OCTAPAD

GROUP - 06

SUMMARY

Octapad is a western electronic instrument consisting of eight pads. It is a compact instrument using which we can mimic other instruments like the Drum Set, Tabla, Flute, and many other instruments. That is the main advantage of octapad over any other electronic instrument; one can use it to play many different types of notes and generate a wide variety of music using the different kits available in it. The latest version of octapad, i.e. SPD-30 contains 99 kits available, it means that 99 notes can be played from one pad, so a total of 99*8 notes can be played using this instrument. This solves the problem of huge space required by the drum-set or similar other instruments. An octapad, although a very compact, and useful instrument, is very costly and many people, who might want to learn it, have to take a step back because of its high price. Its high cost is due to the fact that it is not manufactured in India. It is manufactured only by **Roland Corporation** of Japan.

The aim of our project is to make a software application that mimics an octapad. This will solve the problem of high cost and will help the music enthusiasts to learn this instrument. We have used **Scilab** to generate the musical notes which are essentially generated when one strikes the pads with a pair of sticks. The user interface is designed using **Java GUI**. Since octapad can be used to realize many instruments like drum-set and tablas and contains a wide variety of notes saved electronically into each pad; we decided to show the working of an octapad as a **drum-set**.

THEORY

Our project essentially involves making a software application that works exactly like an actual octapad, and use it to realize an entire drum-set. Hence it comprises of two parts :

1. Generating the musical note for each pad corresponding to each instrument present in a drum-set, and
2. Making a user interface that looks like an actual octapad and fixes the musical note in each pad.

Generating the musical note for each pad corresponding to each instrument present in a   drum-set

For the first part, we have used **Scilab**. Drum-Set consists of the following instruments :
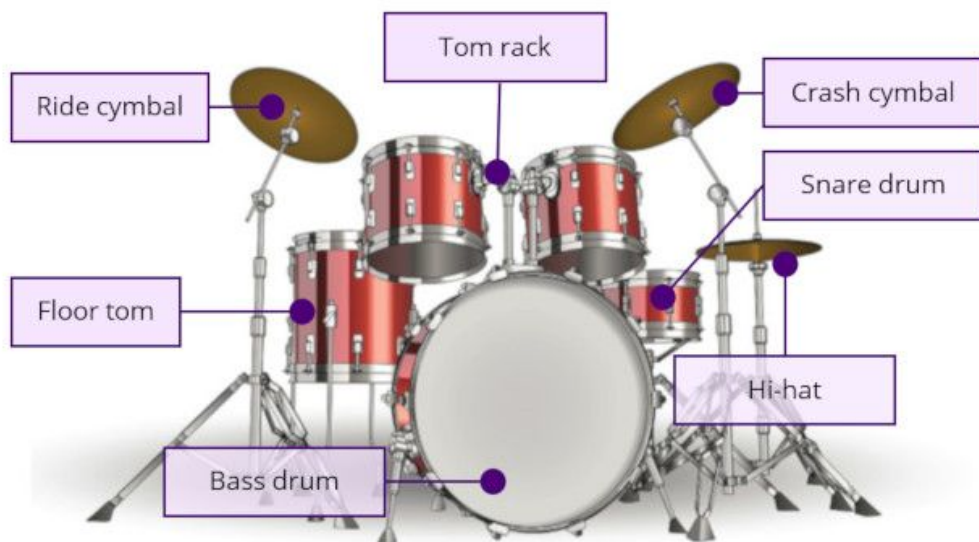
These can be implemented using an octapad in the following manner :
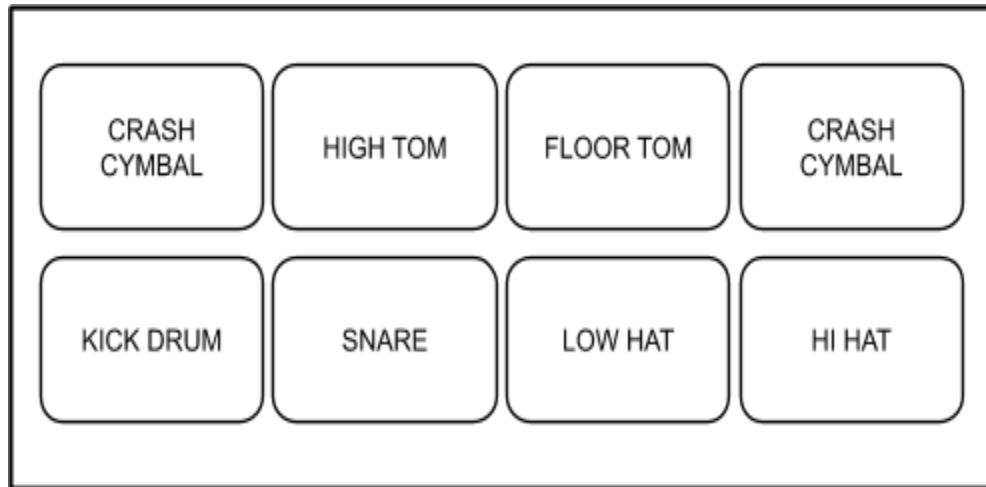
We know the basic sampling frequency of each instrument, which is equal to **44100 samples/second**. So depending on the pitch of the sound we have generated the envelope. The envelope used here is the basic **ADSR (Attack-Decay-Sustain-Release) envelope**. The envelope which we have used is the **exponential wave**, and for the waveform, we have used a range of **sine waves** to generate the desired frequency.

