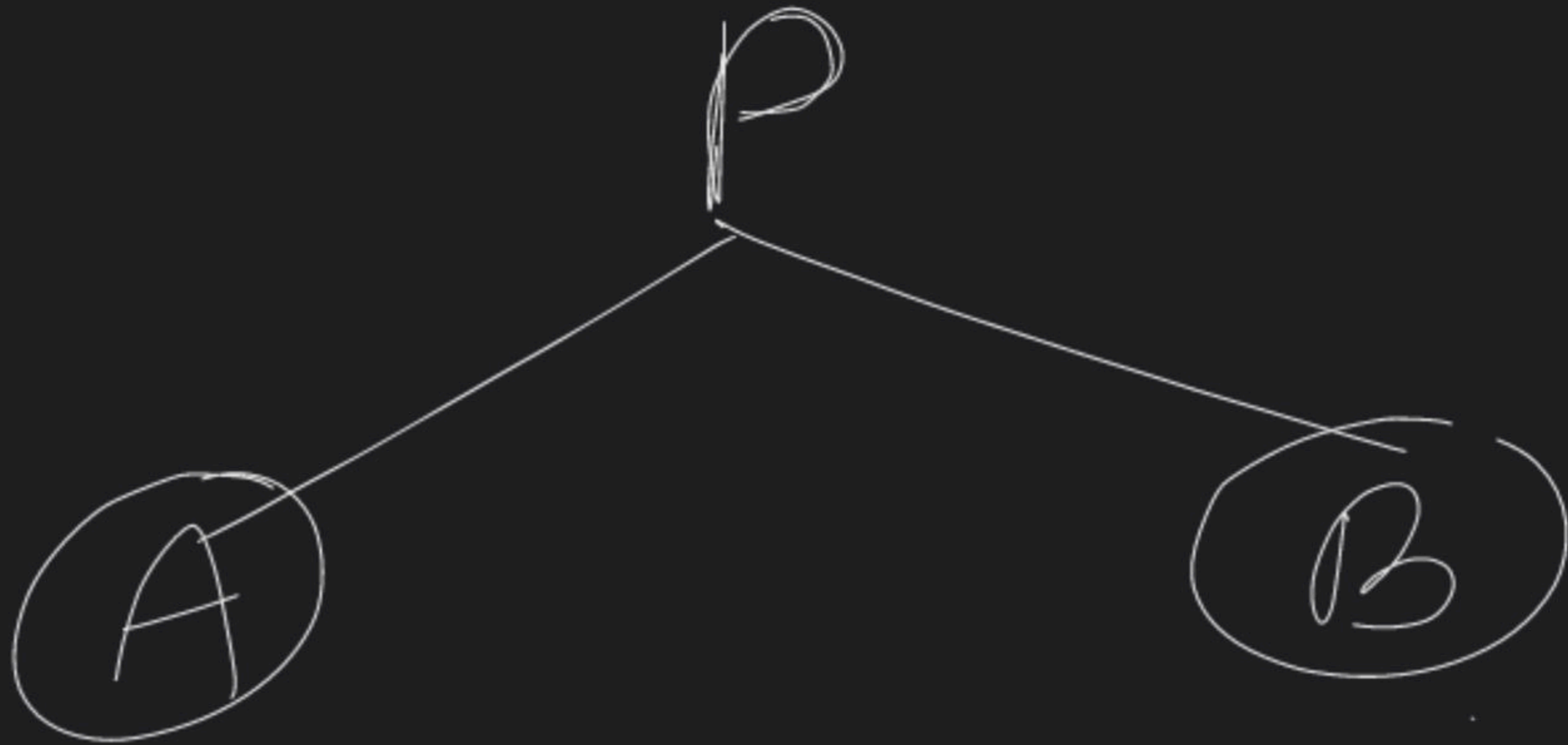




Time Complexity Finding

Complete Course on Algorithms

Analysis



Time complexity

$$T(P) = C + R$$

```
graph TD; C[C] --> Compiler[Compiler]; R[R] --> CPU[CPU]; Compiler --> SLW[SLW]; CPU --> HW[H/W]; SLW --> Language[Language]; HW --> TypeCPU[Type of CPU];
```

