```
%PCM (Pulse code modulation)
clc;
clear all;
close all;
n  = input('Enter n value for n-bit PCM system : ');
n1 = input('Enter number of samples in a period : ');
L = 2^n;

x = 0:2*pi/n1:4*pi;
s = 8*sin(x);
subplot(3,1,1);
plot(s);
title('Analog Signal');
ylabel('Amplitude ==>');
xlabel('Time ==>');


subplot(3,1,2);
stem(s);
grid on;
title('Sampled signal');
ylabel('Amplitude ==>');
xlabel('Time ==>');
%Quantization Process:-
vmax = 8;
vmin = -vmax;
del = (vmax - vmin)/L;
part = vmin:del:vmax;
code = vmin - (del/2):del:vmax+(del/2);
```

```
[ind,q] = quantiz(s,part,code);

l1 = length(ind);
l2 = length(q);

for i=1:l1
    if(ind(i) ~=0)
        ind(i) = ind(i) - 1;
    end
    i=i+1;
end
for i=i:l2
    if(q(i) == vmin-(del/2))
        q(i) = vmin+(del/2);
    end
end
subplot(3,1,3);
stem(q);
grid on;
title('Quantized Signal');
ylabel('Amplitude ==>');
xlabel('Time ==>');
```

```
%Encoding Process:-
figure
code = de2bi(ind,'left-msb');
k=1;
for i=1:l1
    for j=1:n
        coded(k) = code(i,j);
        j=j+1;
        k=k+1;
    end
    i=i+1;
end
subplot(2,1,1);
grid on;
stairs(coded);
axis([0 100 -2 3]);
title('Encoded Signal');
ylabel('Amplitude ==>');
xlabel('Time ==>');

%Demodulation of PCM signal:-
qunt = reshape(coded,n,length(coded)/n);
index = bi2de(qunt','left-msb');
q = del * index + vmin + (del/2);
subplot(2,1,2);
grid on;
plot(q);
title('Demodulated signal');
ylabel('Amplitude ==>');
xlabel('Time ==>');
```