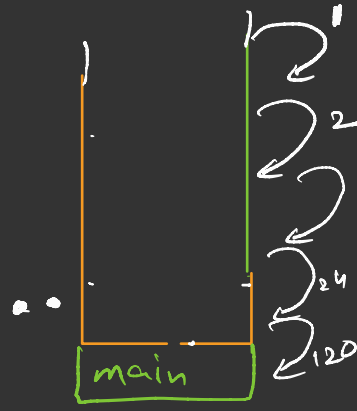
Q Factorial (n) ⇒ n!

Expectation	Faith	Combine
n=5 5×4×3×2×1 ⇒ 120	n=4 4×3×2×1 ⇒ 24 fact(4)	factnm1 = fact(4); return factnm1 * 5

```
fact (int n) {
  if(n==1)
    return 1;
  return fact(n-1); .
  fact * n; ..
```




```
main ( ) {
  fact(5);
```

Time ⇒ O(n)

Space ⇒ O(n)

Ques Power (a, b)

⇒ a^b

Expectation	Faith	Combine
a = 5 b = 4 ⇒ 5^4 ⇒ 5×5×5×5 ⇒ 625	5^3 ⇒ 5×5×5 ⇒ 125	p = power(5, 3) return p * 5

$(a-1)^b$

p = power(a, b-1)
return a * p;

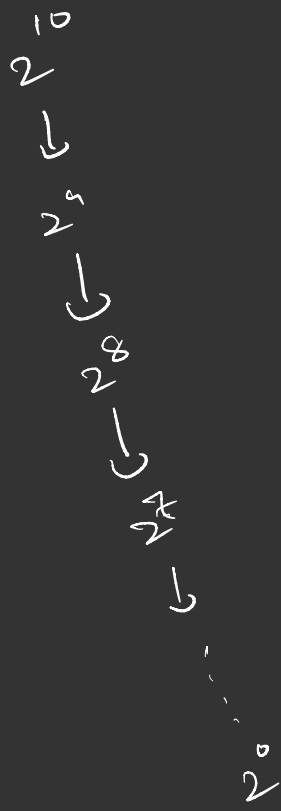
4^4

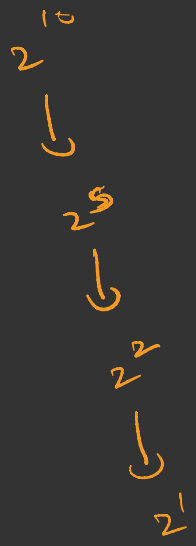
p	s	i-1
p	s	0
p	s	1
p	s	2
p	s	3
p	s	4

if(b == 0)	if(b == 1)
return 1	return a;

Time ⇒ O(n)

space ⇒ O(n)





$2^{10} \Rightarrow 2^5 \times 2^5$

$4^{12} \Rightarrow 4^6 \times 4^6$

$2^{11} \Rightarrow 2^5 \times 2^5 \times 2$

$2^5 \Rightarrow 2^2 \times 2^2 \times 2$

$2^4 \Rightarrow 2^2 \times 2^2$

Expectation	Faith	Combine

a^b
pow(a,b)
	pow(a, b/2)	p2 = pow(a,b/2)
		if(b%2 == 1)
		return p2×p2×a;
		else
		return p2×p2;

Ques Fibonacci → n^{th}

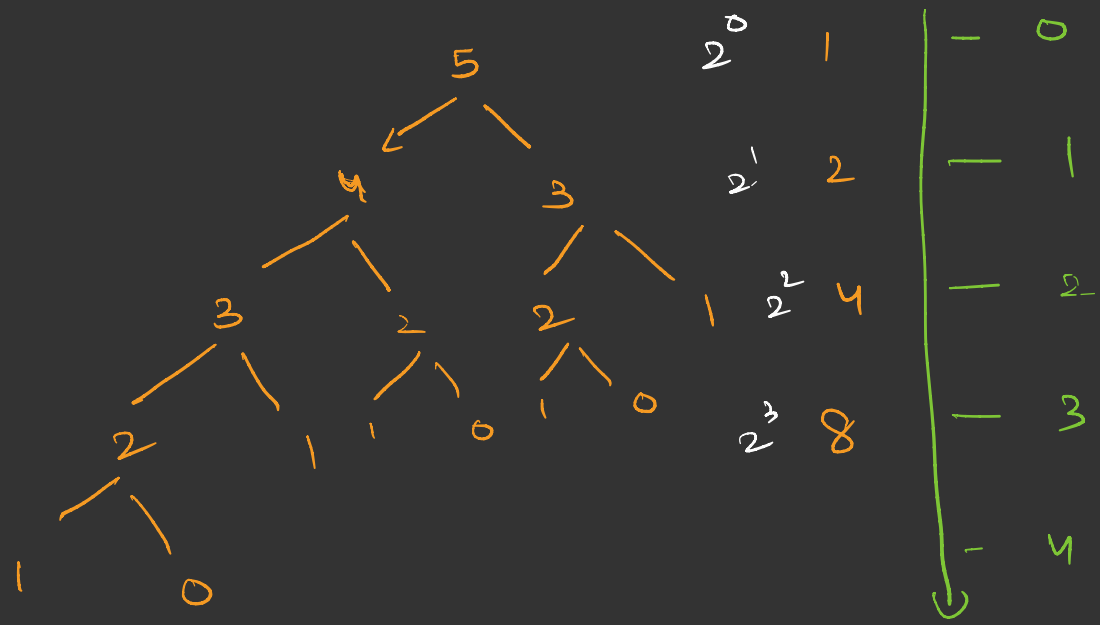
0, 1, 1, 2, 3, 5, 8, 13

0th 1st 2nd . . . . .

n^{th} bibnacci

Expectation	Faith	
n = 5 fib(n) fib(5) ⇒ 5	fib(4) fib(3)	return fib(3) + fib(4)

if(n == 0 || n == 1) return n;



Time $\Rightarrow O(2^n)$

Space $\Rightarrow O(2^n)$