Compiler

CPU

SLW

H/W

Language

Type of CPU

~~Analysis Absolute~~
→ ~~Relative~~
A posteriori Analysis

~~A priori Analysis~~

① dependent on
L.C / T.H

② exact answer

③ Different

① Independent on
L.C / T.H

② approximate

③ Same in every system

A Priori Analysis

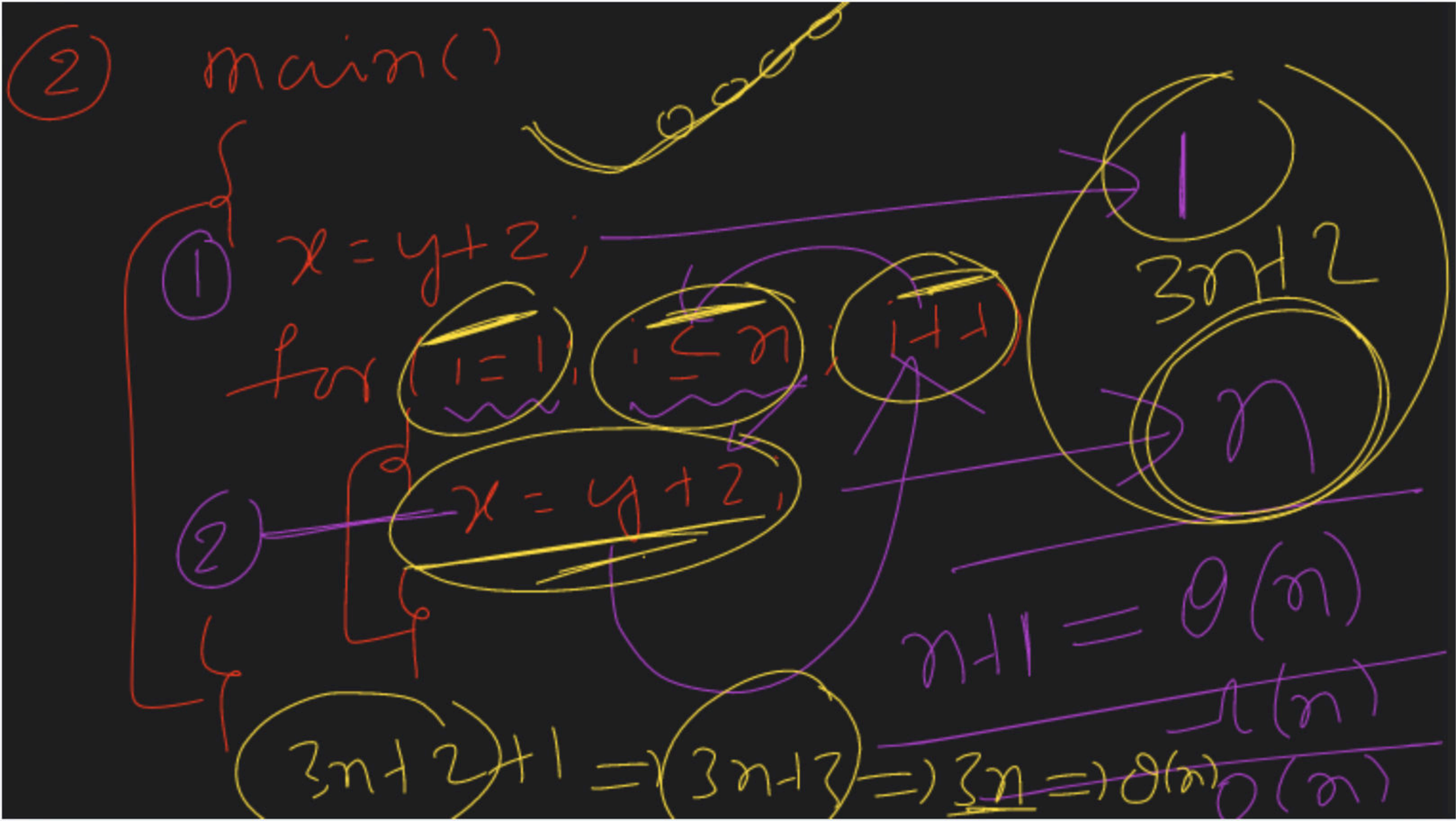
It is a determination of order
of magnitude of a statement.

ex ①

main()

① $x = y + z; \Rightarrow 1$

$$\begin{array}{r} 1 = \theta(1) \\ - 1(1) \\ \hline 0(1) \end{array}$$



③ main()

$i=1$
 $j=1, 2, 3, \dots, n$

$i=1$
 $j=1, 2, 3, \dots, n$

$i=1$
 $j=1, 2, 3, \dots, n$

$i=1$
 $j=1, 2, 3, \dots, n$

① $x = y + 2;$

for ($i=1; i \leq n; i++$)

② $x = y + 2;$

for ($i=1; i \leq n/2; i++$)

for ($j=1; j \leq n/2; j++$)

③ $x = y + 2;$

$n/2 \times n/2 = n^2/2$

$n^2/2 \Rightarrow O(n^2)$

$$\frac{n^2}{2^2} + n - 1 \Rightarrow \left(\frac{n^2}{2^2} \right) \Rightarrow \left(\frac{1}{2^2} \right) \quad \text{②}$$

~~$\Theta(n^2)$~~

~~22~~