

# Short Test 1

**Description:** Considering that the M-sample long signal  $s[\cdot]$  corresponds to a speech raw data, write either an algorithm or a code in any programming language to reverse it in time

```
In [ ]: # defining a function to reverse a signal
def reverse_signal(signal):
    return signal[::-1]
```

## Testing the function

Below I generate sine waves to test the reversing signal function

```
In [ ]: import numpy as np
import pyaudio
```

```
In [ ]: # generating a sine wave with a frequency of 440Hz (note A) and a sine wave with frequency of 256.63 Hz (note C) and sample rate of 44100
sample_rate = 44100
s_A = (np.sin(2 * np.pi * np.arange(sample_rate) * 440 / sample_rate)).astype(np.float32)
s_C = (np.sin(2 * np.pi * np.arange(sample_rate) * 256.63 / sample_rate)).astype(np.float32)
# concatenating the two sine waves so the signal plays A then C
s = np.concatenate((s_A, s_C))
```

```
In [ ]: # defining a function to play the signal
def play_signal(signal):
    p = pyaudio.PyAudio()

    stream = p.open(format=pyaudio.paFloat32,
                    channels=1,
                    rate=sample_rate,
                    output=True)

    stream.write(signal.tobytes())

    stream.stop_stream()
    stream.close()

    p.terminate()
```

```
In [ ]: # reversing the signal
s_reversed = reverse_signal(s)
```

```
In [ ]: # playing the original signal and the reversed signal
play_signal(s) # A > C
play_signal(s_reversed) # C > A
```

**Author:** Matheus Sinto Novaes

**E-mail:** matheus.sinto@unesp.br

**Course:** Digital Speech Processing

**Professor:** Dr. Eng. Rodrigo Capobianco Guido

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