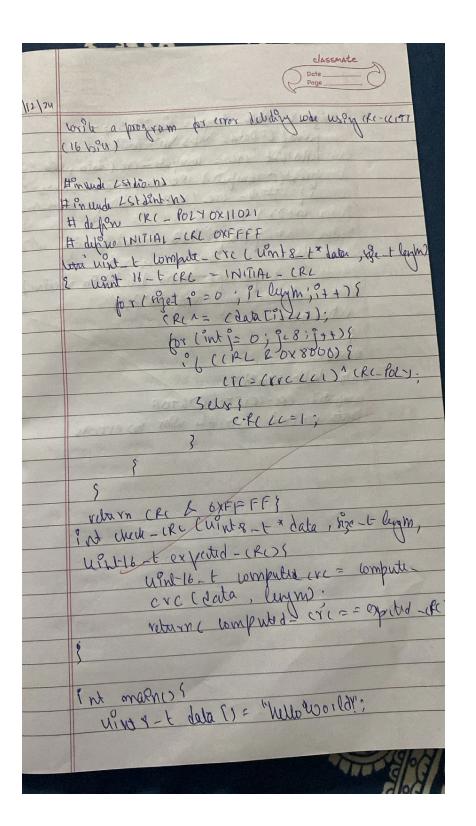
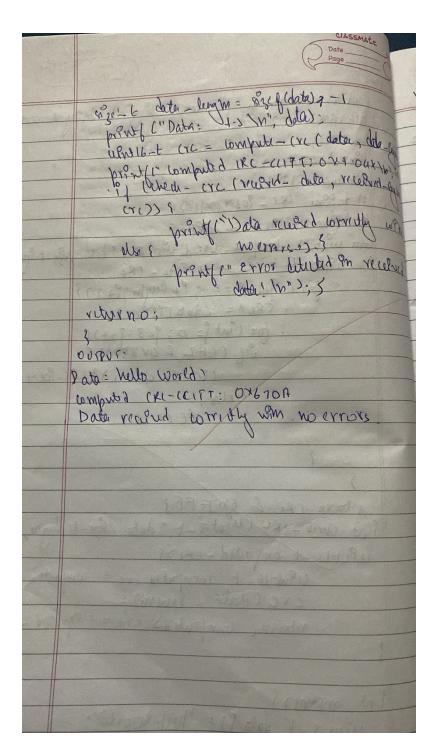
Program 1

Aim of the program: Write a program for error detecting code using CRC-CCITT (16-bits). **Code:**

```
#include <stdio.h>
#include <stdint.h>
#define CRC POLY 0x1021
#define INITIAL CRC 0xFFFF
uint16 t compute crc(uint8 t *data, size t length) {
  uint16 t crc = INITIAL CRC;
  for (size t i = 0; i < length; i++) {
     \operatorname{crc} \stackrel{\wedge}{=} (\operatorname{data}[i] << 8);
     for (int j = 0; j < 8; j++) {
       if (crc & 0x8000) {
          crc = (crc << 1) ^ CRC POLY;
       } else {
          crc <<= 1;
  return crc & 0xFFFF;
int check crc(uint8 t *data, size t length, uint16 t expected crc) {
  uint16 t computed crc = compute crc(data, length);
  return (computed crc == expected crc);
int main() {
  uint8_t data[] = "Hello, World!";
  size t data length = sizeof(data) - 1;
  printf("Data: %s\n", data);
  uint16 t crc = compute crc(data, data length);
  printf("Computed CRC-CCITT: 0x%04X\n", crc);
  uint8 t received data[] = "Hello, World!";
  size t received length = sizeof(received data) - 1;
  if (check crc(received data, received length, crc)) {
     printf("Data received correctly with no errors.\n");
     printf("Error detected in received data!\n");
  return 0;
```

```
1 #include <stdio.h>
2 #include <stdint.h>
 3 #define CRC_POLY 0x1021
4 #define INITIAL_CRC 0xFFFF
  5 uint16_t compute_crc(uint8_t *data, size_t length) {
                tio_t compute_crc(uints_t *data, size_t
uint16_t crc = INITIAL_CRC;
for (size_t i = 0; i < length; i++) {
    crc ^= (data[i] << 8);
    for (int j = 0; j < 8; j++) {
        if (crc & 0x8000) {</pre>
                                          crc = (crc << 1) ^ CRC_POLY;</pre>
                                            crc <<= 1;
14
                  return crc & 0xFFFF;
18
       int check_crc(uint8_t *data, size_t length, uint16_t expected_crc) {
    uint16_t computed_crc = compute_crc(data, length);
    return (computed_crc == expected_crc);
20
21
      int main() {
    uint8_t data[] = "Hello, World!";
    size_t data_length = sizeof(data) - 1;
    print*("Data: %s\n", data);
    rec = compute_crc(data, data_)
26
                 uint16_t crc = compute_crc(data, data_length);
print*("Computed CRC-CCITT: 0x%04X\n", crc);
uint8_t received_data[] = "Hello, World!";
size_t received_length = sizeof(received_data) - 1;
                 if (check_crc(received_data, received_length, crc)) {
   printf("Data received correctly with no errors.\n");
                 } else {
    printf("Error detected in received data!\n");
```





Output:

Data: Hello, World! Computed CRC-CCITT: 0x67DA

Data received correctly with no errors.

Pate: Nulls world?

tomposed (Ne-cert: 0x610)

Date mared wornty with no errors