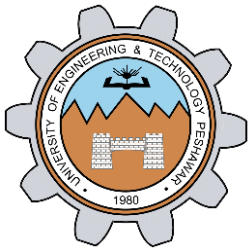
INTRODUCTION TO SIGNALS

LAB # 01



CSE402L Digital Signal Processing Lab

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Class Section: **B**

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

Student Signature: _____

Submitted to: **Engr. Faiz Ullah**

Wednesday, December 9th, 2020

Department of Computer Systems Engineering

University of Engineering and Technology, Peshawar

Lab Objectives:

Objectives of this lab are as follows:

- Generating basic sequences in MATLAB.
- Graphical views of different arithmetic operations on basic functions.

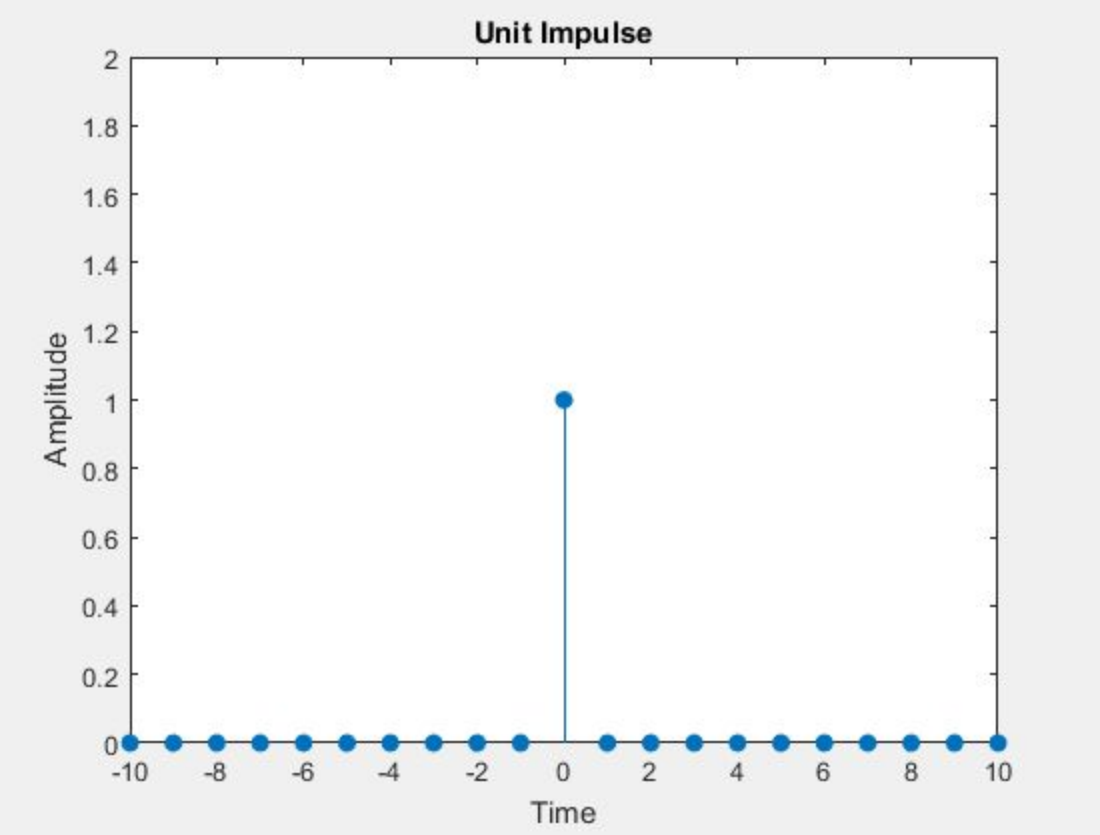
Task # 1:

Write a Matlab code that generates Delta (Impulse) Function.

Code:

```
n=-10:10;
x=[zeros(1,10) 1 zeros(1,10)];
stem(n,x,'filled');
xlabel('Time');
ylabel('Amplitude');
title('Unit Impulse');
axis([-10 10 0 2]);
```

Output:



