

procedure ZeroAll(A, n) ** A is an array holding n elements
for (i from 1 to n)
 $A[i] \leftarrow 0$

claim: For any array A holding n elements, ZeroAll(A, n) assigns zero to each element of the array A such that $A[1] = A[2] = \dots = A[n] = 0$.

Loop-invariant: "At the beginning of each loop iteration, $A[1] = A[2] = A[3] = \dots = A[i-1] = 0$ "

Initialization: $i = 1$ and clearly, A is empty, there's no element in $A[0]$

Maintenance:

Suppose that at the beginning of the i -th loop iteration

$A[1] = A[2] = \dots = A[i-1] = 0$ for any i from 1 to n

Then, at the beginning of the $i+1$ iteration

$A[i] = 0$

$\therefore A[1] = A[2] = \dots = A[i] = 0$ for any i from 1 to n

Termination #1: The for-loop only increment i from 1 to n and we do not change its value

Termination #2: At the end of the for-loop, $i = n$ so the

LI gives that $A[1] = A[2] = \dots = A[n] = 0$

— Correctness of the overall code proven.

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