Intro to NeoMatrix

Week 4 Exercises



Building and Programming robots in TINKERCAD

This week you be continuing to program the NeoMatrix through TinkerCAD. This workshop aims to develop your text programming skills.

You should have completed bronze from Week 3 before starting these challenges.

Please complete the bronze before starting the silver, and complete the silver before starting the gold.



Neopixel and GFX APIs

• NeoPixel:

https://adafruit.github.io/Adafruit_NeoPixel/html/class_adafruit__
_neo_pixel.html

• GFX API: <u>http://adafruit.github.io/Adafruit-GFX-</u> Library/html/class_adafruit__g_f_x.html#a59178a0e0c845a14a3 9b457c43567dd9



BRONZE Challenge:

Aims:

- Define at least one array to represent a picture
- Write a function to draw the picture on the NeoMatrix
- Use the function from your main loop to draw your picture(s) on the NeoMatrix

Additional challenges:

- Add parameters to the function for drawing the picture to specify the top left corner
- A picture could be generated in other ways. E.g. taking the pictures from week 2 silver, it would be possible to write a function to define an array to describe them. This involves using the function matrix.getPixelColor(n) where n is the 1D pixel position in the matrix, i.e. y*width+x



BRONZE Challenge:

Steps:

- Option 1: Define a set of constant values to represent a selection of colours
- Option 2: Use Serial.println(matrixColor(r,g,b)); to obtain numeric values for colours to use in array
- Define variables to hold pictureWidth and pictureHeight. These should be done around the start of your program, i.e. around lines 266-270 in your program
 - If you are creating multiple pictures of different sizes, you will need a set of these for each array.
- Define a array with length pictureWidth*pictureHeight
- Add the necessary number of values to your array using either option 1 or 2 to draw your picture



BRONZE Challenge:

Steps:

- Write a function that takes 3 parameters:
 - int pictureWidth
 - int pictureHeight
 - uint16_t picture[]
- Inside the function, write the nested for-loop to draw the picture on the NeoMatrix

Additional Challenge:

• Add two extra parameters to specify the x,y coordinate for the top left corner when drawing the picture



SILVER Challenge:

Aims:

• Produce a 2D array to hold a series of 'frames' as part of an animated picture

Additional challenges:

• Define more than one animated picture, have these drawn on the display at the same time in different locations



SILVER Challenge:

Steps:

- Define variables to store animation length, width and height
- Define a two dimensional array where the first dimension is the length and the second is the width*height
- Initialise the array with the necessary number of frames of the specified size to produce a simple animation
- Inside your main loop, write a for-loop to step through the animation array drawing each of the frames



GOLD Challenge:

Aims:

• Have your new animation bounce around the display

- Additional challenges:
 - Instead of bouncing around the display, define a start (x1,y1) and end point (x2,y2) for your animation to move between. The picture should move in a straight line between the two points



What else can you add to this program?

• Produce a series of animations that tell a story



Thank You

