CS 342 — Principles of Programming Languages May 17, 1996

Homework 4

This homework is due Friday, Feb. 23 (by 5:00 PM). Note that this is only two days after HW3 is due.

1. In the *CLU Reference Manual* tokens are described in English on pages 96–97. Write a regular grammar for the following kinds of tokens described there:
   (a) (3 points) *Name*
   (b) (3 points) *Real_literal*
2. (5 points) B. Formal thinks that it is always better to give the syntax of tokens using a regular grammar than to give English descriptions (as in the *CLU Reference Manual*). Do you agree? Why or why not?
3. (10 points) Do exercise 7 on page 174 in MacLennan (an extension to BNF).
4. Consider the following grammar.

```
⟨E⟩ ::= ⟨bool exp⟩ | ⟨int exp⟩
⟨bool exp⟩ ::= ⟨bool var⟩ | ¬ ⟨bool exp⟩
⟨bool var⟩ ::= ⟨id⟩
⟨int exp⟩ ::= ⟨int var⟩ | ⟨E⟩ [ ⟨int exp⟩ ]
⟨int var⟩ ::= ⟨id⟩
⟨id⟩ ::= a | b | c
```

   (a) (4 points) Write two different sentences of different lengths in the language generated by the above grammar.
   (b) (8 points) Prove that the above grammar is ambiguous.