//Name :Tushar Bhand

//Roll no.:204A024

clc;

clear;

close;

fm = input("Enter the input signal frequency: ");

k = input("Enter the number of Cycles of input signal: ");

A = input("Enter the amplitude of input signal: ");

tm = 0:1/(fm\*fm):k/fm;

// Original signal

x = A \* cos(2 \* %pi \* fm \* tm);

figure(1);

a = gca();

a.x\_location = "origin";

a.y\_location = "origin";

plot(tm, x);

title("Original Signal");

xlabel("Time");

ylabel("Amplitude");

xgrid(1);

fnyq = 2 \* fm;

// UNDER SAMPLING

fs = (3/4) \* fnyq;

n = 0:1/fs:k/fm;

xn = A \* cos(2 \* %pi \* fm \* n);

figure(2);

a = gca();

a.x\_location = "origin";

a.y\_location = "origin";

plot(n, xn, "r");

title("Under Sampling");

xlabel("Time");

ylabel("Amplitude");

legend("Sampled Signal", "Reconstructed Signal");

xgrid(1);

// NYQUIST SAMPLING

fs = fnyq;

n = 0:1/fs:k/fm;

xn = A \* cos(2 \* %pi \* fm \* n);

figure(3);

a = gca();

a.x\_location = "origin";

a.y\_location = "origin";

plot(n, xn, "r");

title("Nyquist Sampling");

xlabel("Time");

ylabel("Amplitude");

legend("Sampled Signal", "Reconstructed Signal");

xgrid(1);

// OVER SAMPLING

fs = fnyq \* 10;

n = 0:1/fs:k/fm;

xn = A \* cos(2 \* %pi \* fm \* n);

figure(4);

a = gca();

a.x\_location = "origin";

a.y\_location = "origin";

plot(n, xn, "r");

title("Over Sampling");

xlabel("Time");

ylabel("Amplitude");

legend("Sampled Signal", "Reconstructed Signal");

xgrid(1);

**Output:**