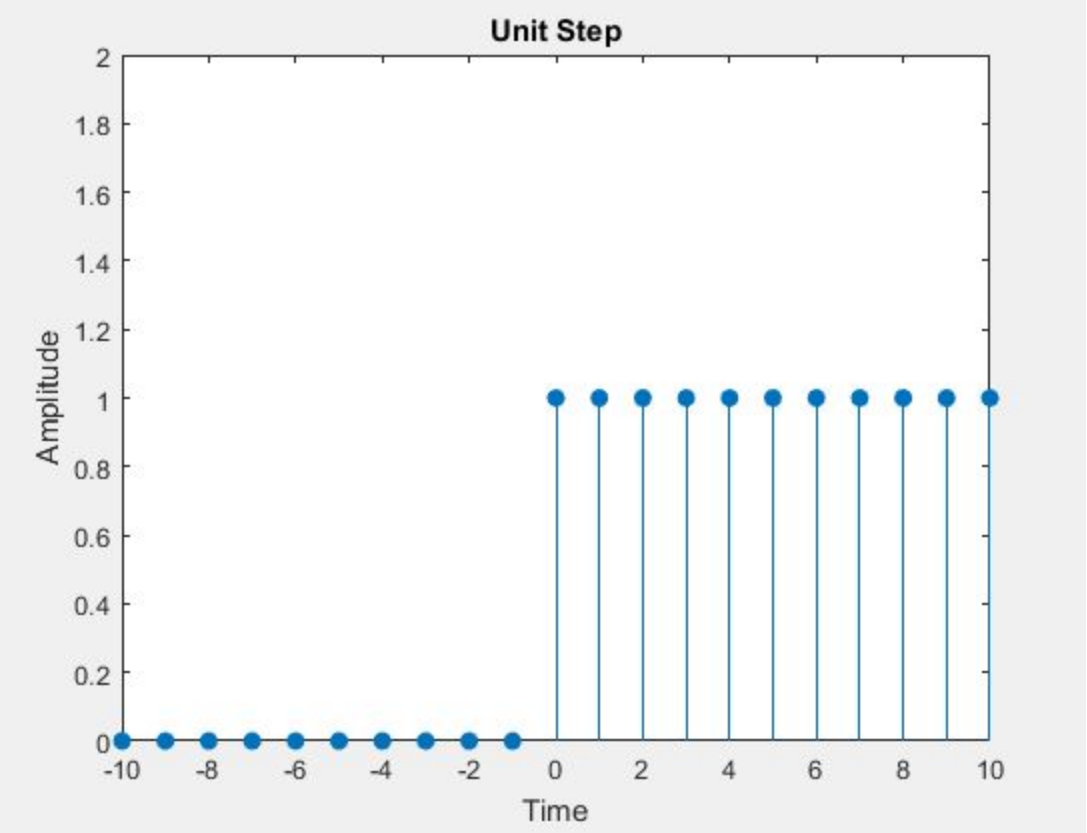
Task # 2:

Write a Matlab code that generates Unit Step Function.

Code:

```
n=-10:10;
x=[zeros(1,10) ones(1,11)];
stem(n,x,'filled');
xlabel('Time');
ylabel('Amplitude');
title('Unit Step');
axis([-10 10 0 2]);
```

Output:



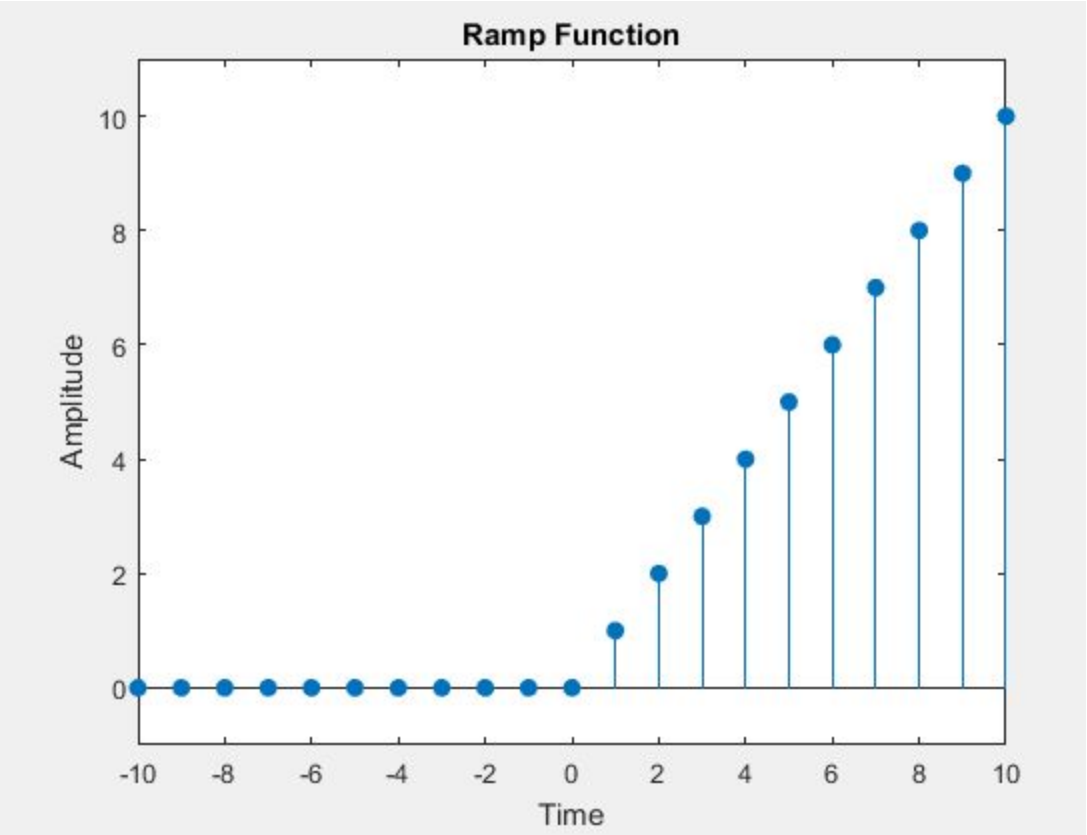
Task # 3:

