

Description

In this project you will implement a program that converts a context free grammar to its equivalent Chomsky normal form.

Implementation

A context free grammar is represented by a tuple as : $G = (N, T, P, S)$ where:

- N is a set of non-terminal symbols.
 - T is a set of terminals.
 - P is a set of rules.
 - S is the start symbol.
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- Your program should read a text file as input (assume that the input file is located in the same folder as the code file). This text file includes all the information needed for representing the grammar:
 - The input file has the following headers in order, **NON-TERMINAL**, **TERMINAL**, **RULES**, and **START**. A sample input file is represented below. The lines after each header represent the content of that set. **Note that S:00S represents $S \rightarrow 00S$, and letter "e" represents epsilon.** So the symbol ":" and "e" must not be used in any other set in the grammar. The non-terminals will always be a capital letter of English alphabet, and the terminals, will be either a small letter from English alphabet (except e) or a one-digit number 0-9.

NON-TERMINAL

S

F

TERMINAL

0

1

RULES

S:00S

S:11F

F:00F

F:e

START

S

- For example the input file above represents:
 - $S \rightarrow 00S \mid 11F$
 - $F \rightarrow 00F \mid \text{epsilon}$
- 2 sample text files for grammar are provided in this assignment. But your code should be able to read and convert any other grammar given as input (the format of the text file will

stay the same but consider that the number of terminals and non-terminals and symbols can change.

- After reading the input file you should convert the grammar into Chomsky normal form and you must print in **console** the output grammar in the same format as the input file.

Technical Detail

- You can use C++ or java for this project.
- **It is your responsibility to make sure that your code runs without any errors. In the case of any errors will get 0 points.**
- **Use of any additional libraries is not permitted in this project.** You must implement everything yourself. Use of additional libraries will result in your code not running and you getting 0 points.

Submission

Deadline: 9th of December until 23:55

You must turn in two files in a **zipped folder**. **One single code file** and your report.

Your report must explain every detail of your design, the data structure you used to represent the grammar, your algorithm for conversion, and the representation of the CNF (Chomsky normal form).

First file should be your code named:

NAME_SURNAME_StudentNO.java

Or

NAME_SURNAME_studentNO.cpp

1. Second file should be your final report named:

REPORT2 _ NAME_SURNAME_StudentNO.pdf

Grading

It is very important to state that each submission must have both the code and the report, submissions that lack any of these two files will not be evaluated and will receive 0 in total.

- Your report (40 pts)
- Your code (60 pts)

Important Notes

- This is an individual assignment, hence sharing your code will be considered cheating.
- you can most probably find code online for this program, but it is very likely that code will be more complicated than what you are required to implement for the assignment. While it is OK to look for ideas online, copying code that you find online will be considered cheating.
- Your codes will be compared with codes available online and also with other submissions.

BEST OF LUCK 😊

In case of any questions email me via negin.amirshirzad@ozu.edu.tr