

Problem 1

```
function selectionSort(list):  
    n = len(list)  
    for i = 1 to i = n - 1 do:  
        max = i  
        for j = i + 1 to j = n do:  
            if list[j] > list[max]:  
                max = j  
        swap(list[i], list[max])
```

Loop Invariant: In i^{th} iteration, the sub-array $\text{list}[0 \dots i]$ will contain i greatest elements.

Problem 2

Loop Invariant: The list $A[1 \dots i]$ has "count" occurrence of target.

Prove:

Initialisation

When $\text{count} = 0$ there are no target found in the list yet.

Maintenance

If $A[i] = \text{target}$, count will increment by one.

If $A[i] = \text{target}$, count will increment by one.

If $A[i] \neq \text{target}$, count will remain the same.

Termination

When $i = n$, the loop finishes. The occurrence of target will equal to count in $A[1 \dots n]$,