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**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:** | |
| Enter the size of the data: | 7 |
| Enter the data, bit by bit: | |
| Enter bit number 7: | 1 |
| Enter bit number 6: | 0 |
| 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 |
| Enter the size of the divisor: 4 Enter the divisor, bit by bit: | |
| Enter bit number 4: | 1 |
| Enter bit number 3: | 0 |
| Enter bit number 2: | 1 |
| Enter bit number 1: | 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.