EEE3030 MATLAB Exercise 4

1. Use the MATLAB function butter() to generate the coefficients for an IIR filter with the following specification:

Sampling frequency (fs)	8 kHz
Cut off frequency (fc)	1 kHz
Analog filter type	Butterworth
Filter order	4

2. Verify the frequency response of the filter to check that it meets the specification (hint: generate the white noise signal as in the demonstration and apply the filter using the MATLAB filter() function).

3. Measure the impulse response of the filter by inputting an impulse (e.g. 1 sample of value 1 followed by 100 zeros).

4. Now calculate the filter outputs using your own code constructed from simple MATLAB instructions e.g for loops etc (this how the filter would be implemented on a microprocessor/DSP in C or a similar language). Verify that the filter impulse/frequency response is the same as that obtained by using the MATLAB filter() function.