

Cycle - 2

(Experiment - 1)

Question:

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

Program:

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

char data[100], crc[16], gen[17];
int len, i, j;

void calc_crc() {
    for (i = 0; i < strlen(gen); i++)
        crc[i] = data[i];
    do {
        if (crc[0] == '1') {
            for (j = 1; j < strlen(gen); j++)
                crc[j] = ((crc[j] == gen[j]) ? '0' : '1');
        }
        for (j = 0; j < strlen(gen) - 1; j++)
            crc[j] = crc[j + 1];
        crc[j] = data[i++];
    } while (i <= len + strlen(gen) - 1);
}

int main() {
    printf("Enter Bit string: ");
    scanf("%s", data);
    len = strlen(data);

    printf("Enter generating polynomial (16 bits): ");
    scanf("%s", gen);
    if (strlen(gen) != 16) {
        printf("Generator polynomial must be 16 bits.\n");
        return 1;
    }

    printf("Generating Polynomial: %s\n", gen);

    for (i = len; i < len + strlen(gen) - 1; i++)
        data[i] = '0';

    printf("Modified Data is: %s\n", data);
    calc_crc();
    printf("Checksum is: %s\n", crc);

    for (i = len; i < len + strlen(gen) - 1; i++)
        data[i] = crc[i - len];

    printf("Final Codeword is: %s\n", data);
    printf("Test Error detection\n1 (Yes) / 0 (No)? : ");
    scanf("%d", &i);

    if (i == 1) {
        printf("Enter position to insert an error: ");
        scanf("%d", &i);
        data[i] = (data[i] == '0') ? '1' : '0';
        printf("Erroneous data: %s\n", data);
    }

    calc_crc();

    for (i = 0; (i < strlen(gen) - 1) && (crc[i] != '1'); i++);
```

```

if (i < strlen(gen) - 1)
    printf("Error detected.\n");
else
    printf("No Error Detected.\n");

return 0;
}

```

Output:

```

C:\Users\Acer\Desktop\Notes (4th Semester)\Labs\Computer Networks (CN)\Cycle 2\Experiment - 1>gcc CRC.c
C:\Users\Acer\Desktop\Notes (4th Semester)\Labs\Computer Networks (CN)\Cycle 2\Experiment - 1>a
Enter Bit string: 110110101
Enter generating polynomial (16 bits): 1101100000000001
Generating Polynomial: 1101100000000001
Modified Data is: 110110101000000000000000
Checksum is: 101000100000110
Final Codeword is: 110110101101000100000110
Test Error detection
1(Yes) / 0(No)? : 0
No Error Detected.

C:\Users\Acer\Desktop\Notes (4th Semester)\Labs\Computer Networks (CN)\Cycle 2\Experiment - 1>a
Enter Bit string: 110110101
Enter generating polynomial (16 bits): 1101100000000001
Generating Polynomial: 1101100000000001
Modified Data is: 110110101000000000000000
Checksum is: 101000100000110
Final Codeword is: 110110101101000100000110
Test Error detection
1(Yes) / 0(No)? : 1
Enter position to insert an error: 7
Erroneous data: 110110111101000100000110
Error detected.

```