LAB 13

Write a program for error detecting code using CRCCCITT (16-bits).

Code:

```
#include<stdio.h>
 #include<string.h>
 #define N strlen(gen_poly)
 char data[28];
 char check_value[28];
 char gen_poly[10];
int data_length,i,j;
 void XOR(){
   for(j = 1; j < N; j++)
   check\_value[j] = ((\ check\_value[j] == gen\_poly[j])?'0':'1');
 }
 void receiver(){
   printf("Enter the received data: ");
   scanf("%s", data);
   printf("Data received: %s", data);
   crc();
   for(i=0;(i<N-1) && (check_value[i]!='1');i++);
     if(i < N-1)
        printf("\nError detected\n\n");
     else
        printf("\nNo error detected\n\n");
 }
 void crc(){
   for(i=0;i<N;i++)
check_value[i]=data[i];
```

```
do{
    if(check_value[0]=='1')
      XOR();
    for(j=0;j< N-1;j++)
      check_value[j]=check_value[j+1];
    check_value[j]=data[i++];
  }while(i<=data_length+N-1);</pre>
}
int main()
  printf("\nEnter data to be transmitted: ");
  scanf("%s",data);
  printf("\n Enter the Generating polynomial: ");
  scanf("%s",gen_poly);
  data_length=strlen(data);
  for(i=data_length;i<data_length+N-1;i++)
    data[i]='0';
  printf("\n_____");
  printf("\n Data padded with n-1 zeros : %s",data);
  printf("\n ");
  crc();
  printf("\nCRC or Check value is : %s",check value);
  for(i=data_length;i<data_length+N-1;i++)
    data[i]=check_value[i-data_length];
  printf("\n_____");
  printf("\n Final data to be sent : %s",data);
  printf("\n \n");
  receiver();
    return 0;
```

OUTPUT:

```
Enter data to be transmitted: 101101

Enter the Generating polynomial: 101101000000000

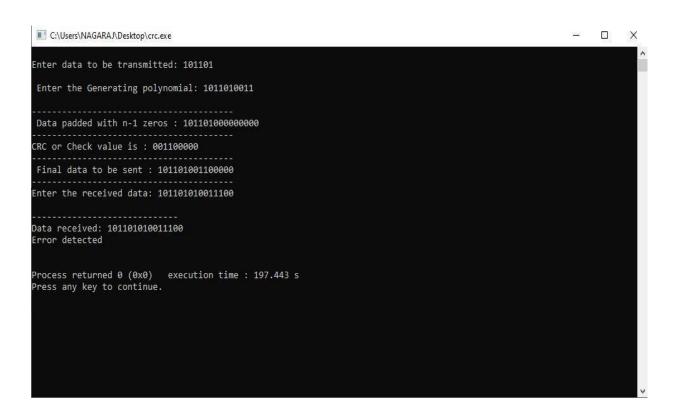
CRC or Check value is: 0011000000

Final data to be sent: 1011010011000000

Enter the received data: 1011010011000000

Process returned 0 (0x0) execution time: 25.115 s

Press any key to continue.
```



b. Write a program for congestion control using Leaky bucket algorithm.

Code:

```
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#define BUCKET_SIZE 10
#define RATE 1
#define PACKETS 20
int main() {
  int bucket = 0;
  int sent = 0;
  int dropped = 0;
  int i;
  printf("Leaky Bucket Congestion Control Simulation\n\n");
  for (i = 0; i < PACKETS; i++) \{
    usleep(500000);
    if (bucket < BUCKET_SIZE) {
       printf("Packet %d sent. Bucket Tokens: %d/%d\n", i + 1, bucket + 1,
BUCKET_SIZE);
       bucket++;
       sent++;
     } else {
       printf("Packet %d dropped (bucket full). Bucket Tokens: %d/%d\n", i + 1,
bucket, BUCKET SIZE);
       dropped++;
  }
  printf("\nSimulation Summary:\n");
  printf("Packets Sent: %d\n", sent);
  printf("Packets Dropped: %d\n", dropped);
  return 0;
```

Output:

```
C:\Users\NAGARAJ\Desktop\bucket.exe
                                                                                                                                                                                                                                             X
Leaky Bucket Congestion Control Simulation
Packet 1 sent. Bucket Tokens: 1/10
Packet 2 sent. Bucket Tokens: 2/10
Packet 3 sent. Bucket Tokens: 3/10
 Packet 4 sent. Bucket Tokens: 4/10
 Packet 5 sent. Bucket Tokens: 5/10
 Packet 6 sent. Bucket Tokens: 6/10
 Packet 7 sent. Bucket Tokens: 7/10
 Packet 8 sent. Bucket Tokens: 8/10
 Packet 9 sent. Bucket Tokens: 9/10
 Packet 10 sent. Bucket Tokens: 10/10
Packet 10 sent. Bucket Tokens: 10/10
Packet 11 dropped (bucket full). Bucket Tokens: 10/10
Packet 12 dropped (bucket full). Bucket Tokens: 10/10
Packet 13 dropped (bucket full). Bucket Tokens: 10/10
Packet 14 dropped (bucket full). Bucket Tokens: 10/10
Packet 15 dropped (bucket full). Bucket Tokens: 10/10
Packet 16 dropped (bucket full). Bucket Tokens: 10/10
Packet 17 dropped (bucket full). Bucket Tokens: 10/10
Packet 18 dropped (bucket full). Bucket Tokens: 10/10
Packet 19 dropped (bucket full). Bucket Tokens: 10/10
Packet 20 dropped (bucket full). Bucket Tokens: 10/10
Simulation Summary:
 Packets Sent: 10
 Packets Dropped: 10
 Process returned 0 (0x0) execution time : 10.992 s
 Press any key to continue.
```

