



CSM 2010 – Compiling Techniques Course Assignment 2002-2003

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Parsing BASIC-Style Variable Declarations and Assignments

- Design and implement a program that parses and produces a simple symbol table for BASIC-style variable declarations and assignments.

- Examples of BASIC variable declarations are:

```
Dim i as Integer
```

```
Dim s as String
```

```
Dim Counter as Integer, Limit as Integer
```

```
Dim d as Double, g as Single
```

```
Dim i as Integer, s as String, d as Double
```

- The language is case-insensitive.
- The only keywords in the language are *Dim* and *As* (apart from the data type names).
- Valid data types are *Byte*, *Integer*, *Long*, *String*, *Single* and *Double*.
- Variable names start with a letter or underscore symbol followed by any number of letters, underscore symbols or digits.
- Declared variables may be assigned CONSTANT values. For example:

```
Dim i as Integer, s as Integer
```

```
i = 7
```

```
s = "Hello World"
```

- You do not need to assign other variables or expressions to the variable in question. You will not be awarded extra marks for doing so. For example, this is not required of you:

```
Dim i as Integer, j as Integer
```

```
i = 7 + 3
```

```
j = i
```

```
j = i * 2
```

- All variables must be declared before being assigned to.

- Variables that are declared but not assigned to are given default values. The default values are 0 for *Byte*, *Integer* and *Long* variables, 0.0 for *Single* and *Double* variables, and the empty string for *String* values.
- Numeric data types (*Byte*, *Integer*, *Long*, *Single* and *Double*) have a specific range of allowable ranges. If a variable is assigned a value out of its acceptable range an overflow error should be reported and the interpreting process reported. The allowable ranges are:

Type	Description	Range*
Byte	Integer Type	0 to 255
Integer	Integer Type	-32,768 to 32,767
Long	Integer Type	-2,147,483,648 to 2,147,483,647
Single	Floating-Point Type	-3.402823E38 to -1.401298E-45 for negative values; 1.401298E-45 to 3.402823E38 for positive values
Double	Floating-Point Type	-1.79769313486231E308 to -4.94065645841247E-324 for negative values; 4.94065645841247E-324 to 1.79769313486232E308 for positive values

* **Note:** These ranges correspond to the equivalent Visual Basic Data types. If you use a language other than Visual Basic the type ranges may vary. You may alter the ranges allowable by your interpreter to accommodate your programming language of choice. However MAKE SURE the changes are documented in your report.

- Variables may be assigned to more than once.
- The variable declarations and assignments must be read from a text file.
- Once the text file is read, scanned, and parsed, a symbol table must be built. The information in the symbol table must be output to the screen. The format should be similar to:

Symbol Table

Variable Count: 2

Variable	Type	Value
-----	----	-----
s	STRING	Hello World
Counter	INTEGER	6

- The program must produce meaningful error messages if any occur.
- Variable re-declarations are not allowed.
- In your report include the BNF syntax for the BASIC variable declarations and assignments as defined by your parser.
- The program must be accompanied by a technical report describing any implementation details and techniques used to complete the assignment.
- Refer to the assignment instructions at <http://webster.cs.um.edu.mt/kguil/assignment.html>