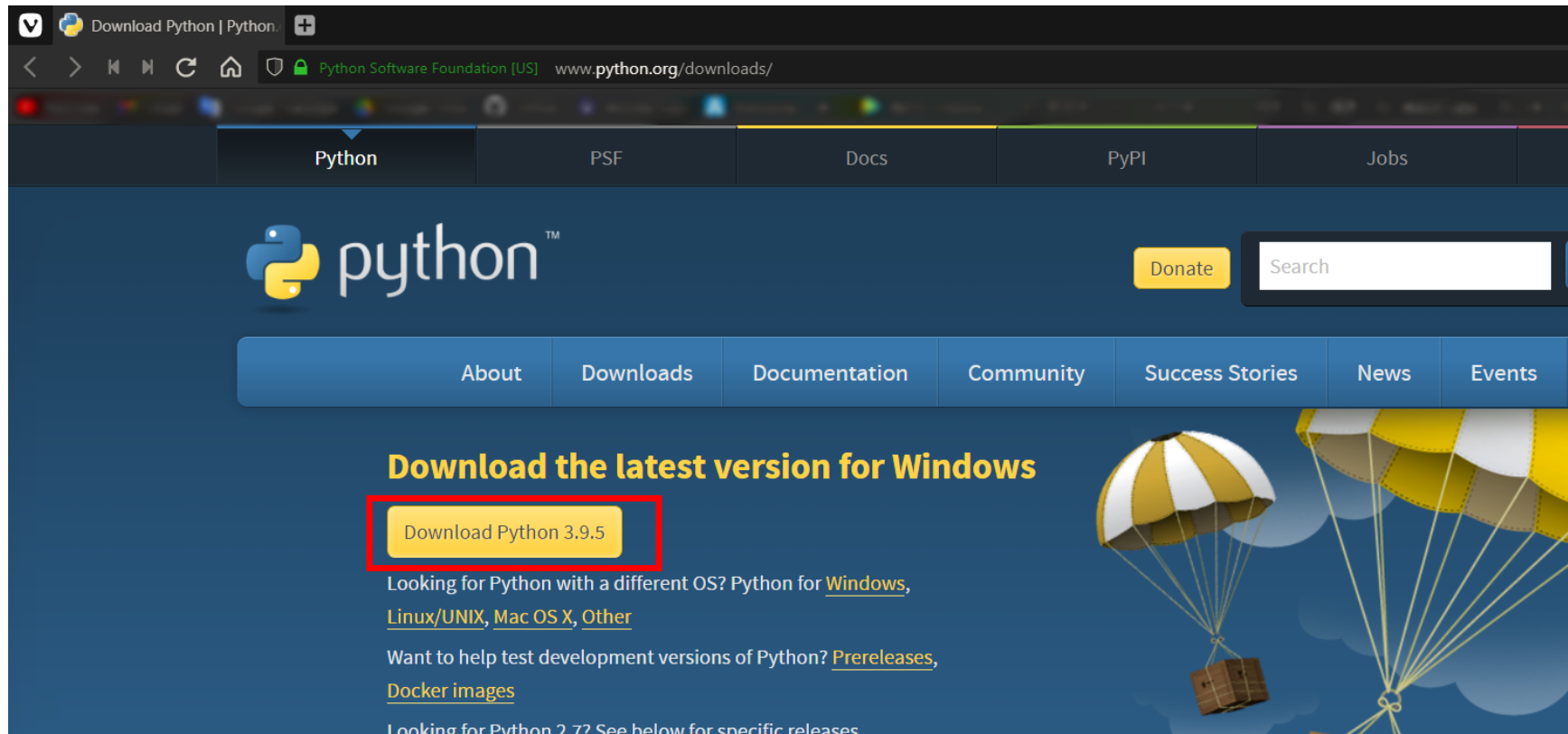


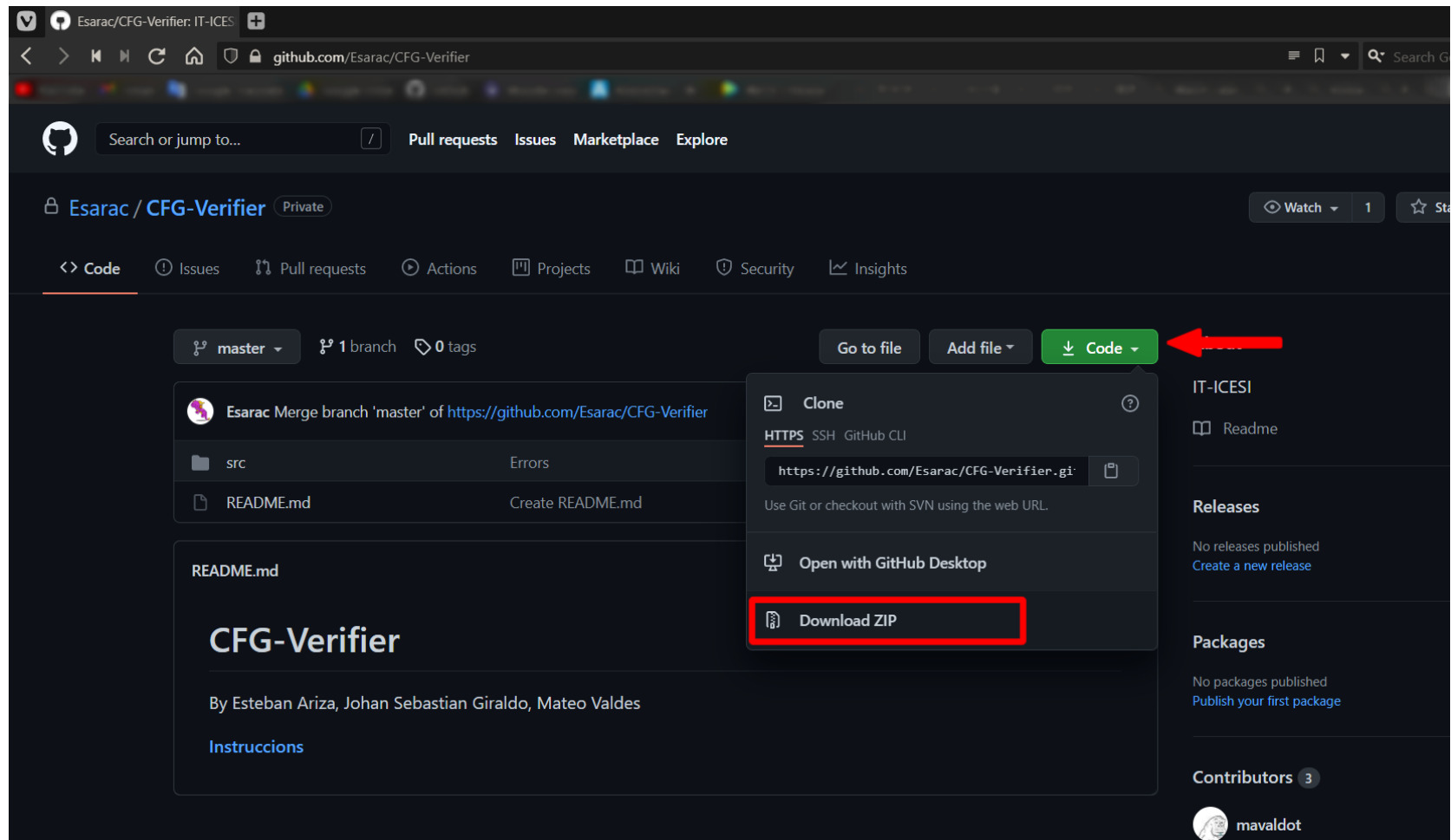
# CFG-VERIFIER

By Esteban Ariza, Johan