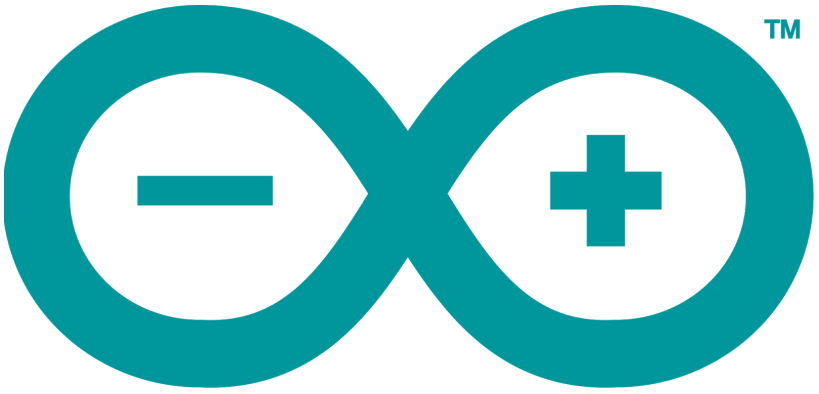

Arduino Labs

Session Four - Practical Programming 2

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Introduction

In this session we will be looking at animating the Neopixel Shield using the Adafruit NeoMatrix Library. This library allows you to display complex things such as text and shapes on the display much more easily by providing a level of **abstraction** between the code and the hardware.

Session Content

This session we will be covering:

1. The Adafruit NeoMatrix and GFX Libraries.
2. Scrolling Text Example Code.
3. Animated Shapes Example Code.
4. Producing your own animation.

Adafruit NeoMatrix and GFX Libraries

The Adafruit GFX Library is a standard library used for the generation of graphics on displays; graphics include things such as text, lines and geometric shapes. Using these core graphics you can build up some very complex images on the display.

The Adafruit NeoMatrix library is a front end for the GFX Library for the Adafruit Neopixel Shield. It includes key information and data about the Neopixel Shield so that the GFX library can communicate with it correctly.

The key thing to remember about these two libraries is that the NeoMatrix Library is a custom implementation of the GFX Library. **This means that the NeoMatrix Library contains all the same functions as the GFX Library.** Some additional functions have then been added to aide with communication with the Neopixel Shield.

The reference for the Adafruit NeoMatrix library can be found here: Adafruit NeoMatrix Guide. The important thing to note is that there is not a lot of information in the guide. This is because they expect you to use the guide for the Adafruit GFX library as it contains all of the same functions. It is worth having a quick read through this guide!

The reference for the Adafruit GFX Library can be found here: Adafruit GFX Guide. All of the functions seen here can be used with the Adafruit NeoMatrix library. So instead of calling:

```
GFXObject.drawRect();
```

You would call:

```
NeoMatrixObject.drawRect();
```

Scrolling Text Example Code

Get the scrolling text example code from the Society Github. Compile and run the code using the methods we discussed in the last session. Have a read through the code and try and understand how it works. How is it different from the code we used last time?

Try and see if you can do the following things:

1. Speed up the rate at which the text scrolls.
2. Change the colour of the text.
3. Change the text being displayed.

Animated Shapes Example Code

Get the simple_animations example code from the Society Github. Compile and run the code using the methods we discussed in the last session. Again, have a read through the code and try and understand how it works.

Try and see if you can do the following things:

1. Speed up the rate of the animation.
2. Change the colours in the animation.

Once you have finished with the simple animations code, have a look at the complex animations code. How does the animation differ? What extra code have I written in order to make it do this?

Producing your own Animation

Now it's time to produce your own animation! There is no specific design challenge this week (unlike the flags last week) as I want to see you explore how you can use the base graphics to generate some complex images. However, try and see if you can make your code the following specification:

1. The colours in the animation should be easy to change.
2. The speed of the animation should be easy to change.
3. Use more than one shape.
4. Use more than one colour.

Try and see if you can make it look like its actually moving. This requires a lot of changes of the shapes in a short amount of time! Can you think of where similar techniques are used in devices you have at home or with you now?

Society Social Media and Feedback

Don't forget to follow the society to here about the latest news and events! We'd love for you to post on social media about the Arduino Labs! Don't forget to tag us in any posts you make when at society events!

Our social media information:

- www.facebook.com/uoseeesoc
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- Gmail - eeesoc@sheffield.ac.uk

We'd love your feedback! Please fill out this form at the end of the session if you have time:

https://goo.gl/forms/Ep4upOA4pgq8CW6u2