Topics to discuss

Bit manipulation Problem - 6

Power of Two

Four ways to solve

231. Power of Two

$2^0, 2^1, 2^2, 2^3, 2^4, 25...$
$1, 2, 4, 8, 16, 32$

Easy | Topics | Companies

Given an integer `n`, return `true` *if it is a power of two. Otherwise, return* `false`.

An integer `n` is a power of two, if there exists an integer `x` such that `n == 2^x`.

Example 1:

> **Input:** n = 1
> **Output:** true
> **Explanation:** $2^0 = 1$

Example 2:

> **Input:** n = 16
> **Output:** true
> **Explanation:** $2^4 = 16$

Example 3:

> **Input:** n = 3
> **Output:** false

```
static boolean solution1(int n){
    if (n==0) return false;
    while (n!=1){
        if (n%2!=0)
            return false;
        n=n/2;
    }
    return true;
}
```

```
Static boolean solution2 (int n){
    if (n<1) return false;
    if (n==1) return true;
    int count = 0;
    for (int i=0 ; i<=32 ; i++){
        if ((n & 1) == 1)
            count++;
        n = n >>1;
    }
    if (count == 1) return true;
    else return false;
}
```

1 → 1
2 → 10
4 → 100
8 → 1000
16 → 10000
32 → 100000

```
static boolean solution3 (int n){
    if (n<1) return false;
    if (n==1) return true;
    return ((n & (n-1)) == 0);
```

$n = 5$, $n-1 = 4$

$n \rightarrow 1\ 0\ 1$

$n-1 \rightarrow 1\ 0\ 0$ &

$1\ 0\ 0 \neq 0$ false.

$n = 4$, $n-1 = 3$

$n \rightarrow 1\ 0\ 0$

$n-1 \rightarrow 0\ 1\ 1$ &

$0\ 0\ 0 = 0$ (True)

```
Static boolean solution4 (int n) {
        if (n<1)  return false;
        if (n==1)  return true;
        if (n%2!=0)  return false;
        return solution4 (n/2);
}
```

Follow Now

Start Practicing

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