CYK Algorithm program Instructions Manual

The membership problem:

Problem: Given a context-free grammar **G** and a string **w.** Is w in L(G)?

The Cocke–Younger–Kasami-Algorithm (CYK or CKY) is a highly efficient parsing algorithm for context-free grammars. This makes it ideal to decide the word-problem for context-free grammars, given in Chomsky normal form (CNF). The following tool can be used to check if a certain word $w \in \Sigma$ is part of a language, given in CNF grammar.

Informally, the algorithm works as follows: In the first step write the word in the first row and add each non-terminal symbol in the row underneath which deduces the terminal symbols. After that, for each cell in the grid start vertically at the top and go down towards the cell to be checked and the second cell up in diagonal. For each such step, combine the cells and check if the combination appears in the grammar. If it does, add the left-hand-side non-terminal to the grid-cell. If after all steps the start-symbol is contained in the last row, the word can be derived by the given grammar.
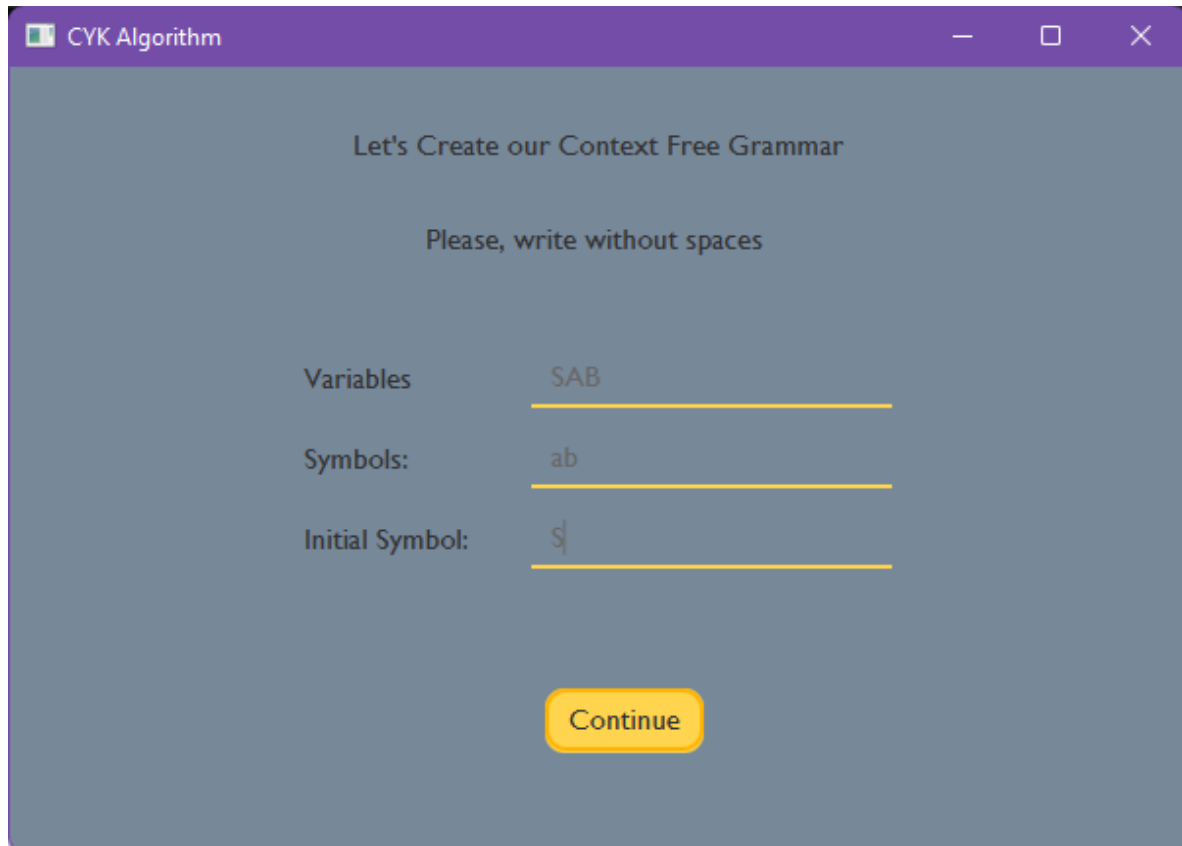
CYK Algorithm Basics:

1. The grammar should be in a Chomsky Normal Form
2. String of terminals $w = a_1 a_2 \ldots a_n$.

How to use the program?

