

Topics to discuss

Bit manipulation Problem - 7
Power of Four



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342. Power of Four

Easy

Topics

Companies

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

An integer n is a power of four, if there exists an integer x such that $n == 4^x$.

Example 1:

Input: $n = 16$

Output: `true`

Example 2:

Input: $n = 5$

Output: `false`

Example 3:

Input: $n = 1$

Output: `true`

```

class solution {
    public boolean isPowerOfFour (int n) {
        return (n & (n-1) == 0) && (n % 3 == 1);
    }
}

```

1, 4, 16, 64, ...

1

$4 - 1 = 3$

$16 - 1 = 15$

$64 - 1 = 63$

$n = 4$ 1 $n = 100$ $(4)_{10}$
 $n-1 = 011$ $\& (3)_{10}$

 $000 = 0$ (True)

② $4 \% 3 == 1$ (True)

```
class solution {  
    public boolean isPowerOfFour (int n) {  
        if (n < 1) return false;  
        if (n == 1) return true;  
        if (n % 4 != 0) return false;  
        return isPowerOfFour (n/4);  
    }  
}
```

$$n = 7$$

$$7 \% 4 \neq 0$$

$$n = 64 \quad (64 \% 4 = 0)$$

$$n = \frac{64}{4} = 16 \quad (16 \% 4 = 0)$$

$$n = \frac{16}{4} = 4 \quad (4 \% 4 = 0)$$

$$n = \frac{4}{4} = 1$$

```
class solution {  
    public boolean isPowerOfFour (int n) {  
        if (n < 1) return false;  
        while (n != 1) {  
            if (n % 4 != 0) return false;  
            n = n / 4;  
        }  
        return true;  
    }  
}
```

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