```
%                    Experiment - 3
% Simulation study of Source Coding technique (Huffman Coding)
% Name : Rathod Chittaranjan
% Roll No : 32457

diary on;
clear all;
clc;
pkg load communications
symbols = 1:6;
p = [0.3 0.25 0.20 0.12 0.08 0.05];
disp (symbols);
disp(p);
dict = huffmandict(symbols,p);
disp(dict);
inputSig = randsrc(10,1,[symbols;p]);
disp(inputSig);
code = huffmanenco(inputSig,dict);
disp(code);
decode = huffmandeco(code, dict);
disp(decode);

diary off;
```

Command Window :

```
1 2 3 4 5 6
 0.300000 0.250000 0.200000 0.120000 0.080000 0.050000
{
 [1,1] =
 0 0
 [1,2] =
 0 1
 [1,3] =
 1 1
 [1,4] =
 1 0 1
 [1,5] =
 1 0 0 0
 [1,6] =
 1 0 0 1
}
 1
 3
 3
 4
 1
 1
 2
 4
 4
 2
Columns 1 through 17:
 0 0 1 1 1 1 1 0 1 0 0 0 0 0 1 1 0
Columns 18 through 23:
 1 1 0 1 0 1
 1 3 3 4 1 1 2 4 4 2
```

Conclusion :

Studied the theory of Hoffman coding and how to calculate the code word from given probability values of different symbols. Simulation of Hoffman coding to get the code word was completed successfully.

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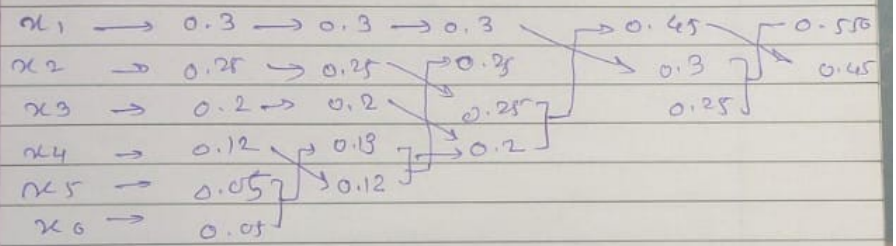
Q. For a DMS source with six symbol $x_1, x_2 \dots x_6$ find a compact code for every symbol if probability of distribution are $p(x_1) = 0.03$, $p(x_2) = 0.25$, $p(x_5) = 0.2$, $p(x_4) = 0.12$ $p(x_5) = 0.08$ $p(x_6) = 0.05$ construct and find the coding efficiency of Huffman code



$0.3x_1 = 00$ (2)
$0.25x_2 = 10$ (2)
$0.2x_3 = 11$ (2)
$0.12x_4 = 011$ (3)
$0.08x_5 = 0100$ (4)
$0.05x_6 = 0101$ (4)

entropy $(H) = \sum_{k=1} p_k \log_2 \left(\frac{1}{p_k}\right)$

$H = 1.96$ bit / symbol

$L = \sum p_k n_k$

$L = 2.38$ bit / symbol

efficiency $= H/L = 57\%$.