In the following example, we will use the grammar G with V = (SAB), Σ = (ab), and S = (S). The productions will be shown steps later.

1. Create the grammar G which will be used to decide if a string w belong to the language generated by itself.

2. Assign the productions to each variable. Be sure to use the correspondent separator and the lambda symbol if it is required.

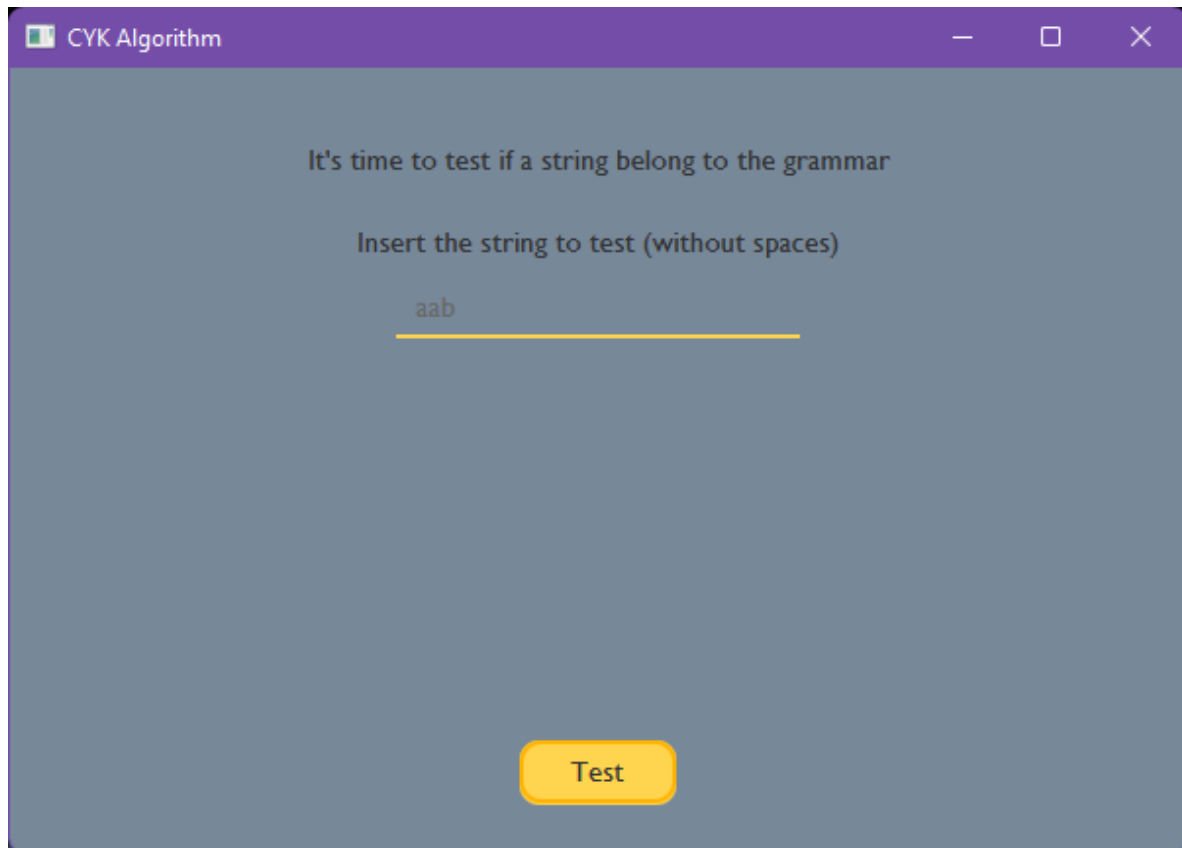CYK Algorithm

Now, let's create our prod...

Please, use | separator. And here is / symbol

Variable		Productions
S	→	AB
A	→	AA|a
B	→	b

Continuar

(The productions P used in the example)

3. Then, insert a string to be tested and see if it is achieved by the grammar. If it is achieved, you will know with a nice alert saying it was achieved.

4. Finally, the answer