- For the value $j+1$: In lines 8–9, we compare list[min] with list[j+1].
- If list[j+1] $<$ list[min], then min stores $j+1$, our claim holds
- Else, min doesn't change and it's easy to see that our claim holds □
- Since $j < n$, it can be atmost $(n-1)$. ∴ The loop in lines 7–9 finds out the 1st index having the min. value in the range [list[i], list[n−1]]. □

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- Now we prove the correctness of the loop in lines 4–11.
- **Claim:** Before the ~~current~~ next iteration of the loop, the values in the range list[0......i] is sorted.

**Proof:** The proof is by induction on $i$.

- **Base Case:** $i=0$. ∴ The loop in lines 7–9 find out the 1st index having the min value in the range list[0.....n−1]. Line 10 swaps the values in the posns 0 and min, we are done.
- **Induction Step:** Let, our claim hold for an arbitrary $i$.

  ∴ list[0] $\leq$ list[1] $\leq$ ....... $\leq$ list[i]

- Now, for the value $(i+1)$. The loop in lines 7–9 finds out the 1st index having the min. value in the range list[i+1.....n−1]. Line 10 swaps the values in the posns. $(i+1)$ and min.

**Claim:** list[i] $\leq$ list[i+1]

**Proof:** Let, list[i] $>$ list[i+1]. When the iteration value is $i$, loop of lines 7–9 returns the 1st index having the min. value in the range list[i......n−1], stores it in min and then swaps the values in posns $i$ and min on line 10. ∴ Now, list[i] has the min. value in the range list[i.....n−1], which is a contradiction to our given claim □