Write a Matlab code that generates Unit Ramp Function.

Code:

```
n=-10:10;
x=(n+abs(n))/2;
stem(n,x,'filled');
xlabel('Time');
ylabel('Amplitude');
title('Ramp Function');
axis([-10 10 -1 11]);
```

Output:



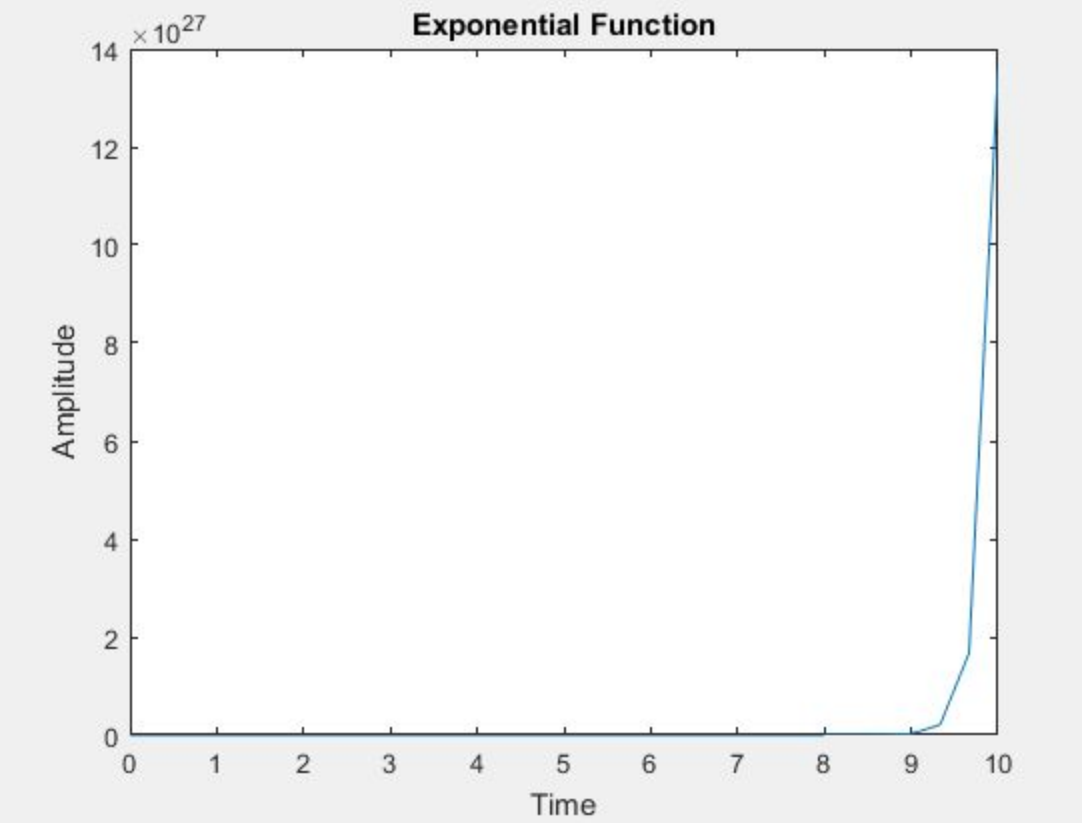
Task # 4:

Write a Matlab code that generates an Exponential Function.

