Example: Minimal-Sum Section of Array

Proving variant:

1 $(0 \le n-k = T) \wedge (n \ne k)$

2\. $1 \le n-k < T+1$

$\{t := \min(t + a[k], a[k])$

3\. $0 \le n-k-1 < T$

$s := \min(s, t)$

4\. $0 \le (n-(k+1)) < T$

$k := k+1\}$

5\. $(0 \le n-k < T)$

Need to show, $1 \to 2$ (which holds)

Proving Invariant:

1\. $Inv1(s,k) \wedge Inv(t,k) \wedge (n \ne k)$

2\. $Inv1(\min(s, \min(t+a[k], a[k])), k+1) \wedge Inv2[\min(t+a[k], a[k]), k+1]$

$\{t := \min(t+a[k], a[k])$

3\. $Inv1(\min(s,t), k+1) \wedge Inv2(t, k+1)$

$s := \min(s,t)$

4\. $Inv1(s, k+1) \wedge Inv2(t, k+1)$

$k := k+1\}$

5\. $Inv1(s,k) \wedge Inv2(t,k)$

Need to show, $1 \to 2$ (which holds by Lemma 4.20 on page 272)