Specification Document

Programming Language Concepts

Due 12/15/20

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Key Word List: and, or, nah(not), Tru(True), False, import, from, class, def, if, ifel, else, for, while, return, try, except, int, String, char, bool, global, nonlocal

-Grammars for keywords, statements, and expressions overall syntax are evaluated

-A description of the semantics ( some combination of the following for each grammar rule ) for the following: Denotation Operational Attribute Grammar

-A list of data types and the operations related to them ( each operation requiring a syntax rule)

int, String, float (real number), char, bool

Identifiers:

$ - used to start an identifier

\_ - used to separate string when initializing an identifier

Invalid types of Identifiers include:

sum of vals // since we can not initialize an identifier with spaces in the name

2013stats // since an identifier can not start with a digit

b - a // an operator should not be in the identifier

var-1 // we can not have a hyphen in the identifier

log2&log3 // we can not have a and sign as an identifier

Key Words - { if, ifel, else, while, for, try, except, class, bool, tru, false, return, def, global, and, or , nah, bool, switch, case, catch, int, String, float (real number), char, bool, double}

Operators - { +, -, /, %}

Literals which include:

String - {""}

Integer - {int} // ex int a, a = 10

Real - {float} // float result, result = 2.1458f

Boolean - {bool} // if true : return tru if false : return nah

Requirements:

- The variables must be declared before they are used

- The variables must have matching types when used in arithmetic expressions (this is a big part of semantic analysis called type checking that we’ll cover separately)

- There should be no duplicate declarations (Pascal prohibits, for example, having a local variable in a procedure with the same name as one of the procedure’s formal parameters)

- A name reference in a call to a procedure must refer to the actual declared procedure

- A procedure call must have the correct number of arguments and the arguments’ types must match those of formal parameters in the procedure declaration

- Utilize the symbol table and check if the symbol exists in it

Info we need to collect about variables:

Name, category, and type. And we utilize the symbols to hold that information.

Information is stored:

symbols are stored in the symbol table by using its insert method.

If variables are not declared and stored in a variable table:

Return null or error.

For example:

Case 1 Case 2

new int a, b; | new int b;

a = 10 , b = 7; | a = 10 , b = 7;

return a; | return a;

# Results in no Error |# Results in an Error since a was not declared