Code:

```
n=0:1/3:10;
k=7;
x=k*exp(2*pi*n);
plot(n,x);
xlabel('Time');
ylabel('Amplitude');
title('Exponential Function');
```

Output:



Task # 5:

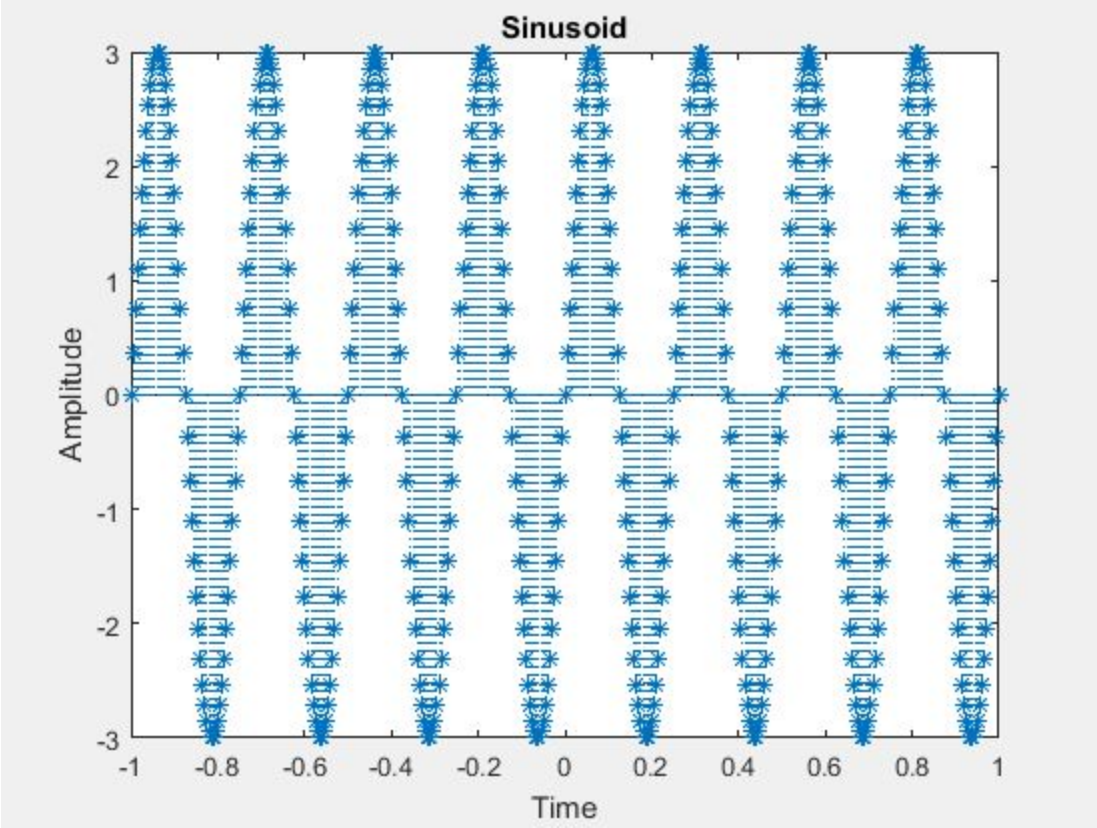
Write a Matlab code that generates a Sinusoidal Function.

Code:

```
f0=4;
A=3;

t=-1:0.005:1;
x=A*sin(2*pi*f0*t);
stem(t,x,'*:');
xlabel('Time');
ylabel('Amplitude');
title('Sinusoid');
```

Output:



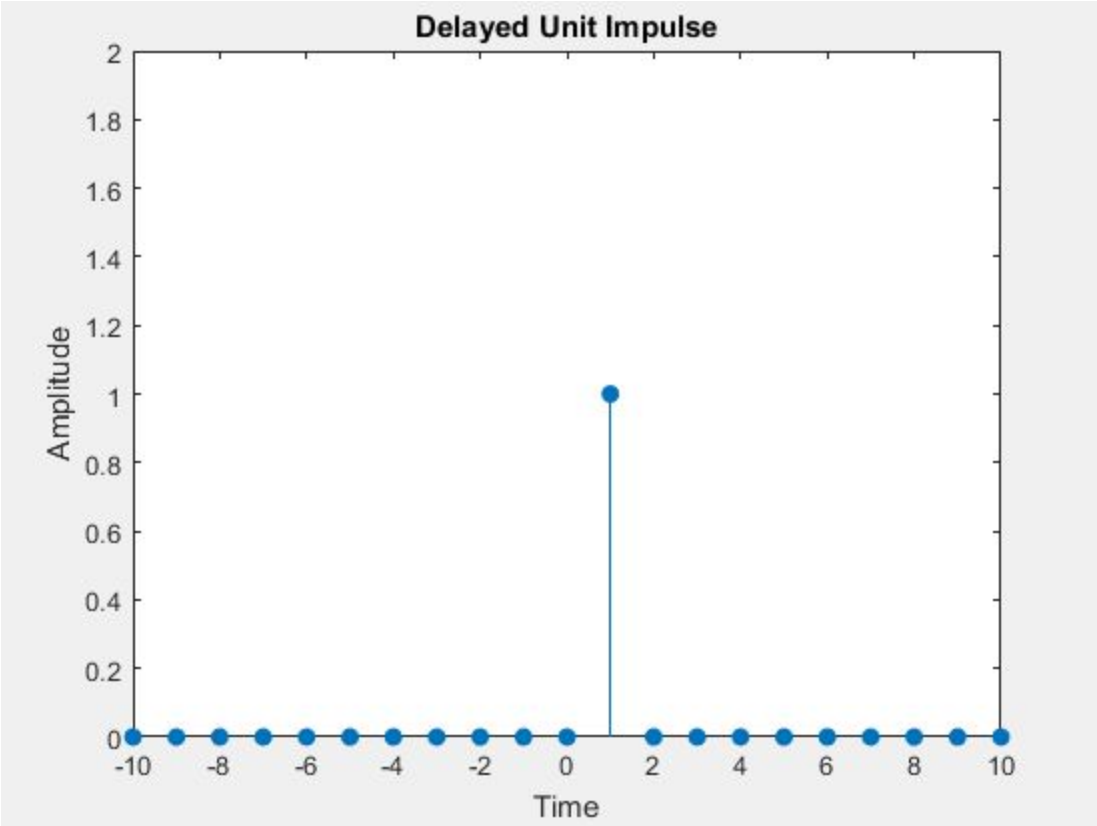
Task # 6:

