

CS 3723: Programming Languages

Feb 29, 2012

You Name:

1. What is the type of each ML function in the following? What does each function do?

(a) `fun Append1(nil, y) = y | Append1(x1::x2,y) = x1 :: Append1(x2, y);`

(b) `fun Append1(nil, y) = [y] | Append1(x1::x2,y) = x1 :: Append1(x2, y);`

2. Which of the following ML datatype declaration most accurately models the union of all types that variable x may have in the following Scheme code?

```
(define Add1 (lambda (x)
  (cond ((null? x) null)
        ((cons? x) (cons (Add1 (car x)) (Add1 (cdr x))))
        (else (+ x 1))))
```

(a) datatype T = Null | Cons of T * T | Number of int;

(b) datatype T = List of int list | Number of int;