

**LINEAR-SEARCH(A, v)**

```
k = NIL
for (i = 1 to A.length)
  if (A[i] == v)
    k = i
    break
return k
```

**Proof of correctness:**

**Loop invariant:** at the start of every iteration we have : v not in A[1..i-1].

**Initialization:** A[1..0] is an empty array and doesn't contain v.

**Maintenance:** if k is not in A[1 .. i-1] and A[i] is equal to v, then k = i and the iteration stops. Otherwise it continues with k = NIL and the iteration continues with k not in A[1 .. i].

**Termination:** if k = A.length + 1, then v is not in A[1 .. n]. Otherwise the program terminates once we find v.