REPORT

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**Time Complexity**

Time Complexity of algorithm implemented is (N)^2 where N is the maximum length of the binary of the input provided.

**Input**

Enter two integers in the range of -(1000) to (+1000)

**Output**

Output is stored in output.txt in binary and decimal form in a nice and readable format.

**Algorithm**

Flowchart has been attached as pdf. Dry run is as follow :

1. Take input a,b and convert into binary; a\_bin and b\_bin
2. For negative numbers, store their two’s complement in the corresponding binary.
3. Make the length of both the binaries same
4. Initialize ac with ‘0’. Length(ac) = length(a\_bin) ; Counter = length(a\_bin); Q\_nplusone = 0
5. While (Counter > 0)
   1. last = a\_bin[-1]
   2. if last, Q\_nplusone == 1,0
      1. ac = ac + twos\_complement(b\_bin)
   3. else if last, Q\_nplusone == 1,0
      1. ac = ac + b\_bin
   4. RightShift(ac, a\_bin)
   5. Counter = Counter-1
6. Answer = ac + a\_bin { Note : this is string addition }

**Test Cases Used and corresponding outputs :**

1. 3 4
   1. Answer in Binary is : 00001100 Answer in Decimal is : + 12
2. -3 4
   1. Answer in Binary(2's complement) is : 00001100 Answer in Decimal is : - 12
3. -3 -4
   1. Answer in Binary is : 00001100 Answer in Decimal is : + 12
4. 1000 1000
   1. Answer in Binary is : 0011110100001001000000 Answer in Decimal is : + 1000000