Group 11, Exercise 3

Mahsa.poorjafari, mpourjaf@rhrk.uni-kl.de, Rama Klaho, klaho@rhrk.uni-kl.de, Rohan Shekar Thingalaya, thingala@rhrk.uni-kl.de, Madhusudhan Subramanya, msubrama@rhrk.uni-kl.de

4. Type Rules for for-loop

for (int i=e0; e1; s1) s2

5) $$\frac{\Gamma \mid\!-_e s1 : \tau}{\Gamma \mid\!-_s s1;}$$ **(stmt-expr)**

6) $$\frac{\Gamma \mid\!-_e s2 : \tau}{\Gamma \mid\!-_s s2;}$$ **(stmt-expr)**

3) $$\frac{}{\Gamma \mid\!-_e true : bool}$$ **(True)**

4) $$\frac{}{\Gamma \mid\!-_e false : bool}$$ **(False)**

2) $$\frac{\Gamma,(l,i:\tau) \mid\!-_{sl} i=e0 \quad \forall_{\tau`}:(l,i:\tau`) \notin \Gamma}{\Gamma \mid\!-_{sl} \tau\ i;\ i=e0}$$ **(var-decl)**

1) $$\frac{\Gamma,(l,i:int) \mid\!-_{sl} e0\ \ \tau_{e0} < int \qquad \Gamma,(l,i:int) \mid\!-_e e1 : bool\ \ \tau_{e1} < bool \qquad \Gamma,(l,i:int) \mid\!-_s s1 : int \qquad \Gamma,(l,i:int) \mid\!-_s s2 : int}{\Gamma \mid\!-_s for\ (int\ i=e0;\ e1;\ s1)\ s2}$$ **(for)**

5. derivation

(return : int[]) |- sl int[] y; y = new int[2]; y[1] = 1; return y;

9) $$\frac{\Gamma=(return:int[]),(l,y:int[]) \vdash_e y:int[] \qquad int[]<int[] \qquad (return:int[])\in\Gamma}{\Gamma=(return:int[]),(l,y:int[]) \vdash_s return\ y;}$$ **(return)**

8) $$\frac{\Gamma=(return:int[]),(l,y:int[]) \vdash_e y:int[] \qquad \Gamma=(return:int[]),(l,y:int[]) \vdash_e 1:int}{\Gamma=(return:int[]),(l,y:int[]) \vdash_e y[1]:int}$$ **(array-lookup)**

6) $$\frac{\Gamma=(return:int[]),(l,y:int[]) \vdash_e y[1]:int[] \qquad \Gamma=(return:int[]),(l,y:int[]) \vdash_e 1:int \qquad int[]<int}{\Gamma=(return:int[]),(l,y:int[]) \vdash_e y[1]=1;}$$ **(assign)**

5) $$\frac{}{\Gamma=(return:int[]),(l,y:int[]) \vdash_e y:int[]}$$ **(int-literal)**

7) $$\frac{\Gamma=(return:int[]),(l,y:int[]) \vdash_e 2:int}{\Gamma=(return:int[]),(l,y:int[]) \vdash_e new\ int[2]:int[]}$$ **(new-array)**

4) $$\frac{\Gamma=(return:int[]),(l,y:int[]) \vdash_e y:int[] \qquad \Gamma=(return:int[]),(l,y:int[]) \vdash_e new\ int[2]:int[] \qquad int[]<int[]}{\Gamma=(return:int[]),(l,y:int[]) \vdash_e y=new\ int[2];}$$

(assign)

3) $$\frac{\Gamma=(return\ :int[]),(l,y:int[])\ \vdash_{sl} y=new\ int[2];\quad \forall_{\tau`}:(l,y:\tau`)\notin\Gamma}{\Gamma=(return\ :int[])\ \vdash_{sl} int[]\ y;\ y=new\ int[2];}$$ **(var-decl)**

2) $$\frac{\Gamma=(return\ :int[])\ \vdash_{sl} int[]\ y;\ \Gamma=(return\ :int[])\ \vdash_{sl} y=new\ int[2];\ \ \Gamma=(return\ :int[])\ \vdash_{sl} y[1]=1;\ \ \Gamma=(return\ :int[])\ \vdash_{sl} return\ y}{\Gamma=(return\ :int[])\ \vdash_{sl} int[]\ y;\ y=new\ int[2];\ y[1]=1;\ return\ y;}$$

(seq)

1) $$\frac{}{\Gamma=(return\ :int[])\ \vdash_{sl} int[]\ y;\ y=new\ int[2];\ y[1]=1;\ return\ y;}$$