

Guidelines for the Project¹

The project is an integral part of the course. Its mark contributes 30% to the final mark.

Topic

You are asked to develop a compiler for an application and a language of your choice. All projects should have the following ingredients:

1. Implement a Lexical Analyser with regular expressions for each Token and the appropriate Attribute. To develop such a lexical analyser use FLEX or any similar tool.
2. Define the Syntactic Productions of the grammar using YACC (or a similar tool).
3. Associate Semantic Rules to some of the productions of the grammar, using Translation Schemes in YACC.
4. In case you choose to extend the LEX and YACC files used in the LAB to a subset of the C programming language, the project should provide:
 - (a) Syntax rules to declare variables and to specify a Type for the variables (it should be possible to specify at least two Types).
 - (b) Statements should include variable assignments, but other statements can be added (even without an associated semantics) as: function or procedure calls, conditional jumps, while iterations, etc.
 - (c) A Symbol Table with methods to access it. The Symbol Table must be a dynamic data structure. Allowing Symbol Tables with a scoping mechanism is considered as a plus.
 - (d) Semantic rules to compute values of expressions and implement a type checker. The Type Checker should print an appropriate message for badly typed expressions.

Evaluation

The project will be evaluated in terms of the quality of the solution, which comprises:

- the complexity and originality of the programming language to be compiled;
- the data structures used in implementing the compiler, for instance for realizing the symbol table;
- the depth of the semantic analysis carried out;
- the robustness of the compiler (does it work without breaking down?) and of the coding itself of the compiler.

¹These guidelines summarize the information given in the lectures, the labs, and in the course presentation form.

Teams:

You can work in teams of up to three students.

Material to Deliver:

Your work should result in a package comprising the following documents and files:

- a PDF documentation that explains the project, containing: a general explanation of what the compiler does; a grammar of the language that is parsed; a description of what the input should look like; instructions of how to run the program;
- lex file and yacc file (specifying your tokens, your grammar, and the semantics);
- all source code files and output file/executable (please, explain your code by means of informative comments);
- examples of input and output of the compiler.

Submission:

Send a zip file to artale@inf.unibz.it by TO BE DECIDED.

Discussion:

The oral presentation of the project will held in TO BE DECIDED.