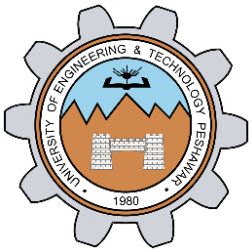
GENERATING UNIT IMPULSE AND UNIT STEP SEQUENCES AND BASIC SIGNALS OPERATION

Lab#07



Spring 2023

Submitted by: **Hassan Zaib Jadoon**

Registration No: **22PWCSE2144**

Class Section: **A**

"On my honor, as student of University of Engineering and Technology, I have neither given nor received unauthorized assistance on this academic work."

Recoverable Signature

Student Signature: X Hassan

Hassan Zaib Jadoon
Student
Signed by: 0319bf8f-243a-4ef4-af4e-980ee8eee4da

Submitted to:

Dr. Safdar Nawaz Khan Marwat

Department of Computer Systems Engineering

University of Engineering and Technology, Peshawar

Task #01

Using one's function; plot the signum sequence over interval -10≤n≤10. It can be defined as:

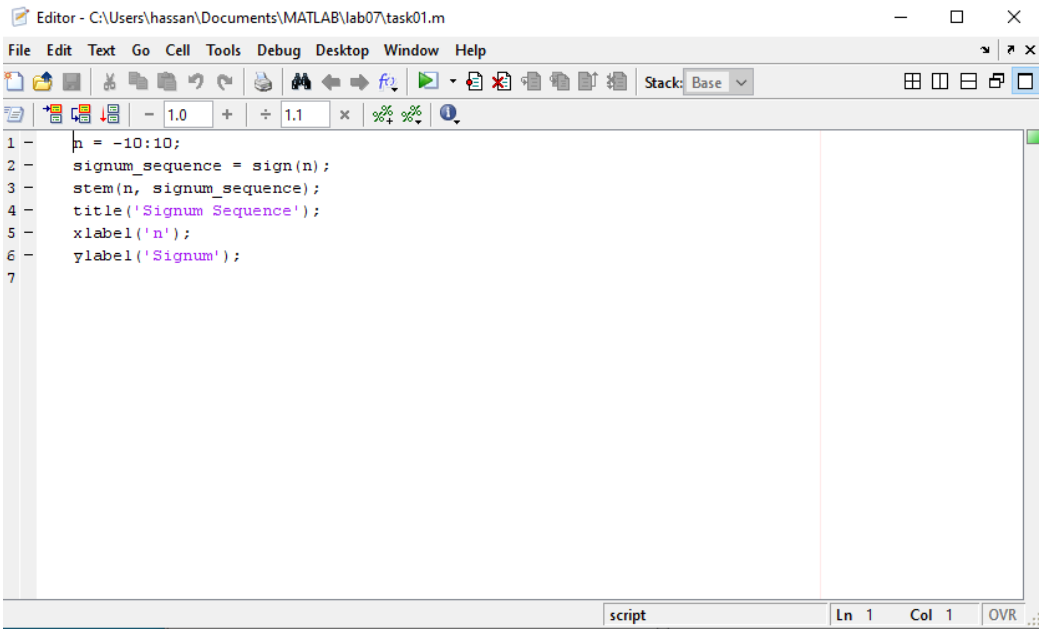
Problem Analysis:

In this problem we have to plot the following given signals for n<,> or = zero.

Algorithm:

1. Generate the n number of sequence from -10 to 10.
2. Now plot the following given signal.

Code:



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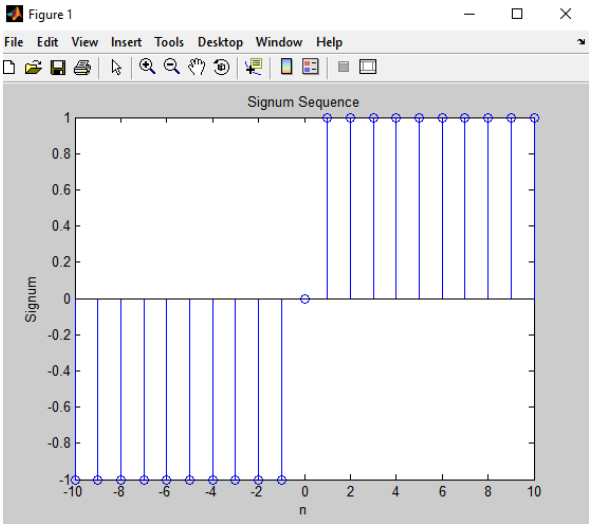


