Algonquin College Logo

# SCHOOL OF ADVANCED TECHNOLOGY

### ICT - Applications & Programming

### Computer Engineering Technology – Computing Science



A11

Language Specification

Team:

[Neeraj Kumar Bansal] - Id: [041000185] / [Tanisa Tasneem] - Id: [041005658]

Venom

***This template is suggested (not mandatory) to answer A11 Specification.***

|  |  |
| --- | --- |
| **Part**  **1** | **Language User Reference** |

**EXPLANATION**

*The purpose of this assignment is to invent a new computer language.*

* *This language can have the syntax and structure of your choosing.*
* *Option 1: Adapt the ‘BOA’ language to be Python compatible.*
* *Option 2: Define a DSL – Proper to solve specific problems (ex: science, economy, music, etc.)..*
* *This is going to be a fairly basic language. There's a lot of functionality that we'll be skipping over, while we implement the basics. You will need to tell me those basics, of course. In this document, I'm going to explain the steps of what to do with a bit of detail.*
  1. **User Manual**

**Element 1: Name / Extension**

Language Name: Venom

Language Extension: .vnm

**Element 2 – Comments**

*Single-line Comment: # Single line comment*

*Multi-line Comments: “”” Multi line comments “””*

**Element 3 – Keywords**

And False

Break Try

Class Not

Return Else

If Elif

While Continue

For

Or

True

**Element 4 – Variables and Datatypes**

***Integer****:*

*int;*

*Range: -2147483648 to 2147483647*

*Size: 4 bytes*

***String****:*

*str;*

*Range: -32768 to +32767*

*Size: 2 bytes*

***Float****:*

*float;*

*Range: -2147483648 to 2147483647*

*Size: 4 bytes*

**Element 5 – Variables and Datatypes**

*[Variables: How would a programmer define variables that can hold integer numbers (numbers with no decimal point), floating point numbers (numbers with a decimal point) or text (i.e.: strings in Java). This is element 1. Consider if you want to flag the variables in a special way, like SOFIA or BASIC, or not, like C or Java.]*

x = 10 # type int

y = 10.5 # type float

z = “Lab1” # type string

**Element 6 - Commands**

* ***Attribution****: How does your language let a programmer assign a value to a variable? (Will you allow casting? If so, how will it work?) How will your language handle math, and will it allow strings to be concatenated (merged)?*
* *Assignment operator: “=” # name = “myname”*
* *Example: casting 2.8 float to integer => x = int (2.8) # output is 2*
* *Math handle: import math (will allow math library and its functions)*
  + *math.sqrt(25) => 5, math.pow(2,3) => 8*
  + *Example: Concatenation of strings “+”*

*a = “my”*

*b = “name” # output c = a + b => print: “myname”*

* ***Selection****: How does your language do if-style logic? (Optional: Do you want to do some kind of switch/case as well?). You will need to explain how "conditionals" work in your language. How do you write Boolean operations, such as "or", "and", "not", and other conditions, such as less than, greater than, etc?*
* *if condition:*

*Statement*

*elif condition:*

*Statement*

*else*

*Statement*

* *Conditions: ==, !=, <, >, <=, >=, and, or, not*
* ***Interaction****: How will your code handle looping? (You can do one or more of a for-style loop, a while/do loop, etc.)*
* *for variable in range: (Ex.: for x in fruits:)*

*Condition or statement*

* *while variable conditional operator value:* *(while x < 6:)*

*Condition or statement*

* ***Input****: How does your program get input from the keyboard? (Strings are easiest.)*

Input = input(‘What is the input?’)

* ***Output****: What would a programmer type to put output on the screen? What sort of variables or data will your code take?*

*Output = print(“Hello World!”)*

* ***Functions****: [Function definition: parameters and returning types]*
  + *What will be the syntax for making a function or subroutine?*

*def functionName():*

* + *How will it take parameters?*

*def funtionName(fname):*

* + *How will it return results?*

*return 1 or 0 (True or False)*

*functionName(“Tanisa”)*

**Element 7 – Proper elements**

*[Include specific features / elements to be included in your language]*

* *What you could include / modify? Think about new datatypes / structures / commands, etc.*

