Addition and Multiplication

1st	2nd	and	or
0	0	0	0
0	1	0	1
1	0	0	1
1	1	1	1

Complement

1's Complement of -8: 1111 0111
2's Complement of -8: 1111 1000

maximum negative and minimum positive remain unchanged

1's Complement of 8: 0000 0111
2's Complement of 8: 0000 1000

1's Complement of -36: 1101 1011
2's Complement of -36: 1101 1100

1's Complement of 36: 0010 0011
2's Complement of 36: 0010 0100

sign bit extension

011	3
010	2
001	1
000	0
111	-1
110	-2
101	-3
100	-4

→ the most significant bits to the next bit of least significant bit set reversed turns out the negative of its value

0100 + 0100 = 1000
overflow
1000 + 1000 = 0000

5 → 0101 7 → 0111 1111 × 1111 = 111000|

```
  1011   ← multiplicand can be negative
x 0111
  1011
 1011
1011
1011
11011101
```

01011 × 00111 = 100|110| ← the lower offset bits from source are not affected by sign bit extension

```
    0101   ← multiplier with sign bit set
x   1001
  0000101
 0000000
000000
01011
11011101
```

00101 × 01001 = 10110| ← the same binary interpretation construed no matter the leftmost bit in the lower offset bits from source is treated as either a sign or digit bit