clc;

clear all;

close all;

pkg load communications

symbols = 1:5;

p=[0.40 0.20 0.20 0.10 0.10];

disp("\nSymbols are");

disp(symbols);

disp("length of symbols=");

disp(length(symbols));

disp("\nRespective probabilities are");

disp(p);

dict = huffmandict(symbols,p);

disp("\nHuffman dictionary is");

disp(dict);

inputSig = randsrc(10,1,[symbols;p]);

%inputSig =[1 1 1 1 2 2 2 3 3 4];

%disp("\nRandom generated input symbols are");

disp("\ninput symbols are");

disp(inputSig);

code = huffmanenco(inputSig,dict);

disp("\nEncoded message is");

disp(code);

decode = huffmandeco(code,dict);

disp("\nDecoded symbols are");

disp(decode);

avg\_code\_len=0;

for i=1:length(symbols)

%disp(p(i));

%disp(length(dict(1:i)));

%disp(x=p(i)\*length(dict(1:i)));

x=p(i)\*length(dict(1:i));

avg\_code\_len=avg\_code\_len+x;

end

disp("avg\_code\_len=");

disp(avg\_code\_len);

H = -sum(p .\* log2(p));

disp("Entropy=");

disp(H);

efficiency=H/avg\_code\_len;

disp("Efficiency=");

disp(efficiency);

redundancy = 1 - efficiency;

disp("Redundancy=")

disp(redundancy);