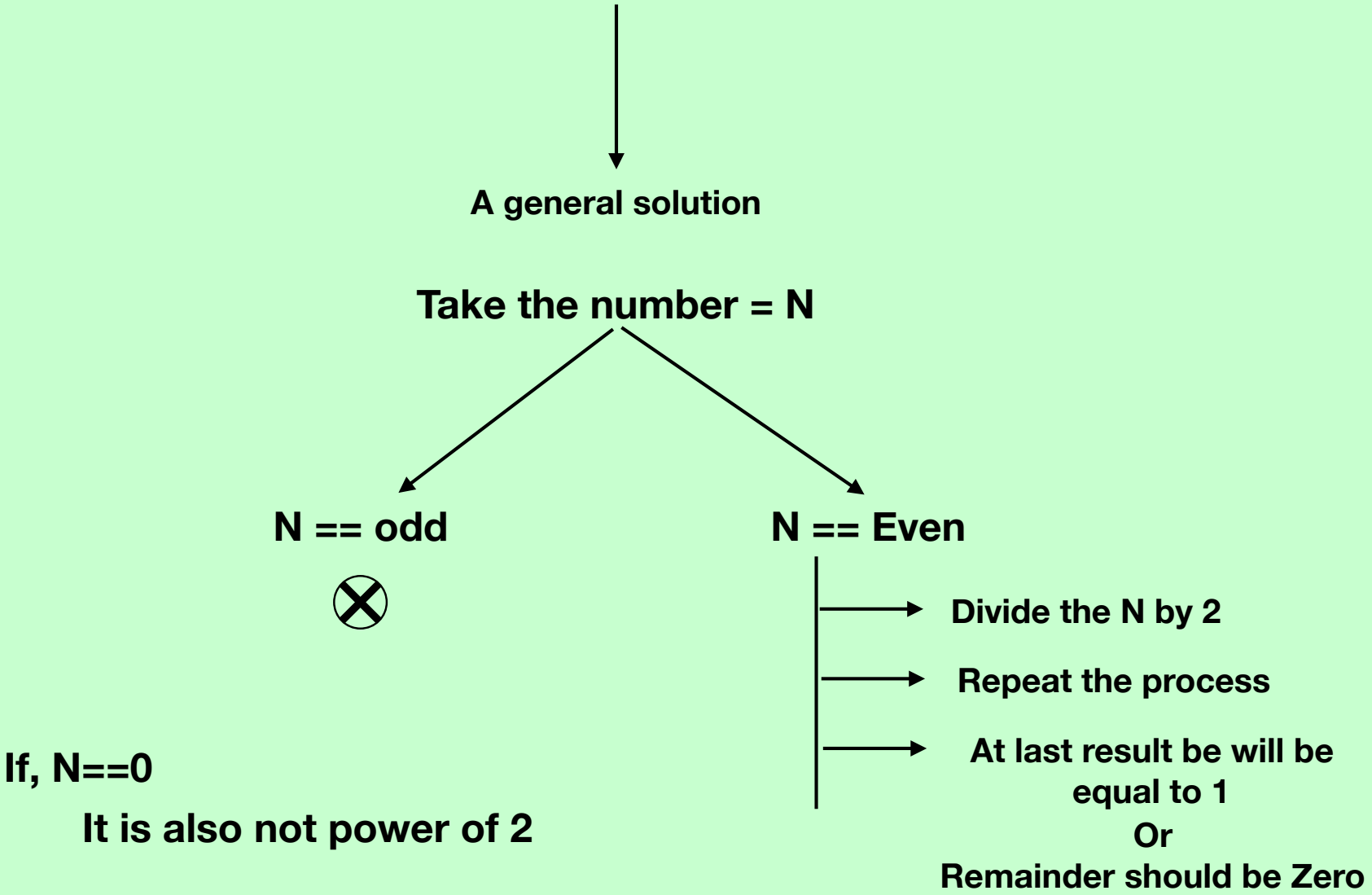
Algorithms on Bitwise Operator

By Prince Agarwal

[“ Hello World ”]

Check if a given number is power of 2 ?



Time complexity for this code is O(logN).

The same problem can be solved using bit manipulation

With very efficient way

	Numbers	Binary Representation
2^3	8	00001000
2^5	32	00100000
	9	00001001
2^6	64	01000000
	23	00010111
	65	01000001
2^7	128	10000000

numbers which are powers of 2, have one and only one bit set in their binary representation

Let

Take the number = X

↓

Now think about the
binary representation of (X) and (X-1)

Example,

X=4

$X = 4 = (100)_2$

$(x - 1) = 3 = (011)_2$

x & (x-1)

↓

AND Operator

1 0 0

0 1 1

0 0 0 → Null Value

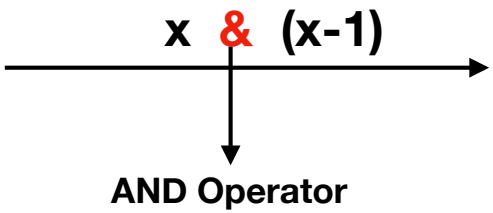
Therefore, x= 4 is a power of 2

Example,

X=6

$X = 6 = (110)_2$

$(x - 1) = 5 = (101)_2$



1 1 0

1 0 1

1 0 0 → NOT Null Value

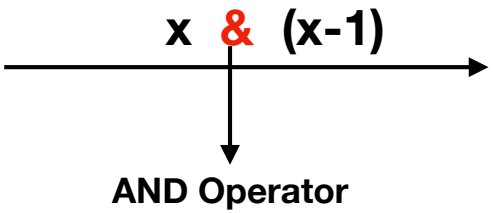
Therefore, x= 6 is NOT a power of 2

Example,

X=8

$X = 8 = (1000)_2$

$(x - 1) = 7 = (0111)_2$



1 0 0 0

0 1 1 1

0 0 0 0 → Null Value

Therefore, x= 8 is a power of 2

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Hello World

“ If you feel any problem then comments in my video
I will reply as soon as possible “

- Prince Agarwal