**Experiment No.04**

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**Aim :** Study and implementation of the Non-Restoring Division Algorithm.

**Code :**

import java.util.Scanner;

public class Nonrestoring {

    static String toBinary(int num, int n) {

        StringBuilder sb = new StringBuilder();

        for (int i = n - 1; i >= 0; i--) {

            sb.append((num >> i) & 1);

        }

        return sb.toString();

    }

    public static void main(String[] args) {

        Scanner sc = new Scanner(System.in);

        // Input

        System.out.print("Enter the Divisor (M) = ");

        int M = sc.nextInt();

        System.out.print("Enter the Dividend (Q) = ");

        int Q = sc.nextInt();

        int n = Math.max(

                Integer.toBinaryString(Q).length(),

                Integer.toBinaryString(M).length()

        );

        int A = 0;

        int quotient = Q;

        for (int i = 0; i < n; i++) {

            A = (A << 1) | ((quotient >> (n - 1)) & 1);

            quotient = (quotient << 1) & ((1 << n) - 1);

            if (A >= 0) {

                A = A - M;

            } else {

                A = A + M;

            }

            if (A >= 0) {

                quotient = quotient | 1;

            }

        }

        if (A < 0) {

            A = A + M;

        }

        System.out.println("Binary representation of Dividend (Q) = " + toBinary(Q, n));

        System.out.println("Binary representation of Divisor (M) = " + toBinary(M, n));

        System.out.println("Quotient in binary = " + toBinary(quotient, n));

        System.out.println("Remainder in binary = " + toBinary(A, n));

        sc.close();

    }

}

**Output :**

