

# CMPUT 325 LEC B1 - Winter 2021 - NON-PROCEDURAL PROG LANGUAGES

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## Primitives (P) = 5 points total

*Basic = 2.5 total*

```
:: update Feb 10, 'true -> 'T, 'false -> nil
:: update Feb 15 more true -> T and false -> nil. Fixed parenthesis in P20.
:: update Feb 15 interp->fl-interp.
```

```
P1: (fl-interp '(+ 10 5) nil) ; > '15
P2: (fl-interp '(- 12 8) nil) ; > '4
P3: (fl-interp '(* 5 9) nil) ; > '45
P4: (fl-interp '(> 2 3) nil) ; > 'nil
P5: (fl-interp '(< 1 131) nil) ; > 't
P6: (fl-interp '(= 88 88) nil) ; > 't
P7: (fl-interp '(and nil t) nil) ; > 'nil
P8: (fl-interp '(or t nil) nil) ; > 't
P9: (fl-interp '(not t) nil) ; > 'nil
P10: (fl-interp '(number 354) nil) ; > 't
P11: (fl-interp '(equal (3 4 1) (3 4 1)) nil) ; > 't
P12: (fl-interp '(if nil 2 3) nil) ; > '3
P13: (fl-interp '(null ()) nil) ; > 't
P14: (fl-interp '(atom (3)) nil) ; > 'nil
P15: (fl-interp '(eq x x) nil) ; > 't
P16: (fl-interp '(first (8 5 16)) nil) ; > '8
P17: (fl-interp '(rest (8 5 16)) nil) ; > '(5 16)
P18: (fl-interp '(cons 6 3) nil) ; > '(6 . 3)
```

*More complex = 2.5 total*

```
P19: (fl-interp '(+ (* 2 2) (* 2 (- (+ 2 (+ 1 (- 7 4))) 2))) nil) ; > '12
P20: (fl-interp '(and (> (+ 3 2) (- 4 2)) (or (< 3 (* 2 2)) (not (= 3 2)))) nil) ; > 't
P21: (fl-interp '(or (= 5 (- 4 2)) (and (not (> 2 2)) (< 3 2))) nil) ; > 'nil
P22: (fl-interp '(if (not (null (first (a c e)))) (if (number (first (a c e))) (first (a c e)) (cons (a c e) d)) (rest (a c e))) nil) ; > '((a c e) . d)
```

## User-defined (U) = 10 points total

*Basic = 4 total*

```
U1: (fl-interp '(greater 3 5) '((greater (x y) = (if (> x y) x (if (< x y) y nil))))) ; > '5
U2: (fl-interp '(square 4) '((square (x) = (* x x)))) ; > '16
U3: (fl-interp '(simpleinterest 4 2 5) '((simpleinterest (x y z) = (* x (* y z))))) ; > '40
U4: (fl-interp '(xor t nil) '((xor (x y) = (if (equal x y) nil t)))) ; > 't
U5: (fl-interp '(cadr (5 1 2 7)) '((cadr(x) = (first (rest x))))) ; > '1
```

*More complex = 6 total*

```
U6: (fl-interp '(last (s u p)) '((last(x) = (if (null (rest x)) (first x) (last (rest x))))) ; > 'p
U7: (fl-interp '(push (1 2 3) 4) '((push (x y) = (if (null x) (cons y nil) (cons (first x) (push (rest x) y))))) ; > '(1 2 3 4)
U8: (fl-interp '(pop (1 2 3)) '((pop(x) = (if (atom (rest (rest x))) (cons (first x) nil) (cons (first x)(pop (rest x))))) ; > '(1 2)
```

U9: (fl-interp '(power 4 2) '((power(x y) = (if (= y 1) x (power (\* x x) (- y 1))))) ; > '16

U10: (fl-interp '(factorial 4) '((factorial(x) = (if (= x 1) 1 (\* x (factorial (- x 1))))) ; > '24

U11: (fl-interp '(divide 24 4) '((divide (x y) = (div x y 0)) (div (x y z) = (if (> (\* y z) x) (- z 1) (div x y (+ z 1))))) ; > '6

Last modified: Monday, 15 February 2021, 1:24 PM

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