Let $L$ be a variable, $L: [*int]$. Here is a program to change all the negative items of $L$ to 0, and otherwise leave $L$ unchanged.

```
for $n:= 0..#$L do if $Ln<0$ then $L:= n\rightarrow 0$ | $L$ else ok fi od
```

Write all the specifications and refinements needed to prove that execution of this program does as intended. You do not need to prove the refinements.

§ The main specification is $P$, defined as

$$P = \#L' = \#L \land \forall i: 0,..\#L \cdot L'i = \max(Li) 0$$

For $0 \leq i \leq k \leq \#L$ define $F$ as

$$F i k = \#L' = \#L \land (\forall j: i,..k \cdot L'j = \max(Lj) 0) \land (\forall j: (0,..i), (k,..\#L) \cdot L'j = Lj)$$

We need to prove

$$P \iff F 0 (\#L)$$

which is easy because

$$P = F 0 (\#L)$$

And we need to prove

$$F n n \iff 0 \leq n \leq \#L \land ok$$

$$F n (n+1) \iff 0 \leq n < \#L \land \text{if } Ln<0 \text{ then } L:= n\rightarrow 0 | L \text{ else ok fi}$$

$$F i k \iff 0 \leq i < j < k \leq \#L \land (Fij. Fjk)$$