**DIVISION ALGORITHM:**

The division algorithm is an algorithm in which given 2 integers N and D,it computes their quotient Q and remainder R ,where 0<R<|D|.

N=DQ+R

Division algorithm is again divided into 2 main categories:

1. FAST DIVISION
2. SLOW DIVISION

**Restoring division**

The quotient digits *q* are formed from the digit set {0,1}.

The above restoring division algorithm can avoid the restoring step by saving the shifted value 2*R* before the subtraction in an additional register *T* (i.e., *T* = *R* << 1) and copying register *T* to *R* when the result of the subtraction 2*R* − *D* is negative.

### Non-restoring division

Non-restoring division uses the digit set {−1, 1} for the quotient digits instead of {0, 1}. The algorithm is more complex, but has the advantage when implemented in hardware that there is only one decision and addition/subtraction per quotient bit; there is no restoring step after the subtraction. This lets it be executed faster.

**ADVANTAGES OF NON-RESTORING DIVISION OVER OTHERS.**

Test subtraction is not required;

the sign bit determines whether an addition or subtraction is used.

RESTORING DIVISION: Slower; requires time because of restoration in each cycle.

SRT: At the last bit position, we get incorrect results. Requires additional step of each iteration.

NEWTON-RAPHSON: Requires large number of gate counts which is not feasible to implement on FPGA. It needs multiplication, addition/subtraction at each iteration.