

Specification for Bachelor Thesis

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1 Title

The preliminary title is *Input Format Design and Translator Development for NJOY*.

2 Background

The NJOY¹ software package is a nuclear data processing system. It is used for converting cross section data between different formats, as well as performing operations on the data. NJOY is currently being used within the MACRO² project at the Division of Applied Nuclear Physics, at the Department of Physics and Astronomy at Uppsala University.

The input format of NJOY is a remembrance from the punched card era. The punched card legacy results in very complex input files which are hard to read. This is not an optimal solution. Therefore, a modern, user friendly input format is to be designed.

3 Task Description

The task consists of two phases,

1. Design of Input Format
2. Implementation of Translator

3.1 Design of Input Format

The new input format has to be designed with usability in mind. The format also has to be designed with algorithmic input file generation in mind, such that input files can be generated by other programs. The design should be based on some commonly known existing format that is fitting to the task. The basis could for example be a programming language.

¹<http://t2.lanl.gov/codes/njoy99/>

²MAssive Computation methodology for Reactor Operation
(<http://www.fysast.uu.se/tk/en/content/macro-project>)

3.2 Implementation of Translator

In order to make the newly designed input format useable with NJOY, it has to be translated to the old input format. As such, a translator has to be developed. The translator must be able to convert input files of the new format into input files of the old format. The translator must be command-line based, and designed for a Linux environment. The translator should be designed with expandability in mind. If time constraints do not allow implementation of all functions within this work, the translator has to be easy to complete. Certain functions to be specified are to be prioritized.

4 Methodology

The implementation of the translator will be performed in a Linux environment, using Python 2.6. The results will be verified by creating input files and running them through the system. These input files will be designed to test all or most of the program's functions.

4.1 Literature

- Fred L. Drake, Jr. *et al.* (2008, Oct. 2). *Python v2.6 documentation* [Online]. Available: <http://docs.python.org/release/2.6/>
- *Et al.* (2010, Mars 31). *User Input for NJOY99, updated through version 364* [Online]. Available: <http://t2.lanl.gov/codes/njoy99/Userinp.364>

5 Delimitation

It is not within the scope of the project to understand what NJOY does or why, beyond what is needed to understand how the input files work. The underlying physics are not within the scope. The new input format and the translator are not required to implement all available input instructions for NJOY.

6 Time Plan

The thesis work will begin at 2011-03-28 and end at 2011-06-10.

6.1 Task List

Task 1: Write report.

Task 2: Introduction to the NJOY input instructions.

Task 3: Introduction to the Python programming language.

Task 4: Design input format.

Task 5: Plan implementation phase.

Task 6: Implement input format.

Task 7: Testing.

Task 8: Implement translator.

6.2 Schedule

6.2.1 Introduction and Start Up

Week 13	Week 14	Week 15	Week 16
<i>Task 1</i>			
<i>Task 2</i>			
<i>Task 3</i>			
		<i>Task 4</i>	

6.2.2 Implementation

Week 17	Week 18	Week 19	Week 20
<i>Task 1</i>			
<i>Task 5</i>			
<i>Task 6</i>			
	<i>Task 7</i>		
	<i>Task 8</i>		

6.2.3 Implementation and Wrap Up

Week 21	Week 22	Week 23
<i>Task 1</i>		
<i>Task 7</i>		
<i>Task 8</i>		