Sebastian Giraldo, Mateo Valdes

**Step 1:** Install Python [here](#) if you do not have it.



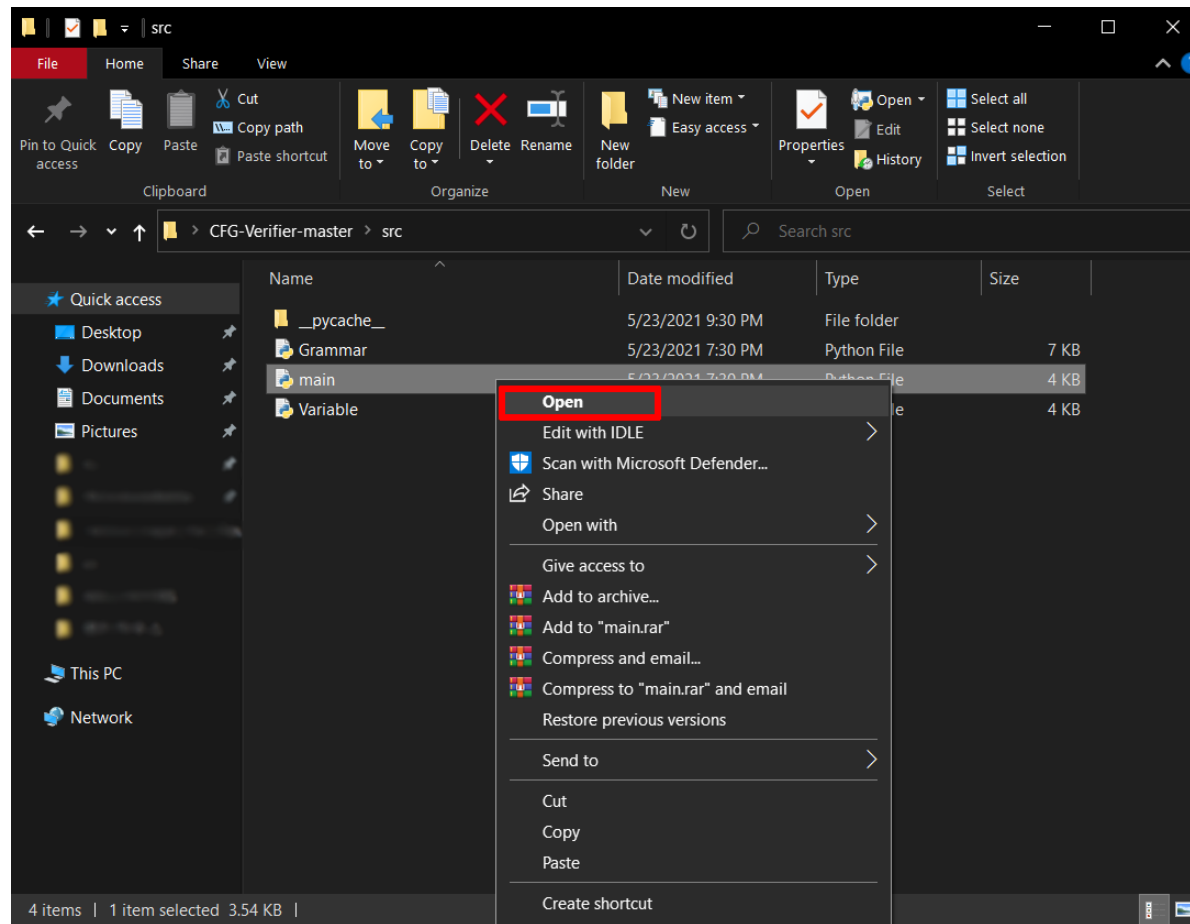
**Step 2:** Go to <https://github.com/Esarac/CFG-Verifier> and click on Code → Download ZIP.