Write a Matlab code that generates Unit Impulse delay (shift) Function.

Code:

```
n=-10:10;
x=[zeros(1,11) 1 zeros(1,9)];
stem(n,x,'filled');
xlabel('Time');
ylabel('Amplitude');
title('Delayed Unit Impulse');
axis([-10 10 0 2]);
```

Output:



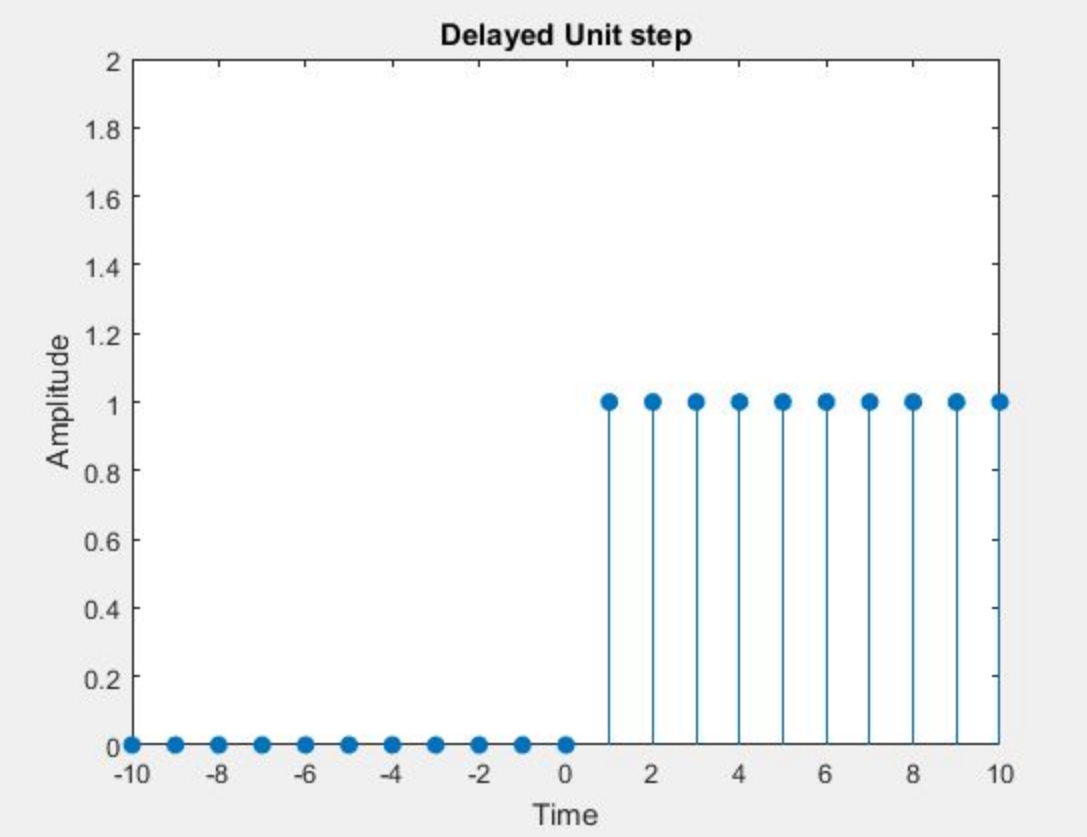
Task # 7:

Write a Matlab code that generates Unit Step delay (shift) Function.

