**Don’t write \( f(n) = O(g(n)) \)**

The notation \( O(g(n)) \) denotes a set of functions. Therefore, we write
\[
f(n) \text{ is in } O(g(n)) \quad \text{or} \quad f(n) \in O(g(n)).
\]

But some books and research articles use the notation
\[
f(n) = O(g(n))
\]
Don’t ever do that! And, if you see a book or website using that notation, stop using to that book or website.

Using equality \( = \) instead of membership \( \in \) can lead to proving things that are false. Here’s an example.

We know that \( n+2 \in O(n) \) and \( n+3 \in O(n) \). Let’s write these as equalities instead:

(1) \[ n+2 = O(n) \]
(2) \[ n+3 = O(n) \]

But transitivity of equality then allows us to conclude that
\[
\begin{align*}
n+2 &= n+3 \quad \text{and} \\
2 &= 3
\end{align*}
\]

Obviously these are false, but we proved them from equalities (1) and (2).

Therefore, never write: \( f(n) = O(g(n)) \).