

Final Project of the First Year of Graduate Studies

Sandy Aoun

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The title of the graduation project of my first year of graduate studies in Computer Science is: “*Conception and implementation of a JSON to XML compiler*”. It consisted of conceiving and implementing a source-to-source compiler which converts a JSON-formatted document into an XML-formatted document. The project was recommended and mentored by Prof. Dr. Kablan Barbar who lectured the Formal Language Theory (undergraduate) course and the Compiler Construction (graduate) course at the Lebanese University.

The central tasks I undertook while working on this project are the following:

1. Exploring the project’s topic which chiefly amounted to becoming familiar with the JSON data format and its syntax.
2. Pulling off a theoretical analysis which showcases the compiler’s design:
 - 2.1. Defining a context-free grammar which represents the syntax of JSON.
 - 2.2. Pulling off a theoretical analysis of the syntax of JSON:
 - 2.2.1. Formulating a lexical analysis which consists of specifying the lexical structure of JSON using a regular expression and then modeling it using a finite automaton.
 - 2.2.2. Formulating a syntactic analysis which consists of transforming the formal grammar into an equivalent non-left-recursive and left-factored grammar, and then modeling the predictive parsing approach using transition diagrams.
 - 2.3. Devising a semantic analysis which consists of coming up with a fitting attribute grammar. In our case, the attribute grammar defines one synthesized attribute that attaches suitable semantic information to the various JSON syntax constructions (represented at this stage by a syntax tree).
3. Implementing the conceived compiler in C++.
4. Writing a technical report (in French) describing thoroughly the undertaken work.
5. Preparing and performing a public oral presentation covering the undertaken work.