

EE 311
Assignment 2

January 18, 2018
Due: January 27, 2018

The m-file on the following page generates 2 seconds of a sine wave with a frequency of 1000 Hz and an amplitude of 1.0. It saves this waveform as a .wav file as *SineWave.wav* with a sample frequency of 44100Hz. The program then reads *SineWave.wav*, plays it through the speaker and plots the file in both time and frequency with appropriately labeled axis.

Use this m-file as a guide and create a single m-file which will do the same thing for a square wave, a sawtooth wave, and a triangular wave. Note that MATLAB has two functions called `square` which will generate a square wave and `sawtooth` which can be used to generate both a sawtooth and a triangular wave. In all cases your waveforms should have an amplitude of 1 and a frequency of 1000 Hz.

Turn in the following:

1. Cover page with your name, the course number (EE 311), the date turned in, and the assignment number.
2. Your commented m-file.
3. Your m-file output figures with appropriate labels and figure numbers.

```

%Sinewave.m
fs = 44100;T = 1/fs;
t = 0:T:2;
y = sin(2*pi*1000*t);
figure(1);clf;
plot(t,y);
axis([0 .02 -1.1 1.1]);
audiowrite('SineWave.wav', y, fs);
%
[x fs] = audioread('SineWave.wav');
T = 1/fs;
k = 1:length(x);
figure(2);clf;
subplot(2,1,1)
plot(k*T,x) %Plot x in time
axis([0 T*length(x) -1.5 1.5])
xlabel('time in seconds');
ylabel('voltage');
title('SineWave.wav in Time');
%
X = fft(x);
X = X/max(abs(X));
subplot(2,1,2)
plot(k*fs/length(x), abs(X)) %Plot X in frequency
axis([0 fs/2 0 .5]);
xlabel('frequency in Hz');
ylabel('gain');
title('SineWav.wav in frequency');
player = audioplayer(x, fs);
play(player);

```