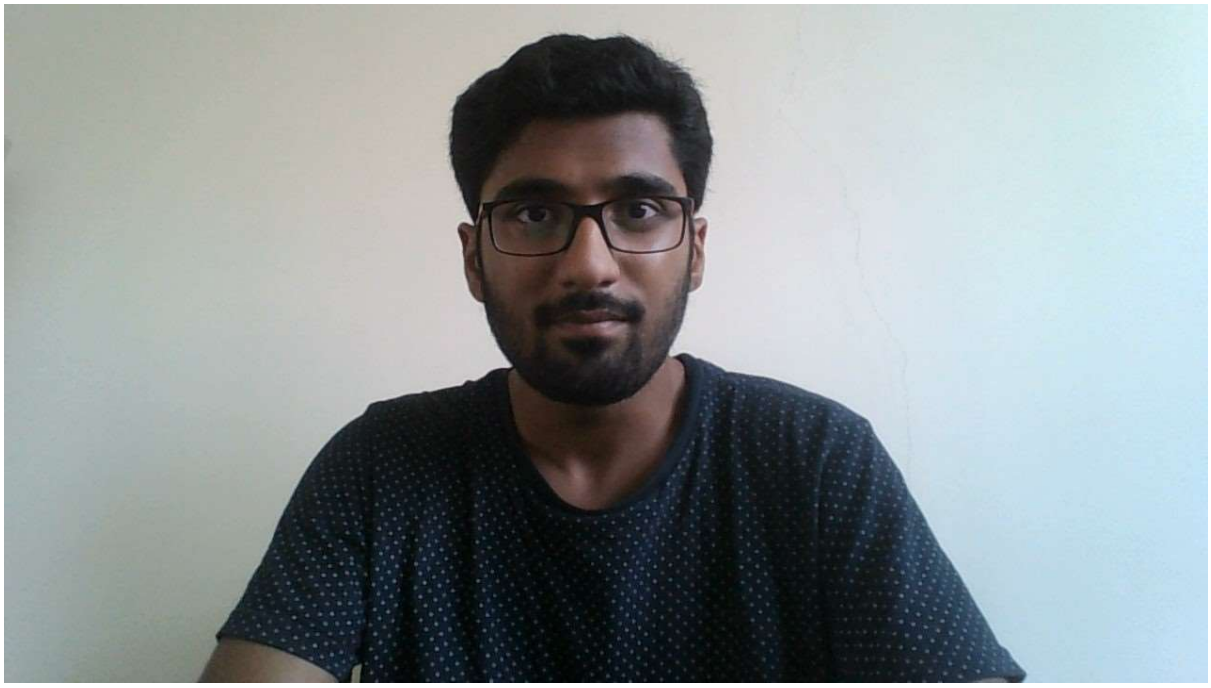
DSAA Computer Assignment – 1

Section – 1 Signal Fundamentals

Question 1a



Question 1b

Three Independent variables shown by

```
>> im1 = imread('201701082.jpg');
>> a = size(im1);
>> a

a =

         720        1280           3
```

Question 1c

Three Components

Red, Green and Blue which are last variable in above displayed sequence

Question 1d

```
a = im1(:,:,1);
imwrite(a, 'red.jpg');
```

```
b = im1(:,:,2);
imwrite(b, 'green.jpg');
```

```
c = im1(:,:,3);
imwrite(c, 'blue.jpg');
```

Question 1e

```
>> im1 = imread('201701082.jpg');
>> a = min(min(im1(:,:,1)));
>> a

a =

  uint8

   0
>> b = min(min(im1(:,:,2)));
>> b

b =

  uint8

   1
>> c = min(min(im1(:,:,3)));
>> c

c =

  uint8
```

```
   0

>> a = max(max(im1(:,:,1)));
>> a

a =

  uint8

   238
>> b = max(max(im1(:,:,2)));
>> b

b =

  uint8

   246
>> c = max(max(im1(:,:,3)));
>> c

c =

  uint8

   255

>> a = mean(mean(im1(:,:,1)));
>> a

a =

  140.7580
>> b = mean(mean(im1(:,:,2)));
>> b

b =

  148.8469
>> c = mean(mean(im1(:,:,3)));
>> c

c =

  149.9140
```

Question 1f

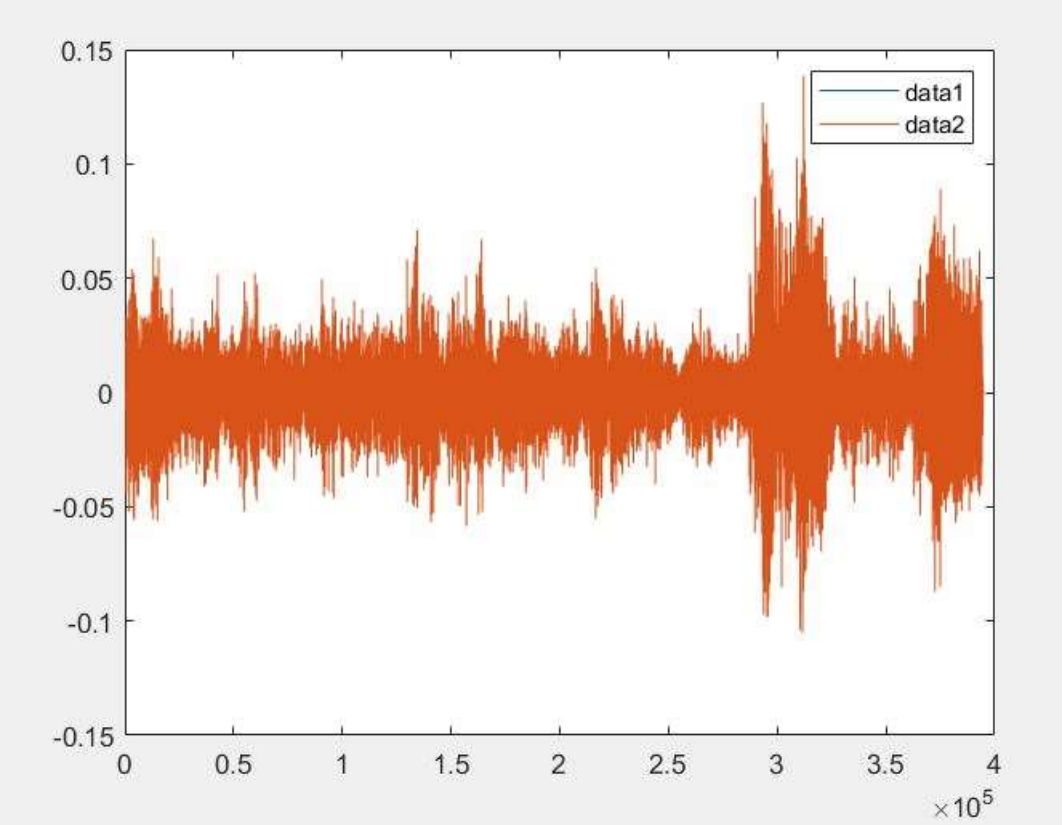
```
>> a = size(im1);
>> a
```

```
a =

         720        1280           3
```