Code:

```
n=-10:10;
x=[zeros(1,11) ones(1,10)];
stem(n,x,'filled');
xlabel('Time');
ylabel('Amplitude');
title('Delayed Unit step');
axis([-10 10 0 2]);
```

Output:



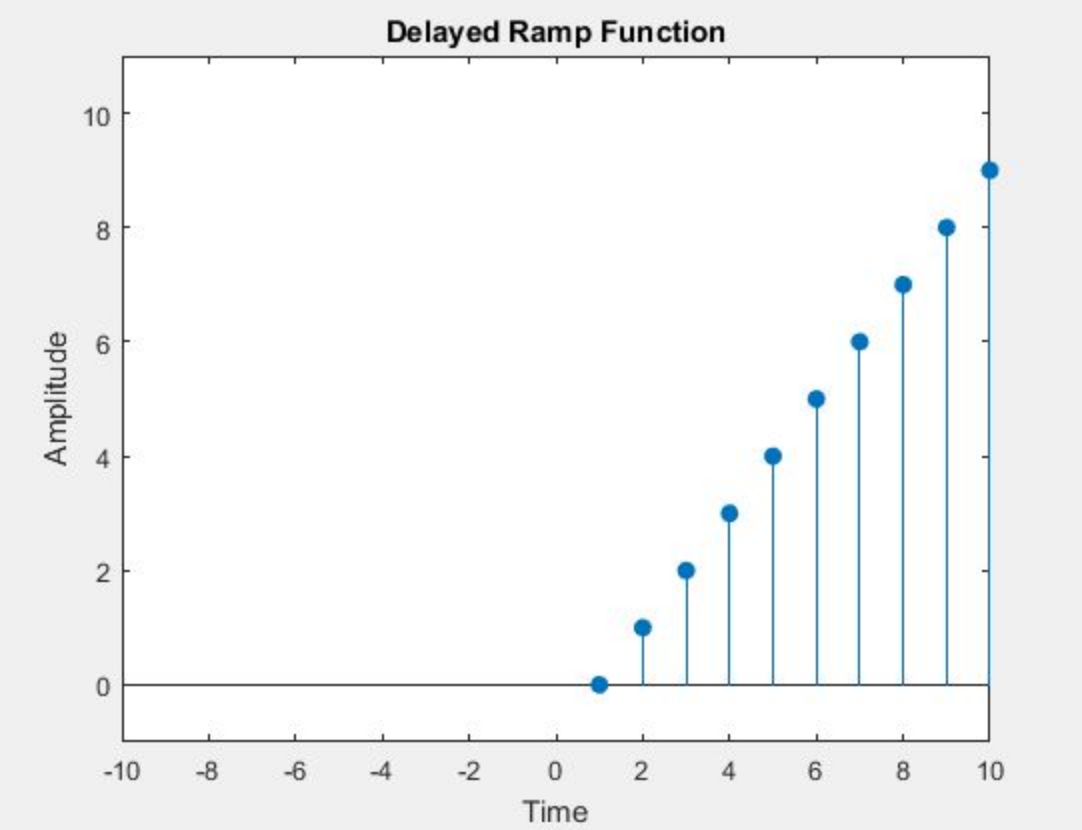
Task # 8:

Write a Matlab code that generates Unit Ramp delay (shift) Function.

Code:

```
n=1:10;
stem(n,n-1,'filled');
xlabel('Time');
ylabel('Amplitude');
title('Delayed Ramp Function');
axis([-10 10 -1 11]);
```

Output:



