CS 1621 Concepts of Programming Languages

Fall 2016

Homework 2 (100 points)

Due time: 3:00pm, October 3rd, 2016

(Homework answers should be typed, or clearly hand-written. Please print your name on the paper copy).

1. (5 points) Textbook. Chapter 3: problem 6 (a) (b) (page 163).

2. (5 points) Textbook. Chapter 3: problem 12 (a) (c) (page 164).

3. (10 points) Given a grammar as follows,

   \[
   \begin{align*}
   \langle \text{stmt} \rangle & \rightarrow \langle \text{if-stmt} \rangle \mid \langle \text{other-stmt} \rangle \\
   \langle \text{if-stmt} \rangle & \rightarrow \text{if} \ \langle \text{logic-expr} \rangle \ \text{then} \ \langle \text{stmt} \rangle \mid \\
   & \quad \quad \text{if} \ \langle \text{logic-expr} \rangle \ \text{then} \ \langle \text{stmt} \rangle \ \text{else} \ \langle \text{stmt} \rangle
   \end{align*}
   \]

   determine if this grammar is ambiguous. If yes, give an example to show it is ambiguous.
   and provide three solutions to eliminate ambiguity.

4. (10 points) What is the difference between inherited attributes and synthesized attributes? Discuss with examples?


6. (10 points) Write a regular expression for the decimal literal which has the following restrictions:
   (1) Decimal literal must include a whole number and a fraction. Thus .34 must be written as 0.34 and 4. must be written as 4.0.
   (2) Unnecessary leading and trailing zeros should be avoided. That is 0.0 123.01 123003.0 are all legal but 00.0, 0.00, 002334, 1.23.00 are not.