Task #02

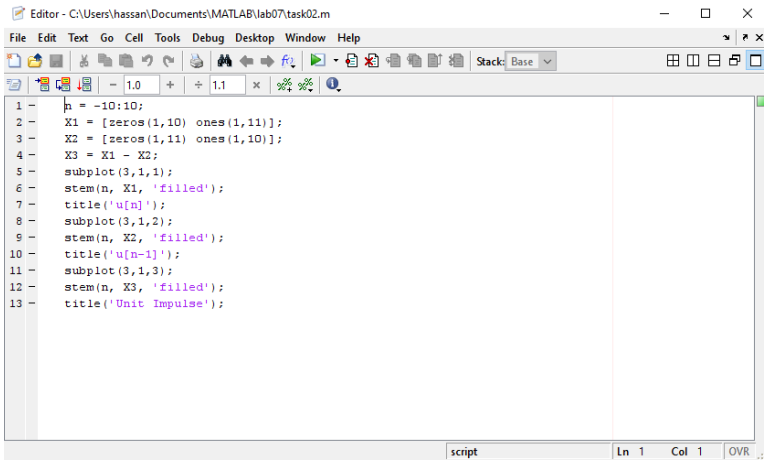
Problem Analysis:

In this problem we must make the unit impulse signal from unit step signal

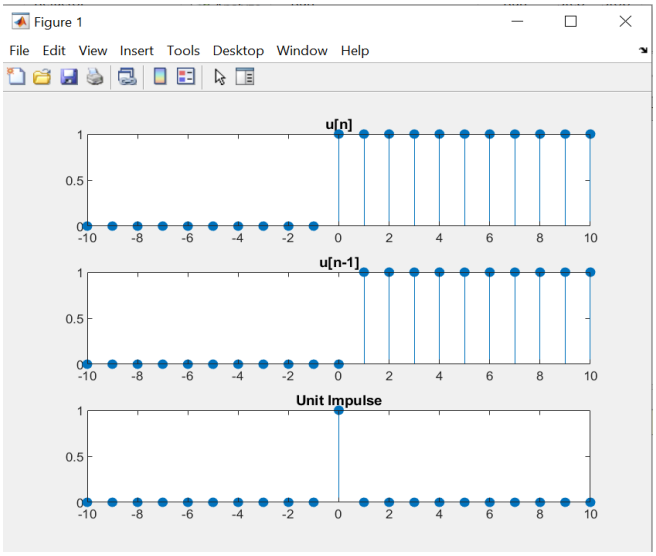
Algorithm:

1. Generate the n number of sequence from -10 to 10.
2. Now make u[n] signal and assign it to x1.
3. Then make u[n-1] signal and assign it to x2.
4. Subtract x1 from x2 and assign it to x3.
5. Now plot the x1 x2 and x3 signals.

Code:



Output:



Conclusion:

We generate the unit impulse signal from unit step signal.

Task #03

Delay the original signal given in above example by 1 sec. Plot both the delayed & original signal on the same figure.

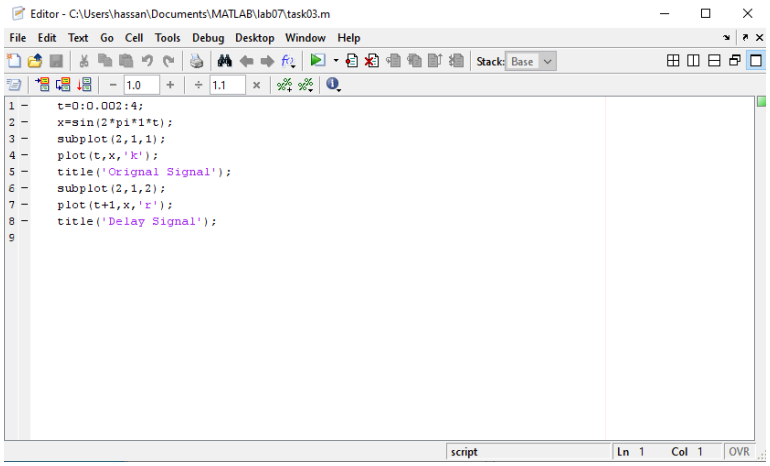
Problem Analysis:

In this problem we have to delay the original signal given in above example by 1 sec. Plot both the delayed & original signal on the same figure.

