CSCE 330 Fall 2001

Program 4—Solution Guide

Assigned Wednesday 01/11/14. Due Monday 01/11/26.

Do exercises 2.1.1, 3.1.1, 3.1.2, 3.2.1(a), 3.2.1(d) in Ullman's text. Submit your work as a text file using the dropbox.

Answer:

Exercise 3.1.1

```
(* Moscow ML version 1.41 (1 October 1996)
Enter `quit();' to quit.*)

(* Ex 5.1a *)
fun cube(x: real) = x * x * x;
(*> val cube = fn : real -> real*)

(* Ex 5.1b *)
fun min(a: int, b,c) =
        if a < b then
                if a < c then a
                else c
        else
                if b < c then b
                else c;
(* > val min = fn : int * int * int -> int*)

(* Ex 5.1c *)
fun third(L) = hd(tl(tl(L)));
(* > val third = fn : 'a list -> 'a *)

(* Ex 5.1d *)
fun rev3 (x, y, z) = (z, y, x);

(* Exercise 5.1 e (alternative solution) *)
fun third(x: string) =
        hd(tl(tl(explode(x))));
(* > val third = fn : string -> char
- third("abcd");
> val it = #"c" : char *)

(* Ex 5.1 e--Ullman's solution *)
fun thirdChar(x : string) = third(explode(x));
```

```
(* Ex 5.1f *)
fun cycle(L) = tl(L)@[hd(L)];
(* > val cycle = fn : 'a list -> 'a list
- cycle([1,2,3]);
> val it = [2, 3, 1] : int list *)
```

Exercise 3.2.1a

```
- fun fact i = if i = 1 then 1 else i * fact (i-1);
val fact = fn : int -> int
- fact 3;
val it = 6 : int
-
```

Exercise 3.2.1d

```
- fun len L = if null(L) then 0 else 1 + len (tl (L));
val len = fn : 'a list -> int
- GC #0.0.0.0.1.8:   (0 ms)
len [1,2,3,4,5];
val it = 5 : int
-
```