Dear Student,

Please complete the below and submit it within the deadline.

- Download the "DSPLab_EndSem2021_DataFileFor_(RollNumber).mat" file corresponding to your Roll Number from `https://drive.google.com/drive/folders/1DVLc8bYAoXjZIgbV8QDCZh1qfyWbw3Md?usp=sharing`

- Read the file and play the signal over your speaker. The sampling frequency of the signal is $F_s = 44100$ Hz.

- Find out the frequency components in the signal using the DFT operation. You can use any inbuilt function for computing the DFT in MATLAB.

- Design an FIR and an IIR filter with real coefficients to filter out the highest 4 frequency components of the signal. You can use inbuilt tools in MATLAB for this task.

- Filter out the these highest 4 frequencies by implementing the FIR filter in any form of your choice. Filter out the these highest 4 frequencies by implementing the IIR filter in Direct-Form-II.

- Play the filtered signal over your speaker. Do you hear some noise, in addition to the audible signal? Remove the additional noise and play.

- Quantize the filter coefficients to 4 bits. With the coefficients quantized, will the filter be stable?

The above is an open-ended question/task. You are expected make your own assumptions and design choices to arrive at a result you think is the best (according to the criteria you think is right). During your exam slot, you should individually explain your approach, justify your assumptions and design choices. You should be able to answer underlying conceptual questions. You should also be able to make changes to the system design and code if asked.

What should you submit in Google Classroom? You are expected to submit one .mlx file (MATLAB Live Script, similar to the prelab workbooks), which does all the tasks mentioned above. The file should be named as "DSPLab_EndSem2021_SolutionBy_(RollNumber).mlx".