Linear search

1. $i \leftarrow 0$ $\longrightarrow$ 0

2. while $i < n$ and $A[i] \neq v$ $\longrightarrow$ $3n$

3. ~~starting~~ $i \leftarrow i+1$ $\longrightarrow$ $2(n-1)$

4. if $A[i] \neq v$ $\longrightarrow$ 2

5. Output "Not found" $\longrightarrow$ 1

6. Else $\longrightarrow$ 0

7. Output "found" $\longrightarrow$ 1

$$T(n) = 0 + 3n + 2(n-1) + 2 + 1 + 0 + 1$$
$$= 3n + 2n - 2 + 2 + 1 + 0 + 1$$
$$= 5n + 2$$

$$T(n) = 5n + 2$$

$$T(n) \leq 5n + n, \quad n > 0$$

$$T(n) \leq 6n, \quad \text{for} \ n = 1$$

Hence, $c = 6$ and $g(n) = n$, $n_0 = 1$

So $T(n)$ is $O(n)$.