Question 2a

```
voicesig = audioread('Recording.wav');
plot(voicesig);
legend;
```



Question 2b

2 channels Left and Right

Question 2c

Analog Signal

Question 2d

```
>> voicesig = audioread('Recording.wav');
>> a = size(voicesig);
```

```
>> a


a =


      395263           2
```

Question 2e

```
function en = Ques02e(name)
    aud = audioread(name);
    s = size(aud);
    for ch = 1:s(2)
        a = aud(:, ch);
        l = length(a);
        en = 0;
        for frame = 1:l
            en = en+a(frame)^2;
        end
        disp([num2str(en), "is Energy for",
num2str(ch)]);
    end
return
```

```
>> Ques02e('Recording.wav')
    "112.6892"    "is Energy for"    "1"


    "112.6892"    "is Energy for"    "2"
```

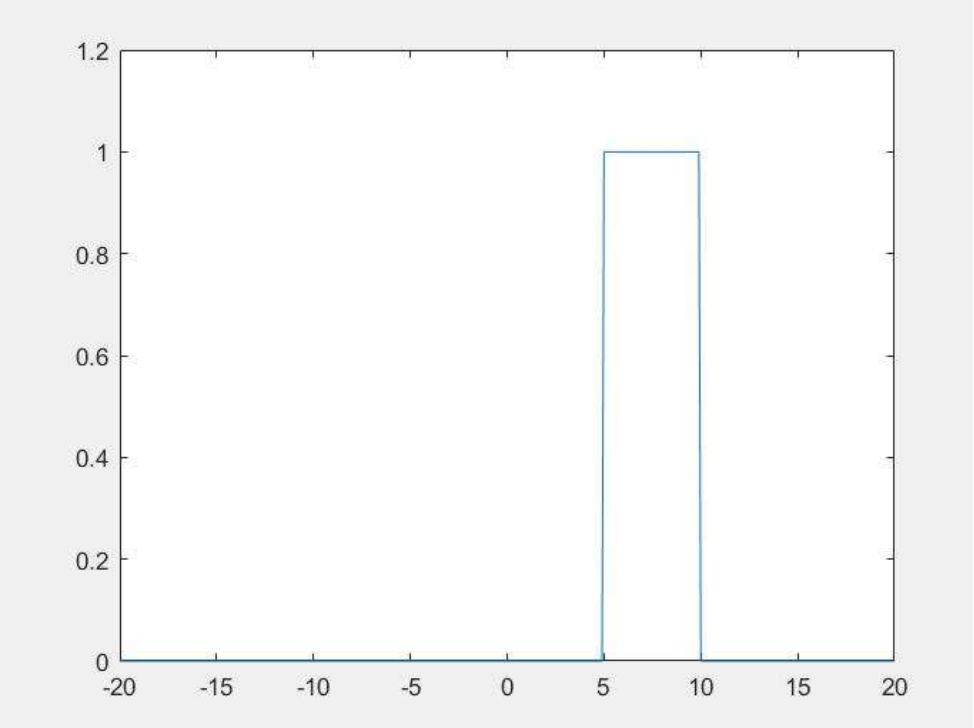
Section – 2 Signal Transformation

Question 1 function

```
function Ut = myunitstep(t)
    Ut = zeros(size(t));
    Ut(t>=0) = 1;
return;
```

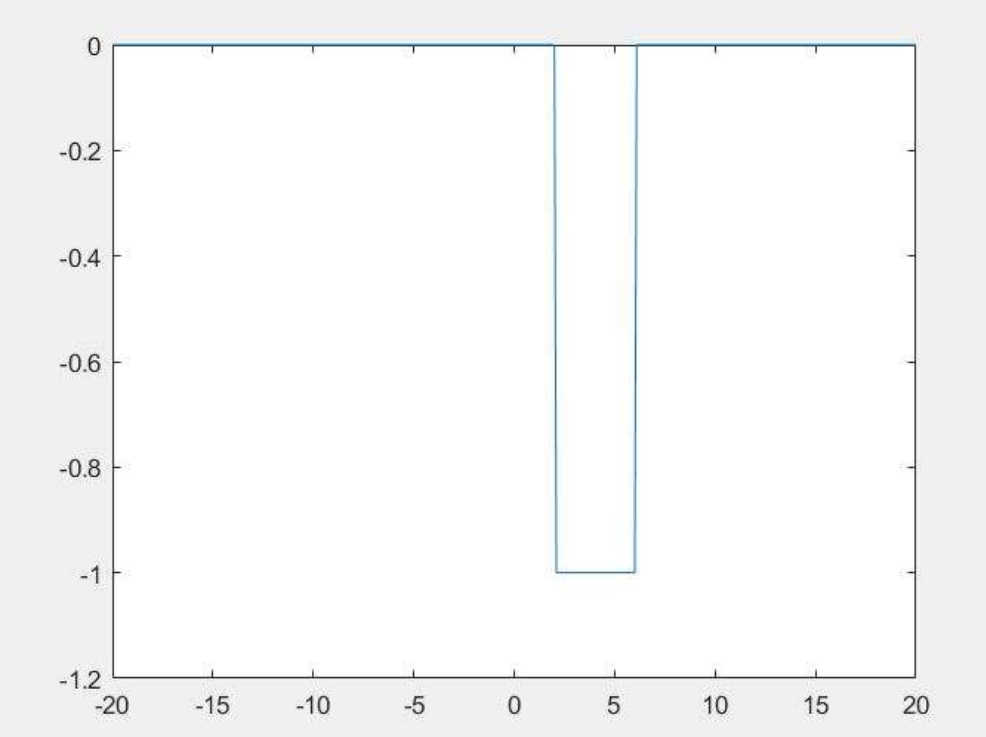
Question 1a

```
t = -20:0.1:20;
t1 = t-5;
t2 = t-10;
ut1 = myunitstep(t1);
ut2 = myunitstep(t2);
f = ut1-ut2;
plot(t, f);
ylim ([0,1.2]);
```



