

## Tkinter and Pyaudio

### Exercises

- 1) In the demo program *Tk\_demo\_04\_slider.py*, whenever the gain slider is adjusted, a clicking sound can be heard, due to the discontinuity in signal waveform due to a sudden change in amplitude. Modify this program so there is no click (no signal discontinuity).
- 2) Implement a real-time echo effect GUI with a slider to control the delay time. Use a circular buffer.
- 2) Make a real-time vibrato effect GUI with sliders to control the parameters (LFO, depth).
- 3) Make a real-time AM effect GUI with sliders to control the parameters (modulation frequency, gain).

*Submit #1 only.*