OBSERVATION:

```
17/08/2023
            LAB -13
          CRC Implementation
 write a Program for error Detecting and
       Using CBC - CCITT
  C- Code
# include < 2+dio. h7

H include < 8+9ring. h7
#define N Stylen (gen Poly)
 Chan data [28]; moitor tital 22900 in
 chan chech-value [28])
 Char gen- Poly [10];
 int data-length, i, i;
 void XOR ()
 bioc. cls is dispectly connected was themet &
  for (3=1)3(N)3++)
  Check-vawe &: J= C( Check-value [3] == gen-Polys
          (O): () (O)
·void Receiver ()
Printf("Enter the neceived data!")
Scom & ("% 8", data);
```

```
pain+f(11)n
                 ----h(n");
 printf(" Data received: 9.8", dadas;
 ch(C);
 fon(i=0;(i≤N-1) 80 (check-value [;]:='1');i++
 · f(iKN-1) Book stand
  point f ("In Everon delected min");
  else
 printf(" INO Erron deleded m m")
 3
 void Cacco
$ for ( i=0 ) i(N :) i++)
    chedy - Value [i] = data [i];
  do 3
    if Canean _ value loj == 11)
    XOR () 3 Sand - 13 most - NORD - Carloton
   for (5=0) j < N-1 ; j++)
   check-value [i] = data [i++];
 3 while (ix=data_dength + N-1);
3
 int main ()
  Printf (11 In Enter the Data to be
               thankmitted i");
```

```
Scomf (19.8" data);
    printf ("In Enter the generating Polynom
    Scan & ( 11908", gm-Poly)
    data-length = 8+911 en (data);
   for ( = data length ; i < data length + N-1; it+)
     data EiJ='0';
    Printf("In --
  printf(" In Data Padded with n-1 zeroa : 9,911
           data);
  Printf("In - ---");
    che ()i
Printf("In CRC of Check value 12:0/08"),
            check - value >
 for (1= data: length; i (data_length + N-1; i++)
  data [i] = Check-Vellue [i - data-length]
Primit ("In - f - - -
                      51.0) DECOSON (11.7.2
Printf ("In Final data to be sent i % 2", data)
 Printf(")n - - - - - In")
 Deceiver ();
  netwon o:
```

OUTPUT?

Enter data to be transmitted : 101010 Enter the divisor Polynomial 11011 para Padded with n+ Zeroes i 101010000 CRC vouve is ? 001 Final codeworld to be sent = 101010000

Enter the received data: 10001000 Escron detected

Enter data to be thome 2 mitted ! 10/100 Enter the divisor Polynomial [100] Data Padded with n+ zeroes 1 1011 0000 CRC value 18 1001 100 3 15 15 AB 15 AB

Final Codeword to be Sent ! 101100001

Enter the necessed data; 1011 000 01

No Error Detected. M Concening C= (buck 2726

extend to becket brother size for our o

```
white a Program for congestion contra
 using Lang Bucker algorithm
C- code
Hindudes Stdio. hz
int maine
 int incoming, outgoing, buck_2134, n, sto
Poriona & (" Enter Bucket Rize ")
Scomf("%d", ebuck_ 8;3e);
Print & (" Enter outgoing size: ")
sounf("9.d", 20dgoing);
Print & ("Enter the number of inputs!")
 Scanf (1% d' & n);
while (n!=0)
E Printf ("Enter the incoming bucket size!"
   Scanf ("olod" & incoming ):
  if Eincoming (= (buck- 2ize - Stone))
    Stone + = incoming i
   Print & C'Bucket buffer Size god od of
           % d' In", stone, buck_size)
  3
 dse
```

Pachela Imi incoming - (buck - Size - Stone)); point? C' Bucket buffer size 100 out of 100 mi, Stone, buck Sizesi Stone = Stone - outgoing prints (11 pfeer outgoing of d Packets left out of eled in buffer mu, stone, buck_size); marting Moor , Tame and Suppose - b OUTPUT:-Enter bucket Size & 5000 Enter outgoing ratei2000 Enter number of inPuls 12 Enter the incoming Packet 813+1,3000 Bucket 13087er 8730 3000 cut of 5000 After outgoing 1000 packets left out of 5000 Enter the incoming rachet Size (1000) Bucket buffer Size 2000 out of 5000 After outgoing o Packet defi out of 5000 in Buffer . Manager and a survey of