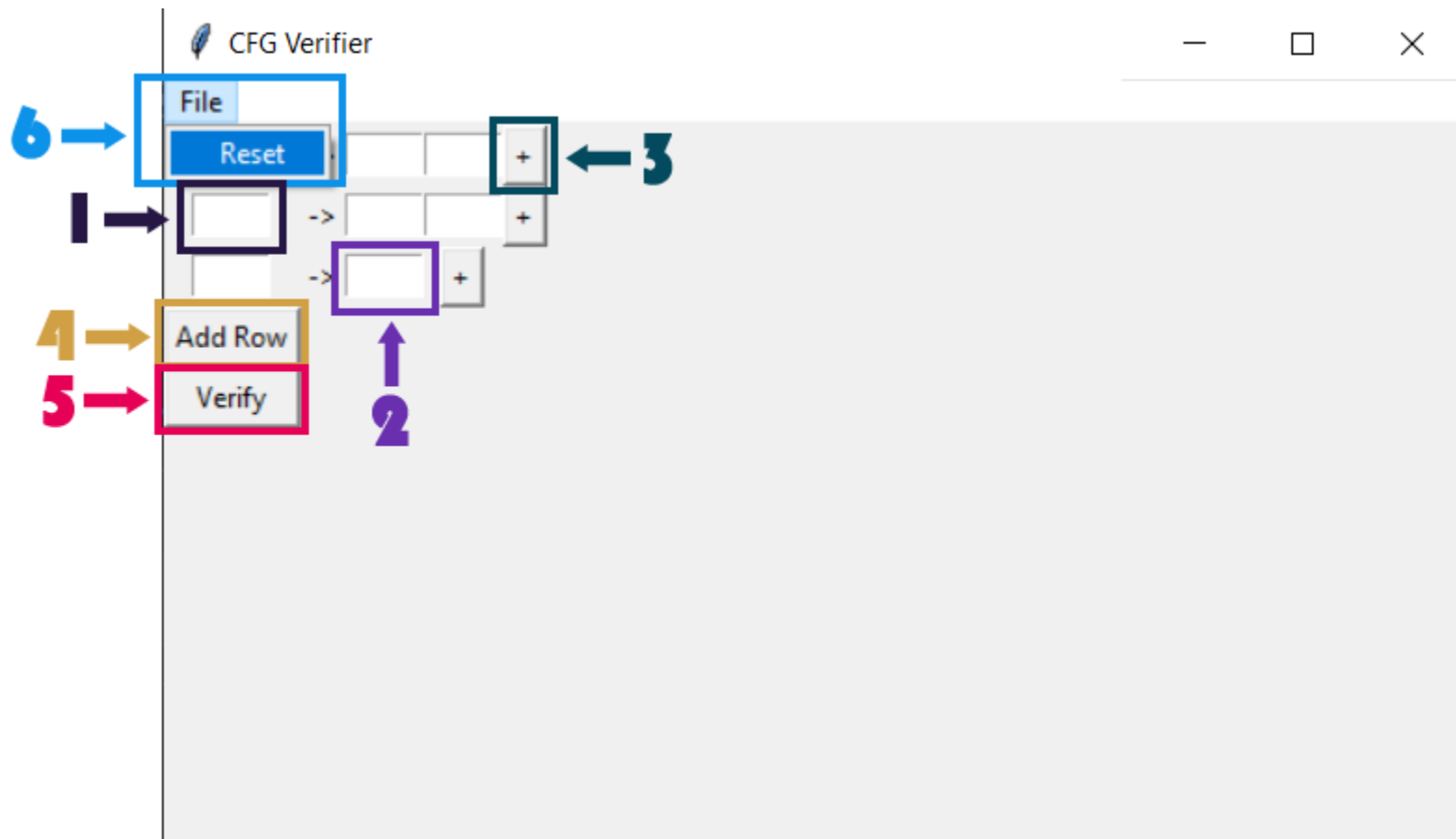
**Step 3:** Extract the ZIP file, open the extracted folder and follow this path: "CFG-Verifier-master/src".

**Step 4:** In the "src" folder, open the file "main.py"

**Note:** You can either open it by just double-clicking on it or by right-clicking on it → open.



## Components of the program:



(1) **Variable field:** Use this field to enter a variable of a grammar in CNF:

**Note:** You cannot let this field empty. Any input must be in uppercase ("S" is accepted, "s" is not accepted).



The image shows a window titled "CFG Verifier" with a feather icon. Below the title bar is a "File" label. The main area contains a text input field with "S" entered, followed by a "->" label, another empty text input field, and a "+" button. Below these are two buttons: "Add Row" and "Verify".

(2) **Production rule field:** Use this field to enter the production rules of a variable:

**Note:** An empty field represent  $\lambda$ , to enter  $\lambda$  add a field and let it empty.

**Note 2:** You cannot enter a string with a length greater than 2 in a production rule field (A grammar in CNF cannot have a variable with a production rule that has more than 2 symbols).