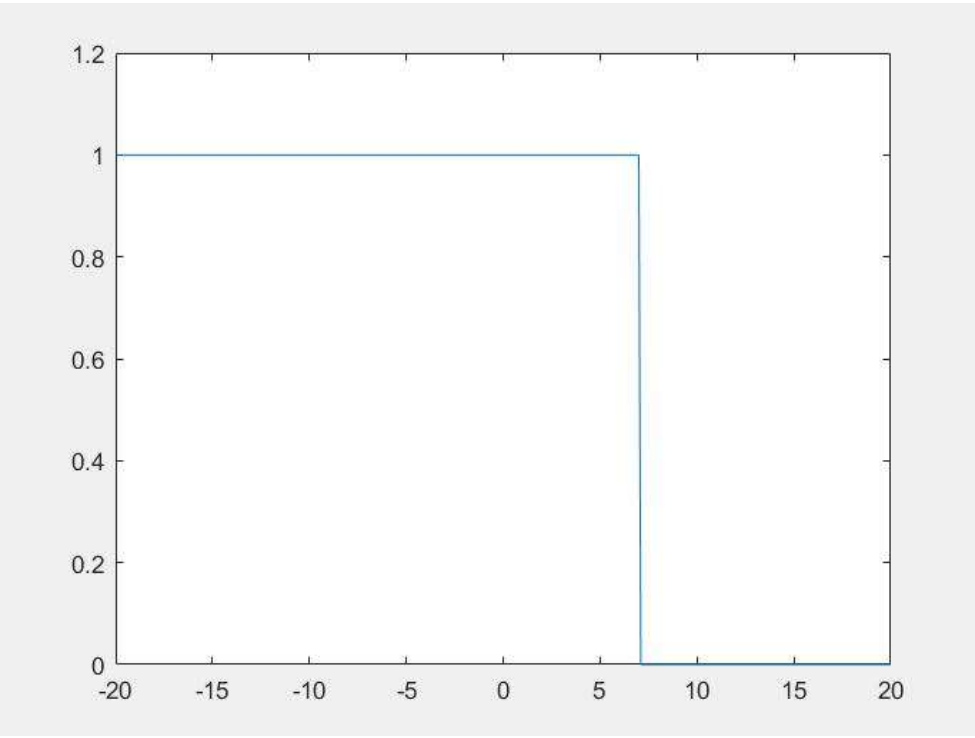
Question 1b

```
t = -20:0.1:20;
t1 = 2-t;
t2 = 6-t;
ut1 = myunitstep(t1);
ut2 = myunitstep(t2);
f = ut1-ut2;
plot(t, f);
ylim ([-1.2,0]);
```



Question 1c

```
t = -20:0.1:20;
t1 = 7-t;
ut = myunitstep(t1);
plot(t, ut);
ylim ([0,1.2]);
```

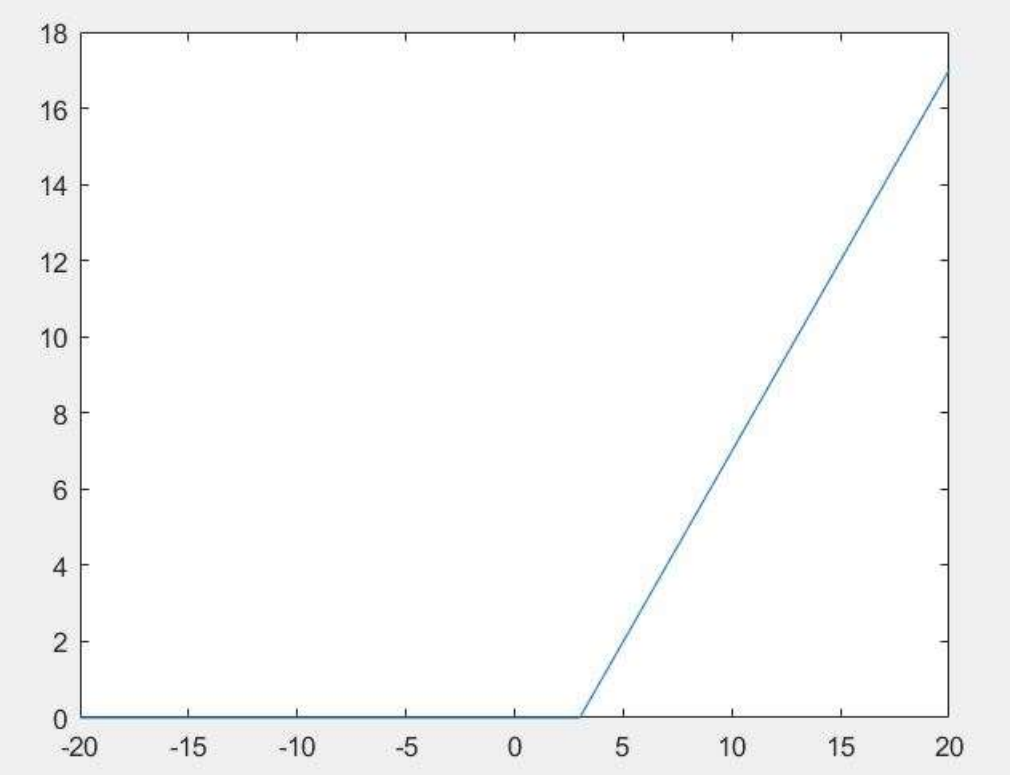


Question 2 Function

```
function Rt = myramp(t)
    Rt = t;
    Rt(t<0) = 0;
return;
```

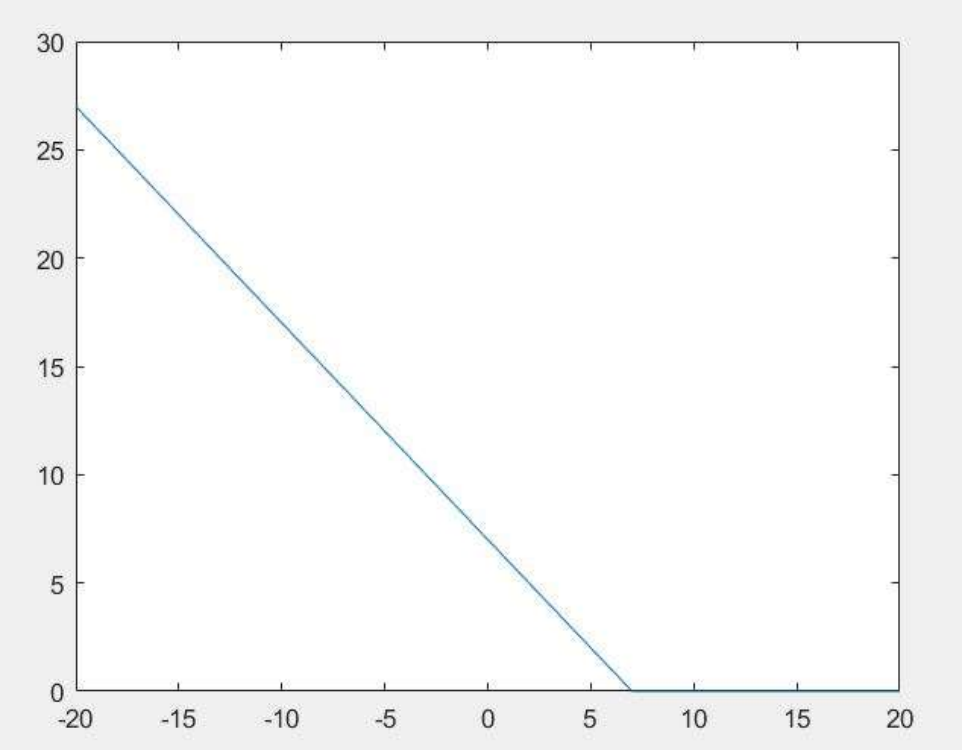
Question 2a

```
t = -20:20;
t1 = t-3;
rt = myramp(t1);
plot(t, rt);
```



