

Tiger type rules, revision #1  
(does not handle let or arrays or records)

Schema:

$G \mid \neg^b e : t$

An expression e type checks  
if the rules let you conclude:  
0  $\mid \neg^b \text{false } e : t$   
(for any t)

G is a finite mapping from variables to types.

b is a boolean

e is a tiger AST (exp from assignment 1a)

t is int, void, or string

There is an implicit forall quantifier for each free variable that appears in the rules. The horizontal bar is the "then" part of an "if ... then ..." (the things above the bar being the conditions of the "if"). The bracketed word to the right of the rule is its name. The + operator on G keeps is asymmetric; it keeps bindings on the right if the same variable is in both places (thus respecting scope).

Rules:

-----[num]

$G \mid \neg^b \text{num} : \text{int}$

-----[str]

$G \mid \neg^b \text{str} : \text{string}$

-----[void]

$G \mid \neg^b () : \text{void}$

$x:t \ \backslash \text{in } G$

-----[var]

$G \mid \neg^b x : t$

$G \mid \neg^b e1 : \text{int} \quad G \mid \neg^b e2 : \text{int}$

-----[biop]

$G \mid \neg^b (\text{biop } e1 \ e2) : \text{int}$

$G \mid \neg^b e1 : \text{string} \quad G \mid \neg^b e2 : \text{string}$

-----[eqop]

$G \mid \neg^b (\text{eqop } e1 \ e2) : \text{int}$

$G \mid \neg^b e1 : \text{int} \quad G \mid \neg^{\text{true}} e2 : t$

-----[while]

$G \mid \neg^b (\text{while } e1 \ e2) : \text{void}$

-----[break]

$G \mid \neg^{\text{true}} (\text{break}) : \text{void}$

$G \mid \neg^b e1 : \text{int} \quad G \mid \neg^b e2 : t$

-----[when]

$G \mid \neg^b (\text{when } e1 \ e2) : \text{void}$

$G \mid \neg^b e1 : t1 \quad G \mid \neg^b (\text{begin } e2 \ e3 \ e4 \ \dots) : t$

-----[beginN]

$G \mid \neg^b (\text{begin } e1 \ e2 \ e3 \ e4 \ \dots) : t$

$G \mid \neg^b e1 : t1 \quad G \mid \neg^b e2 : t2$

-----[begin2]

$G \mid \neg^b (\text{begin } e1 \ e2) : t2$

$G \mid \neg^b \text{id} : t \quad G \mid \neg^b e : t$

-----[set]

$G \mid \neg^b (:= \text{id } e) : \text{void}$

$G \mid \neg^b e1 : \text{int} \quad G \mid \neg^b e2 : t \quad G \mid \neg^b e3 : t$

-----[if]

$G \mid \neg^b (\text{if } e1 \ e2 \ e3) : t$

$G \mid \neg^b e1 : \text{int} \quad G \mid \neg^b e2 : \text{int} \quad G+\{x:\text{int}\} \mid \neg^{\text{true}} e3 : t$

-----[for]

$G \mid \neg^b (\text{for } (x \ e1 \ e2) \ e3) : \text{void}$

$G \mid \neg^b e : t$

-----[let0]

$G \mid \neg^b (\text{let } () \ e) : t$

$G \mid \neg^b e1 : t1 \quad G+\{\text{id1}:t1\} \mid \neg^b (\text{let } ([\text{var } \text{id2 } e2] \ \dots) : t$

-----[letN]

$G \mid \neg^b (\text{let } ([\text{var } \text{id1 } e1] \ [\text{var } \text{id2 } e2] \ \dots) \ e) : t$