***Include****:*

1. *Formatting options: printf(“%d”, x)*

***Modify****:*

1. *Multi-line comments:*

*From: “”” This is a multi-line comment “””*

*To: ## This is a multi-line comment ##*

|  |  |
| --- | --- |
| **Part**  **2** | **Examples** |

**Option 1: Python-like**

**Hello World**

|  |  |  |
| --- | --- | --- |
|  | firstProgram = “Hello World!”  print(firstProgram) |  |

**Sphere Volume Expression (or any other example)**

|  |  |  |
| --- | --- | --- |
|  | pi = 3.1415926535897931  r = 4  V= 4.0/3.0\*pi\* r\*\*3 |  |

|  |  |
| --- | --- |
| **Part**  **3** | **Architectural Aspects** |

**Advantages**

*[What's the goal of your language? Are you trying to make something simple, fun, complicated? My personal language, Chambly, is based around being useful to scientists. (You can just make something up here, honestly. Think about it a little bit, have a little fun.)]*

***Goal****: Our goal is to make the language readable and understandable by non-programmers by using plain English like syntax and to reduce excessive functions like by eliminate different components for single and multi-line comments instead user can use “#” for single line and “##” for multi-line.*

**Strategy: C Implementation**

*[How your language can be implemented in C – ex: datatypes]*

* *In plain English, or maybe even some high-level* *pseudocode, how are you going to parse your language? You will be writing a compiler for your language, so these are some things you need to think about.*

***=>*** *Since there are no datatype specifications in python, in C for example converting a floating point to int we will be doing something like the following:*

*float = 4.55*

*x = (int)float #x=4*

*#class of this variable will be int*

*[Your ideas about how to identify elements from language]*

* *Consider your "write to the console" command as an example. How will your compiler detect it? How will it sort out what to write to the console? What if there's some literal text (ie: "this is going to get printed") instead of variables?*

***=>*** *The compiler will detect a write to console using the print function, so when characters inside the print function are going to be printed as well as if there is a variable inside the print function it is going to output the value stored in it. The print function will also allow us to print out literal text.*

*[Your ideas about how to identify scope (ex: blocks between conditionals or functions)]*

* *How do you mark a block of code? If I use your loop logic, how do I control what portion of code gets looped through? In C, you might use* *{ and }. In Python, the indentation is what matters. How does it work in your language?*

***=>*** *Curly brackets {} are required when writing inside main function in C, but for loop logic those can be eliminate by using a TAB space in front of the follow up line after any loop logic. Multi-line portion* *will might run into an error or will not give an expected output.*

**Basic ideas about C implementation**

*[Which structures or datatypes you imagine* *to use in your language implementation]*

* *What do you think is going to be really hard about this? What would be, in your opinion, the hardest part of parsing your own new language? You don't have to write an essay, a paragraph or two will be fine.*

***=>*** *Implementing new components while maintaining the original from python and run it on C*  *language’s console is going to be the hardest part. Also, as we are thinking of introducing output formatter component and to make it error free in Python is also going to be challenging. Also, as we are planning to make our language venom simple and less complicated and in future that can arise some unexpected new challenges which we never expected. But we are motivated and are going to pull this off and make a new plain English like language using Python structures and keywords including our own flavor.*

***Note 1: C Datatypes***

*Remember that you are implementing your language in ANSI C. For this reason, you cannot create arbitrarily your language (from scratch). You need to use what is already provided by C Compiler. For this reason, think about using and defining the language obeying the datatypes.*

**Problems when using C implementation**

*[Your vision about main problems / difficulties when implementing a new language (ex: memory allocation, range of datatypes]*

**FINAL SUGGESTIONS**

*Here some ideas to think about your language....*

* *Don't make this assignment harder than it needs to be on yourself. Focus on making the syntax for your language that meets our requirements. Worry about extra features later.*
* *Don’t worry if your new language winds up having really difficult parts. You'll be allowed to change your language as you go along, as long as you make "patch notes" to explain those changes. We'll tell you about this later.*
* *There's a marking key at the end of* ***CST8152\_Compilers\_F22-A11-Specification*** *that should steer you along for grades. Focus your efforts on where you'll get the best results.*
* *Finally, think about creating an “master-piece”: until now, you have used several languages. And if you have conditions to define yours, how it could be?*

**References**

W3schools: https://www.w3schools.com/python/default.asp

Algonquin College

Fall, 2022