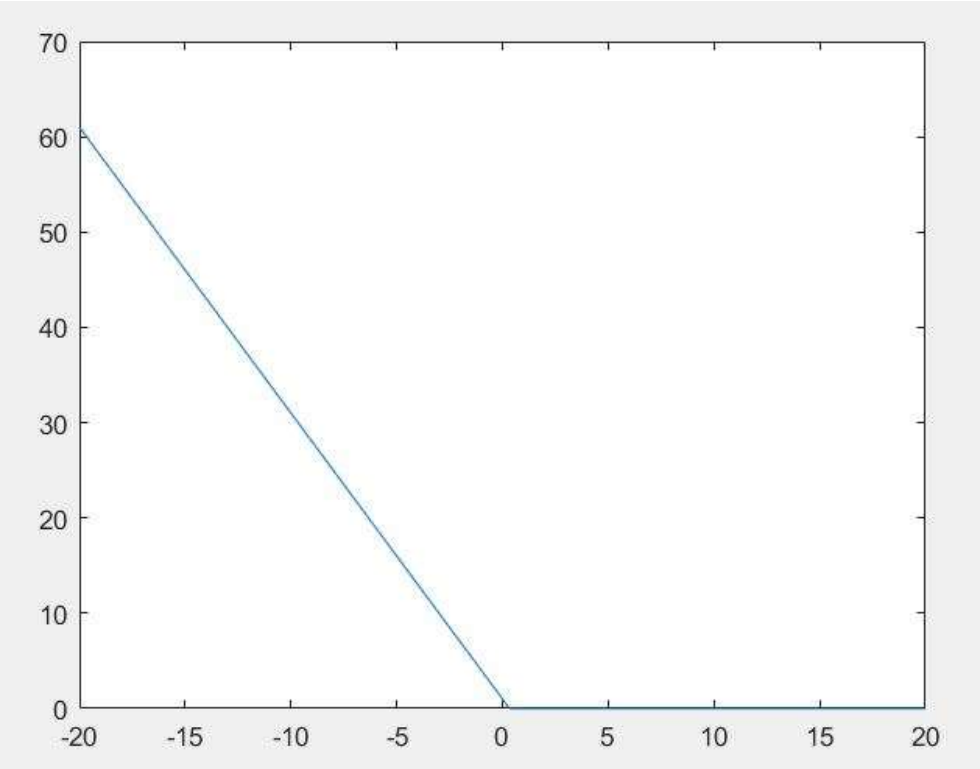
Question 2b

```
t = -20:20;
t1 = 7-t;
rt = myramp(t1);
plot(t, rt);
```



Question 2c

```
t = -20:0.1:20;
t1 = 1-(3*t);
rt = myramp(t1);
plot(t, rt);
```

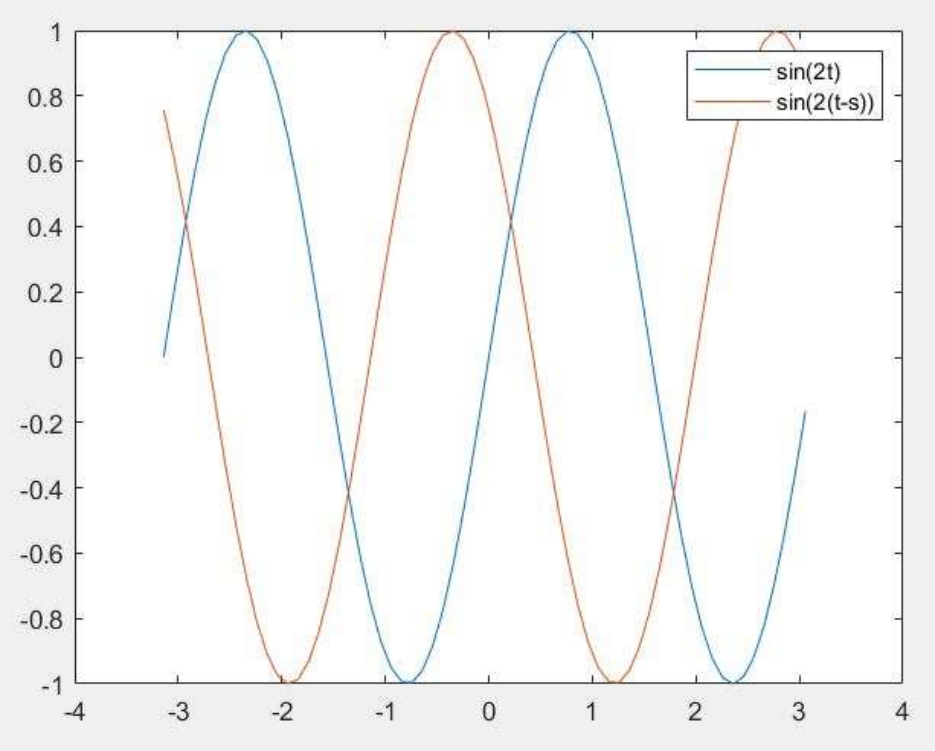


Question 3 Function

```
function f = mysine(t)
    f = zeros(size(t));
    o = 2;
    f = sin(o*t);
return;
```

Question 3a

```
t = -pi:0.1:pi;
s = input('Enter a value : ');
t1 = t-s;
sf = mysine(t);
sf1 = mysine(t1);
figure
plot (t, sf)
hold on
plot (t, sf1);
hold off
legend('sin(2t)', 'sin(2(t-s))');
```

