BIRZEIT UNIVERSITY

College of Engineering & Technology
Computer Science Department

Comp439 **Final project** **Midnight 07/07/ 2023**

Given the grammar defined by the following set of production rules in the ***EBNF :***

project-declaration → project-def "**.**"
project-def → project-heading declarations compound-stmt
project-heading → **project** "name" ";"
declarations → const-decl var-decl subroutine-decl
const-decl → **const** (const-item ";")$^+$ | λ
const-item → "name" = "integer-value"
var-decl → **var** (var-item ";")$^+$ | λ
var-item → name-list ":" **int**
name-list → "name" ("," "name")*
subroutine-decl → subroutine-heading declarations compound-stmt “;” | λ
subroutine-heading → **routine** "name" ";"
compund-stmt → **start** stmt-list **end**
stmt-list → (statement ";")*
statement → ass-stmt | inout-stmt | if-stmt | loop-stmt | compound-stmt | λ
ass-stmt →” name” ":=" arith-exp
arith-exp → term (add-sign term)*
term → factor (mul-sign factor)*
factor → "(" arith-exp ")" | name-value
name-value → "name" | "integer-value"
add-sign → "+" | "-"
mul-sign → "*" | "/" | “%”
inout-stmt → **input** "(" "name" ")" | **output** "(" name-value ")"
if-stmt → **if** “(“ bool-exp “)” **then** statement else-part **endif**
else-part → else statement | λ
loop-stmt → **loop** “(“ bool-exp “)” **do** statement
bool-exp → name-value relational-oper name-value
relational-oper → "=" | "<>" | "<" | "<=" | ">" | ">="

Notes:

(0) All “names” and “integer-value” are user defined names and values in the source code.
(1) The tokens in **bold** letters are reserved words.
(2) The words between “ …” are terminals (tokens).

Write an a recursive descent parser for the above grammar.

* You should work **individually only**, any signs of cheating will be penalized severely.
* Your program will be tested with a random program.
* No programs will be accepted after the deadline for any reason whatsoever.
* In the ERROR function, report the error clearly and precisely showing the **line** and **token** where the Error occurs and exit the program (panic mode error handling.
* Submit only the source code by replying to the message “**439-Project-S22**” on Ritaj web page.