```
def algoritmo3(n):
    a = 1
    b = 1
    c = 1
    while a <= n:
        b+=2*a
        c+=c**2
        a+=1
    return [b,c]
```

Estado (a, b, c)

Inicial $(1, 1, 1)$

Transformacion $(a, b, c) \to (a+1,\ b+2a,\ c+c^2)$

$(1,1,1) \to (2,\ 1+2,\ 1+\underbrace{1}_{c}^2) \to (3,\ \underbrace{1+2+4}_{7},\ (\underbrace{2+2}_{6})^2)$

$\to (4,\ 7+6,\ 6+6^2\ )$

$$b = 1 + \sum_{a=2}^{n+1} 2(a-1)$$

$n=2$

$$b = 1 + \sum_{a=2}^{3} 2(a-1)$$

$$b = 1 + 2 + 4$$

a	b	c
1	1	
2	$1 + 2$	
3	$1 + 2 + 4$	
4	$1 + 2 + 4 + 6$	

$(3, 7)$

$(4, 13)$

$n+1$ $\quad 1 + 2 + 4 + 6 + \dots + 2n$

$\quad\quad\quad 1 \quad 2 \quad 3 \quad\quad n+1$

a $\quad 1 \quad 2 \quad 3 \quad 4 \quad\quad n+1$

$n=3$

$$b = 1 + \sum_{a=2}^{4} 2(a-1) = 1 + 2(2-1) + 2(3-1) + 2(4-1)$$

$$= 1 + 2 + 4 + 6 = 13$$

$$b = 1 + \sum_{a=2}^{n+1} 2(a-1) = 1 + \sum_{a=2}^{n+1} 2a - 2\sum_{a=2}^{n+1} 1$$

$$1 + 2\left(\frac{(n+1)(n+2)}{2}\right) - \cancel{2} - 2(n+1) + \cancel{2}$$

$$1 + (n+1)(n+2) - 2(n+1)$$

$$1 + (n+1)(n+2-2) = \boxed{1 + n(n+1)}$$

n	a	b Pasado
0	1	1
1	2	3
2	3	7
3	4	13

$(n+1,\ 1+n(n+1),\ ?)$ $\quad n = a-1$

$(a-1+1,\ 1+(a-1)(a-1+1),\ ?)$

$(a,\ \underline{1+(a-1)a})$

$(1,1) \to (2,3) \to (3,7) \to (4,13) \to \dots \to (n+1,\ 1+n(n+1))$

$1+0(1) \qquad 1+2 \qquad 1+2\times 3 \qquad 1+3\times 4 \qquad 1+(n+1-1)(n+1)$

$1+n(n+1)$

$(a,b) \to (a+1,\ b+2a)$

$p(a) \to p(a+1)$

(a,b)

$(a,\ (a-1)a+1)$

$a = a+1$: $\quad a(a+1)+1$

$b+2a$: $\quad (a-1)a+1+2a$

$a(a-1+2)+1$

$a(a+1)+1$

Termino? $\quad a = 1, 2, 3, \dots, n+1$

```
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                a+=1
        return [b,c]
```

$c = c + c^2$ $\rightarrow$ $c = a^{**}2$

$(1, 1) \to (2, 1 + 1^2) \to (3, 1 + 1^2 + 2^2)$

$(4, 1 + 1^2 + 2^2 + 6^2) \to (5, 1 + 1^2 + 2^2 + 6^2 + 42^2)$

a	c
1	1
2	2
3	6
4	42
5	1806

2, 3, 7, 43

1 ←
1 (2)
2 (3)
6 (7)
42 (43)

$C(a) = C(C(a-1) \times (C(a-1) + 1))$

$C(1) = 1$

$C(2) = C(1)\,(C(1) + 1)$
2

$C(3) = C_2\,(C_2 + 1)$
6

$\hookrightarrow$ $\boxed{C_a = C_{a-1}^2 + C_{a-1}}$

$C_1 = 1$

$C_a = C_{a-1}^2 + C_{a-1}$

$t_a = \log(C_a)$

$t_a = 2t_a + \log(t_a)$

$C_1 = 1$
$C_2 = C_1^2 + C_1 = 2$
$C_3 = C_2^2 + C_2 = 6$
$= 6^2 + 6 = 42$

Invariante 1) Inicial (a, c) $(1, 1)$ ✓

C_a $a = 1$ 1

Final) $a = n + 1$

$n = 3$

$C_{n+1} = C_n^2 + C_n$

$C_4 = C_3^2 + C_3$
$C_3 = C_2^2 + C_2$
$C_2 = C_1^2 + C_1$

$C_2 = 1^2 + 1 = 2$
$C_3 = 2^2 + 2 = 6$
$C_4 = 6^2 + 6 = 42$

$(a, c) \to (a+1, c+c^2)$

$C_a = C_{a+1}^2 + C_{a-1}$

$P(n) \to P(n+1)$

$a = a+1$

$C_{a+1} = C_a^2 + C_a$ ✓

$C_{a+1} = (C_{a-1})^2 + (C_{a-1})^2 + C_{a-1}$

$$C_{a+1} = \Big(\overbrace{C_{(a-1)}^2 + C_{a-1}}^{C_a}\Big)^2 + \underbrace{C_{a-1}^2 + C_{a-1}}$$

$C_{a+1} = C_a^2 + C_a$