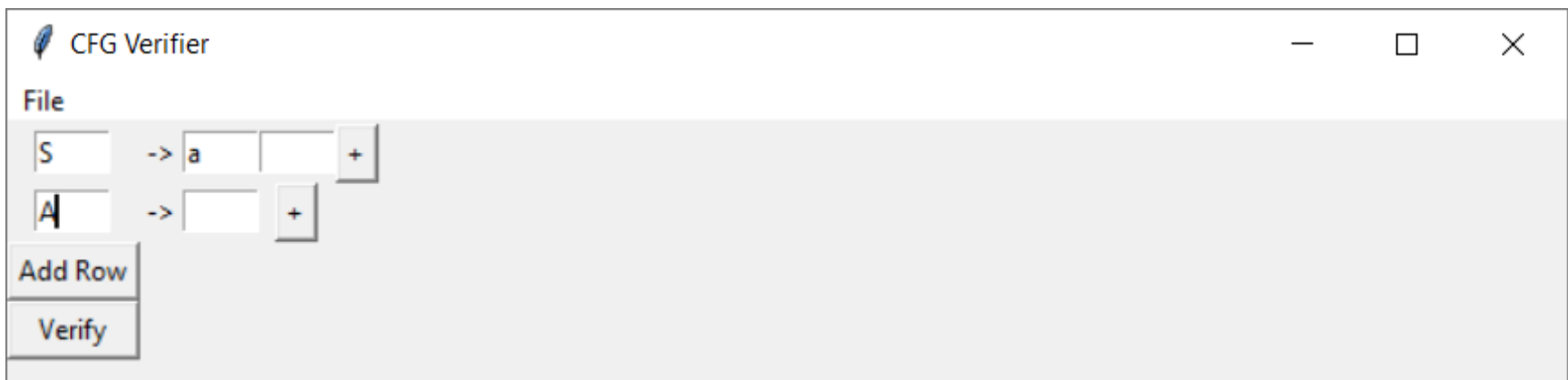
The image shows the same "CFG Verifier" window. In this state, the text input field after the "->" label now contains the character "a". The "S" remains in the first input field. The "Add Row" and "Verify" buttons are still present below.

(3) **Add field button:** Use this button to add a production rule field for a variable:



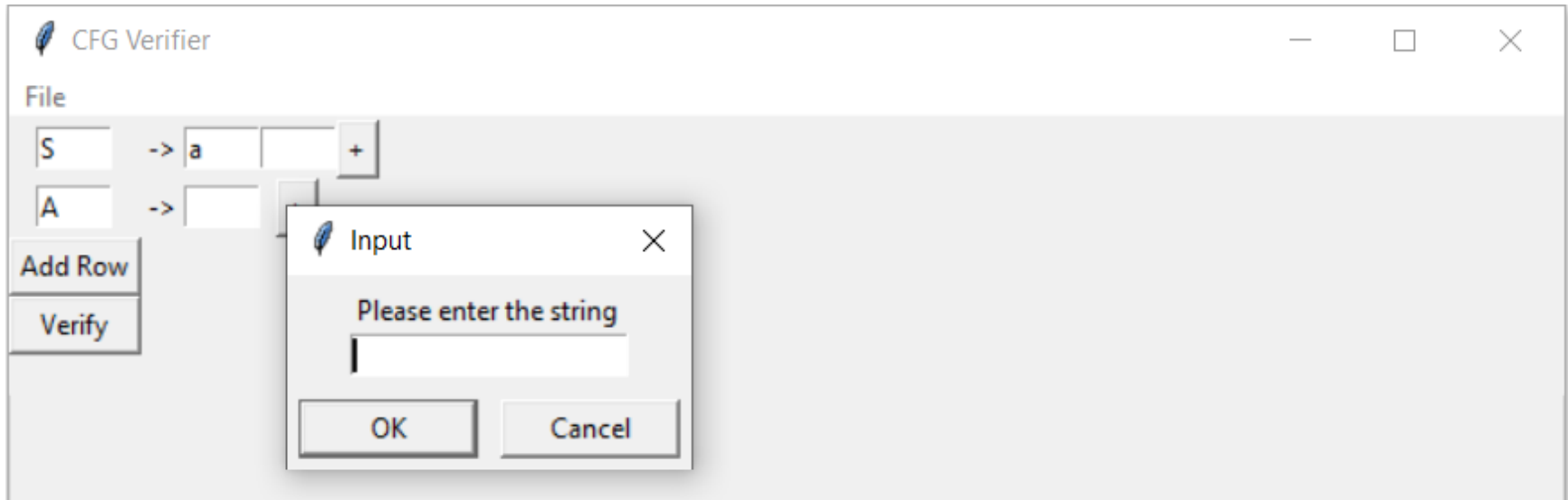
The image shows a window titled "CFG Verifier" with a feather icon in the top-left corner and standard window controls (minimize, maximize, close) in the top-right. Below the title bar, the word "File" is displayed. The main area contains a single production rule: a text box with "S", followed by "->", a text box with "a", and an empty text box. To the right of the empty box is a small button with a "+" sign. Below this row are two buttons: "Add Row" and "Verify".

