Joseph Camacho-Terrazas
9/15/2020
Chapter 3 Problem Set
4. Rewrite the BNF of Example 3.4 to add the ++ and -- unary operators

of Java.

EXAMPLE 3.4 An Unambiguous Grammar for Expressions

<assign> → <id> = <expr>
<id> → A | B | C
<expr> → <expr> + <term>
| <term>
<term> → <term> * <factor>
| <factor>
<factor> → (<expr>)
| <id>

<assign> -> <id> = <expr>

<id> -> A | B | C

<expr> -> <expr> + <term>

| <term>

<term> -> <term> * <factor>

| <factor>

<factor> -> (<expr>) | <id> | <id> ++ | <id> --

Joseph Camacho-Terrazas
9/15/2020
Chapter 3 Problem Set
11. Consider the following grammar:

<S> → <A> a <B> b

<A> → <A> b | b

<B> → b

Which of the following sentences are in the language generated by this grammar?

a. babb

<S> -> <A> -> b -> ba -> ba <B> -> bab -> babb

b. bbbabb

<S> -> <A> -> <A> b -> <A> <A> b -> b <A> b -> bbb -> bbba -> bbba <B> -> bbbab -> bbbabb

~~c. bbaaaaabc~~ – There's no "c" in the grammar

~~d. aaaaaa~~ - There needs to be at least one "b" in the sentence

Joseph Camacho-Terrazas
9/15/2020
Chapter 3 Problem Set
21. Using the virtual machine instructions given in Section 3.5.1.1, give an

operational semantic definition of the following:

a. Java do-while

loop:

statements;

if (expression == false) goto out

goto Loop:

out:

b. Ada for

loop:

statements;

start_value++;

If(end_value >= start_value) goto loop

out:

c. C++ if-then-else

if (expression == true) goto S1;

goto S2:

S1: statements1;

S2: statements2;

d. C for

for(expr1; expr2; expr3)

evaluate(expr1);

loop = control = evaluate(expr2)

if control == 0 goto out

Joseph Camacho-Terrazas
9/15/2020
Chapter 3 Problem Set
evaluate(expr3)

goto loop

out:

e. C switch

switch(if literal_value == expression_value) goto S1:

goto S2:

S1: literal_statements;

S2: default_statements;