Fundamentos de lenguajes de programación

Inferencia de tipos: Ejemplos

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Ejercicios inferencia de tipos

Considere la siguiente expresión:

```
let
    j = proc(int x, ? y)
        +(x,y)
    t = proc(? k, int a, ? b)
        (k a b)
    in
        (t j 2 3)
```

Indique su tipo

$t_1 \rightarrow (t\ j\ 2\ 3)$

$t_j = proc(\ldots)\ldots$

$t_t = proc(\ldots)$

$t_x \to x$

$t_y \to y$

$t_k \to k$

$t_b \to b$

$t_q \to q$

$t_2 \to t(x, y)$

$t_3 \to (k\ q\ b)$

$(t\ j\ 2\ 3)$

$j = proc(\ldots)$

$t_t = (t_j * int * int) \to t_1$

$t_j = (int * t_y) \to t_2$

$f(x, y)$ $(t_x * t_y) \to t_2$

$(int * int) \to int$

$t_y = int$

$t_x = int$

$t_2 = int$

$t_e = (t_j * int * int) \to t_1$

$t_e = (t_k * int * t_b) \to t_3$

$t_1 = t_3$

$t_k = t_j$

$t_b = int$

$$t_k = (t_a * t_b) \to t_3$$

$$t_j = (int * t_y) \to t_2$$

$t_a = int$

$t_y = t_b$

$t_3 = t_2$

$$t_t = ((int * int \to int) * int * int) \to int)$$

$$t_1 = int$$

Ejercicios inferencia de tipos

Respuesta:

- y = int
- k = (int*int->int)
- b = int
- La expresión es de tipo **int**

f = proc (int a, int b) +(a,b)

tf = (int*int->t2)

(f x y)

tf = (tx * ty -> t1)

Recuerda: Relacionar llamado (app-exp) con la declaración (proc (....))

Ejercicios inferencia de tipos

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Considere la siguiente expresión:

```
let
    j = proc(int x, ? y)
        if (y 2) then +(x,2) else -(x,3)
    t = proc(? k, int a, ? b, ? c)
        (k +(a,b) c)
    s = proc(? a) zero?(a)
    in
      let
          p = proc(?m , ? n)
              (m n 5 1 4 s)
          in
            . (p t j)
```

Indique su tipo

$t_j \to proc(..)$

$t_t \to proc(..)$

$t_s \to proc(...)$

$t_p \to proc(..)$

$t_x = int$

t_y

t_k

$t_q = int$

t_b

t_c

t_m

t_n

$t_2 = (y\ z)$

$t_3 = +(x, 2)$

$t_4 = -(x\ 3)$

$t_5 = (k\ t_6\ c)$

$t_6 = +(9, b)$

$t_7 = Zero?(9)$

$t_8 = (m\ n\ 1\ t_5)$

2) Plantear Ecuaciones

$t_p = (t_t * t_j) \to t_1$

$t_p = (t_m * t_n) \to t_8$

$t_t = (t_k * int * t_b * t_c) \to t_5$

$t_j = (int * t_y) \to t_3$

$t_j = (int * t_y) \to t_4$

$t_m = (t_n * int * int * t_5) \to t_8$

$t_t = (t_{nx} * int * int * t_5) \to t_8$

$t_y = (int \to t_2)$

$t_y = (int \to bool)$

$t_k = (t_6 * t_c) \to t_5$

$t_q * t_b \to t_6$

$int * int \to int$

$t_x * int \to t_3$

$int * int \to int$

$t_x * int \to t_4$

$t_a = int$ $t_b = int$ $t_6 = int$ $t_3 = int$

$t_1 = t_a$ $t_q = int$ $t_9 = (int \to bool)$ $t_4 = int$

$t_2 = bool$ $t_j = (int * (int \to bool) \to int$

$t_1 = int$

$t_x = int$ $t_n = t_j$

$t_k = t_n$ $t_1 = t_a$

$t_c = (int \to bool)$

$t_m = t_t$ $t_5 = t_c$

$t_5 = int$ $t_g = t_5$

$t_t = ((int * (int \to bool) \to int) * int * int * (int \to bool) \to int$

$t_p = (t_t * t_j) \to int$