Using complements in subtraction

Using 2´s complement in subtraction :

Instead of subtraction a number , we can add it's 2's comp, and disregard the last carry.

EX: decimal

```
  7        111 ─────────────────────────►  111
 -5       -101   1´s   010   2´s            011
  2               1+                      1 010   + ve. No.
                 011                      X  carry
```

EX: 13   1101 ─────────────────────► 1101
```
 -10      1010   1´s  0101    2´s            0110
   3               1+                      1  0011    +ve. No.
                 0110                         X carry
```

EX: 4   100 ──────────────────────► 100
```
  -7     -111   1´s   000    2´s             001+
  -3              1+                         101
                 001                      No carry    -ve. No.   ➤
```

So 101──► 0 10──►011

Using 1´s complement in subtraction :

Instead of subtracting a number we add the 1´s complement of the number , the last carry is then added to the number to get the final answer .

EX: 7   111 ───────────────────►   111
```
  -5       - 101      1´s         ─────►             010 +
   2                                    carry  ──►1  001
                                        + ve.  No.    ↳ 1 +
                                                      010
```

EX: 3   011 ————————————————▶   011

   <u>-5</u>   <u>101</u> ————1' s————————▶   <u>010 +</u>

                                                101

No carry ⟶ - ve. No.

           101 ⟶ 010

<u>Binary division :</u>

The standard division format is:

    <u>Dividend</u>   =quotient

      Divisor

The divisor can be subtracted from the dividend a number of times equal to the quotient. For example in decimal:

<u>21</u> ⟹   21-7=14 1st

7

           14-7=7 2nd

           7-7=0 3rd so quotient= 3

In binary:

EX: <u>1100</u>

     100

100 ⟶ 0100 <u>1's comp.</u>▶ 1011 <u>2's comp.</u>▶ 1100

   1100

 <u> 1100 +</u>

X 1 1000   q=1

  <u> 1100+</u>

X 1 0100   q=2

   <u>1100 +</u>

X 1 0000   q=3   the result

EX: Divide 1010   by 101:

101 ⟶   0101   1's comp.   1010   2's comp.   1011

    1010
    <u>1011 +</u>
X 1   0101   q=1
    <u>1011 +</u>
X 1   0000   q=2   the result