Language Models and Processing Techniques
Homework 1 : CFGs

Assignment Title: Sentence Generation from Grammar File

Objective: Your task is to develop a program that can parse a provided grammar file named **grammar.gr** and generate 10,000 distinct, grammatically correct sentences based on the rules defined in the file.

Key Requirements:

1. **Parsing Grammar File**: Carefully read and interpret the contents of **grammar.gr**. This file contains the grammatical rules and structure that your generated sentences must adhere to.
2. **Sentence Generation**: Once you have understood the grammatical rules, your program should be capable of automatically generating 10,000 unique sentences that are in compliance with these rules.
3. **Optimization**: It is crucial that your code is optimized for efficiency. Focus on minimizing the use of computational resources such as memory and processing power. Your program should run smoothly and generate sentences in a reasonable amount of time without overburdening the system.
4. **Output Format**: The generated sentences should be saved in a text file, neatly organized and easily readable.
5. **Documentation**: Include comments in your code to explain your logic and approach. Additionally, provide a brief write-up describing your methodology, challenges faced, and how you addressed them.

Deliverables:

- The source code of your program.
- A text file containing the 10,000 generated sentences.
- A documentation file explaining your approach and code.

Evaluation Criteria:

- Correctness and adherence to the grammatical rules in **grammar.gr**.
- The uniqueness and variety of the sentences generated.
- Efficiency and optimization of the code.
- Quality of documentation and code comments.

Submission Deadline: 18 Dec, 2023

Please ensure that your submission is complete and adheres to all the requirements mentioned above. Good luck, and we look forward to seeing your creative and efficient solutions!