```
clc
clear all
close all

% CHECKING PARITY AND DETECTING ERROR IN BITS
%ID 2017KUCP1009
%Name VIBHOR RAWAL

a=round(rand(1,4));
a

p1=sum(a);
if (p1==0 || p1==2 || p1==4)
display(' Even parity ');
else
display(' odd parity');
end;

gray_code=zeros(1,4);
gray_code(1,1)=a(1,1);
gray_code(1,2)=xor(a(1,1),a(1,2));
gray_code(1,3)=xor(a(1,2),a(1,3));
gray_code(1,4)=xor(a(1,3),a(1,4));
gray_code

hamming_code=zeros(1,7);
hamming_code(1,3)=a(1,1);
hamming_code(1,5)=a(1,2);
hamming_code(1,6)=a(1,3);
hamming_code(1,7)=a(1,4);

x=hamming_code(1,3)+hamming_code(1,5)+hamming_code(1,7);
y=hamming_code(1,3)+hamming_code(1,6)+hamming_code(1,7);
z=hamming_code(1,5)+hamming_code(1,6)+hamming_code(1,7);

if (x==2 || x==0)
hamming_code(1,1)=0;
else
hamming_code(1,1)=1;
end;
if (y==2 || y==0)
hamming_code(1,2)=0;
else
hamming_code(1,2)=1;
end;
if (z==0 || z==2)
hamming_code(1,4)=0;
else
hamming_code(1,4)=1;
end;
hamming_code
```

```
corrupted_code=hamming_code;
v=[1,2,3,4,5,6,7];
random_error=randi([1,7],1);
if(corrupted_code(1,v(1,random_error))==0)
corrupted_code(1,v(1,random_error))=1;
else
corrupted_code(1,v(1,random_error))=0;
end;
corrupted_code

p1=corrupted_code(1,1)+corrupted_code(1,3)+corrupted_code(1,5)+corrupted_code(1,7)
p2=corrupted_code(1,2)+corrupted_code(1,3)+corrupted_code(1,6)+corrupted_code(1,7)
p3=corrupted_code(1,4)+corrupted_code(1,6)+corrupted_code(1,5)+corrupted_code(1,7)

if(rem(p1,2)==0 || p1==0 )
k1=0;
else
k1=1;
end;
if(rem(p2,2)==0 || p2==0 )
k2=0;
else
k2=1;
end;
if(rem(p3,2)==0 || p3==0 )
k3=0;
else
k3=1;
end;


if(k1==0 && k2==0 && k3==0)
display('There is no error');
else
    p=k1*1+k2*2+k3*4;
display('Error at position ')
p
end
```

```
a =

     1     1     0     0

 Even parity

gray_code =

     1     0     1     0


hamming_code =

     0     1     1     1     1     0     0
```

```
corrupted_code =

     0     1     0     1     1     0     0

Error at position

p =

     3
```

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