// Name: Rakesh Mahadev Bandi

// PRN: 2024065738

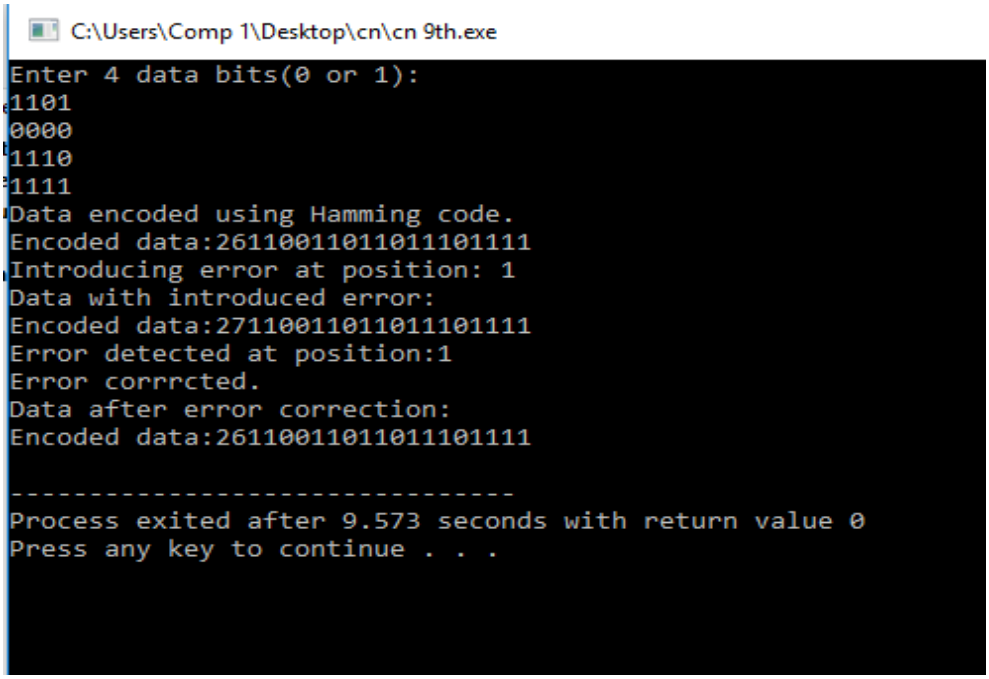
// Roll No: 3

```
#include<stdio.h>
#include<stdlib.h
>
#include<time.h>
void encodeHamming(int data[4],int encoded[7])
{
  encoded[2]=data[0];
  encoded[4]=data[1];
  encoded[5]=data[2];
  encoded[6]=data[3];
  encoded[0]=data[0]^data[1]^data[3];
  encoded[1]=data[0]^data[2]^data[3];
  encoded[3]=data[1]^data[2]^data[3];
}

void introduceError(int encoded[7])
{
        srand(time(0));
        int errorPos=rand()%7;
        printf("Introducing error at position: %d\n",errorPos+1); encoded[errorPos]^=1;
}
```

```
  void correctHamming(int encoded[7])
{
    int    p1=encoded[0]^encoded[2]^encoded[4]^encoded[6];
    int    p2=encoded[1]^encoded[2]^encoded[5]^encoded[6];
    int    p3=encoded[3]^encoded[4]^encoded[5]^encoded[6];
    int errorPos=p1*1+p2*2+p3*4;
    if(errorPos==0)
{
    printf("No error detected.\n");
}
Else
{
printf("Error detected at position:%d\n",errorPos);
encoded[errorPos-1]^=1;
printf("Error corrrcted.\n");
}
}
  void printEncodedData(int encoded[7])
{
  printf("Encoded data:");
  for(int i=0;i<7;i++)
{
  printf("%d",encoded[i]);
}
printf("\n");
```

```
  }
  int main()
{
  int data[4];
  int encoded[7];
  printf("Enter 4 data bits(0 or 1):\n");
  for(int i=0;i<4;i++){
  scanf("%d",&data[i]);
}
encodeHamming(data,encoded);
printf("Data encoded using Hamming code.\n");
printEncodedData(encoded);
introduceError(encoded);
printf("Data with introduced error:\n");
printEncodedData(encoded);
correctHamming(encoded);
printf("Data after error correction:\n");
printEncodedData(encoded);

return 0;
  }
```

Output :


C:\Users\Comp 1\Desktop\cn\cn 9th.exe
Enter 4 data bits(0 or 1):
1101
0000
1110
1111
Data encoded using Hamming code.
Encoded data:26110011011011101111
Introducing error at position: 1
Data with introduced error:
Encoded data:27110011011011101111
Error detected at position:1
Error corrrcted.
Data after error correction:
Encoded data:26110011011011101111

Process exited after 9.573 seconds with return value 0
Press any key to continue . . .