Algonquin College Logo

# SCHOOL OF ADVANCED TECHNOLOGY

### ICT - Applications & Programming

### Computer Engineering Technology – Computing Science



A11

Language Specification

Team:

[Xiaohang Ji] - Id: [040997760] / [Le Thi Thanh Van] - Id: [040990185]

**Language Name [aliju]**

***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 ‘Julius’ language to be Julia compatible (see* [*https://julialang.org/*](https://julialang.org/)*).*
* *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**

*[Name your language! We suggest you use one "word" related to your “Julia-like” language or DSL]*

*.ali*

*(hash code:*de72c07 *）*

**Element 2 – Comments**

*[Comments: I want to do comments in your language. How do I write them?*

*using ## for single comment*

*or start with #=, end with =#*

**Element 3 – Keywords**

*[Keywords: List the sequence of reserved / keywords from your language*

*begin, break, const, do, else, elseif, false, for, function, if , import, return, end*

**Element 4 – Datatypes**

*[Datatypes: Define integers, real numbers (float points) and strings. Determine their ranges. ]*

*[Remember to define the number of bytes – and, if possible, range*

*INT: 8, FLOAT: 16, STR*

**Element 5 – Variables**

*[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 (ie: 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.]*

*programmer will have to assign a value for the variable when they create it*

*ex: x= 10*

*y= 10.1*

*z= “hello”*

**Element 6 - Commands**

* ***Attribution / assignment****: 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)?*

*assign a integer value: a = 10*

*math : Use built-in mathematical operation like +, -, /, \**

*for casting, we use: a.as(float)*

*It allows string to be concatenated, using: cc(stringa, stringb)*

* ***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-style logic:*

*if (condition)*

*statement*

*elseif (condition)*

*statement*

*else*

*statement*

*end*

*There’s no switch/case*

*Boolean operations: “ &” for and, “ | ” for or, “ ! ” for not, “ > ” for greater than, “ < ” for smaller than,”>=” for greater or equal, “<=” for smaller or equal*

* ***Interaction****: How will your code handle looping? (You can do one or more of a for-style loop, a while/do loop, etc.)*

*Using for for looping*

*for(condition)*

*statement*

*end*

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

*print("What's your name ? \n\n")*

*name = readline()*

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

*printf(“your name is %s”, name)*

*printf(“your age is %d”, age)*

*println("hello world")*

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

*function nameOfFunction(parameters):*

*statement*

*end*

* + *How will it take parameters?*

*to call the function: nameOfFunction(parameter)*

* + *How will it return results?*

*using return keyword*

**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.*
* *Note: Do not share this info (it is supposed to be your proper elements in the language.*

struct dictName

variable with different data types

end

ex: struct car

STR carColor = ‘black’

INT carAge= 18

end

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

**Option 1: Julia-like**

**Hello World**

|  |  |  |
| --- | --- | --- |
|  | [Your Code here]  println(‘Hello World!’) |  |

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

|  |  |  |
| --- | --- | --- |
|  | pi = 3.1415926535897931  r= 6.0  V= 4.0/3.0\*pi\* r\*\*3  printf('The volume of the sphere is: %f',V) |  |

*[TIP: See examples in the Lecture Notes –* ***Appendix 1****]*

**Option 2: DSL**

**[Your example here]**

|  |  |  |
| --- | --- | --- |
|  | [Your Code here] |  |

|  |  |
| --- | --- |
| **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.)]*

*Our goal is to make a user friendly language, for beginners with clear phrasing, readable syntax*

**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.*

*in Julia we have sever different datatypes for floats (Float16, 32, 64), but in c, we need to*

*adapt to proper elements: float, double*

*[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?*

*we have a print() function that takes 1 parameter which is what will be written on the console, a text can be put in double quote “”*

*[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?*

*In our language, loop, if must end with a end keyword, and we have to use indentation like julia*

**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.*

for our language there is no complex number(4+3i), so we need to create a structures to use it, but in c language, we can use it directly

***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]ju*

*we do need to think about more about the range of datatypes, for now we are choosing int8 and float16. if there’s a number larger than int8, we might need to combine 2 int8.*

**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\_W23-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**

*[Include eventual references used here]*

* *NOTE: Even if you use any tool (ex: ChatGPT), report here.*

Algonquin College

Winter, 2023