Chapter 36 : The Max location problem.

In which we also apply Searching by Elimination.

Let g[M..N] be an array of int {M ≤ N}. We are asked to find the location of the largest element in g.

We shall apply the searching by elimination algorithm. We begin by defining F

* (0) F.x ≡ ⟨∀ i :: g.i ≤ g.x⟩

We can now specify our problem as follows.

Pre: ⟨∃ k : M ≤ k ≤ N : F.k⟩

Post : F.x

We now calculate our guards

F.a ⇒ F.b
= {definition of F}
⟨∀ i :: g.i ≤ g.a⟩ ⇒ ⟨∀ i :: g.i ≤ g.b⟩
⇐ {≤ transitive}
g.a ≤ g.b

By symmetry, (F.b ⇒ F.a) ⇐ g.b ≤ g.a

And thus, using the symmetric linear search, we arrive at our finished program

```
a, b := M, N
;do a ≠ b →     {M ≤ a < b ≤ N}

                if g.a ≤ g.b → a := a + 1
                [] g.b ≤ g.a → b := b – 1
                fi

od
; x := a
```