

## CECS 524 Unit 3 Assignment 2

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### Grammar:

```
grammar MyGrammar;
@header { package unit3;
import java.util.HashMap; }
@lexer::header{ package unit3;}
@members {
/** Map variable name to Integer object holding value */
HashMap memory = new HashMap();
}

ID : ('a'..'z'|'A'..'Z'|'_') ('a'..'z'|'A'..'Z'|'0'..'9'|'_')*
;

INT : '0'..'9'+
;

FLOAT
: ('0'..'9')+ '.' ('0'..'9')* EXPONENT?
| '.' ('0'..'9')+ EXPONENT?
| ('0'..'9')+ EXPONENT
;

COMMENT
: '//' ~('\n'|\r')* '\r'? '\n' {$channel=HIDDEN;}
| '/*' ( options {greedy=false;} : . )* '*/' {$channel=HIDDEN;}
;

WS : ( ' '
| '\t'
| '\r'
| '\n'
) {$channel=HIDDEN;}
;

STRING
: '"' ( ESC_SEQ | ~('\\"|'') ) * '"'
;

CHAR: '\\' ( ESC_SEQ | ~('\\"|'') ) '\\'
;

fragment
```

```

EXPONENT : ('e'|'E') ('+'|'-')? ('0'..'9')+ ;

fragment
HEX_DIGIT : ('0'..'9'|'a'..'f'|'A'..'F') ;

fragment
ESC_SEQ
:   '\\\' ('b'|'t'|'n'|'f'|'r'|'\''|'\''|'\\\'')
|   UNICODE_ESC
|   OCTAL_ESC
;

fragment
OCTAL_ESC
:   '\\\' ('0'..'3') ('0'..'7') ('0'..'7')
|   '\\\' ('0'..'7') ('0'..'7')
|   '\\\' ('0'..'7')
;

fragment
UNICODE_ESC
:   '\\\' 'u' HEX_DIGIT HEX_DIGIT HEX_DIGIT HEX_DIGIT
;

program : statement+;

statement
:
print|      println|let;

let      :      'LET' ID '=' expr {memory.put($ID.text, new
Integer($expr.value));};
expr returns [int value]
: e=multExpr {$value = $e.value;}
( '+' e=multExpr {$value += $e.value;}
| '-' e=multExpr {$value -= $e.value;}
)*
;

multExpr returns [int value]
: e=atom {$value = $e.value;} ('*' e=atom {$value *= $e.value;}) *
;

atom returns [int value]
: INT {$value = Integer.parseInt($INT.text);}
| ID
{
Integer v = (Integer)memory.get($ID.text);
if ( v!=null ) $value = v.intValue();
else System.err.println("undefined variable "+$ID.text);
}
| '(' expr ')' {$value = $expr.value;}
;

```

```
print : 'PRINT' STRING
{System.out.print($STRING.getText().substring(1,$STRING.text.length() -
1));}|'PRINT' expr {System.out.print($expr.value);} ;
println : 'PRINTLN' STRING
{System.out.println($STRING.getText().substring(0,$STRING.text.length() -
1));}|'PRINTLN' expr {System.out.println($expr.value);} ;
```

## Output:

