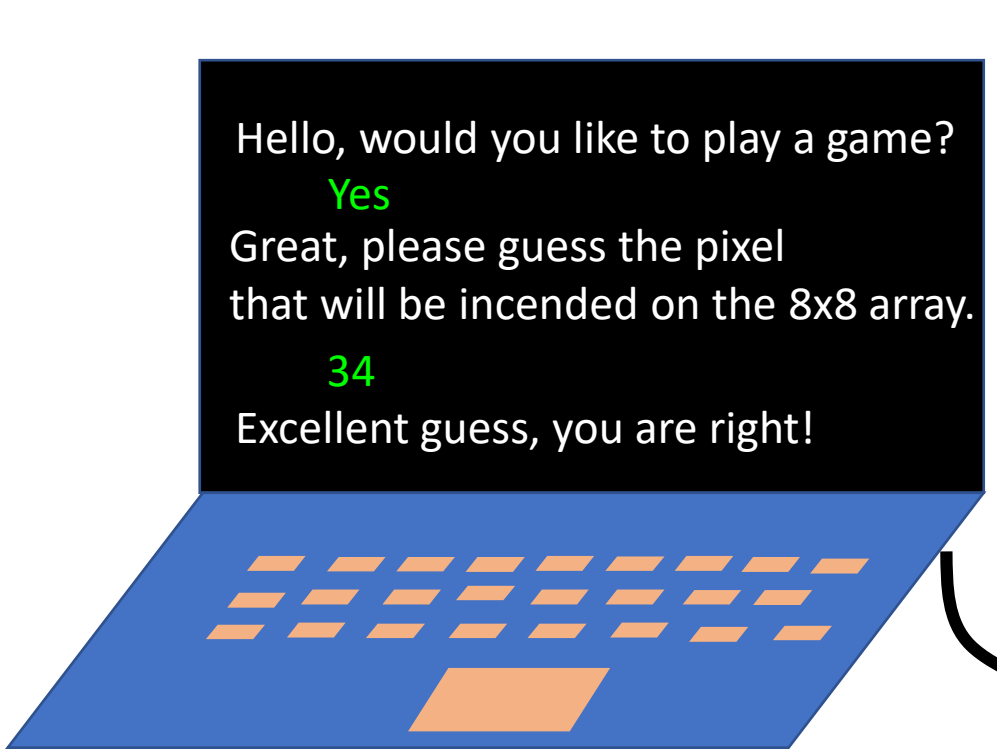
-> When the correct pixel is guessed, the pixel will light up GREEN.

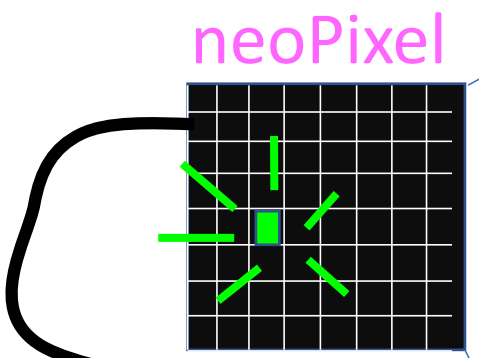
- If the game player is within 1-4 pixels of the correct value, a pixel will turn BLUE to notify the player.
- If the game player is more than 4 pixels away from the correct value, a warning pixel will light RED

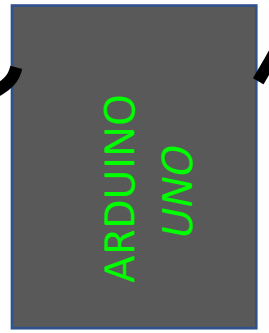
-> Use the *Arduino* microprocessor and IDE to flash instructions to the neoPixel.

Conceptual Framework II:

Console Interaction







0	1	2	3	4	5	6	7
8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23
24	25	26	27	28	29	30	31
32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47
48	49	50	51	52	53	54	55
56	57	58	59	60	61	62	63

LED layout schematic

Coding Prerequisites:

-> Find C++ library for the neoPixel and add to workspace.

-> Find out how the “Cin” and “Cout” functions operate in Arduino IDE.

-> Find out the data type that neoPixel library uses to dictate individual pixels.

-> Understand how the “void setup” and “void loop” function in Arduino IDE.

