NAME: G.Shiva Shankar reddy

REG.NO.: 192211486

CODE: CSA0734

EXPERIMENT: 29

AIM: To implement the simulation of error correction code-CRC

PROGAM:

```
import java.util.*; class CRC {
public static void main(String args[]) {
Scanner scan = new Scanner(System.in); int n;
System.out.println("Enter the size of the data:"); n = scan.nextInt();
int data[] = new int[n]; System.out.println("Enter the data, bit by bit:"); for(int i=0 ; i < n ; i++) {
System.out.println("Enter bit number " + (n-i) + ":"); data[i] = scan.nextInt();
}
System.out.println("Enter the size of the divisor:"); n = scan.nextInt();
int divisor[] = new int[n]; System.out.println("Enter the divisor, bit by bit:"); for(int i=0 ; i < n ; i++) {
System.out.println("Enter bit number " + (n-i) + ":"); divisor[i] = scan.nextInt();
}
int remainder[] = divide(data, divisor); for(int i=0 ; i < remainder.length-1 ; i++) {
System.out.print(remainder[i]);
}
System.out.println("\nThe CRC code generated is:"); for(int i=0 ; i < data.length ; i++) {
System.out.print(data[i]);
}
for(int i=0 ; i < remainder.length-1 ; i++) { System.out.print(remainder[i]);
}
System.out.println();
int sent_data[] = new int[data.length + remainder.length - 1]; System.out.println("Enter the data to be sent:");
for(int i=0 ; i < sent_data.length ; i++) {
System.out.println("Enter bit number " + (sent_data.length-i)+ ":"); sent_data[i] = scan.nextInt();
}
receive(sent_data, divisor);
}
static int[] divide(int old_data[], int divisor[]) { int remainder[] , i;
int data[] = new int[old_data.length + divisor.length]; System.arraycopy(old_data, 0, data, 0, old_data.length);
remainder = new int[divisor.length]; System.arraycopy(data, 0, remainder, 0, divisor.length); for(i=0 ; i <
old_data.length ; i++) {
System.out.println((i+1) + ".) First data bit is : "+ remainder[0]); System.out.print("Remainder : ");
if(remainder[0] == 1) {
        for(int j=1 ; j < divisor.length ; j++) {
```

```
  remainder[j-1] = exor(remainder[j], divisor[j]); System.out.print(remainder[j-1]);
  }
  }
  else {
  for(int j=1 ; j < divisor.length ; j++) { remainder[j-1] = exor(remainder[j], 0);
  System.out.print(remainder[j-1]);
  }
  }
  remainder[divisor.length-1] = data[i+divisor.length];
  System.out.println(remainder[divisor.length-1]);
  }
  return remainder;
  }
  static int exor(int a, int b) {
  if(a == b) {
  return 0;
  }
  return 1;
  }
  static void receive(int data[], int divisor[]) {
  int remainder[] = divide(data, divisor); for(int i=0 ; i < remainder.length ; i++) {
  if(remainder[i] != 0) {
  System.out.println("There is an error in received data..."); return;
  }
  }
  System.out.println("Data was received without any error.");
  }
}
```

OUTPUT:

```
                7
Enter the
size of the
data:
Enter the data, bit by bit:
Enter bit       1
number 7:
Enter bit       0
number 6:
Enter bit       0
number 5:
Enter bit       1
number 4:
Enter bit       1
number 3:
Enter bit       0
number 2:
Enter bit       1
number 1:
Enter the size of the divisor:
4 Enter the divisor, bit by
```

bit:
Enter bit 1
number 4:
Enter bit 0
number 3:
Enter bit 1
number 2:
Enter bit 1
number 1:
1.) First data bit is : 1
Remainder : 0101
2.) First data bit is : 0
Remainder : 1010
3.) First data bit is : 1

Remainder : 0011
4.) First data bit is : 0 Remainder : 0110
5.) First data bit is : 0 Remainder : 1100
6.) First data bit is : 1 Remainder : 1110
7.) First data bit is : 1 Remainder : 1010
101
The CRC code generated is: 1001101101 Enter the data to be sent:
Enter bit number 10: 1
Enter bit number 9: 0
Enter bit number 8: 0
Enter bit number 7: 1
Enter bit number 6: 1
Enter bit number 5: 0
Enter bit number 4: 1
Enter bit number 3: 1
Enter bit number 2: 0
Enter bit number 1: 1

First data bit is : 1 Remainder : 0101 2.) First data bit is : 0 Remainder : 1010 3.) First data bit is : 1 Remainder : 0011 4.) First data bit is : 0 Remainder : 0111 5.) First data bit is : 0 Remainder : 1110 6.) First data bit is : 1 Remainder : 1011 7.) First data bit is : 1 Remainder : 0000 8.) First data bit is : 0 Remainder : 0000 9.) First data bit is : 0 Remainder : 0000 10.) First data bit is : 0 Remainder : 0000 Data was received without any error.

RESULT: Therefore simulation of error correction code-CRC has been successfully excecuted.