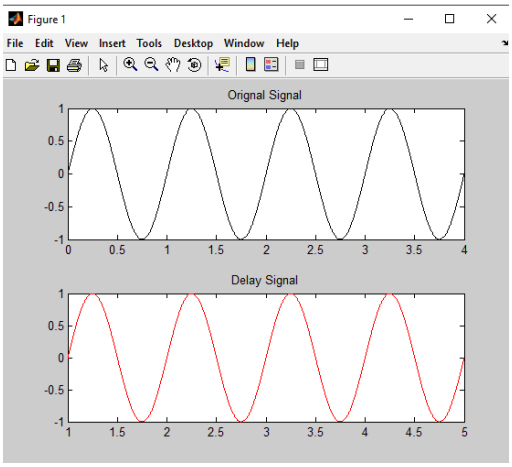
Algorithm:

1. Now generate time t sequence from 0 to 4 with a difference of 0.002.
2. Now plot the sin wave.
3. Then make the signal delayed from t to t+1 and plot it.

Code:



Output:



Conclusion:

We delay the original signal given in above example by 1 sec.

Task #04

Flip the following signal:

$$y = 5 \exp\left(i * n * \frac{\pi}{4}\right)$$

Plot the original signal as well as the flipped one in the same figure

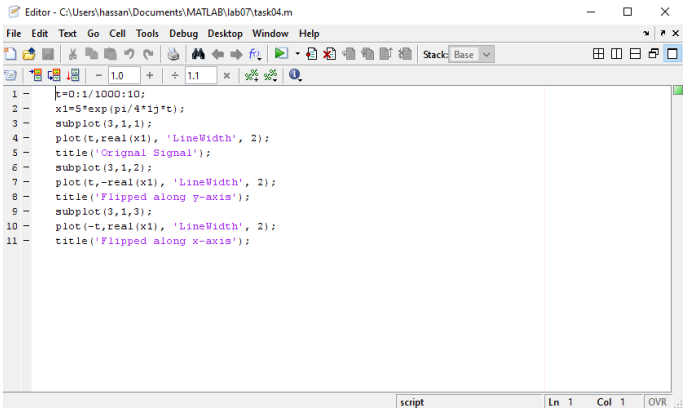
Problem Analysis:

In the problem we have to flip the given signal and the plot both the original and flipped signal.

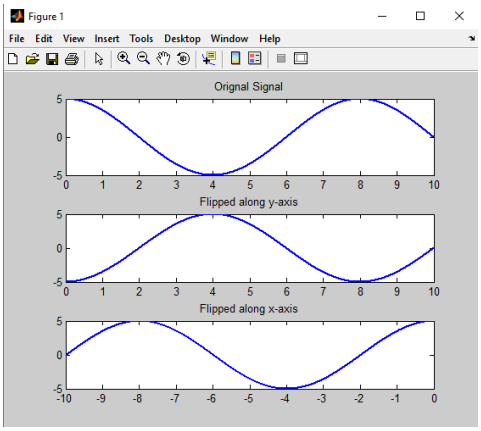
Algorithm:

1. First clear the command window.
2. Then clear the workspace.
3. Then close any open files.
4. Now generate time t sequence from 0 to 4 with a difference of 0.002.
5. Then make the given exponential signal.
6. Plot the original signal.
7. Flipped the original signal by assigning negative sign to original signal.
8. Plot the flipped signal.

Code:



Output:



Conclusion:

We make and plot the given exponential signal and flipped it.

