CN Assignment 1

WRITE A C PROGRAM TO IMPLEMENT ERROR DETECTION CRC ALGORITHM , SPECIFICATIONS

1. MENU DRIVEN
2. TEST CASE 1: ACCEPT THE DATA
3. TEST CASE 2: REJECT THE DATA

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

char data[32];
char checkValue[28];
char crcKey[10];

int dataLength;

void xor() {
   for (int j = 1; j < strlen(crcKey); j++)
       checkValue[j] = checkValue[j] == crcKey[j] ? '0' : '1';
}

void crc() {
   printf("\n");

   int i;
   for (i = 0; i < strlen(crcKey); i++)
       checkValue[i] = data[i];

   do {
       if (checkValue[0] == '1')
           xor();

       int j;
       for (j = 0; j < strlen(crcKey) - 1; j++)
           checkValue[j] = checkValue[j + 1];

       checkValue[j] = data[i++];
       printf("Check Value: %s\n", checkValue);
   } while (i <= dataLength + strlen(crcKey) - 1);

   printf("\n");
}
```

```c
int main() {
   while (1) {
       printf("Choose one of the options:\n");
       printf("1. Set CRC Key.\n");
       printf("2. Generate CRC key from data.\n");
       printf("3. Check validity of data.\n");
       printf("4. Exit from the program.\n");
       printf("\n");
       printf("Choose your option: ");

       int choice;
       scanf("%d", &choice);

       switch (choice) {
       case 1:
           printf("Enter CRC Key: ");
           scanf("%s", crcKey);
           break;
       case 2:
           printf("Enter data: ");
           scanf("%s", data);
           dataLength = strlen(data);
           for (int i = 0; i < strlen(crcKey) - 1; i++)
               data[i + dataLength] = '0';

           printf("Data after appending zeros: %s\n", data);

           crc();

           printf("CRC Value: %s\n", checkValue);
           for (int i = 0; i < strlen(crcKey) - 1; i++)
               data[i + dataLength] = checkValue[i];

           printf("Data sent: %s\n", data);
           break;
       case 3:
           printf("Enter data to check: ");
           scanf("%s", data);

           crc();

           int i;
           for (i = 0; (i < strlen(crcKey) - 1) && (checkValue[i] ≠
'1'); i++)
               ;

           if (i < strlen(crcKey) - 1)
               printf("Error detected!\n");
           else
```

```
                printf("No error detected.\n");
            break;
        case 4:
            return 0;
        default:
            printf("Invalid option selected.");
        }

        printf("\n\n");
    }

    return 0;
}
```

Output:

```
Choose one of the options:
1. Set CRC Key.
2. Generate CRC key from data.
3. Check validity of data.
4. Exit from the program.

Choose your option: 1
Enter CRC Key: 101



Choose one of the options:
1. Set CRC Key.
2. Generate CRC key from data.
3. Check validity of data.
4. Exit from the program.

Choose your option: 2
Enter data: 0110101
Data after appending zeros: 011010100

Check Value: 110
Check Value: 111
Check Value: 100
Check Value: 011
Check Value: 110
Check Value: 110
Check Value: 11

CRC Value: 11
Data sent: 011010111
```

```
Choose one of the options:
1. Set CRC Key.
2. Generate CRC key from data.
3. Check validity of data.
4. Exit from the program.

Choose your option: 3
Enter data to check: 011010111

Check Value: 110
Check Value: 111
Check Value: 100
Check Value: 011
Check Value: 111
Check Value: 101
Check Value: 00

No error detected.


Choose one of the options:
1. Set CRC Key.
2. Generate CRC key from data.
3. Check validity of data.
4. Exit from the program.

Choose your option: 3
Enter data to check: 011010110

Check Value: 110
Check Value: 111
Check Value: 100
Check Value: 011
Check Value: 111
Check Value: 100
Check Value: 01

Error detected!


Choose one of the options:
1. Set CRC Key.
2. Generate CRC key from data.
3. Check validity of data.
```

```
4. Exit from the program.

Choose your option: 4
```