CRC - 16

```
#include <stdio.h>
#include <string.h>

void binaryXOR (char *result, const char *a,
                const char *b) {
    for (int i = 0; i < 16; i++) {
        result[i] = (a[i] == b[i]) ? '0' : '1';
    }
    result[16] = '\0';
}

void calculateCRC (const char *data, int length,
                   char *checksum)
{
    char crc[17];
    for (int i = 0; i < 16; i++) {
        crc[i] = '0';
    }
    crc[16] = '\0';

    for (int i = 0; i < length; i++) {
        for (int j = 0; j < 8; j++) {
            char msb = crc[0];
            for (int k = 0; k < 16; k++) {
                crc[k] = crc[k+1];
            }
            crc[15] = '0';

            if (msb == '1') {
                char temp[17];
```

```
            binaryXOR(temp, crc, "10001000001000001");
            strcpy(crc, temp);
        }
    }
    crc[15] = (data[i] == '1') ? '1' : '0';
  }
  strcpy(checksum, crc);
}

int main() {
  char data[100];
  printf("Enter data in binary: ");
  scanf("%s", data);

  int dataLength = strlen(data);
  char checksum[17];
  calculateCRC(data, dataLength, checksum);

  printf("Calculated CRC: %s\n", checksum);
  char receivedChecksum[17];
  printf("Enter recieved CRC: ");
  scanf("%s", recievedChecksum);

  if (strcmp(recievedChecksum, checksum)
                                  == 0) {
    printf("Data is error-free.\n");
  }
  else {
    printf("Data contains errors");
  }
  return 0;
}
```

Output:

Enter data in Binary : 10001
Calculated CRC - 0111001001000001
Enter recieved CRC : 1011100100111100
Data contains error

Enter Data in Binary
Calculated CRC 0111001001000000
Enter recieved CRC : 0111001001000000
Data is error-free.

10/10

24/8/23

```
Enter data to be transmitted: 1010101111

 Enter the Divisor: 10101


 Data padded with n-1 zeros : 101010111100000000000000000

CRC or Check value is : 1100
 rem strlen is : 4
 101010111100000000000000000
 101010111100000000000000100
 101010111100000000000000110

 Final data to be sent : 101010111100000000000000110

Enter the received data: 101010111100000000000000110


Data received: 101010111100000000000000110
Error detected


Process returned 0 (0x0)   execution time : 38.224 s
Press any key to continue.
```

```
Enter data to be transmitted: 100011100011

 Enter the Divisor: 1001


 Data padded with n-1 zeros : 1000111000110000000000000000


CRC or Check value is : 000

 rem strlen is : 4
 1000111000110000000000000000

 1000111000110000000000000000

 1000111000110000000000000000


 Final data to be sent : 1000111000110000000000000000


Enter the received data: 1000111000110000000000000000


Data received: 1000111000110000000000000000
No error detected


Process returned 0 (0x0)   execution time : 20.893 s
Press any key to continue.
```