Power(x, n) ⇒ x^n

Brute Force:

```
power(x, n)
    if n == 1
        return x
    else
        return x * (x, n-1)
```

$x^n = x \cdot x^{n-1}$

$\rightarrow x \cdot x^{n-2}$

$\rightarrow x \cdot x^{n-2}$

.....

n times

negative power

$5^{-7} = \left(\frac{1}{5}\right)^7$

$x \leftarrow \frac{1}{x}$; $n \leftarrow -1 * n$

Time Complexity: O(n)

Efficient Way:

What is better than O(n)?

O(lg n) ⇒ Binary Search

```
power(x, n)
    if n == 1
        return x

    p ← power(x * x, n/2)

    if n is even
        return p
    else
        return p * x
```

power(x, 8)

p ← power(x * x, 4)

→ power($x^2 * x^2$, 2)

→ power($x^4 * x^4$, 1)

$n \rightarrow \frac{n}{2} \rightarrow \frac{n}{4} \rightarrow \dots 1$

O(lg n)