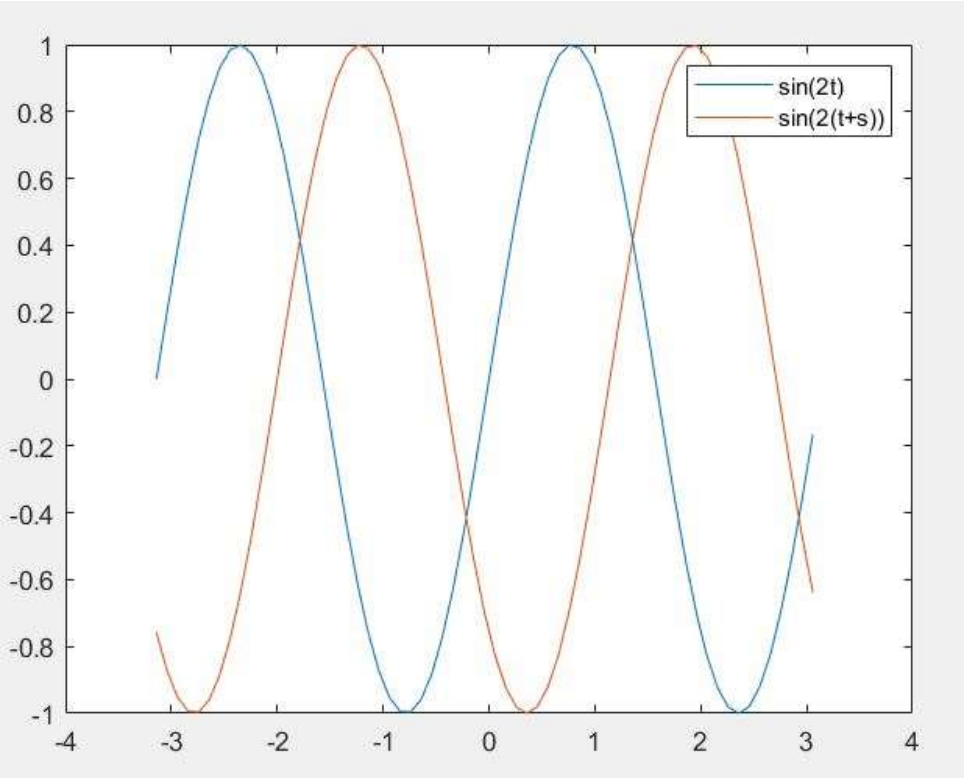


(Here $s/t_0 = 2$ and $w_0/o = 2$)

Question 3b

```
t = -pi:0.1:pi;
s = input('Enter a value : ');
```

```
t1 = t+s;
sf = mysine(t);
sf1 = mysine(t1);
figure
plot (t, sf)
hold on
plot (t, sf1);
hold off
legend('sin(2t)', 'sin(2(t+s))');
```



(Here $s/t_0 = 2$ and $w_0/o = 2$)

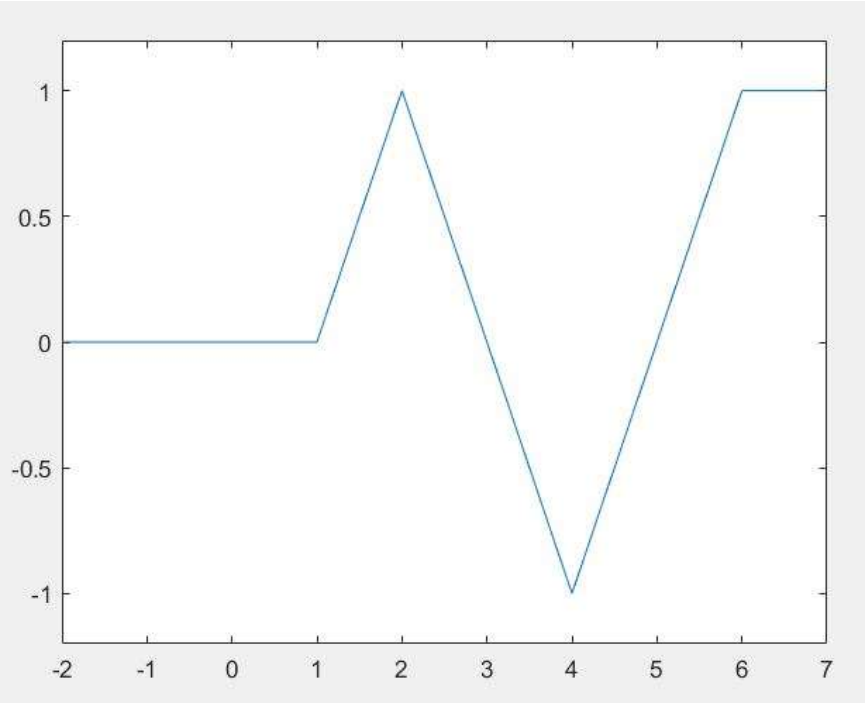
Question 4 Function

```
function f = myfunc1(t)
    f = zeros(size(t));
    f(t<0) = 0;
    f(t>=0 & t<1) = t(t>=0 & t<1);
    f(t>=1 & t<3) = 2-t(t>=1 & t<3);
    f(t>=3 & t<5) = t(t>=3 & t<5)-4;
    f(t>=5) = 1;
return;
```

Question 4a

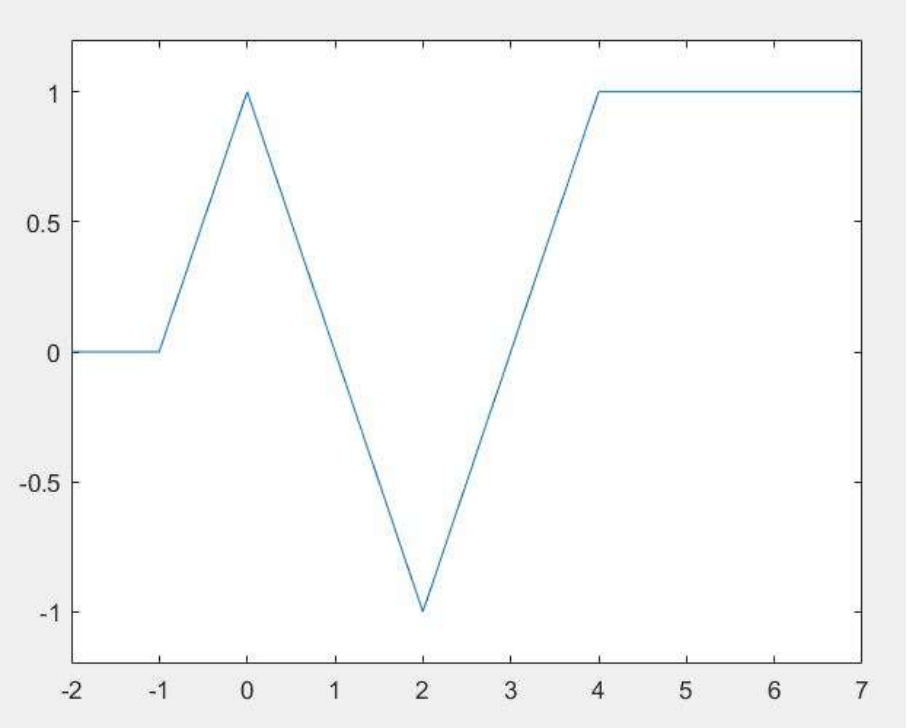
```
t = -2:0.1:7;
t1 = t-1;
```

```
x = myfunc1(t1);
plot(t, x);
ylim([-1.2, 1.2]);
```



