# LABORATORY ACTIVITY #1
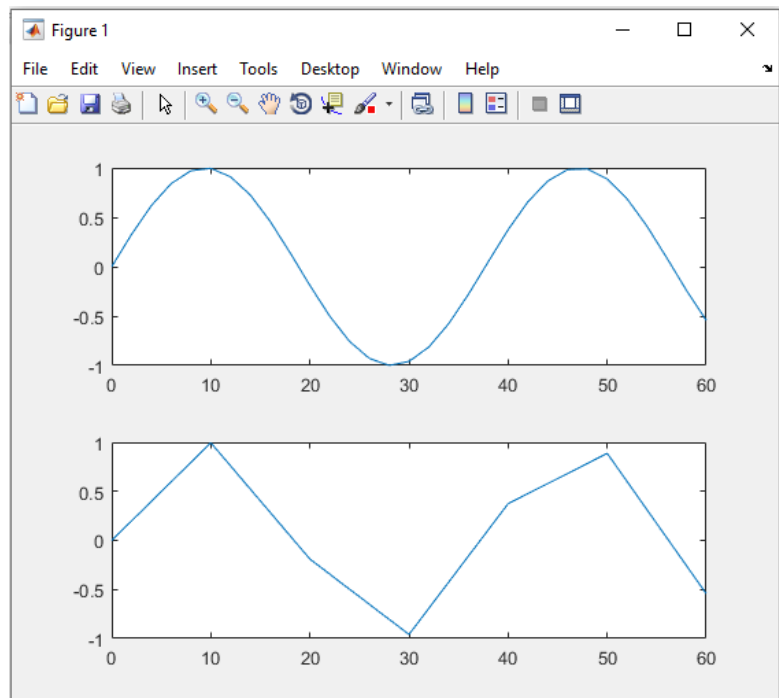
## GENERATION OF SIGNALS IN MATLAB/SCILAB

I. **Continuous Time Signal**

Continuous-time signal is the "function of continuous-time variable that has uncountable or infinite set of numbers in its sequence".

The MATLAB **plot function** may be used to generate such plots.

```
n1 = 0:2:60;
z = sin(n1/6);
subplot(2,1,1)
plot(n1,z)

n2 = 0:10:60;
w = sin(n2/6);
subplot(2,1,2)
plot(n2,w)
```



II. **Discrete Time Signal**

Discrete-time signal is the "function of discrete-time variable that has countable or finite set of numbers in its sequence". It is a digital representation of continuous-time signal.

It is common to graph a discrete-time signal as dots in a Cartesian coordinate system. This can be done in the Matlab environment by using the stem command.

**stem(Y)** plots the data sequence, Y, as stems that extend from a baseline along the x-axis. The data values are indicated by circles terminating each stem.

- If Y is a vector, then the x-axis scale ranges from 1 to length(Y).

- If Y is a matrix, then stem plots all elements in a row against the same x value, and the x-axis scale ranges from 1 to the number of rows in Y.

**stem(X,Y)** plots the data sequence, Y, at values specified by X. The X and Y inputs must be vectors or matrices of the same size. Additionally, X can be a row or column vector and Y must be a matrix with length(X) rows.

- If X and Y are both vectors, then stem plots entries in Y against corresponding entries in X.

- If X is a vector and Y is a matrix, then stem plots each column of Y against the set of values specified by X, such that all elements in a row of Y are plotted against the same value.

- If X and Y are both matrices, then stem plots columns of Y against corresponding columns of X.

**stem(___,'filled')** fills the circles. Use this option with any of the input argument combinations in the previous syntaxes.

Example:
n = 0:2:60;
y = sin(n/6);
stem(n,y)
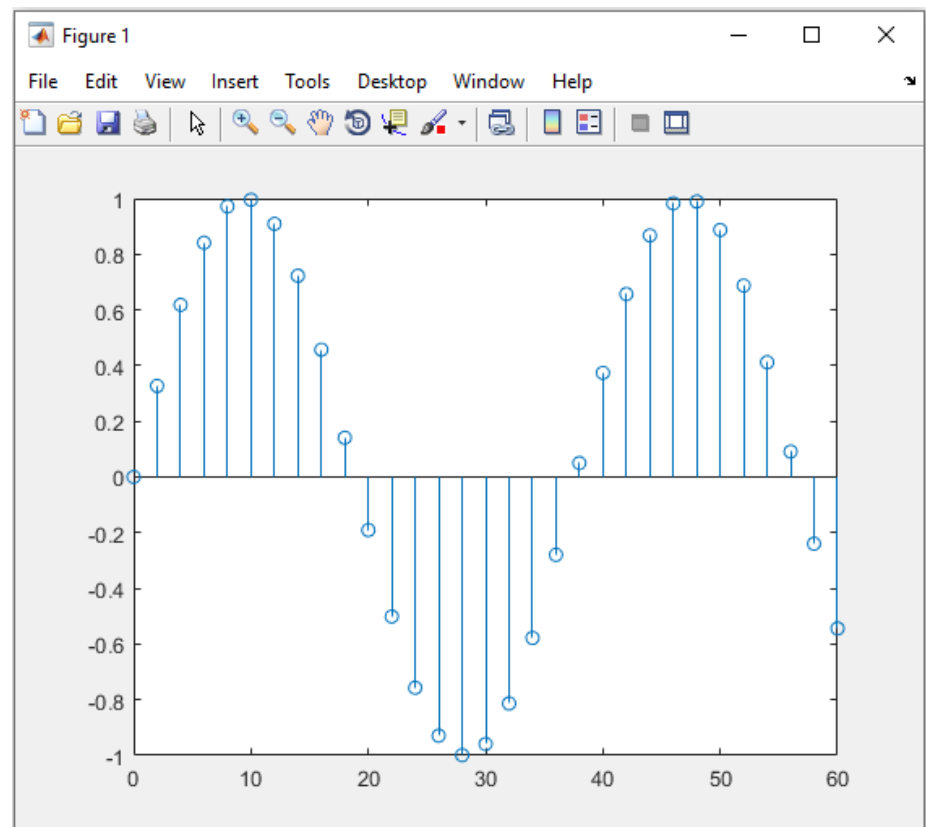
III.    Laboratory Exercises
1.  Generate a Continuous Time Signal and a Discrete Time Signal for $\sin(2\pi ft)$ where t is from 0 to 10 and f is based on the student number in the class list.
2.  Generate the Discrete Time Signal for the following standard input signals:
    a.  Unit Step Input
    b.  Unit Ramp Input
    c.  Unit Impulse Input
    d.  Parabolic Input
    e.  Sinusoidal Input

**Note:** Label the simulations with the **title** command and include your family name. Comment your complete name in the MATLAB/SCILAB code.