Q1. Record an approximately 10 sec speech audio and you are also provided with another audio music signal (audio48Khz.wav). You have to perform the following tasks with each of the two audio signals.

a) Plot the frequency spectrum. Find out the maximum frequency present in the signal.
b) Perform upsampling by 2 and downsampling by 4 and save the new generated audio signals.
c) Listen to them and identify what is the effect of upsampling and downsampling. Give a brief explanation of observed effects.

Q2. Read an EEG signal (eeg1-f3.dat) using *load ('eeg1-f3.dat')* command in MATLAB. The sampling frequency of signal is 100 Hz. The EEG signal contains three bands delta, theta, alpha in frequency range as follows

$0.5 \leq delta < 4$
$4 \leq delta < 8$
$8 \leq delta \leq 13$

You are required to filter the EEG signal in following frequency bands and take the DFT and verify the presence of each band.