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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:

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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 executed.