Documentation of Project Implementation for 1. task IPP 2023/2024
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1 The main logic of the program

The script begins by handling possible parameters and reading the standard input using the function `readline()`. The empty and comment-only lines are removed, and the header line is validated. Then, the comments are removed from any lines where they are present. Subsequently, each line undergoes validation, checking for correct operation codes, the appropriate number and types of operands, and verifying the operand format. The XML is generated manually, without using external libraries.

2 Functional decomposition

The source code was divided into three files that provide individual functionalities. The main logic of the program is implemented in the file `parse.py`, which handles the parsing of the source code and parameters, generation of XML representation, and possible error exits. File `lib_parse.py` contains helper functions for validating the operands of individual instructions and other functions for generating the correct XML format. In the file `lib_stats.py` helper functions for calculating statistical data are implemented.

3 Extensions

The implementation includes an extension designed to calculate statistics, which stores statistical data specified in the parameters in a designated file. To manage the storage of parameter groups and the target files, a dictionary named `stats_parameters` is used, which is implemented as a global data structure and used only if the source code is parsed successfully. Also, in the case of multiple instances of statistics parameters, the script verifies the distinctness of file paths.

4 Possible improvements

Refactoring the script into an object-oriented paradigm could significantly improve the quality of the program and its robustness, by promoting modality and maintainability. For example, it was possible to use The Abstract Factory pattern with a factory class which creates source code parser, instruction parser, and statistics calculator classes.