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%Yusuf Ahmed Khan, 20ELB084
%sampling experiment
clear all;
close all;
clc;
t=-10:0.01:10;
T=4;fm=1/T;
x=cos(2*pi*fm*t);
subplot(2,2,1);plot(t,x,'linewidth',3);
xlabel('time');ylabel('amplitude');
grid;
title('input signal');
n1=-4:1:4;
fs1=1.6*fm;
fs2=2*fm;
fs3=8*fm;
x1=cos(2*pi*fm/fs1*n1);
subplot(2,2,2);stem(n1,x1,'linewidth',3);
xlabel('number of samples');ylabel('amplitude');
hold on;
subplot(2,2,2);plot(n1,x1,'linewidth',3);
xlabel('time');ylabel('amplitude');
grid;
title('under sampling');
n2=-5:1:5;
x2=cos(2*pi*fm/fs2*n2);
subplot(2,2,3);stem(n2,x2,'linewidth',3);
xlabel('number of samples');ylabel('amplitude');
hold on;
subplot(2,2,3);plot(n2,x2,'linewidth',3);
xlabel('time');ylabel('amplitude');
grid;
title('uniform sampling');
n3=-20:1:20;
x3=cos(2*pi*fm/fs3*n3);
subplot(2,2,4);stem(n3,x3,'linewidth',3);
hold on;
subplot(2,2,4);plot(n3,x3,'linewidth',3);
xlabel('number of samples');ylabel('amplitude');
xlabel('time');ylabel('amplitude');
grid;
title('over sampling');

```