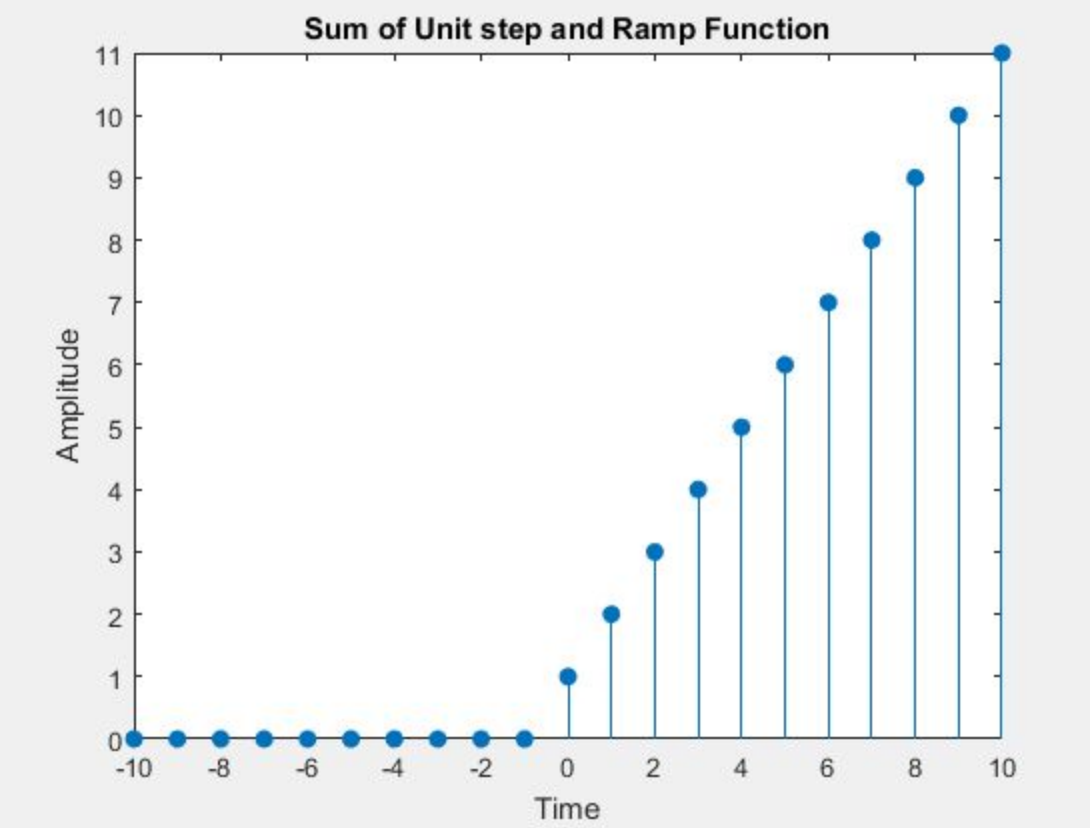
Task # 9:

Write a Matlab code to sum Unit Step and Unit Ramp Function.

Code:

```
n=-10:10;
x=(n+abs(n))/2;
x1=[zeros(1,10) ones(1,11)];
sum=x+x1;
stem(n,sum,'filled');
xlabel('Time');
ylabel('Amplitude');
title('Sum of Unit step and Ramp Function');
axis([-10 10 0 11]);
```

Output:



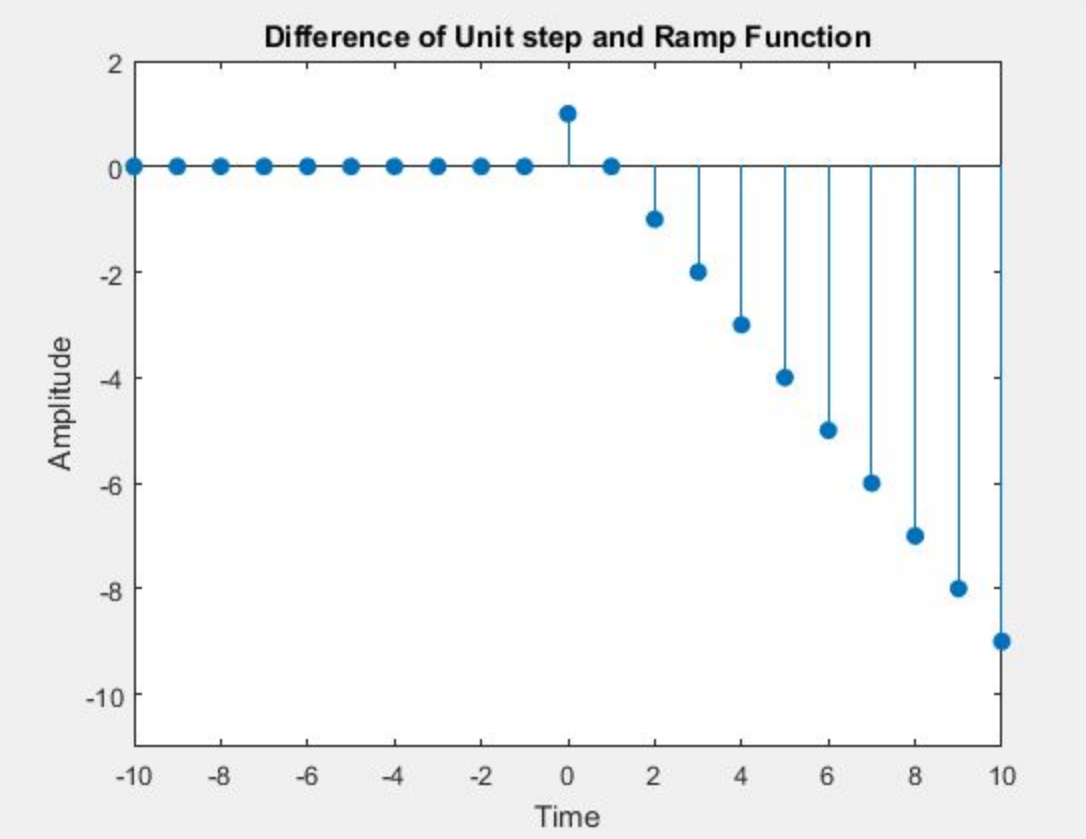
Task # 10:

Write a Matlab code to subtract Unit Ramp Function from Unit Step Function.