We have tried to mimic the actual sound of the instrument as closely as possible using the above-described method. The Scilab code written for each note generates the waveform of the note and a **.wav file** of that particular note.

For the second part, we have used **Java Swing GUI** to make an interface that looks like an actual octapad. It consists of eight buttons each representing one pad on an octapad. The .wav file generated by the Scilab code is programmatically added in the button such that when the button is pressed the java program reads the particular .wav file signed to it and generates the sound.

We have used java GUI since it is easy to implement programs in it and it acts as a better user interface by providing the feel of an actual Octapad.

ALGORITHM
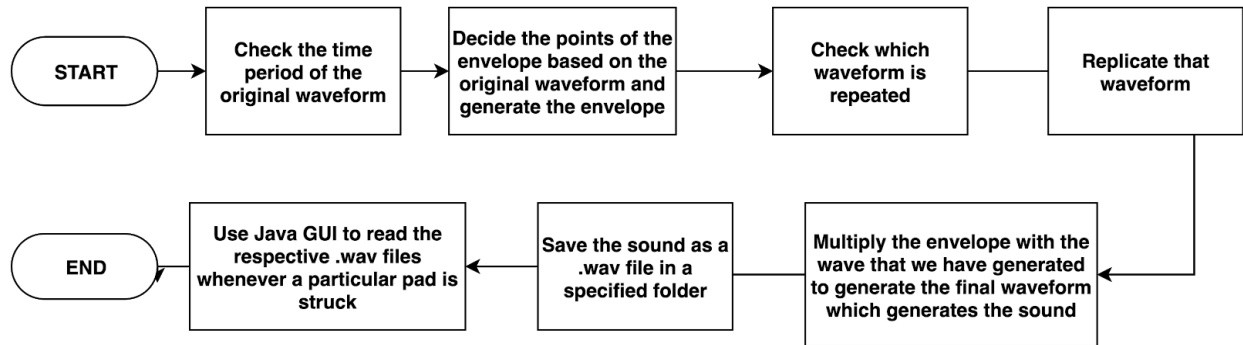
RESULTS

We have been able to make the application that realizes an Octapad. The Scilab code written to generate the notes were developed by trial and error method. The notes generated by us were almost similar to the original sound of the respective instrument. We have saved those notes in the form of .wav files and were read using Java GUI Application.

