



## CS 784: Programming Languages

### Midterm Take Home Supplement • 20 points

Due: Nov 07, 2011 midnight

This is optional work. If you choose to submit, the score you receive on the new submission will replace the score of Problem 2 you had of the Midterm.

1. (15 points) Possibly using the tricks of the following PROC program, write a procedure for factorial in PROC. As a hint, remember that you can use Currying to define a two-argument procedure `times`.

```
(run "let makemult =
  proc (maker)
    proc (x)
      if zero?(x) then 0
      else -((maker maker) -(x,1)), -4)
  in let times4 = proc (x) ((makemult makemult) x)
  in (times4 3)"
```

This happens to be Exercise 3.24 in EOPL3. It is reproduced above with a tiny improvement.

2. (5 points) Now that it has become a home work, include a set of tests for  $n!$ , by using your answer as the argument string to the run method of `chapter3/proc-lang/`. Start from  $0!$ , and use larger and larger numbers, until your Scheme runs out of memory etc. Include comments within `answer.scm` that explain how your factorial works.

Remote login to `gandalf.cs.wright.edu` and turnin your answer as in `~pmateti/CS784/turnin P2 answer.scm` Should the turnin fail for some reason, email the `answer.scm` to `pmateti@wright.edu` with a subject line of "CS784/P2".