# Microprocessor Techniques: Final Project Requirement Specifications

## Project: Terminal Oscilloscope

### Requirements

The project will use the ADC of the microcontroller to read a voltage level on a GPIO pin. This value will be averaged over a number of samples. The UART will then be used to output a character to the terminal at a calculated coordinate to visualise the input voltage over time. The voltage level will be represented on the y-axis of the terminal and time will be represented on the x-axis.

The user will be able to change the sample rate of the ADC and the vertical scale of the output by inputting characters to the terminal.

* A/Z – increase/decrease scale by 0.5V
* >/< - increase/decrease sample rate

The graph will be drawn using the \* symbol. A vertical and horizontal scale will also be drawn and in the case of the vertical scale be updated on user input.

### Components

The main hardware components of the system will be the UART for interfacing with the terminal and the ADC for the reading of the input signal. A number of software components will also be built to control the hardware, store voltage readings and translate them into a coordinate system.

### Extension

The program could possibly be extended by drawing more information to the terminal such as the current average voltage, or by changing the printed characters to create a smoother graph.

### Simplification

If the oscilloscope program proves too challenging the program will be modified to only display DC voltages. The X and Y axis scales may also be removed to simplify to the project.