Aim: To WAP on Sampling theorem

%Sampling Theorem

clc;

clear all;

t = 0:0.001:1;

fm = input('Enter the modulating signal frequency = ');

x = sin(2\*pi\*fm\*t);

subplot(4,2,1);

plot(t,x);

xlabel('Time ----->');

ylabel('Amplitude ----->');

title('Message Signal');

fs1 = input('Enter Sampling Frequency < Modulating Signal Frequency = ');

fs2 = input('Enter Sampling Frequency = 2\*Modulating Signal Frequency = ');

fs3 = input('Enter Sampling Frequency > Modulating Signal Frequency = ');

%Sampling at fs<<2fm

n = 0:1/fs1:1;

x1 = sin(2\*pi\*fm\*n);

subplot(4,2,3);

stem(n,x1);

xlabel('Time ----->');

ylabel('Amplitude ----->');

title('Undersampled fs<<2fm Signal');

subplot(4,2,4);

plot(n,x1);

xlabel('Time ----->');

ylabel('Amplitude ----->');

title('Reconstructed Undersampled fs<<2fm Signal');

%Sampling at fs=2fm

n = 0:1/fs2:1;

x2 = sin(2\*pi\*fm\*n);

subplot(4,2,5);

stem(n,x2);

xlabel('Time ----->');

ylabel('Amplitude ----->');

title('Sampled at Nyquist Rate fs=2fm Signal');

subplot(4,2,6);

plot(n,x2);

xlabel('Time ----->');

ylabel('Amplitude ----->');

title('Reconstructed Nyquist Rate fs=2fm Signal');

%Sampling at fs>>2fm

n = 0:1/fs3:1;

x3 = sin(2\*pi\*fm\*n);

subplot(4,2,7);

stem(n,x3);

xlabel('Time ----->');

ylabel('Amplitude ----->');

title('Oversampled fs>>2fm Signal');

subplot(4,2,8);

plot(n,x3);

xlabel('Time ----->');

ylabel('Amplitude ----->');

title('Reconstructed Oversampled fs>>2fm Signal');

Enter the modulating signal frequency = 15

Enter Sampling Frequency < Modulating Signal Frequency = 10

Enter Sampling Frequency = 2\*Modulating Signal Frequency = 30

Enter Sampling Frequency > Modulating Signal Frequency = 100