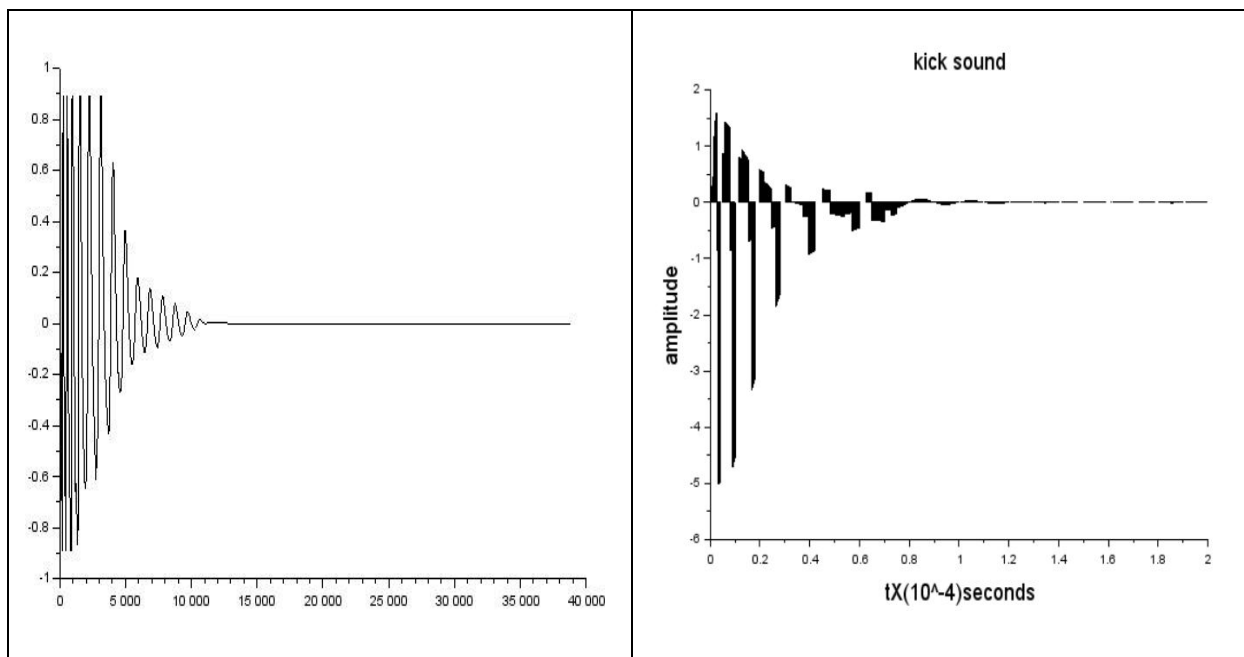The waveforms generated by us and the original sound waves :
