Assignment #4
Implementation of Block Structure

Part 1 (to think about, and discuss with classmates and your instructor)

A. (Exercise 6-2, p. 215) Draw the stack and EP and SP registers just after the call Q(P) is executed [i.e., before fp(5) is executed] in the program skeleton in Figure 6.5 (p. 226).

B. (Exercise 6-3, p. 217 [modified]) Compute the static nesting levels of all identifiers (i.e. variable and procedure names) in the program in Figure 6.14. Compute the static nesting level of each use of a name and the static distances between the uses and declarations of the names. Finally, compute the offsets of the variables in this program. Assume for this problem that the environment of B1 is at static nesting level 0, and that variable offsets are to begin at 0.

C. (Exercise 6-7, p. 226) Explain why the activation record for T’s environment of definition is not in the active static chain when it is invoked from Q by fp(5). Draw the stack and all the static and dynamic links at the time of call.

D. (Exercise 6-9, p. 230) What is the static distance between goto 1 and the definition of label 1 in the program in Figure 6.7?

Part 2 (to turn in; due Tuesday April 26)

(Exercise 6-10, p. 230 [modified]) Some languages (e.g. Algol) allow labels to be passed as parameters to procedures; this is analogous to passing a procedure or function as a parameter. Write a short paper explaining in detail, including code sequences, the implementation of a label actual and a goto to a formal label.