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# SCHOOL OF ADVANCED TECHNOLOGY

### ICT - Applications & Programming

### Computer Engineering Technology – Computing Science



A11

Language Specification

Team:

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Language Name [JUANscript]

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

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| **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]*

*[What is the filename extension of your language? For example, for C it is .c, and for Professor Paulo's “Julius”* ***language*** *it is ".****jul****".]*

*[What is your language patterned after, or what is it similar to? What languages are inspiring your choice? It's okay if you're following Julia closely.]*

*JUANscript will be a scripting esoteric language, with no OOP, I will try to make it like PHP in terms of scripting, the extension will be .juan*

*All of this is inspired on an internet image with the caption JUAN, just look up JUAN meme and it should become apparent the esoteric nature of this.*

**Element 2 – Comments**

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

/\*This is a comment\*/ just like in ANSI C

**Element 3 – Keywords**

*[Keywords: List the sequence of reserved / key words from your language]*

*juan is the equivalent of let, it makes an untyped character variable, to set it up just add is and the value*

*JUAN is used for constants, same as lower case, JUAN myConst is “CONSTANT JUAN”;*

*<?JUAN and JUAN?> Are tags for the script*

*JUANFULLHD is echo, ex: JUANFULLHD “Hello JUAN”;*

*NAUJ is if, JUANSEGUNDO is elif, JUANTERCERO is else and ENDNUAJ is endif.*

*JUANPQ is while, example, JUANPQ (3<5){ /\*code\*/}*

*JUANBALCONY takes user input, example, JUANBALCONY(inputVar)*

*Logical and numerical operators remain the same as in most programming languages, things like || for or, && for and, ! for not, == for equal, > for greater than, etc…*

*For methods just use regular tags but in lowercase and with no arrows, example, ?juan myFunction(){ /\*function\*/ }*

*Since this is untyped type for variables there is no need for anything before the function name*

*juan? For return*

**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]*

*Data types are undefined.*

**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.]*

*Example for definition of string: juan myVar*

*For int: juan myInt*

*For float: juan myFloat*

**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)?*

*Example for definition of string: juan myVar is “juan”;*

*For int: juan myInt is 420;*

*For float: juan myFloat is 6.9;*

* ***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?*

*Start the logic with NAUJ (condition){} JUANSEGUNDO(elif condition){} JUANTERCERO(else condition) ENDNAUJ for endif*

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

*Just a while loop in the form of JUANPQ(condition){/\*code/\*}*

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

*With JUANBALCONY, JUANBALCONY(input value);*

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

*JUANFULL HD “Hello JUAN”;*

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

*?juan functionName(juan parameterVariable){ /\*In case of no parameters parenthesis remains empty\*/*

*/\*In case of return\*/*

*/\*juan? returnVariable\*/*

*}*

**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.*

*A syntax entirely based on a meme, where each keyword is an actual caption in an image, just by looking up the keyword on google followed up by the work meme, you will find a meme with the caption of the keyword.*

*//Note: I tried to make the syntax make as much sense as I could, I know it might not be the best, but it’s supposed to be funny, not efficient. And humor is subjective, so if my sense of humor feels odd, it’s just a generational thing.*

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

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

**Option 1: Julia-like**

**Hello World**

|  |  |  |
| --- | --- | --- |
|  |  |  |

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

|  |  |  |
| --- | --- | --- |
|  |  |  |

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

**Option 2: DSL**

**[Your example here]**

|  |  |  |
| --- | --- | --- |
|  | <?JUAN  JUANFULLHD “Hello JUAN”;  Juan age;  JUANBALCONY(age)  JUANFULLHD “\nYour age is: “ + age;  JUAN?> |  |

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| **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.)]*

*It’s meant to be funny, centennial humor can be odd and I just made this language to exploit that fact, truth be told there are already lots of esoteric languages based on other popular millennial and centennial trends, so I came up with a more obscure and random trend to make JUANscript, also it’s meant to be as odd and strange as the real trend itself… The syntax is meant to be similar to regular scripting languages, but the keywords are captions on actual JUAN memes, just google them with the word meme after the keyword and you will find an image about it.*

**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.*

*I will need to use a reader in order to make lexemes and produce output tokens, then with the parser create a parse tree that uses the token stream in order to make a syntax tree that will be read and compared to the language definitions.*

*[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 printf function in c has two forms, one with one parameter, a constant char pointer that acts as a string, and the other that takes one regular char pointer for the format and other for the actual text, in JUANscript the same can be done, if there is only a regular string, it can just print that, in case there is some type on concatenation I can just realloc the current output string in order to add the concatenated elements and use that single string for printing to the output, in case there are variables I can just cast them into a char pointer and print it as plain 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?*

*Using curly brases {}, indentation sounds harder and I even tough I am making a scripting language similar to python, I want to make it readable for myself.*

**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.*

*The undefined variable type, I know python interpreter is in C, so it’s possible, how ever I don’t have much of an idea on how to make this, outside of that just knowing how to parse keywords into C sounds complicated.*

***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]*

*I will not do garbage collection, it’s a simple language so I don’t think implementing the manual memory allocation should be a necessary, for the ranges, I will use the same as in C, and use the limits.h library.*

**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.*

*https://knowyourmeme.com/memes/juan-horse-on-balcony*

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