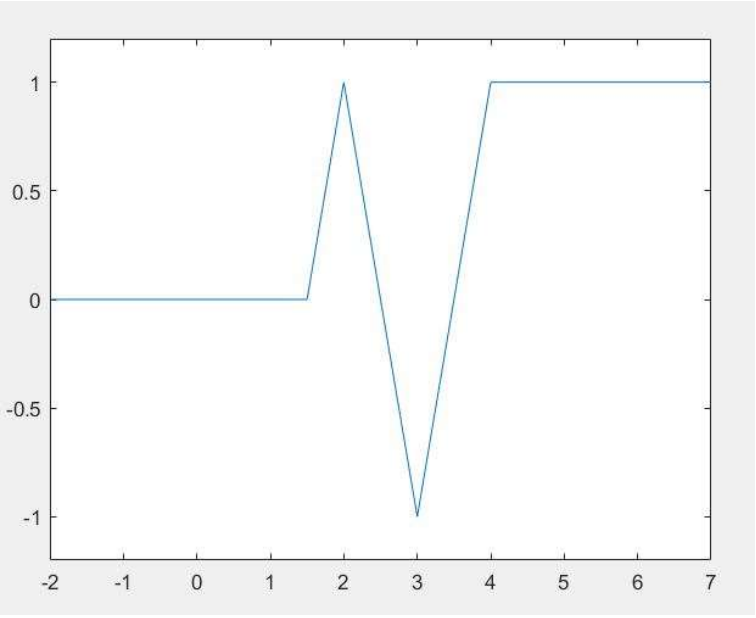
Question 4b

```
t = -2:0.1:7;
t1 = t+1;
x = myfunc1(t1);
plot(t, x);
ylim([-1.2, 1.2]);
```



Question 4c

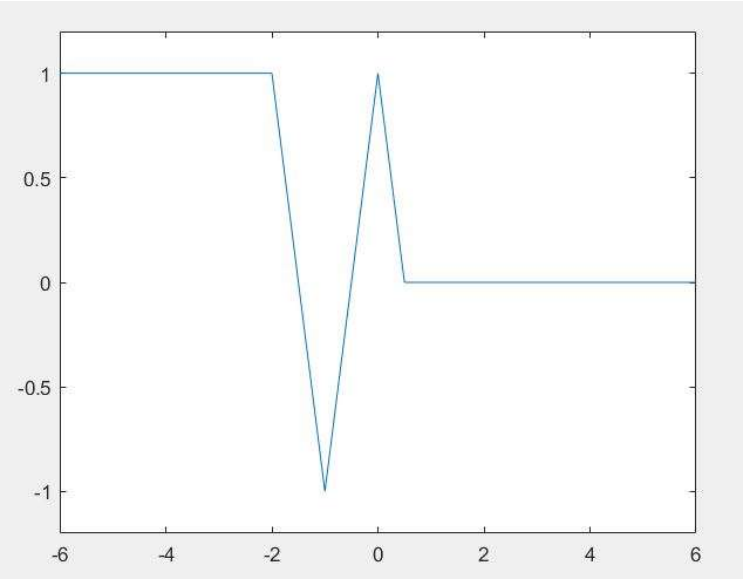
```
t = -2:0.1:7;
t1 = 2*t-3;
x = myfunc1(t1);
plot(t, x);
ylim([-1.2, 1.2]);
```



Question 4d

```
t = -6:0.1:6;
t1 = 1-2*t;
```

```
x = myfunc1(t1);
plot(t, x);
ylim([-1.2, 1.2]);
```

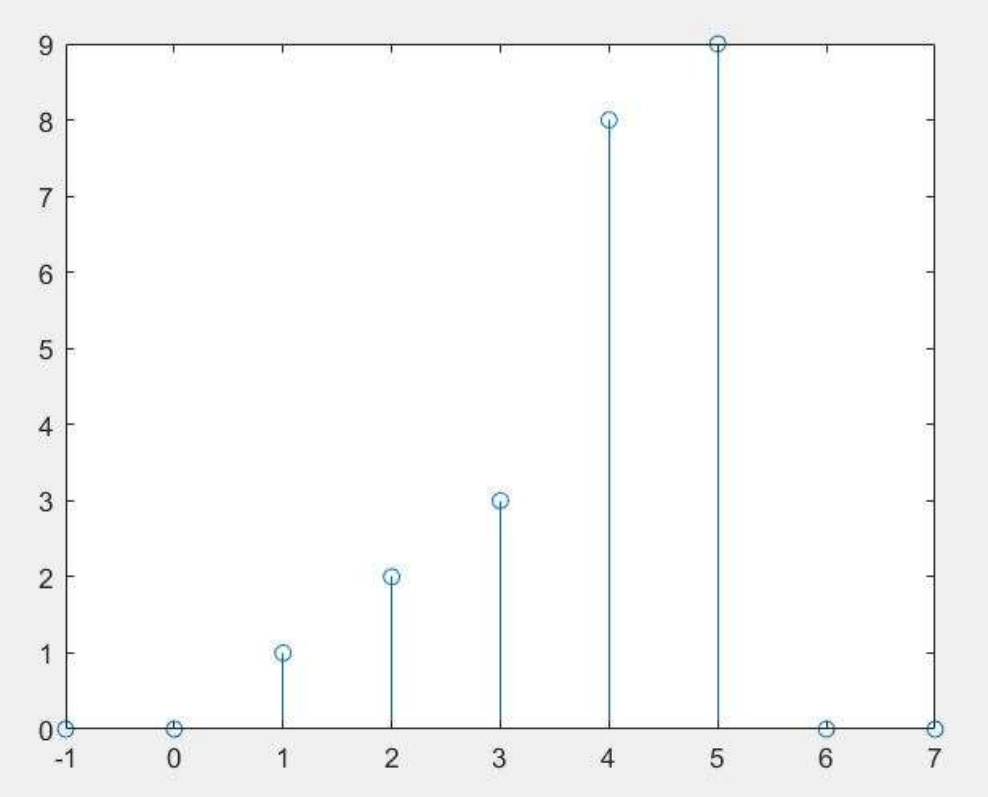


Question 5 Function

```
function f = myfunction2(t)
    f = zeros(size(t));
    f(t == 0) = 1;
    f(t == 1) = 2;
    f(t == 2) = 3;
    f(t == 3) = 8;
    f(t == 4) = 9;
end
```

