```
clc
clear all
close all

% CHECK_PARITY_AND_ERROR_DETECTION_IN_BITS
% ID 2017KUCP1011
% Name Ashish Uniyal

a=round(rand(1,4));
a
b=sum(a);
if (b==0 || b==2 || b==4)
    display(' Even parity ');
else
    display(' odd parity');
end;
g=zeros(1,4);
g(1,1)=a(1,1);
g(1,2)=xor(a(1,1),a(1,2));
g(1,3)=xor(a(1,2),a(1,3));
g(1,4)=xor(a(1,3),a(1,4));
gray_code=g
t=zeros(1,7);
t(1,3)=a(1,1);
t(1,5)=a(1,2);
t(1,6)=a(1,3);
t(1,7)=a(1,4);
w=t(1,3)+t(1,5)+t(1,7);
x=t(1,3)+t(1,6)+t(1,7);
y=t(1,5)+t(1,6)+t(1,7);
if (w==2 || w==0)
    t(1,1)=0;
else
    t(1,1)=1;
end;
if (x==2 || x==0)
    t(1,2)=0;
else
    t(1,2)=1;
end;
if (y==0 || y==2)
    t(1,4)=0;
else
    t(1,4)=1;
end;
% P1_STARTING_FROM_LEFT
hamming_code=t
x=[3,5,6,7];
v=randi([1,4],1);
if(t(1,x(1,v))==0)
   t(1,x(1,v))=1;
else
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    t(1,x(1,v))=0;
end;
errored_code=t
b=t(1,1)+t(1,3)+t(1,5)+t(1,7);
n=t(1,2)+t(1,3)+t(1,6)+t(1,7);
m=t(1,4)+t(1,6)+t(1,5)+t(1,7);
if(rem(b,2)==0 || b==0 )
    i=0;
else
    i=1;
end;
if(rem(n,2)==0 || n==0 )
    p=0;
else
    p=1;
end;
if(rem(m,2)==0 || m==0 )
    l=0;
else
    l=1;
end;
z=[i,p,l];
if(i==0 && p==0 && l==0)
    display('no error');
else
    sum=i*1+p*2+l*4;
    fprintf(' Error at %d position',sum);
end;
```

```
a =

     0     1     1     1

 odd parity

gray_code =

     0     1     0     0


hamming_code =

     0     0     0     1     1     1     1


errored_code =

     0     0     0     1     1     1     0

 Error at 7 position
```

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