Documentation of Project Implementation for IPP 2017/2018

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1. Description

Project is based on set of scripts which are together providing interpretation of language IPPcode18. Set of scripts consists of three parts: *parse.php* which performs parsing source code to XML format, *interpret.py* which performs interpreting of source code formatted in XML, *test.php* is script for testing proper functionality of previous two scripts and output is provided in HTML format. For usage information of this scripts run them with option *--help*.

1. Implementation details

All three scripts were implemented with procedural approach because object-oriented approach would be more time demanding and the project itself was relatively small. However, some simple classes were used in script *interpret.py* for various stacks, variables and frames in aim to make the code more readable and easier to debug and modify.

1. parse.php

Script *parse.php* is using php DOM library for creating XML structured output. Basic principle of this script is to parse input line by line ignoring comments and if input is semantically and lexically correct than put it in specified XML format. Lexical analysis is mostly done with regular expressions. Semantic analysis is performed only partially, the rest is performed by *interpret.py*. This script only checks if instruction has exact number of arguments and whenever they are symb or var as specified in IPPcode18 specification.

1. interpret.py

Next script *interpret.py* is the biggest part of this project compared to other scripts. It has a lot of lines of code which is caused by fact that every instruction of language IPPcode18 has its own function that provides proper parsing. The reason of this solution is to create code which is easier to debug.

*Interpret.py* expects file with formatted XML structure which is parsed with python’s *xml.etree.ElementTree* module. If parsing of XML file went successfully, then it’s proper structure is checked. After that script goes through all instructions and tries to load all labels in dictionary containing its names and instruction numbers. Then finally performs pre-runtime semantic, lexical and syntactical analysis. This script doesn’t rely on code analysis done in *parse.php*. In case that everything went successfully script start performing interpretation of program. Simple classes are used for representing variables, frames, call-stack, data-stack and stack-frame.

1. test.php

Last script *test.php* similarly as *parse.php* uses DOM library, but this time for creating HTML representation of output. To make life easier, HTML template is represented as firstly represented as string which is later parsed with function loadHTML(). This also allows to add some CSS for table with test results more visually appealing. Test firstly loads all \*.src files and then assign them their \*.in, \*.rc and \*.out files. Then runs test and results saves as \*My.out files and all output from stderr redirects to files \*.err. Execution of this tests are done with php function exec(). Reference output and actual output is compared with diff command. If return codes are identical and so are outputs than test is displayed in result table in green color with status OK otherwise status is FALSE and color of test is red. Lastly script provides some short summary of tests under the table.

1. Extensions