Task #05

Flip the following signal:

$$x[n]= 2\delta[n]+ 5\delta[n-1] + 8\delta[n-2] + 4\delta[n-3] + 3\delta[n-4]$$

Plot the original signal as well as the flipped one in the same figure

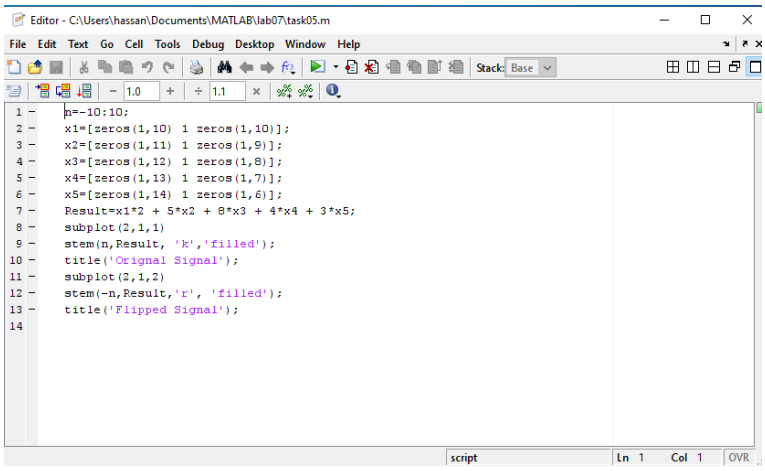
Problem Analysis:

In this problem we have to make the given signal and then flipped it. Then plot both the original and flipped signal.

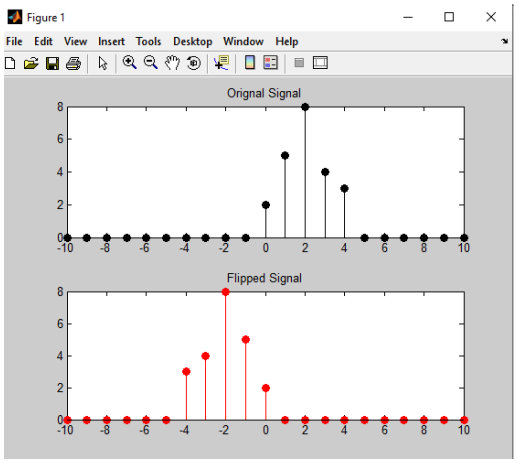
Algorithm:

1. First clear the command window.
2. Then clear the workspace.
3. Then close any open files.
4. Generate the n number of sequence from -10 to 10.
5. Then make the unit impulse signals for the following given impulses.
6. Plot this signal.
7. Then flipped the original signal by assigning negative sign to original signal.
8. And plot it.

Code:



Output:



Conclusion:

We make and plot the given discrete signal and flipped it.

Task #06

Scale the continuous-time sinusoid used in signal shifting example by a factor of 2.

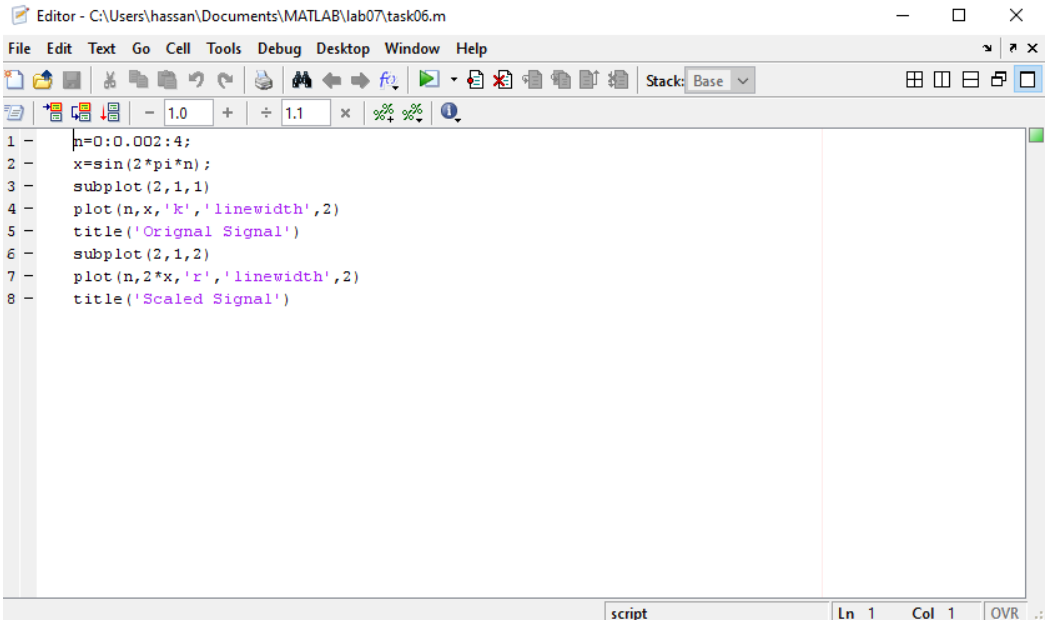
Problem Analysis:

In this problem we have to scale the continuous-time sinusoid used in signal shifting example by a factor of 2.