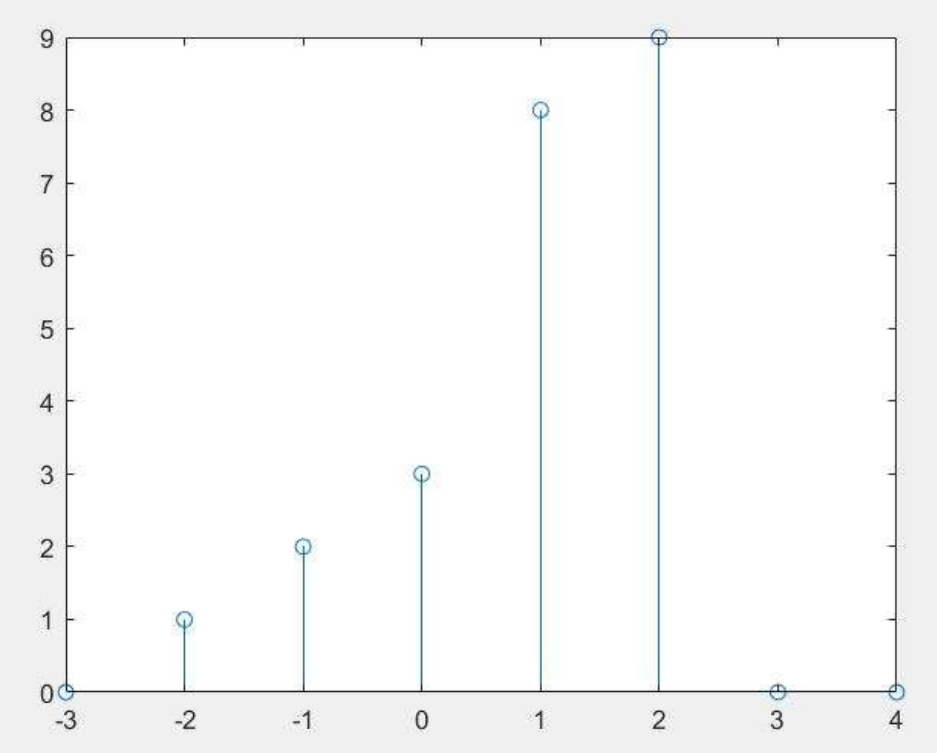
Question 5a

```
t = -1:7;
t1 = t-1;
n = myfunc2(t1);
stem(t, n);
```



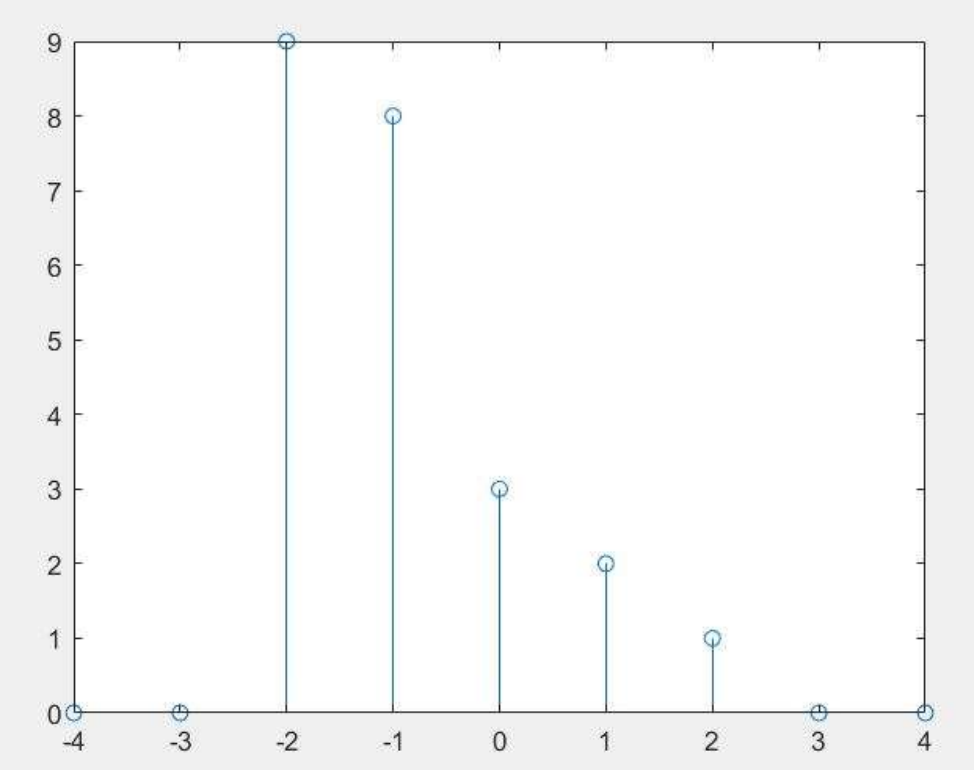
Question 5b

```
t = -3:4;
t1 = t+2;
n = myfunc2(t1);
stem(t, n);
```



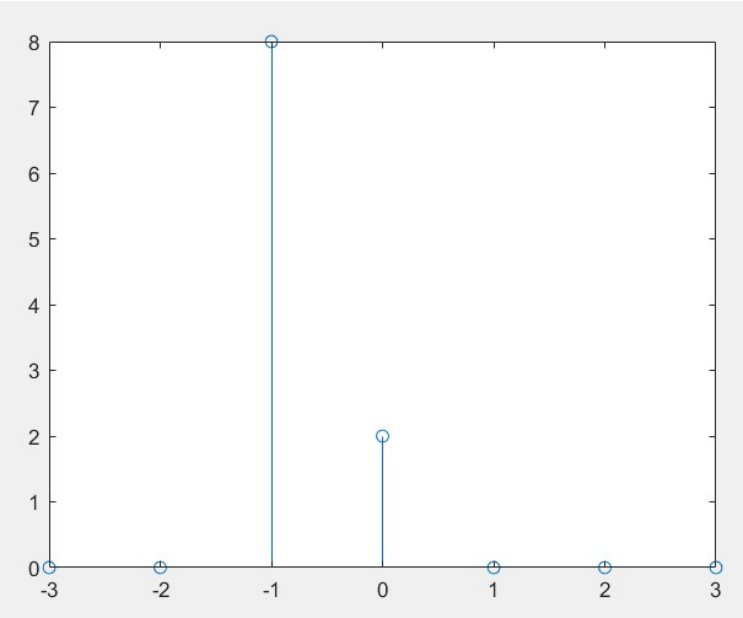
Question 5c

```
t = -4:4;
t1 = 2-t;
n = myfunc2(t1);
stem(t, n);
```



