Name:

Student ID:

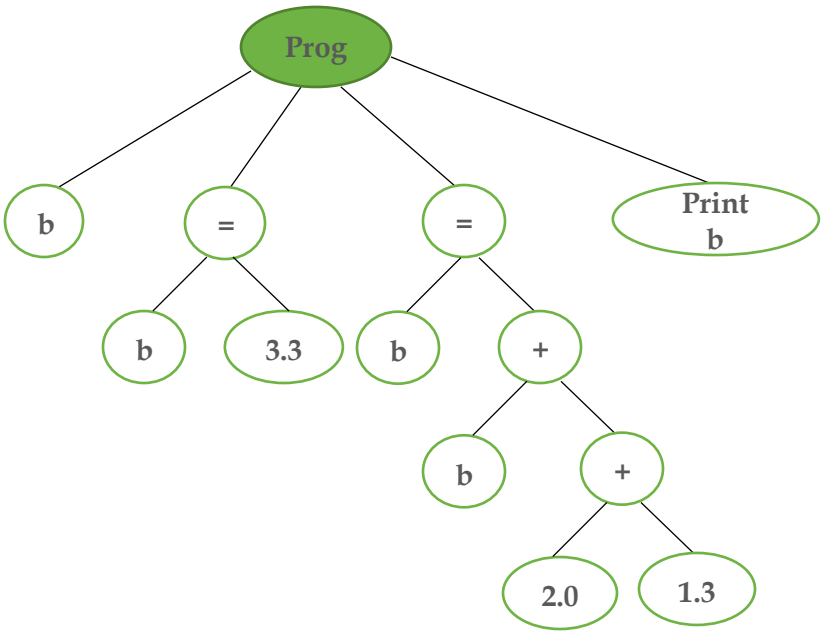
Compiler Construction, Spring 2017
Quiz 1

Based on the grammar and formal definition of the ***ac*** language listed below, please draw the parse tree and the corresponding abstract syntax tree for the input: **f b b=3.3 b=b+2.0+1.3 p b**.
(Please use the leftmost derivation method to derive the rules. A derivation that always chooses the leftmost possible nonterminal at each step is called a leftmost derivation.)

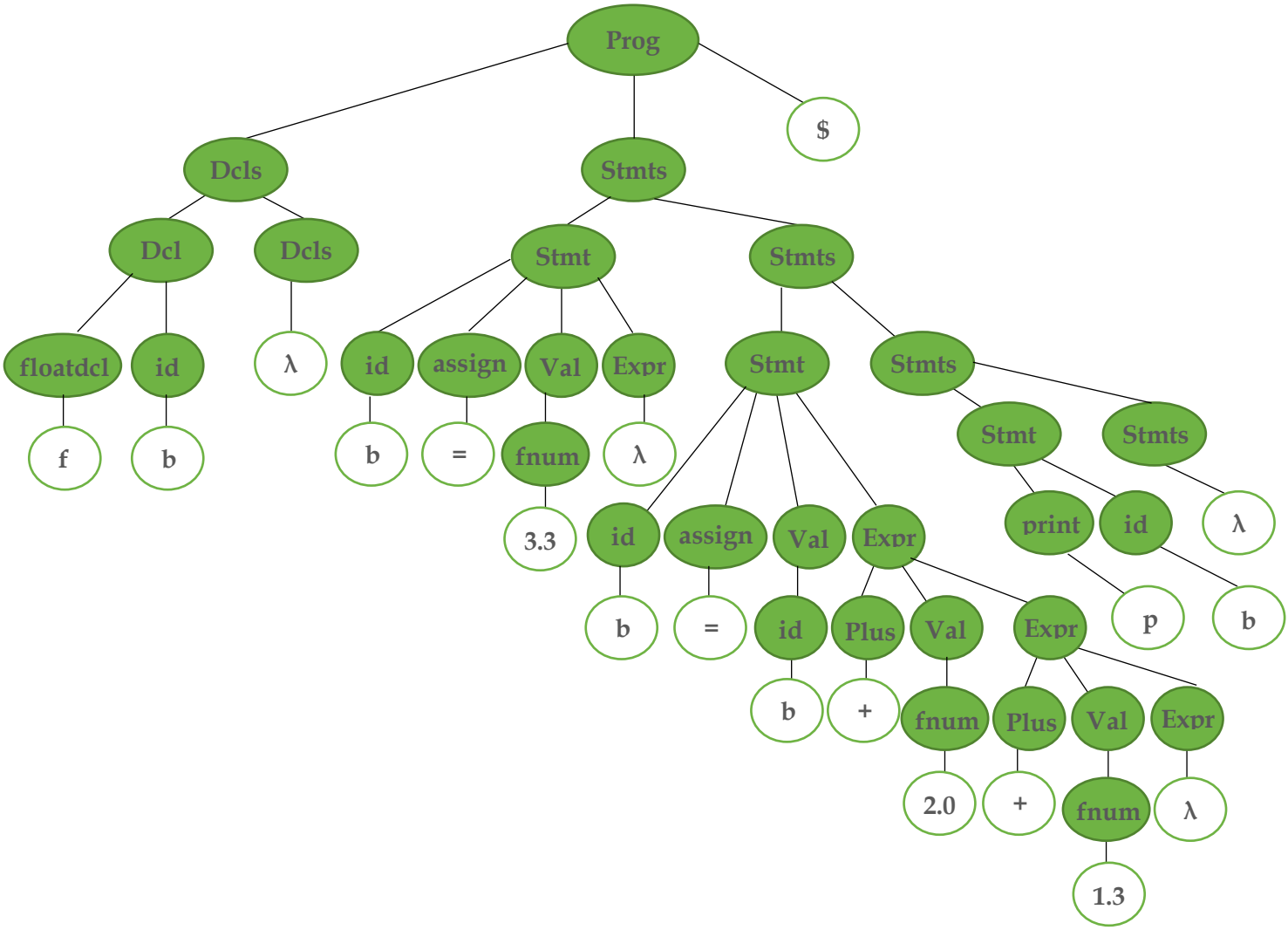
```
1 Prog  → Dcls Stmts $
2 Dcls  → Dcl Dcls
3       | λ
4 Dcl   → floatdcl id
5       | intdcl id
6 Stmts → Stmt Stmts
7       | λ
8 Stmt  → id assign Val Expr
9       | print id
10 Expr → plus Val Expr
11      | minus Val Expr
12      | λ
13 Val  → id
14      | inum
15      | fnum
```

Terminal	Regular Expression
floatdcl	"f"
intdcl	"i"
print	"p"
assign	"="
plus	"+"
minus	"-"
inum	$[0-9]^+$
fnum	$[0-9]^+.[0-9]^+$
blank	$(" ")^+$
id	[a − e] | [g − h] | [j − o] | [q − z]

abstract syntax tree



parse tree


Prog
$
Dcls
Stmts
Dcl
Dcls
Stmt
Stmts
floatdcl
id
λ
id
assign
Val
Expr
Stmt
Stmts
f
b
b
=
fnum
λ
Stmt
Stmts
3.3
id
assign
Val
Expr
print
id
λ
b
=
id
Plus
Val
Expr
p
b
b
+
fnum
Plus
Val
Expr
2.0
+
fnum
λ
1.3