

34. Implementing the simulation of error correction code - CRC in java/C.

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

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

```
#define POLYNOMIAL "1101" // Example divisor (CRC-3)
```

```
void xorOperation(char *dividend, const char *divisor) {
```

```
    for (int i = 0; i < strlen(divisor); i++) {
```

```
        dividend[i] = (dividend[i] == divisor[i]) ? '0' : '1';
```

```
    }
```

```
}
```

```
void computeCRC(char *data, char *remainder, const char *polynomial) {
```

```
    int dataLen = strlen(data);
```

```
    int polyLen = strlen(polynomial);
```

```
    char temp[100]; // Ensure enough space
```

```
    strcpy(temp, data);
```

```
    for (int i = 0; i <= dataLen - polyLen; i++) {
```

```
        if (temp[i] == '1') {
```

```
            xorOperation(&temp[i], polynomial);
```

```
        }
```

```
    }
```

```
    strncpy(remainder, &temp[dataLen - polyLen + 1], polyLen - 1);
```

```
    remainder[polyLen - 1] = '\0';
```

```
}
```

```
void appendCRC(char *data, const char *remainder) {
```

```
    strcat(data, remainder);
```

```
}
```

```

int verifyCRC(char *receivedData, const char *polynomial) {
    char remainder[strlen(polynomial)];
    computeCRC(receivedData, remainder, polynomial);

    for (int i = 0; i < strlen(remainder); i++) {
        if (remainder[i] != '0') return 0; // Error detected
    }
    return 1; // No error
}

int main() {
    char data[100] = "11010011101100"; // Example data
    char remainder[strlen(POLYNOMIAL)];
    char transmittedData[100];

    strcat(data, "000"); // Append space for remainder (POLYNOMIAL length - 1)
    computeCRC(data, remainder, POLYNOMIAL);
    strcpy(transmittedData, data);
    appendCRC(transmittedData, remainder);

    printf("Transmitted Data: %s\n", transmittedData);

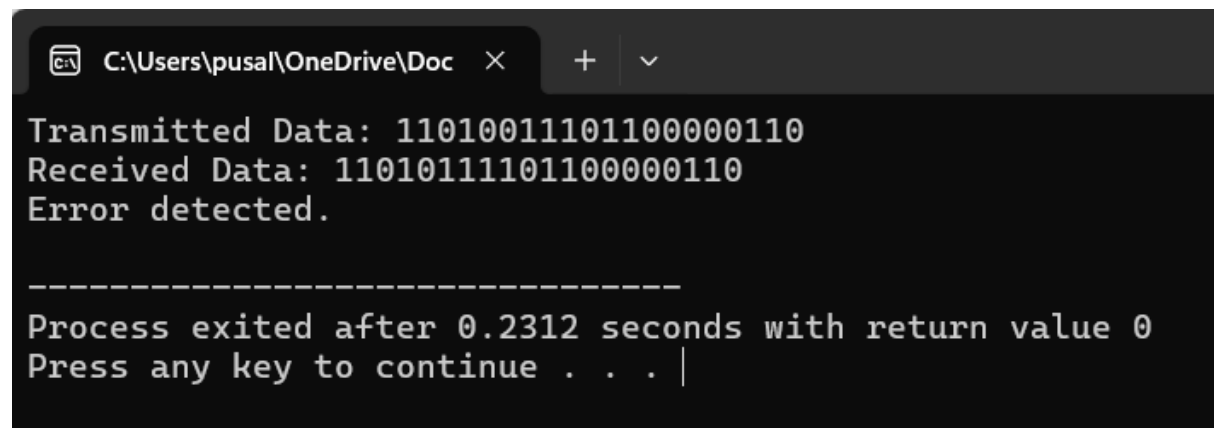
    // Simulate received data (introduce errors for testing)
    char receivedData[100];
    strcpy(receivedData, transmittedData);
    receivedData[5] = (receivedData[5] == '0') ? '1' : '0'; // Introduce error

    printf("Received Data: %s\n", receivedData);

    if (verifyCRC(receivedData, POLYNOMIAL)) {
        printf("No error detected.\n");
    }
}

```

```
} else {  
    printf("Error detected.\n");  
}  
  
return 0;  
}
```



```
C:\Users\pusal\OneDrive\Doc × + ▾  
Transmitted Data: 11010011101100000110  
Received Data: 11010111101100000110  
Error detected.  
  
-----  
Process exited after 0.2312 seconds with return value 0  
Press any key to continue . . . |
```