ANALYTICS FOR INDUSTRIAL INTERNET 2018

EXERCISE 1b /during lecture 13.9.2018 / not to be submitted

Part A:
Signal averaging

The file `https://abacus.abo.fi/ro.nsf/W/temp/$File/ecg.dat` contains a 500 Hz sampled signal on ECG. The signal is repetitive (however, heart beat freqency is unknown). The signal is very contamined with noise, and hence very unclear. Using signal averaging, it is possible to remove noise from the measured signal.
Try to find out what the repetition period of the original signal is, and use signal averaging to remove the noise. One challenge is to find the period of the signal. is there a way to automate the process of finding the repetition period?

Part B:
Upsampling and downsampling
The `https://abacus.abo.fi/ro.nsf/W/temp/$File/solo_c.dat` contains a sound snippet sampled at 44,1 kHz. Design and verify a sample rate converting system that

(i) performs sample rate conversion to 8 kHz

(ii) performs sample rate conversion to 48000 kHz

Verify that it works OK by listening to the sound. Compare own solution to inbuilt function resample().