Ex. No. 2	Synchronized Animation and Audio
Date of Exercise	19-07-24

Aim:

To record and visualize audio waves.

Algorithm

1. Start
2. Import the required modules
3. Define the number of blocks, channels, format, and other parameters.
4. Open a stream and record audio using pyaudio.
5. Use matplotlib to plot the recorded audio.
6. Show the plot.
7. Stop

Program

A) To display and visualize audio waves

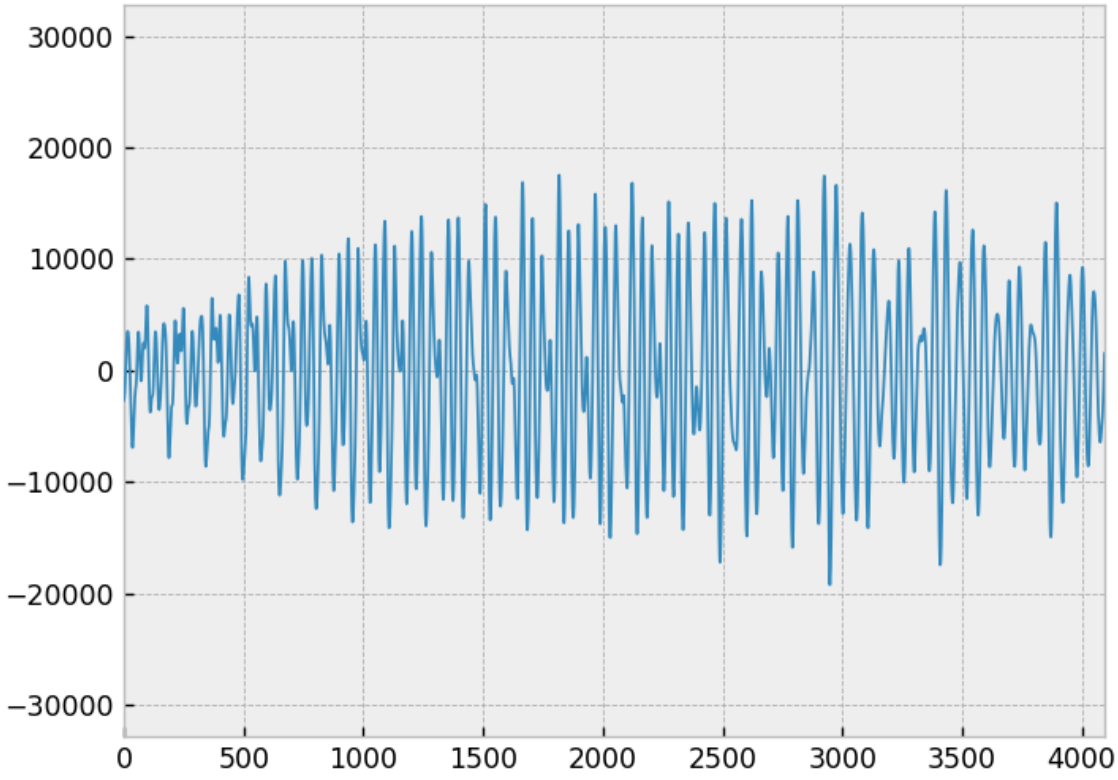
Code:

```
import numpy as np
import pyaudio
import matplotlib.pyplot as plt
from matplotlib.animation import FuncAnimation

p = pyaudio.PyAudio()

info = p.get_host_api_info_by_index(0)
numdevices = info.get('deviceCount')
for i in range(0, numdevices):
    if p.get_device_info_by_host_api_device_index(0, i).get('maxInputChannels') > 0:
```

```
    print("Input Device id ", i, " - ", p.get_device_info_by_host_api_device_index(0,
i).get('name'))

SAMPLESIZE = 4096
SAMPLERATE = 44100

stream = p.open(format=pyaudio.paInt16,
                channels=1,
                rate=SAMPLERATE,
                input=True,
                frames_per_buffer=SAMPLESIZE)

plt.style.use('bmh')
fig, ax = plt.subplots()
x = np.arange(0, SAMPLESIZE)
line, = ax.plot(x, np.random.rand(SAMPLESIZE), lw=1)
ax.set_xlim(0, SAMPLESIZE - 1)
ax.set_ylim(-2**15, 2**15 - 1)

def init():
   line.set_ydata(np.ma.array(x, mask=True))
   return line,

def animate(i):
   try:
      data = np.frombuffer(stream.read(SAMPLESIZE), dtype=np.int16)
      line.set_ydata(data)
   except IOError as e:
      print("IOError:", e)
   return line,

ani = FuncAnimation(fig, animate, init_func=init, blit=True, interval=50,
cache_frame_data=False)
plt.show()
```

Output

```
Input Device id  0  -  Microsoft Sound Mapper - Input
Input Device id  1  -  Microphone Array (Intel® Smart
Input Device id  2  -  Headset (WH-CH510)
```



Result

The program to record and visualize audio waves has been successfully built and verified.