Reading Assignments

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

Homework Assignments

5 questions, total 24 points.

1. Keywords vs. identifiers (5 points).
   Based on the Tiger language specification (the version on the class webpage dated October 7, 2013), is it legal to define your own type and give it the name int? Please refer to specific sentence(s) in the specification when defending your answer!

2. Type analysis (4 points).
   For each of the following questions, your answer should be a Tiger program that is syntactically correct, but has a static type error. Please pick a program that is as short as possible.
   2a. (2 points) Give a Tiger program with a static type error in a varDec.
   2b. (2 points) Give a Tiger program with a static type error in a callExp.

3. Static vs. dynamic typing (3 points).
   Give a short Tiger program that has no static errors, but has a dynamic error.
4. Type equivalence (6 points).
   Consider the following Tiger program:

   ```tiger
   let
   type A = { x:int, y:int }
   type B = A
   type C = { x:int, y:int }
   var a : A := A { x=1, y=1 }
   var b : B := a
   var c : C := a
   in
   print("Done!\n")
   end
   ```

   4a. (3 points) Is this program correct, given that Tiger’s type system uses name
equivalence? If not, please list all static type errors. Briefly explain.

   4b. (3 points) Would this program be correct if Tiger’s type system would use struc-
tural equivalence? If not, please list all static type errors. Briefly explain.

5. Bottom-up parsing (6 points).
   Consider the following grammar:

   ```
   E -> F ^ E | F
   F -> ( E ) | n
   ```

   The first few moves for parsing the string \((n^n)^n\) bottom-up look as follows:

<table>
<thead>
<tr>
<th>Stack</th>
<th>Input</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>$</td>
<td>(n^n)^n</td>
<td>shift</td>
</tr>
<tr>
<td>$(</td>
<td>n^n)^n</td>
<td>shift</td>
</tr>
<tr>
<td>$(n</td>
<td>^n)^n</td>
<td>reduce F-&gt;n</td>
</tr>
<tr>
<td>$(F</td>
<td>^n)n</td>
<td>shift</td>
</tr>
<tr>
<td>$(F^</td>
<td>n)n</td>
<td>shift</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>

   Write down the remaining moves.