HW 1 – Evaluation and Environments
CS 421 – Spring 2014
Revision 1.0

Assigned January 23, 2014
Due February 2, 2014, 11:59 pm

1 Change Log

1.0 Initial Release.

2 Turn-In Procedure

This assignment is named `hw1`. Using your favorite tool(s), you should put your solution in a file named `hw1-solution.pdf`. Your answers to the following questions are to be submitted using the svn repository as described in the section `Instruction for Solving and Submitting Assignments` on the web-page:

`http://courses.engr.illinois.edu/cs421/sp2014/mps/index.html`

3 Objectives and Background

The purpose of this HW is to test your understanding of

- the scope of variables, and the state of environments used during evaluation

Another purpose of HWs is to provide you with experience answering non-programming written questions of the kind you may experience on the midterms and final.

4 Problems

1. (15 pts) Below is a fragment of OCaml code, with various program points indicated by numbers with comments.

```
3 * 7;;
(* 1 *)
let x = 22;;
let y = x / 2;;
(* 2 *)
let z =
  let x = 15 * y
  in
(* 3 *)
  (x,y);;
(* 4 *)
let w = x + y
 in
(* 5 *)
```

```
  2 * w;;
(* 6 *)
let f x = y * x;;
(* 7 *)
let x = f y;;
(* 8 *)
```

For each of program points 1 through 8 please describe the environment in effect after evaluation has reached that point. You may assume that the evaluation begins in an empty environment, and that the environment is cumulative thereafter. The program points are supposed to indicate points at which all complete preceding declarations (including local ones in scope) have been fully evaluated. Answers should be written as a set of bindings (without the use of the update operator).