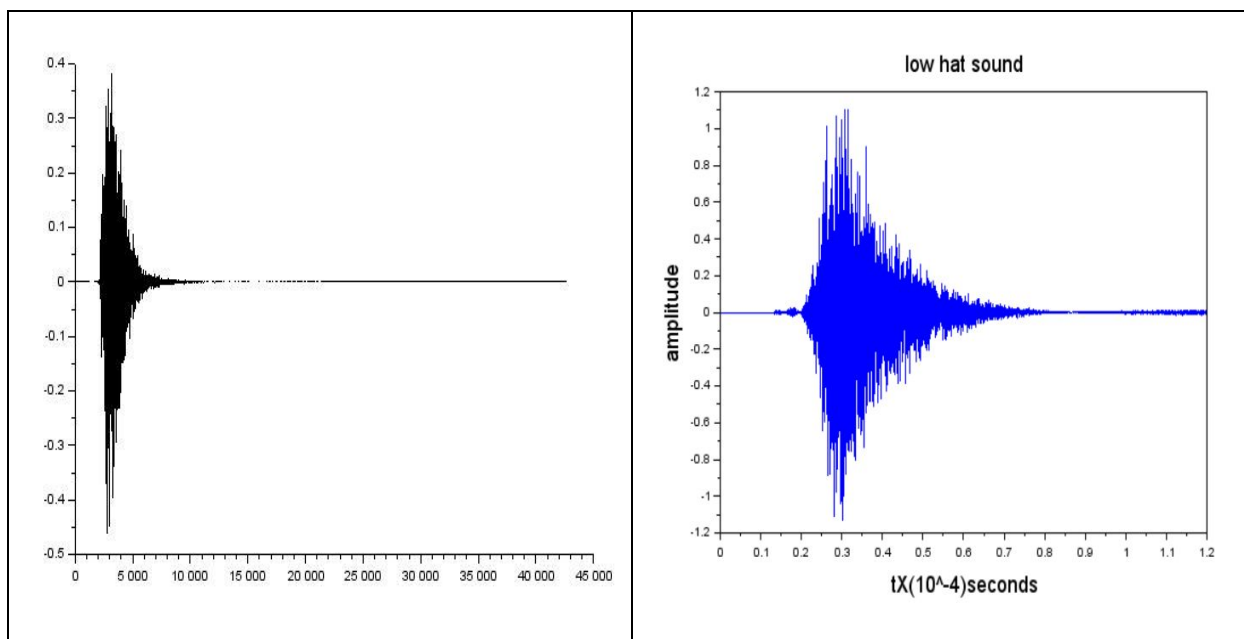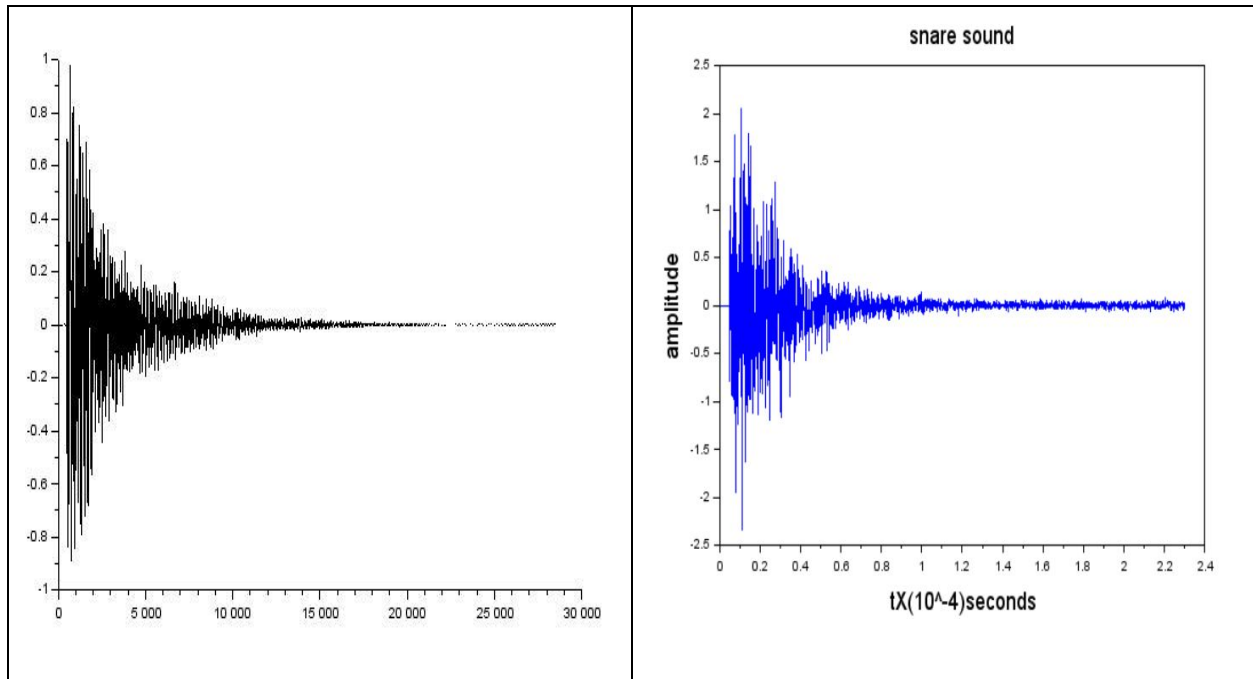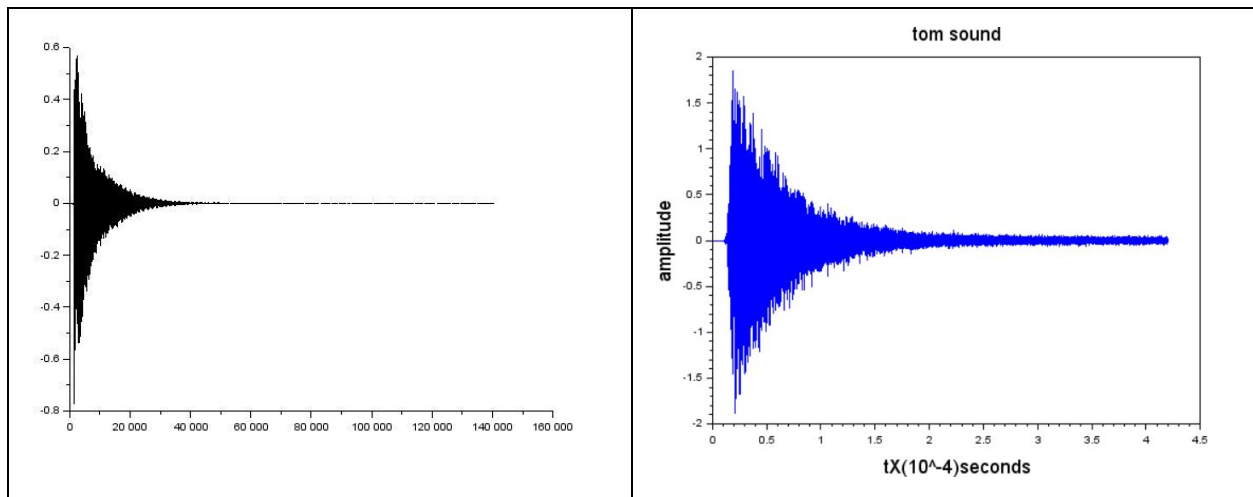
Crash

