

# Report of Exercise 1

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**1**

**- what is the length of the audio signal: t in seconds (0.1 pt)?**

the length of the audio signal is 3.603 seconds. The length of the signal divides by the sampling frequency, which is  $\text{len}(x)/f_s$ , where  $x$  is the input signal and  $f_s$  is the sampling frequency.

**- what is the fundamental frequency of the audio signal: F0 in Hz (0.1 pt)?**

1875 Hz, as we can see from the figure, the first partial is at 1875 Hz.

**- what are the partials of the audio signal, find the first three (0.1 pt)?**

1875 Hz, 7000 Hz, 10000 Hz. As we can read from the figure, when we zoom in from the figure, we can get these three values.

**4**

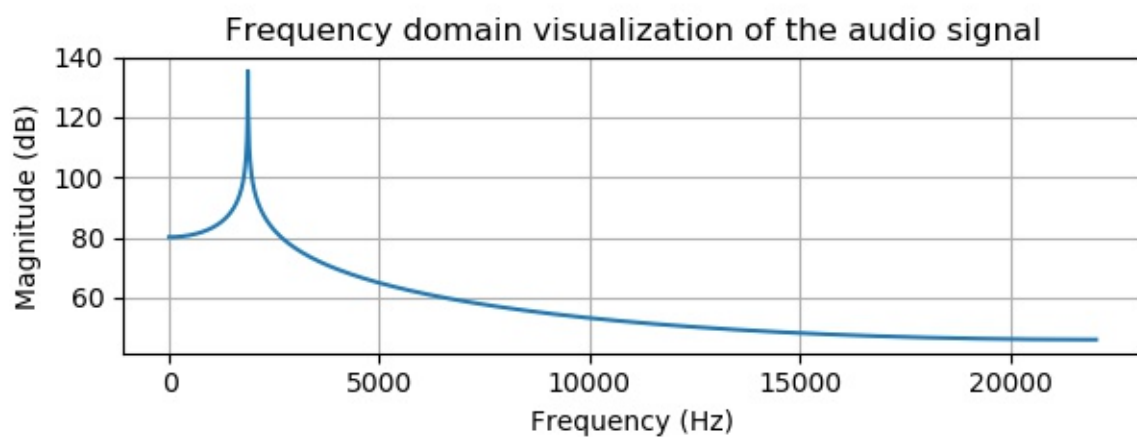
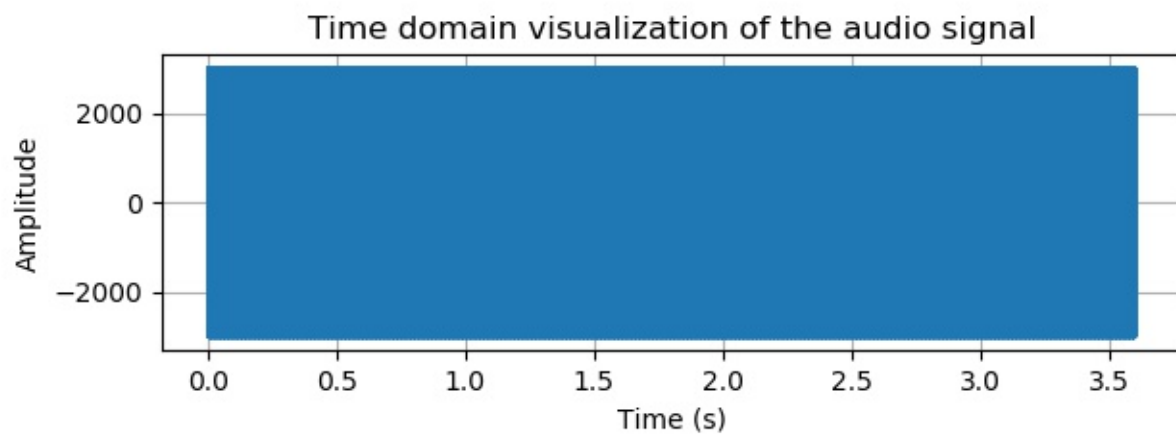
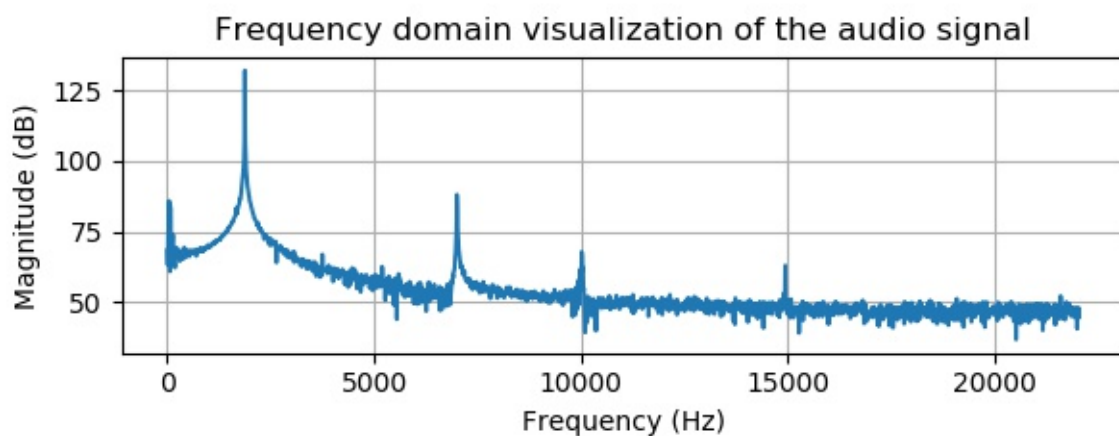
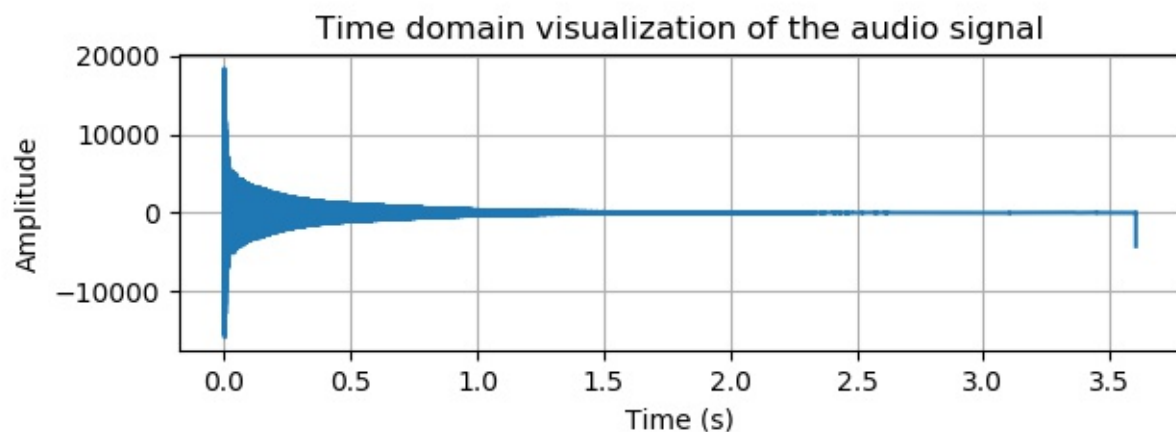
**- Question: play y1, y2, y. listen to the signals, do you think your synthesized signal resembles the original musical instrument (0.2 pt)?**

