

Add two numbers without using arithmetic operators

Difficulty Level : Hard • Last Updated : 22 Apr, 2021

Write a function `Add()` that returns sum of two integers. The function should not use any of the arithmetic operators (+, ++, -, -, .. etc).

Sum of two bits can be obtained by performing XOR (^) of the two bits. Carry bit can be obtained by performing AND (&) of two bits.

Above is simple Half Adder logic that can be used to add 2 single bits. We can extend this logic for integers. If x and y don't have set bits at same position(s), then bitwise XOR (^) of x and y gives the sum of x and y. To incorporate common set bits also, bitwise AND (&) is used. Bitwise AND of x and y gives all carry bits. We calculate $(x \& y) \ll 1$ and add it to $x \wedge y$ to get the required result.