

Project-1

Due: April-2-2009

1- Write an EBNF definition for a hypothetical programming language that obeys the following rules:

- A program is composed of multiple lines of code each of which is terminated by a semicolon.
- Every line of code is an assignment statement with a variable name on the left hand side and an arithmetic expression on the right hand side. The assignment symbol is " :=".
- The arithmetic expression is composed of integer constants (including negative numbers), integer variables (written with alphabetical characters only and case sensitive), the operators +, -, * (for addition, subtraction and multiplication respectively) and left and right parentheses '(' ')' .
- Parentheses can be nested and the operator precedence of conventional arithmetic is preserved.
- Variable usage does not require any declaration as the variables are assumed to be declared the first time they are used.

- **Example code:**

```
a:=234+55;
b:=32;
c:=(a+b*2)*24;
```

2- Write a lexical analyzer for this language. The program should accept a text file (containing a program) as input and produce a list of textual representations of all the lexemes.

Example: variable ("a"), symbol (":="), intConstant (234), symbol ("+") intConstant (55), symbol (";")

Catch all the necessary syntax errors and issue suitable error messages.

Error examples:

```
c:=(a+b)*2)*24; (paranthesis mismatch)
2b:=32; (unsuitable identifier 2b)
23:=1+b; (identifier expected on the left of assignment operator)
```

- This project can be carried out in teams of 2 students from the same lab group. It may also be done individually.
- The program should be written in Java
- After the completion of this project a brief demonstration (demo) is going to be made to your lab instructor. (Önder Gürcan, Bekir Afşar or Ahmet Egesoy according to your lab group)
- The EBNF document and the source files should also be e-mailed to your lab instructor.

Good luck