Yes, somehow it resembles the original musical instrument. However, there are some dissimilarities. The reason for that is we only construct the first two partials not every partial of the original signal.

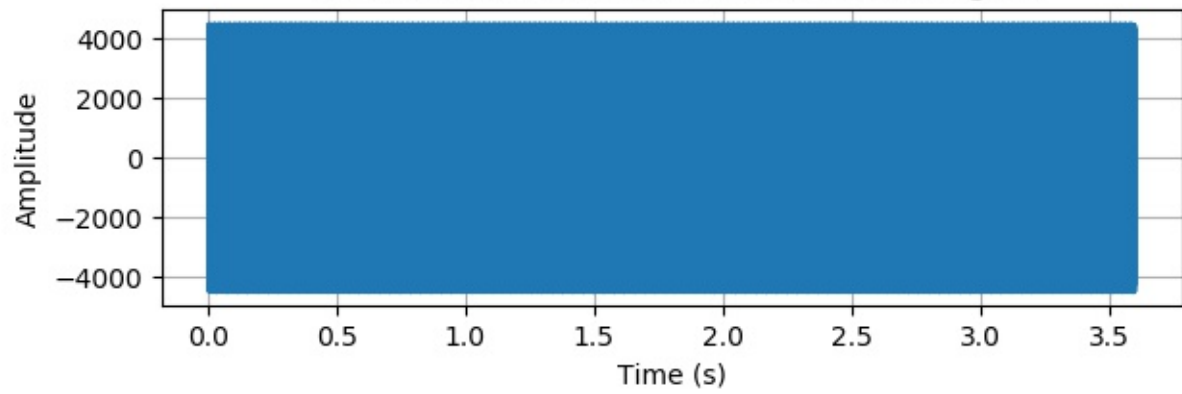
**- Question: what would you do to make the synthesized signal more similar to the original (0.3 pt)?**

we should create more partials, like the first, the second, the third..., instead of the first two partials of the original signal.

**The figures that have been created during the code are listed below.**



Time domain visualization of the audio signal



Frequency domain visualization of the audio signal