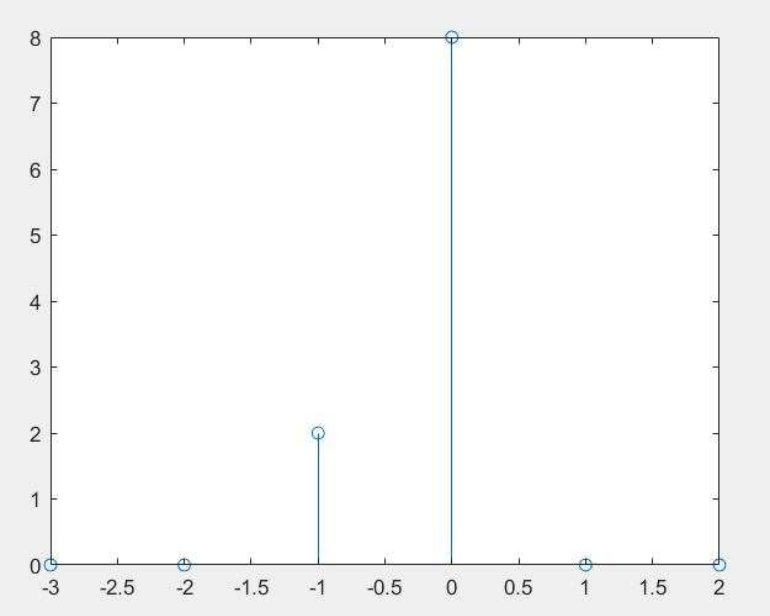
Question 5d

```
t = -5:1;
t1 = 1-2*t;
n = myfunc2(t1);
stem(t, n);
```



Question 5e

```
t = -3:2;
t1 = 2*t+3;
n = myfunc2(t1);
stem(t, n);
```



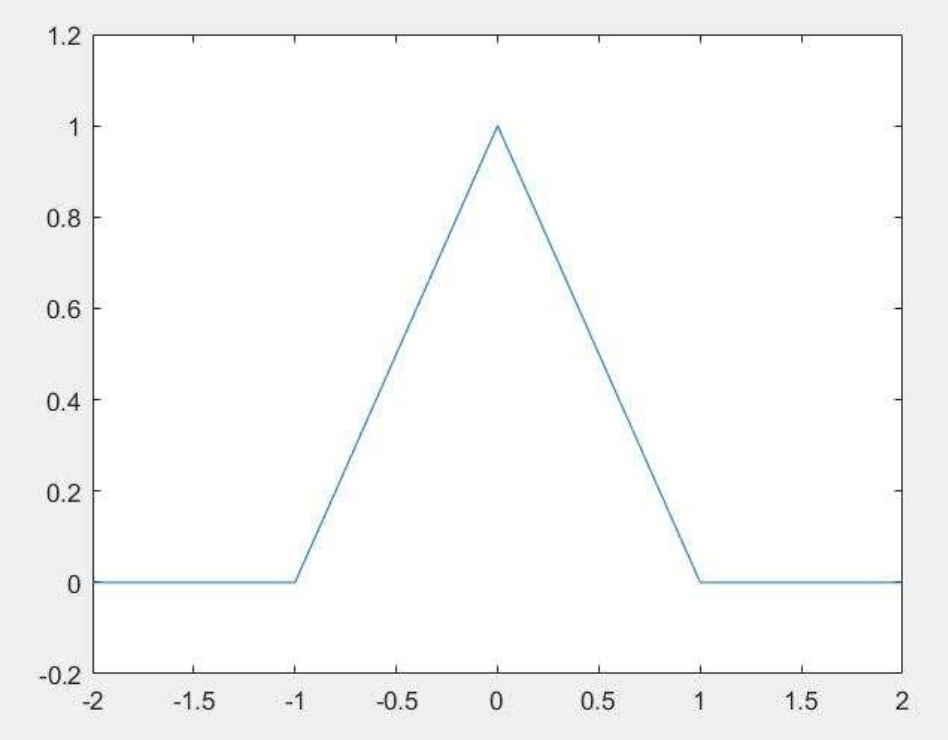
Section – 3 Signal Generation

Question 1 Function

```
function f = myfunction(t)
    f = zeros(size(t));
    f(-1<t & t<=0) = 1+t(-1<t & t<=0);
    f(t>0 & t<1) = 1-t(t>0 & t<1);
end
```

Question 1a

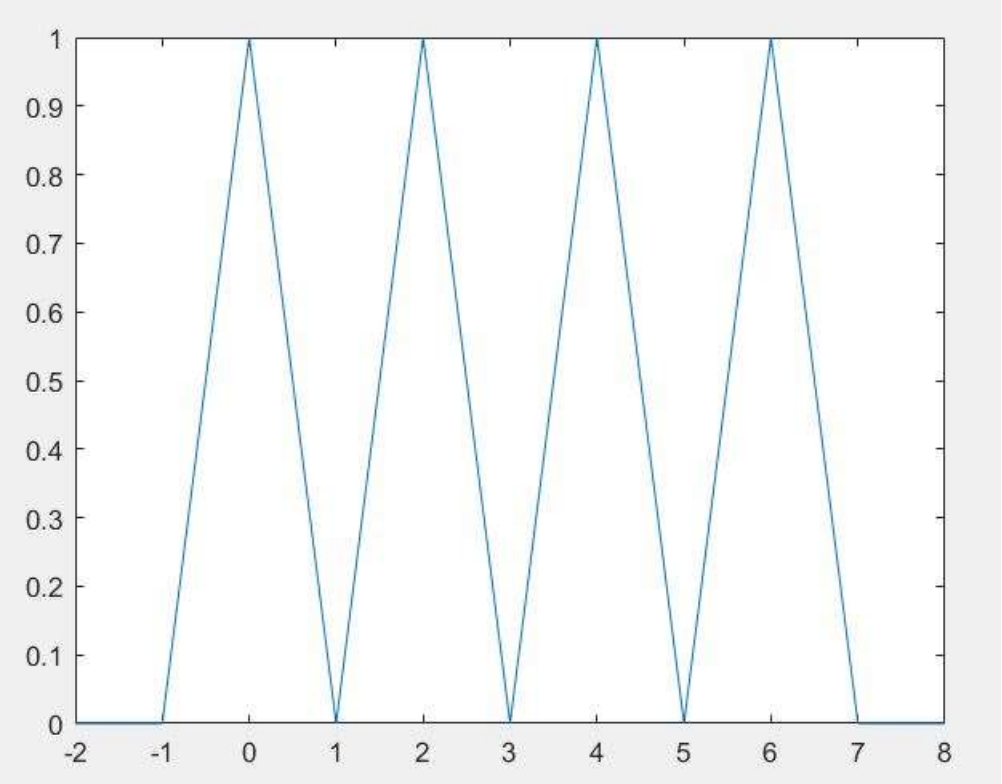
```
t = -2:0.1:2;
u = myfunction(t);
plot (t, u);
ylim([-0.2, 1.2]);
```



Question 1b

```
n = input('Enter the Time Period you wanted ');
t = -2:0.1:2*n;
t1 = t;
ut = zeros(size(t));
for a = 1:n
    ut = ut+myfunction(t);
```

```
    t = t-2;
end
plot(t1, ut);
```



(Here n = 4)