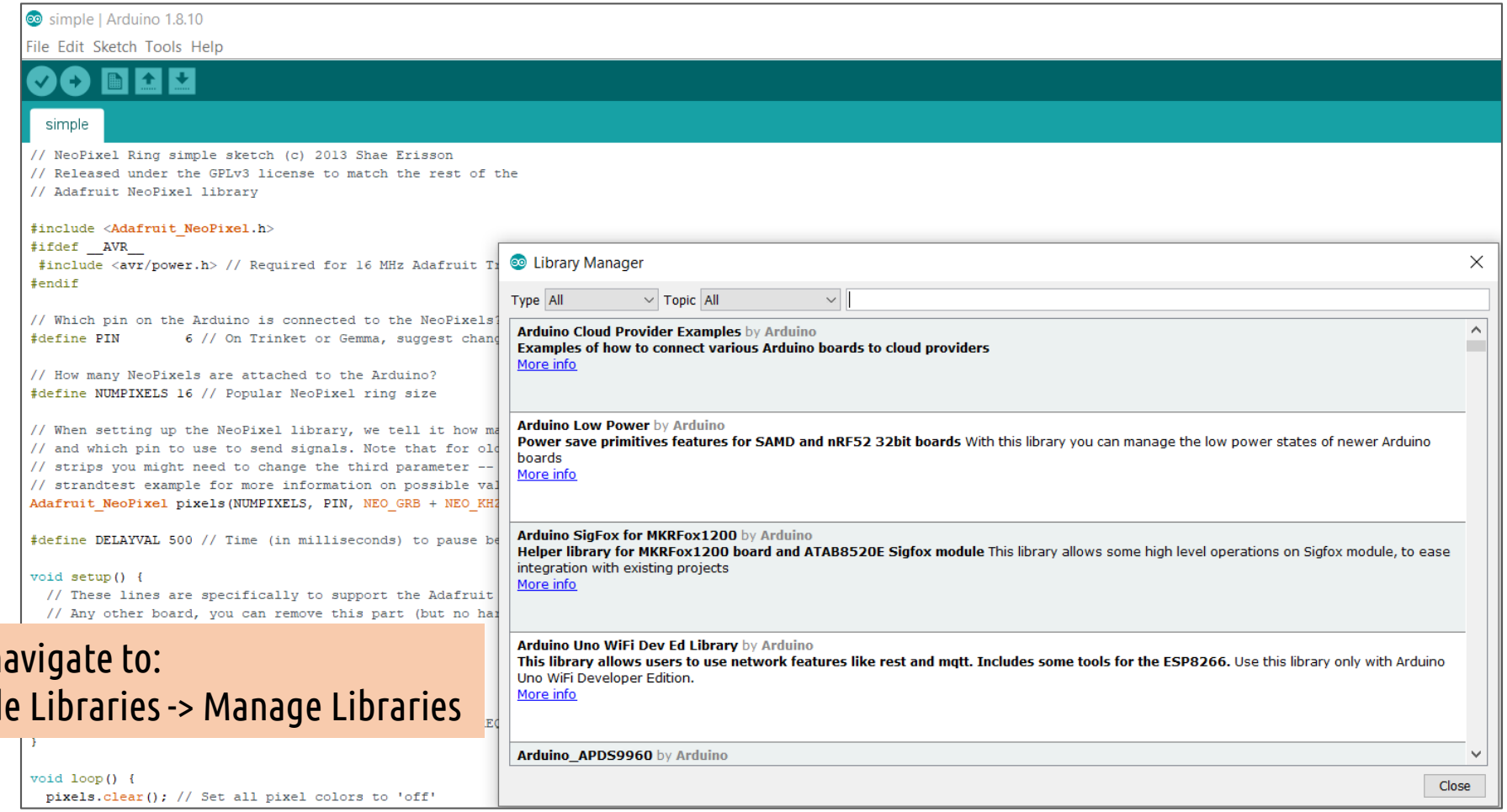
-> Figure out how to make a random number generator in Arduino.

Hardware:

ARDUINO
UNO

ADAFRUIT
neoPixel

The ARDUINO IDE:



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To add libraries, navigate to:
-> Sketch -> Include Libraries -> Manage Libraries

