COMPUTER NETWORKS AND SECURITY LABORATORY

Assignment No. 4 B

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Ques :- Write a program for error detection and correction for 7/8 bits ASCII codes using Hamming Codes

Solution :-

Program :

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//Lab Assignment : Write a program for error detection and correction ASCII codes using Hamming Codes.

#include<stdio.h>

void main()
{
        int data[10],j;
   printf("Enter 4 bits of data one by one\n");
   scanf("%d",&data[3]);
   scanf("%d",&data[5]);
   scanf("%d",&data[6]);
   scanf("%d",&data[7]);

   //Calculation of parity bits
        data[1]=data[3]^data[5]^data[7]; //P1 = D3 D5 D7
        printf("Parity Bit at P1 %d\n",data[1]);
        data[2]=data[3]^data[6]^data[7]; //P2 = D3 D6 D7
        printf("Parity Bit at P2 %d\n",data[2]);
   data[4]=data[5]^data[6]^data[7]; //P4 = D5 D6 D7
   printf("Parity Bit at P4 %d\n",data[4]);


   printf("\nEncoded data is\n");
   for(j=7;j>0;j--)
      printf("%d ",data[j]);

        printf("\n");
   int dataatrec[10],c,c1,c2,c3,i;
```

```
   printf("Enter received data bits one by one :");
   for(i=0;i<7;i++)
      scanf("%d",&dataatrec[i]);

   c1=dataatrec[6]^dataatrec[4]^dataatrec[2]^dataatrec[0]; // C1 = P1 D3 D5 D7
   c2=dataatrec[5]^dataatrec[4]^dataatrec[1]^dataatrec[0]; // C2 = P2 D3 D6 D7
   c3=dataatrec[3]^dataatrec[2]^dataatrec[1]^dataatrec[0]; // C4 = P4 D5 D6 D7

   c=c3*4+c2*2+c1 ;//calculating decimal value

   if(c==0)
      printf("No error while transmission of data\n");
   else
    {
      printf("Error on position: %d",c);

      printf("\nData received : ");
      for(i=0;i<7;i++)
         printf("%d",dataatrec[i]);

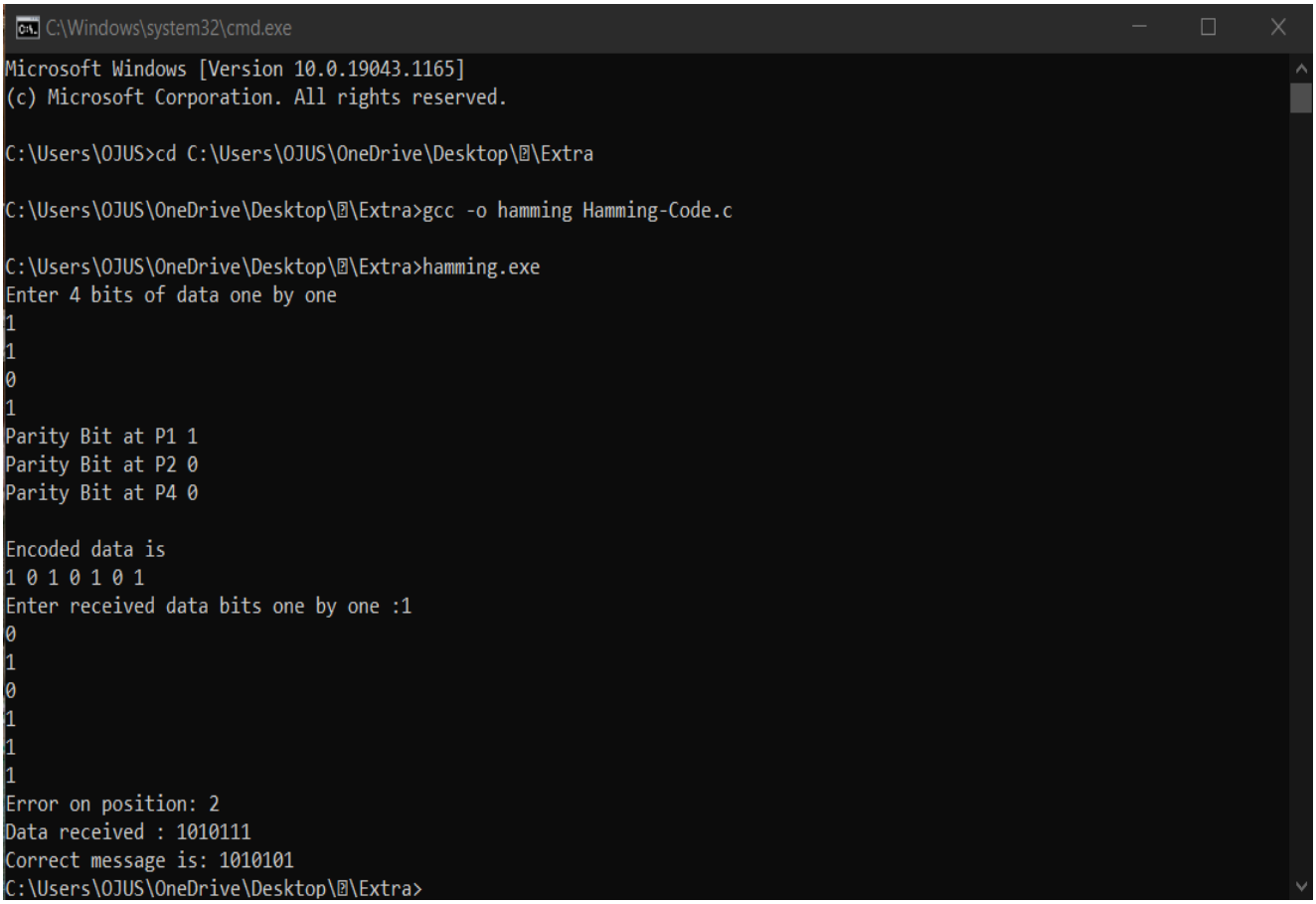
      printf("\nCorrect message is: ");

      //if errorneous bit is 0 we complement it else vice versa
      if(dataatrec[7-c]==0)
         dataatrec[7-c]=1;
      else
         dataatrec[7-c]=0;

      for (i=0;i<7;i++)
         printf("%d",dataatrec[i]);

   }
}
```

Output :


C:\Windows\system32\cmd.exe
Microsoft Windows [Version 10.0.19043.1165]
(c) Microsoft Corporation. All rights reserved.
C:\Users\OJUS>cd C:\Users\OJUS\OneDrive\Desktop\@\Extra
C:\Users\OJUS\OneDrive\Desktop\@\Extra>gcc -o hamming Hamming-Code.c
C:\Users\OJUS\OneDrive\Desktop\@\Extra>hamming.exe
Enter 4 bits of data one by one
1
1
0
1
Parity Bit at P1 1
Parity Bit at P2 0
Parity Bit at P4 0
Encoded data is
1 0 1 0 1 0 1
Enter received data bits one by one :1
0
1
0
1
1
1
Error on position: 2
Data received : 1010111
Correct message is: 1010101
C:\Users\OJUS\OneDrive\Desktop\@\Extra>