TECHNICAL REPORT

We first simulated the draggable objects theory. Then once you drag the objects, the objects' positions are updated on the spot. The next step would be pressing on of the buttons which are the measuring with decay or not. There are also another 2 buttons; the window destroyer and the delete the lines button.

Once you press either one of the buttons of the measurement process. A frequency spectrum of each of the stereo channel will be displayed (left and right). Firstly, we imported the necessary libraries for the code. Then we created a tkinter window with simple rules as texts on the cyan canvas we move freely in. We have 3 functions for each object (Mic1, Mic2, and Source). We then read our audio file as a wav one and extract the necessary features for our project (sample frequency, number of samples, number of channels, time and the sample wave).

As we mentioned before we plot the normal simulation without decay with its frequency spectrum if the no decay button is pressed. We calculate the distance between each mic and the source and display them as an alert message. Moreover, we calculate the delay of each distance and add it to the time axis of each signal. You will notice that the larger the distance, the more delay the signal will have and the later it will finish even if it is 1 second.

As displayed in the video, you can drag the objects around in the window and calculate the distance and delay with decay or not. Then graphs will pop up and view the channels, frequency spectrums and the delayed signals separately. Furthermore, the decay button will view both signals together. Of course, you could delete the lines and start over anytime without the need to run the code again. Just drag the objects to your desired positions and press the buttons and the figures would be displayed. Along the way, we print some vital attributes to keep track of the experiment. It would be visible in the terminal every time the experiment is run.

Abdelrahman Khaled was responsible for the draggable objects, distance and delay calculations. Youssef Ayman was responsible for the conversions from amplitude to dB and decay mode phase in the simulation.