Reading Assignments

- For lecture on 10/13/2013: Dragon-book 6.5 (12p)
- For lecture on 10/17/2013: Dragon-book 4.5 + 4.8 (17p)

Homework Assignment

3 questions, total 16 points. All questions consider the following Tiger program.

function \texttt{f}(a:\texttt{int}, b:\texttt{int}): \texttt{int} = (a := a+1; /\texttt{C}\texttt{c} / a+b)

function \texttt{g}(a:\texttt{int}, b:\texttt{int}): \texttt{int} = f(b := a, /\texttt{B}\texttt{c} / a := b)

\texttt{var} c : \texttt{int} := 1 /\texttt{A}\texttt{c} /

\texttt{print}(g(c,c))

1. Environments (4 points).
   Imagine an evaluator for Tiger that implements the language with the standard semantics as described in the specification (with lexical \textit{static scoping} and \textit{Call-by-Value}).
   (a) What does the program print with the normal Tiger semantics?
   (b) What should the environment look like when evaluation crosses points /\texttt{A}\texttt{c} /, /\texttt{B}\texttt{c} /, and /\texttt{C}\texttt{c} /?

2. Calling conventions (6 points).
   Answer the following questions and make sure to clarify any assumptions you make to come up with your answer (or explain the alternatives, if such exist).
   (a) What does the program print if the Tiger semantics is changed to use \textit{Call-by-Reference} (but still have lexical scoping)?
   (b) What does the program print if the Tiger semantics is changed to use a \textit{single global dynamic scope} (but still \textit{Call-by-Value})?
   (c) What does the program print if the Tiger semantics is changed to use both a single global dynamic scope and \textit{Call-by-Reference}?

3. Symbol table management (6 points).
   Imagine a syntax-directed name analysis for Tiger programs (as you will soon be programming as project milestone 2).
   (a) Draw a parse tree, and identify the nodes that correspond to the expressions just after (right of) the marked points /\texttt{A}\texttt{c} /, /\texttt{B}\texttt{c} /, and /\texttt{C}\texttt{c} /.
(b) Make a picture of what the symbol table should contain when processing the marked nodes (assume the standard semantics).

(c) Explain how the symbol table management should be changed to accommodate a *single global dynamic scope*.