2. Argue Selection Sort correctness.

so for its correctness we need both termination and partial correctness

so proof of correctness using loop invariant

1. Initialize

→ Before the first iteration (i=0) so from start up to index '-1' as an empty array (no elements have been sorted yet')

2. Maintenance

→ During the 'i'-th iteration it scans from index 'i' to 'n-1' to found minimum element (min)

→ when we find minimum element is then swapped with element at index 'i'

→ After swap element at index 'i' is smallest element from unsorted portion and is now its correct position.

→ Consequently subarray from start to index i is now sorted

→ subarray up to index i-1 we already sorted

→ the element at index i is now the smallest to unsorted proportion.

→ Termination:

when outer loop completes (after the final iteration where $i = n-1$), the invariant states that the subarray from the start of the array up to index $n-1$ is sorted and contains smallest n elem

n is the length of array this means the entire array is sorted

∴ This shows that Selection sort is correct as loop invariant shows that intialization, Maintanence and termination happes