Programamción usando Invariantes de Ciclo

30 de mayo de 2018

```
proc factorial (in n: ℤ, out res: ℤ) {
  Pre {n ≥ 2}
  Post {res = ∏ⁿᵢ₌₂ i}
}
```

$$I_1 \equiv 1 \leq i \leq n \wedge_L res = \prod_{j=2}^{i} j$$

$$I_2 \equiv 2 \leq i \leq n \wedge_L res = \prod_{j=2}^{i} j$$

$$I_3 \equiv 2 \leq i \leq n+1 \wedge_L res = \prod_{j=i}^{n} j$$

```
proc swap (inout l: seq⟨ℤ⟩) {
  Pre {|l| mod 2 = 0 ∧ l = L₀}
  Post {|l| = |L₀| ∧_L (∀i : ℤ)( (0 ≤ i < |l| ∧ i mod 2 = 0) →_L
        l[i] = L₀[i + 1] ) ∧ (∀i : ℤ)( (0 ≤ i < |l| ∧ i mod 2 =
        1) →_L l[i] = L₀[i − 1] )}
}
```

$$I \equiv |l| = |L_0| \land -1 \leq i \leq |l| - 1 \land_L i \bmod 2 = 1$$
$$\land (\forall j : \mathbb{Z})(\ 0 \leq j \leq i \to_L l[j] = L_0[j] \ )$$
$$\land (\forall j : \mathbb{Z})(\ (i < j < |l| \land j \bmod 2 = 0) \to_L l[i] = L_0[i + 1] \ )$$
$$\land (\forall j : \mathbb{Z})(\ (i < j < |l| \land j \bmod 2 = 1) \to_L l[j] = L_0[j - 1] \ )$$