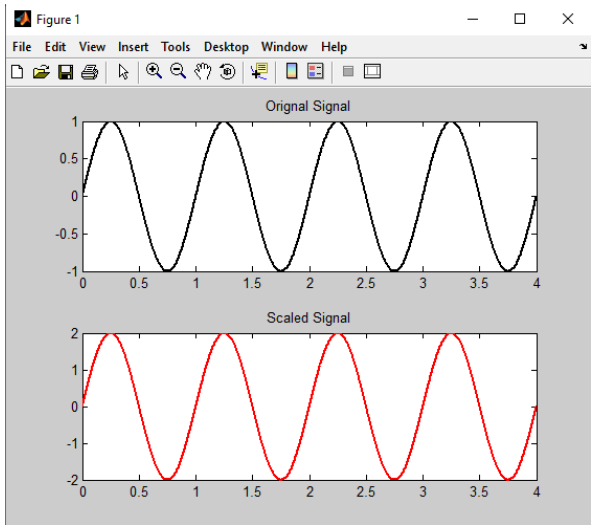
Algorithm:

1. Generate the n number of sequence from 0 to 4 with a difference of 0.002.
2. Make a sinusoidal signal and plot it.
3. Then scale the original by aa factor of 2.
4. Plot the scaled signals.

Code:



Output:



Discussion and Conclusion:

We make and observe the sinusoidal signal and then scaled it by a factor of 2.

Task #07:

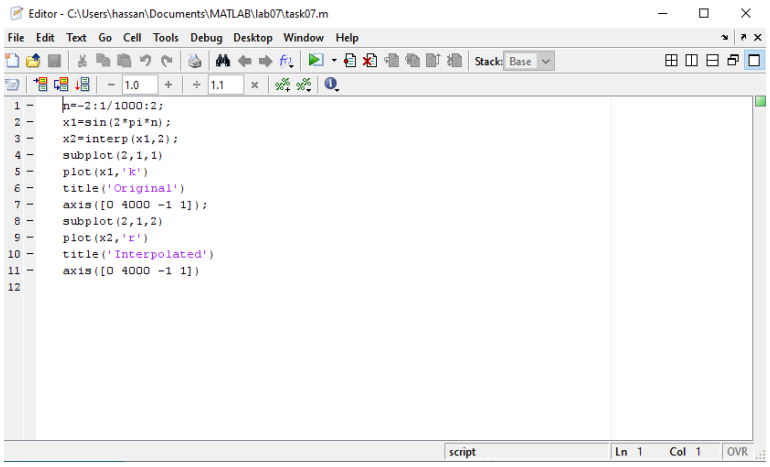
Problem Analysis:

In this we have to use interpolate command by making up-sample signal and scaled it by a factor of 2.

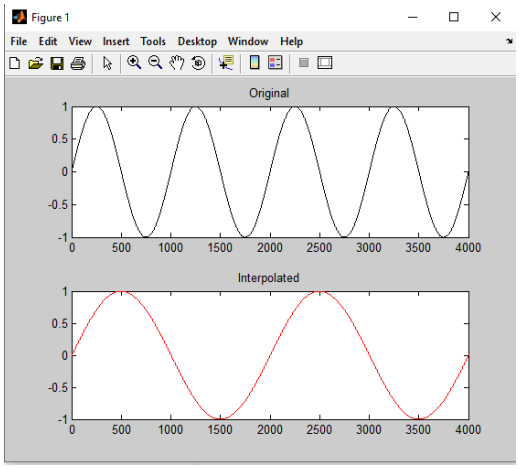
Algorithm:

1. Generate the n number of sequence from -2 to 2 with a difference of 0.001.
2. Make a sinusoidal signal and assign it to x1
3. Then interpolate the x1 signal and assign it x2.
4. Plot the x1 and x2 signals.

Code:



Output:



Discussion and Conclusion:

We use the interp command to interpolate the up-sample signal by a factor of 2.