Hi-Hat
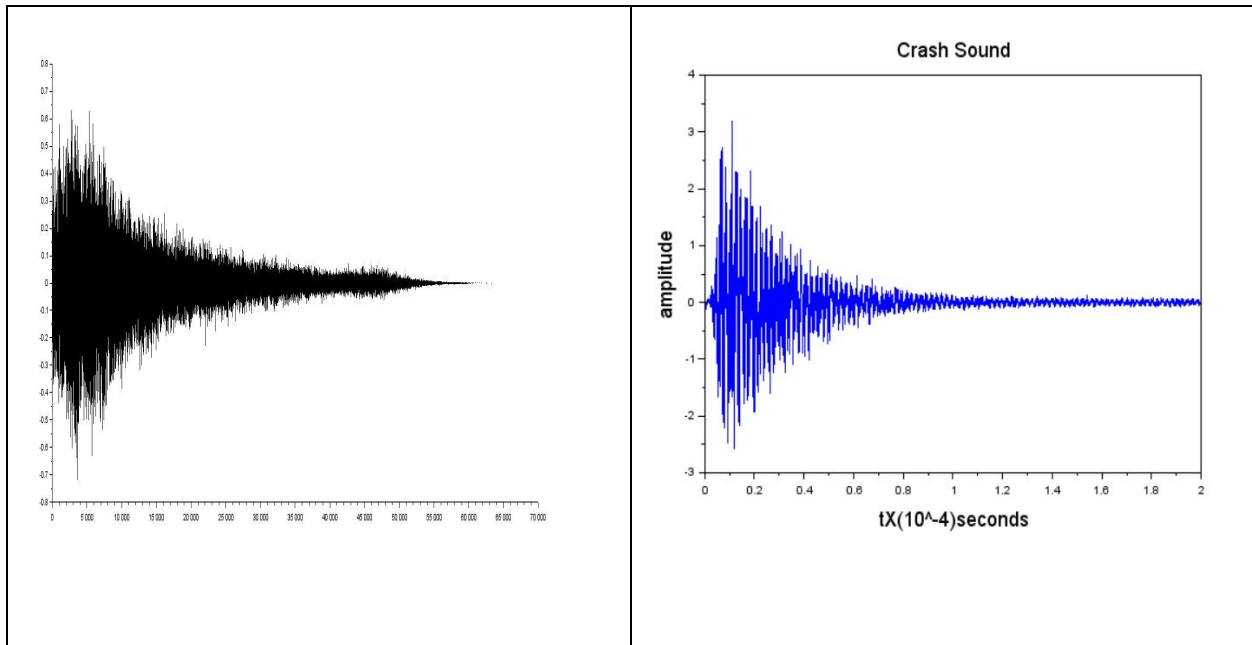
Kick-sound
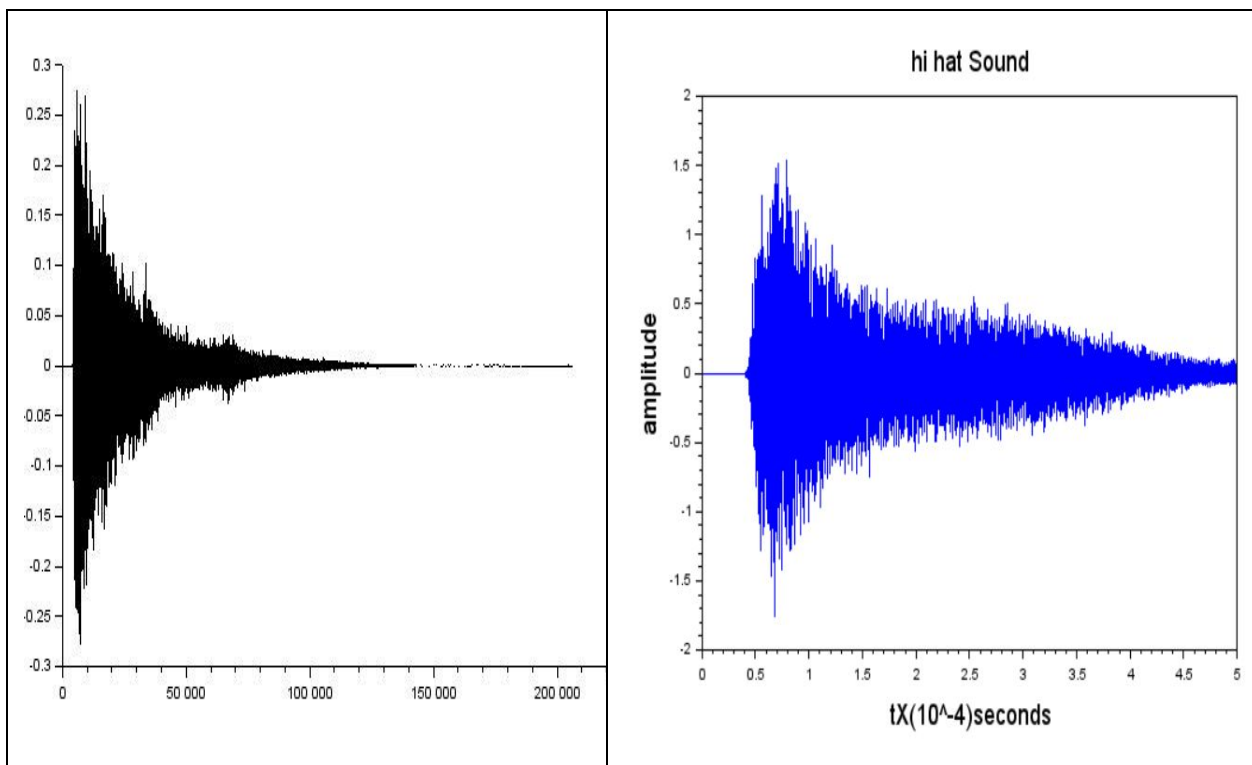
kick sound

Low-hat

low hat sound

Snare

Tom

The final Octapad Application after implementing the GUI looks like this.

We have designed our octapad application only for one kit, the actual octapad consists of many kits which can be used to generate different types of music. The frequencies can be changed according to our requirements in an actual octapad, but our application has fixed frequencies. These are the limitations of our application.

For future aspects, we wish to extend the number of notes per pad in our octapad to use it to realize other instruments like flute, percussion drums, tablas, etc. We also wish to implement a functionality to change the frequencies and other settings so as to generate the required music.