Code:

```
n=-10:10;
x=(n+abs(n))/2;
x1=[zeros(1,10) ones(1,11)];
diff=x1-x;
stem(n,diff,'filled');
xlabel('Time');
ylabel('Amplitude');
title('Difference of Unit step and Ramp Function');
axis([-10 10 -11 2]);
```

Output:



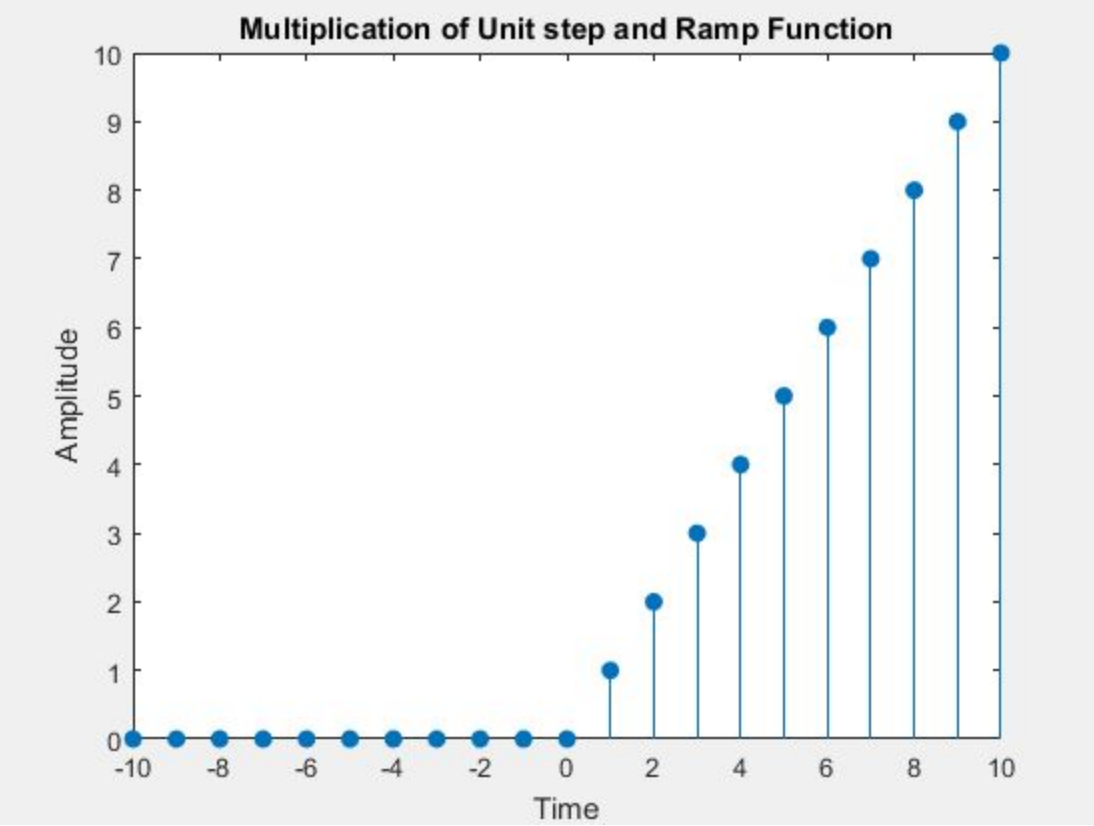
Task # 11:

Write a Matlab code to multiply Unit Step and Unit Ramp Function.

Code:

```
n=-10:10;
x=(n+abs(n))/2;
x1=[zeros(1,10) ones(1,11)];
mul=x.*x1;
stem(n,mul,'filled');
xlabel('Time');
ylabel('Amplitude');
title('Multiplication of Unit step and Ramp Function');
axis([-10 10 0 10]);
```

Output:



Task # 12:

Write a Matlab code to divide Unit Step and Unit Ramp Function.

Code:

```
n=-10:10;
x=(n+abs(n))/2;
x1=[zeros(1,10) ones(1,11)];
div=x1./x;
stem(n,div,'filled');
xlabel('Time');
ylabel('Amplitude');
title('Division of Unit step and Ramp Function');
axis([-10 10 0 2]);
```

Output: