LBC code

Code:

```
clear all;
close all;
clc;


n = input('Enter no of code bits: ');
k = input('Enter no of message bits: ');
p = input('Enter parity matrix: ');
disp('Parity matrix: ');
disp(p);
I = eye(k);
p =[1 1 0; 1 0 1;1 1 1; 0 1 1];
G =[I,p];
disp('Generator matrix');
disp(' G = [Ik : P]');
disp(G);
m = dec2bin(0:1:2^k-1);
disp('message words')
disp(m);
C = m * G;
for i = 1:2^k
for j =1:n
C(i,j) = mod(C(i,j),2);
end
end
disp('Codewords are:');
disp(' C = mG');
```

```
disp(C);
weight = sum(C');
disp('Hamming weight of codes');
disp(weight');
weight(1,1) = weight(1,2);
d = min(weight);
disp('Minimum Hamming weight(dmin):')
disp(d);
Td = d - 1;
disp('td =');
disp('dmin - 1');
disp(Td);Tc = (d-1)/2;
disp('tc=');
disp('(dmin-1)/2');
disp(Tc);
H = [p',eye(n-k)];
disp(' H = [transpose(P):I(n-k)');
disp(H);
disp( 'H transpose')
disp(H');
E = eye([n,n]);
r = input('Enter recieved codeword(r):');
s = r*H';
for i=1:n-k
s(1,i) = mod(s(1,i),2);
end
h = H';
disp('Syndrome is (S):');
disp('S = r * transpose(H)');
```

```
disp(s);
if(s==[0 0 0])
disp ('valid code word');
else
for i=1:n
if(s ==h(i,:))
error = i;
disp('error is in')
disp(i);
break;
end
end
end
disp('Error pattern(e)= ');
disp(E(error,:));
c = mod(r + E(error,:),2);
disp('error corrected code word');
disp('C = r + e');
disp(c);
```

Output:

Enter no of code bits: 7

Enter no of message bits: 4

Enter parity matrix: [1,0,0;0,1,1;1,1,1;1,0,0]

Parity matrix:

1	0	0
0	1	1
1	1	1

1 0 0

Generator matrix

G = [Ik : P]

1 0 0 0 1 1 0

0 1 0 0 1 0 1

0 0 1 0 1 1 1

0 0 0 1 0 1 1

message words

0000

0001

0010

0011

0100

0101

0110

0111

1000

1001

1010

1011

1100

1101

1110

1111

Codewords are:

C = mG

0	0	0	0	0	0	0
0	0	0	1	0	1	1
0	0	1	0	1	1	1
0	0	1	1	1	0	0
0	1	0	0	1	0	1
0	1	0	1	1	1	0
0	1	1	0	0	1	0
0	1	1	1	0	0	1
1	0	0	0	1	1	0
1	0	0	1	1	0	1
1	0	1	0	0	0	1
1	0	1	1	0	1	0
1	1	0	0	0	1	1
1	1	0	1	0	0	0
1	1	1	0	1	0	0
1	1	1	1	1	1	1

Hamming weight of codes

0

3

4

3

3

4

3

4

3

4

3

4

4

3

4

7

Minimum Hamming weight(dmin):

3

td =

dmin - 1

2

tc=

(dmin-1)/2

1

H = [transpose(P):I(n-k)

1 1 1 0 1 0 0

1 0 1 1 0 1 0

0 1 1 1 0 0 1

H transpose

1 1 0

1 0 1

1 1 1

0 1 1

1 0 0

0 1 0

0 0 1

Enter recieved codeword(r):[0 0 0 0 0 0 1]

Syndrome is (S):

S = r * transpose(H)

0 0 1

error is in

7

Error pattern(e)=

0 0 0 0 0 0 1

error corrected code word

C = r + e

0 0 0 0 0 0 0