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Cmps 342 Hw3

Problems 1-4

1. Write Working Programs

A) Area of Circle Given a Diameter of 10.

Formula: $A = \pi r^2$

(let(P 3.14)(d 10))(let(r(÷d2))(* P r r)))

B) Fahrenheit From Celcius: $F = C * 1.8 + 32$

(let(c 30)(d 1.8)(e 32)(let(F(c*d)(+e F))))

2. left most derivation

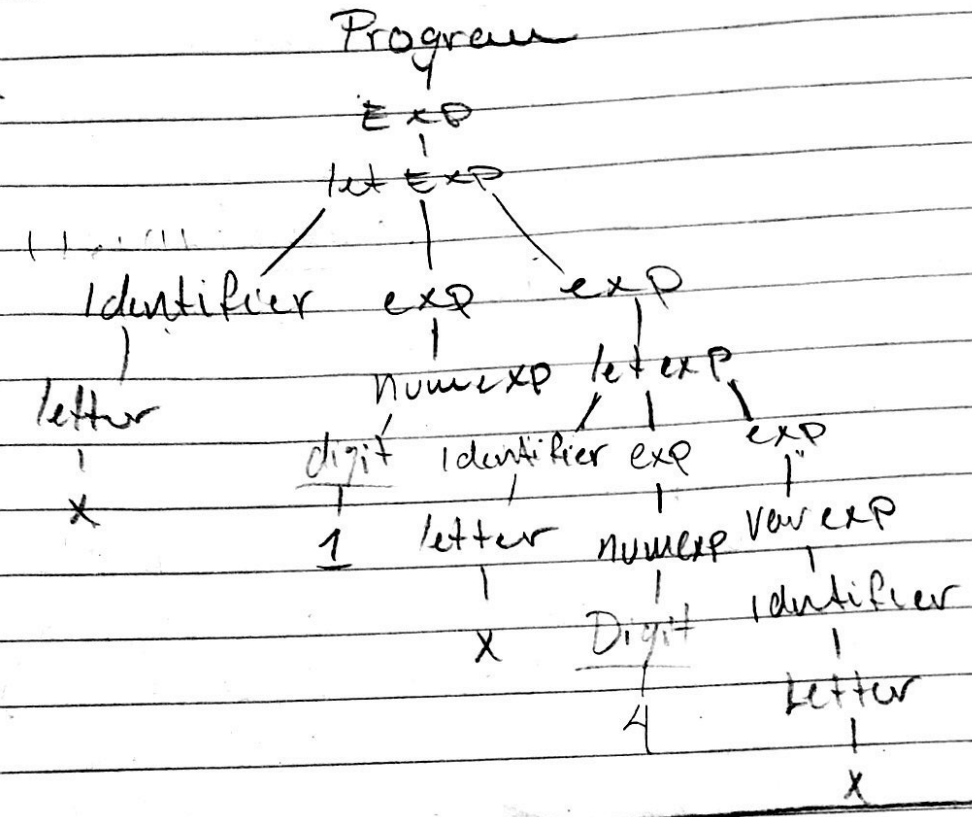
A) (let((x1))(let((x4)x))

=> Program
=> Exp
=> let exp
=> (Let(((identifier exp))+) exp);
=> (let((identifier exp))+) let exp);
=> (let((letter exp))+)(let((identifier exp))+) exp);
=>* (let((x num exp))+)(let((identifier exp))+) exp)
=>* (let((x 1))(Let((letter exp))+) exp)
=>* (let((x1))(Let((x num exp))+) exp)
=>* (Let(x1))(Let((x 4))+) exp)
=>* (Let x1))(Let((x 4)) Var exp)
=>* (let x1))(Let((x4)) Identifier)
=>* (let(x1))(let((x4)) letter)

=>* (Let((x1))(let((x4))x))

PARSE TREE

2A)



2B Program => Exp => let Exp

=> (let((identifier exp))+) exp);

=> (let((identifier exp))(((identifier exp))) exp)

=> (Let(((letter exp) (identifier exp))+ exp)

=> (letll (c numexp))+) (letter exp))+ exp)

=> (Letll (c 3) ('d numexp)) exp)

=> (Letll (c 3) ('d 4)) var exp')

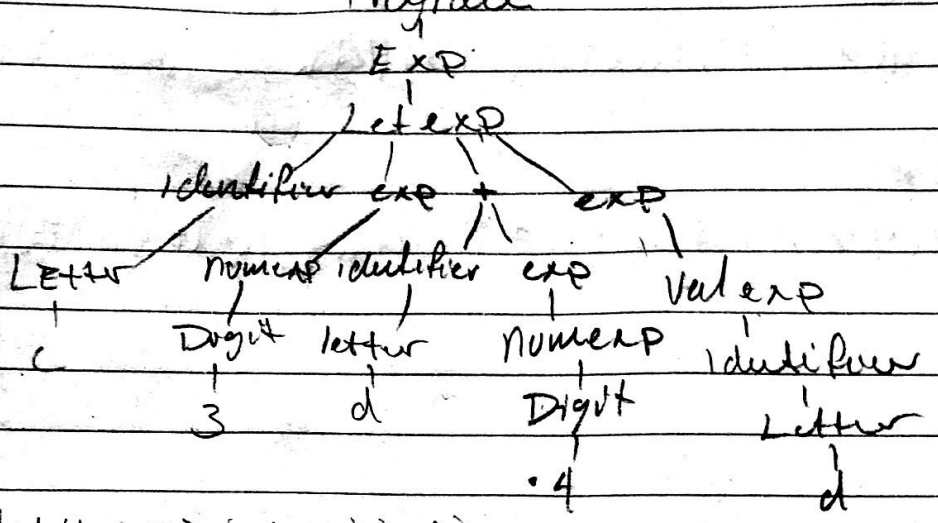
=> (Letll (c 3)('d 4)) identifier)

=> (Letll (c 3)('d 4)) letter)

=> (Letll (c 3)('d 4)) d);

PARSE Tree

2B



(let((c 3)(d 4))d);

3. List Free and Bound variables

A) (let((c 5)(z a))(let((x c)(y b))(+c(-z(+xy)))))

Bound	Free	All Are Bound
z	a	c
x	b	z
y		x
c		y

B) (let((ab)(y 10))(let((xy))(+c(xy)x(-g a))))

Bound	Free	Free	Bound
a	b	c	x
x y		g	y
x			a

4

10 + 11 * 1 = 21

1) (let ((x 2) (y 5)) (let ((x 11) (z 10)) (let ((y 1)) (* (+ x z) y))))

3 + 4 * 7

2) (let ((x 90) (y 6)) (let ((y 9) (z 7)) (let ((x 4)) (* (+ y x) z))))