

CSE 305 Programming Languages Spring, 2010

Homework 6

Maximum Points: 13

Due 10:30 AM, Friday, March 5, 2010

Professor Shapiro

February 26, 2010

Write the answers in a file named `hw6.txt`. Put your name and user name at the top of the file, and submit the file, using the UNIX command, `submit_cse305 hw6.txt`. You will be instructed to submit two additional files below.

1. (3) Modify the grammar of Example 3.4 on page 127 of *Sebesta* to include the pre-increment, pre-decrement, post-increment and post-decrement operators in an unambiguous way, and write that grammar at this place in your submission file.
2. (5) The LOSL code that provides the semantics of the C-languages' expression `++x` is

```
x x fetch 1 + store
```

Note that if you enter the Common Lisp interactive shell, and evaluate the following expressions:

```
losl(8): (load "/projects/shapiro/CSE305/losl")
; Fast loading /projects/shapiro/CSE305/losl.fasl
losl(9): :pa losl
losl(10): (run '(x x fetch 1 + store stop x> 3) :trace t)
```

when the program stops, the value stored at the memory cell allocated to `x` will have been incremented by 1, and that value will be left in the stack.

- (a) (3) Write at this position in your answer file, the LOSL code that provides the semantics of the C-languages' expression `x++`, and submit that code in a file named `hw6q2.cl`
- (b) (2) Insert at this position in your answer file a transcript of a test run of your LOSL code, as shown above.
3. (5) Write a LOSL program to calculate the factorial of n for a given positive integer n . Recall that the factorial of n is the product of all the integers from 1 through n . For example, the factorial of 4 is 24.

More specifically, your program must include the variables `n` and `fact`, and may use additional variables. The variable `n` should be initialized before your program runs, and all other variables must be initialized by your program. When your program stops, the variable `fact` must contain the factorial of n .

- (a) (3) Write your LOSL factorial program here in your submission file, and also write it into a file named `hw6q3.cl`, and submit that file.
- (b) (2) Put here in your submission file a transcript of running your LOSL factorial file on the input 4.