NeoMatrix Challenges

Playing with colours, shapes and animations



Warning

- The individual neopixels are very bright!
- Do not stare at the neomatrix, or look at it for too long at a time
- Unplug the neomatrix when not testing
- Do not increase the brightness set in the code



Getting started

- The physical version of the neomatrix only requires a single pin to control it from the Arduino
- We are also able to directly include the libraries to use it, that were not available on TinkerCAD
- This makes the start of our program much simpler, but once started, the programs written will match the code written on TinkerCAD for the exercises this term



Initial Code

#include <Adafruit_NeoMatrix.h>
#define NEOPIXEL_PIN 6

```
const int width = 32;
```

```
const int height = 8;
```

Adafruit_NeoMatrix matrix = Adafruit_NeoMatrix(width, height, NEOPIXEL_PIN, NEO_MATRIX_TOP + NEO_MATRIX_LEFT + NEO_MATRIX_COLUMNS + NEO_MATRIX_ZIGZAG, NEO_GRB + NEO_KHZ800);



Setting up the neomatrix

/** * Function to initialise arduino and neomatrix */

}

```
void setup() {
    // Initialize the NeoPixel library.
    matrix.begin();
    matrix.setTextWrap(false);
    matrix.setBrightness(7); // Don't increase this value above 10
    matrix.fillScreen(0);
    matrix.show();
```

```
Serial.begin(9600);
```

ABERYSTWYTH

Connecting and Downloading to Arduino:

- Step 1: Copy and paste your text code into Arduino IDE.
 IMPORTANT: Only copy the necessary code, e.g. functions you have written
- Step 2: Click on the tick in the top left to 'compile' code.
- Step 3: Plug your Arduino into the computer.
- Step 4: Click on the circle with a \rightarrow arrow to transfer.







Available NeoMatrix drawing functions

- matrix.fillScreen(matrix.Color(r,g,b));
- matrix.drawPixel(x,y,matrix.Color(r,g,b));
- matrix.fillRect(x, y, width, height, color);
- matrix.drawRect(x, y, width, height, color);
- matrix.fillCircle(center_x, center_y, radius, color);
- matrix.drawCircle(center_x, center_y, radius, color);
- matrix.clear();
- matrix.show();



Available NeoMatrix text functions

- matrix.drawChar (x, y, character, color, backgroundColor, size); //if backgroundColor same as color, no background drawn
- matrix.setTextColor (color);
- matrix.setTextColor (color, backgroundColor);
- matrix.setCursor (x, y);
- matrix.print(message);



BRONZE Challenge:

- Reproduce the patterns from the next few slides on your neomatrix
- Tip: Use a new function to draw each pattern



Bronze Challenge 1

- Made using:
 - Colours: Red, Green and Blue
 - Functions: Fill screen, rectangles and circles





Bronze Challenge 1

• Has the characters 'A, 'R' and 'C' in blue, red and white, along with a red square and magenta circle, all on a green background





Bronze Challenge 1

- Write functions to draw three individual pictures then draw them on the full display. The functions should have x and y parameters to specify where to draw them, e.g. void emojiHappy(int x, int y)
- Here are some example attempts at emojis for suggestions. You can draw different pictures if desired





SILVER Challenge:

• Drawing a picture and animate it

- Taking one or more of the pictures from Bronze challenge 3, animate it to either bounce around the screen or change between a series of frames
- If you already have functions from TinkerCad to do this, write functions for alternative movement patterns, e.g. right to left, or disappearing off the bottom and reappearing at the top.
 - Can you consider rotating the neomatrix so it is taller with falling objects bouncing at the bottom?



- Create a series of animations and effects that combine together the various features covered this topic, e.g.
 - building up the visualisation of drawing different patterns
 - rotating between different visual effects
 - drawing animated pictures

