Lab 1: GNU Radio familiarization

Task 1: Happy birthday song

- Synthesize the tune for “Happy birthday to you” on GNU Radio on repeat loop
- The piano notes for this tune are:

  C,C,D,C,F,E;

  C,C,D,C,G,F;

  C,C,C*,A,G,F,E;

  A#,A#,A,F,G,F

Each note corresponds to a certain frequency. For example, the standard C corresponding to 262Hz. You can look up the remaining frequencies online.

Task 2: Music synthesis

- You have been given two audio files – background.wav and vocal.wav The former contains the background score for a song, sampled at 44.1 kHz, and the latter contains the vocal component, sampled at 32kHz.

- Your task is to coherently combine the two to recreate the music clip

Task 3: Equalization

- Build an equalizer in GNU Radio for music.
  - An equalizer allows one to tune the gain/amplification in different frequency bands: https://en.wikipedia.org/wiki/Equalization_(audio)
  - Use the following bands: 20Hz -- 500Hz, 500Hz -- 3kHz, 3kHz -- 6kHz, 6kHz -- 9kHz, 9kHz -- 15kHz

  - You should have a GUI with a slider for adjusting the gain on each band
  - Use the audio clip Bach.wav to demonstrate your equalizer

Task 4: FM player

- Use the RTL-SRD dongle to build an FM player using GNU Radio
- Your GUI should have a mechanism for choosing the FM frequency

*You are allowed to use the built-in FM demodulation block for this task