GAME_number | Arduino 1.8.10

File Edit Sketch Tools Help

GAME_number

Code for Game

```
// NeoPixel Ring simple sketch (c) 2013 Shae Erisson
// Released under the GPLv3 license to match the rest of t
// Adafruit NeoPixel library
#include <Adafruit_NeoPixel.h>
#ifdef __AVR__
 #include <avr/power.h> // Required for 16 MHz Adafruit Trinket
#endif

// Which pin on the Arduino is connected to the NeoPixels?
#define PIN        6 // On Trinket or Gemma, suggest changing this to 1

// How many NeoPixels are attached to the Arduino?
#define NUMPIXELS 64 // Popular NeoPixel ring size

// When setting up the NeoPixel library, we tell it how many pixels,
// and which pin to use to send signals. Note that for older NeoPixel
// strips you might need to change the third parameter -- see the
// strandtest example for more information on possible values.
Adafruit_NeoPixel pixels(NUMPIXELS, PIN, NEO_GRB + NEO_KHZ800);

#define DELAYVAL 500 // Time (in milliseconds) to pause between pixels

// NeoPixel brightness, 0 (min) to 255 (max)

void setup() {
  // These lines are specifically to support the Adafruit Trinket 5V 16 MHz.
  // Any other board, you can remove this part (but no harm leaving it):
#if defined(__AVR_ATtiny85__) && (F_CPU == 16000000)
  clock_prescale_set(clock_div_1);
#endif
  // END of Trinket-specific code.

  pixels.begin(); // INITIALIZE NeoPixel strip object (REQUIRED)
  Serial.begin(9600);
  Serial.println("Enter a pixel");
  //delay(10);
}
```

Include library for neoPixel

defining these variable names into scope; number of pixels and pin #

Code and explanation provided by library;

defining variable into scope for delay time between changing pixels

void setup( ) is designed to run once to setup the neoPixel device

ARDUINO IDE will not accept <iostream>. So, for “Cin” and “Cout” we have to use the “Serial” function.

Serial version of “Cout”

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GAME_number

Code for Game

```
String incomingByte;
int pixel = 0;
void loop() {

  pixels.clear(); // Set all pixel colors to 'off'
  pixels.show();

  int pixel;
  //make goal random
  int goal = 32;

  if(Serial.available() > 0)
  {
    incomingByte = Serial.readString();
    pixel = incomingByte.toInt();

    int diff = pixel - goal;
    if(diff < 0){diff = diff * -1;}
    if(diff >= 1 && diff <= 5)
    {
      pixels.setPixelColor(pixel-1, pixels.Color(0,0,50));
      pixels.show();
      delay(200);
    }
    else if(diff > 5)
    {
      pixels.setPixelColor(pixel-1, pixels.Color(50,0,0));
      pixels.show();
      delay(200);
    }
    else
    {
      pixels.setPixelColor(pixel-1, pixels.Color(0,50,0));
      pixels.show();
      delay(200);
    }


    Serial.println(pixel);
    Serial.println("Enter a pixel");
  }
```

variable for calling pixel

== if space available, continue

The typed input from the gameplayer in the ARDUINO command prompt will bill converted from Serial to String.

void loop( ) this loop will continue indefinitely. It contains all the actions to create the game.

If / else loop to determine whether the player's guess is spot on (GREEN), close (BLUE), or far from close (RED)

If the correct pixel hasn't been guessed, then the "Cout" prompt will continue to reappear.

Code for Game

```
  // The first NeoPixel in a strand is #0, second is 1, all the way up
  // to the count of pixels minus one.
  //for(int i=0; i<NUMPIXELS; i++) { // For each pixel...

    //pixels.Color() takes RGB values, from 0,0,0 up to 255,255,255
    //Here we're using a moderately bright green color:
    //pixels.setPixelColor(i, pixels.Color(10, 0, 0));

    //pixels.show();   // Send the updated pixel colors to the hardware.

    //delay(250); // Pause before next pass through loop
  //}

  //pixels.setPixelColor(0, pixels.Color(0,0,10));
  //pixels.setPixelColor(20, pixels.Color(0,0,10));

  delay(DELAYVAL);
}
```

Important information for how the pixel array is ordered.

Predefined function to set pixel color in RGB values

Apply the predefined delay variable add end of void loop ( ); This perpetuates how long the led will be incended for.

The Razor's Edge of gaming Tech:

ARDUINO IDE and Command Line Interaction

GAME_number

```
}

String incomingByte;
int pixel = 0;
void loop() {

  pixels.clear(); // Set all pixel colors to 'off'
  pixels.show();

  int pixel;
  //make goal random
  int goal = 32;

  if(Serial.available() > 0)
  {
    incomingByte = Serial.readString();
    pixel = incomingByte.toInt();

    int diff = pixel - goal;
    if(diff < 0){diff = diff * -1;}
    if(diff >= 1 && diff <= 5)
    {
      pixels.setPixelColor(pixel-1, pixels.Color(0,0,50));
      pixels.show();
      delay(200);
    }
    else if(diff > 5)
    {
      pixels.setPixelColor(pixel-1, pixels.Color(50,0,0));
      pixels.show();
      delay(200);
    }
    else
    {
      pixels.setPixelColor(pixel-1, pixels.Color(0,50,0));
      pixels.show();
      delay(200);
    }


    Serial.println(pixel);
```

COM3

```
Enter a pixel
```

Autoscroll Show timestamp Newline 9600 baud

Done uploading.