COMS W4115
Programming Languages and Translators
Homework Assignment 1

Prof. Stephen A. Edwards   Assigned February 13th, 2002
Columbia University   Due February 20th, 2002

This is due at the beginning of class 2:40 PM.

Submit your answers on paper (i.e., do not email it).

Make sure to write both your name and your Columbia ID (e.g., se2007) on your assignment.

This is to be done alone. You may consult the instructor and the TAs, but not other students.

1. Scott, Exercise 1.1, Page 26. Give examples in Java and highlight each error. Part e, a violation of the language definition, is extra credit; Java is supposed to be safe.

2. Scott, Exercise 3.9, Page 159. Note that the same problem arises in Java and will arise in Tiger. Describe the algorithm using pseudocode: you do not have to implement it.

3. Scott, Exercise 3.11, Page 160.

4. Draw a DFA for a scanner that recognizes and distinguishes the following set of keywords. Draw accepting states with double lines and label them with the name of the keyword they accept.

```
auto case char const continue
default do double else enum
if ifelse union unsigned
```

5. Draw a picture showing all the activation records on the stack at the point where `print` is about to be called. For each record, indicate the name of the procedure, its own local variables, and the static link. This is a Pascal-like language with lexical scope and nested procedure definitions. Draw the stack growing downward.

```
procedure Outer;
var x : integer;

  procedure A;
  var y : integer;

  begin
    print(x, y);
  end

  procedure B;
  var z : integer;

    procedure C;
    var w : integer

    begin
      A;
    end

  begin
    C;
  end

begin
  B;
end.
```