CSCE 330 Fall 2000

Homework 3—Denotational Semantics

Wednesday 00/9/20

Exercise 1. Specify *mem* for a program with identifiers x, y, and z, whose values are 2, 3, and 4, respectively.

Exercise 2. In the program of the previous exercise, i is $< 1, 2, 3 >$ and o is $< 5 >$. Specify the state of computation of the program. Call it s_P.

Exercise 3. What is $dsem_{EX}(x + y, s_P)$?

Exercise 4. What is $dsem_{EX}(w, s_P)$?

Exercise 5. What is $dsem_{AS}(x := x + y, s_P)$?

Exercise 6. What is $dsem_{AS}(x := x + w, s_P)$?

Exercise 7. What is $dsem_{RD}(read(z), s_P)$?

Exercise 8. What is $dsem_{WR}(write(z), s_P)$?

Exercise 9. (This is a little more difficult.) Suppose that we want to extend our language with a new statement, $writeExp(E)$, which writes an expression to the output stream. Give the denotational semantics of $writeExp(E)$.

Exercise 10. What is $dsem_{SL}(x := y;\ write(x), s_P)$?

Exercise 11. Let BOOL be the set of all Boolean (relational) expressions. $dsem_{BOOL} : BOOL \times S \rightarrow \{true, false\} \cup \{undef\}$ is defined almost exactly as $dsem_{EX}$. Complete the specification of $dsem_{BOOL}$.

Exercise 12. What is $dsem(\text{if } x < y \text{ then } read(x) \text{ else } read(y), s_P)$?