(4) **Add row button:** Use this button to add a row and enter another variable:



The image shows the same "CFG Verifier" window, but now it contains two production rules. The first rule is "S -> a" in the first row. The second rule is in the second row: a text box with "A", followed by "->", an empty text box, and a small button with a "+" sign. The "Add Row" and "Verify" buttons are still present at the bottom.

(5) **Verify button:** Use this button to enter a string and check if it can be produced by the grammar:



(6) **Reset button:** Use this button to reset the program to enter a new grammar:

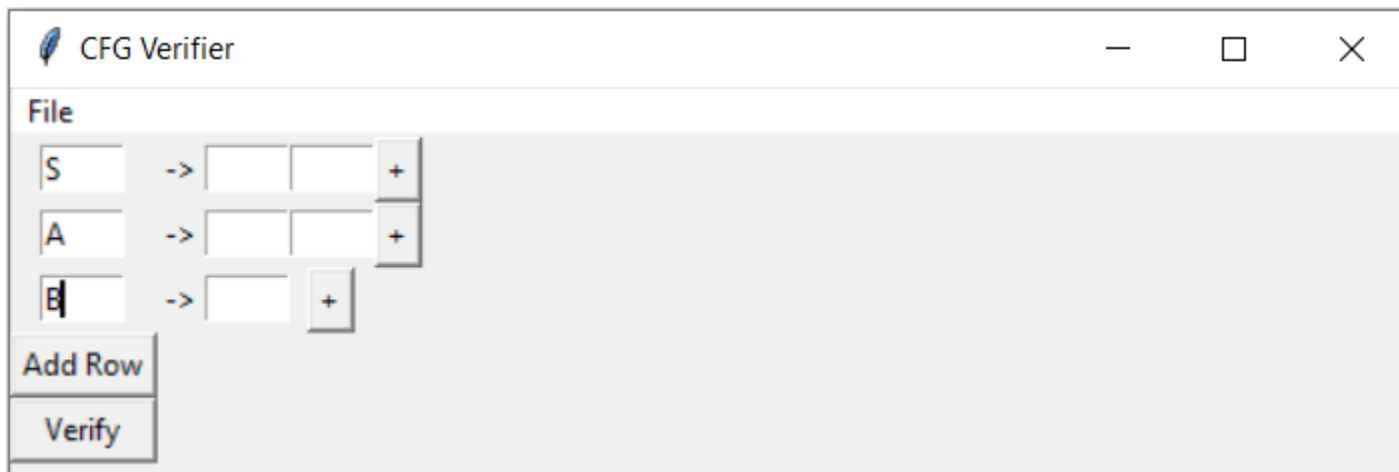


## How to use the program:

Given a grammar in **CNF**:

$$S \rightarrow AB \mid BA \mid \lambda$$
$$A \rightarrow AB \mid a$$
$$B \rightarrow b$$

Use component **(1) Variable field** and **(4) Add row button** to enter the variables  $S$ ,  $A$  and  $B$ :



The screenshot shows a window titled "CFG Verifier" with a standard Windows title bar (minimize, maximize, close buttons). Below the title bar is a menu bar with a "File" option. The main area contains a table for entering variables and their production rules. The table has three rows, each corresponding to a variable:  $S$ ,  $A$ , and  $B$ . Each row has a "Variable field" (a text box containing the variable name), a "->" symbol, and a "Production rule field" (a text box). To the right of the production rule field is an "Add field button" (a small square button with a "+" sign). Below the table are two buttons: "Add Row" and "Verify".

Variable field	->	Production rule field	Add field button
S	->		+
A	->		+
B	->		+

Buttons: Add Row, Verify

Use component **(2) Production rule field** and **(3) Add field button** to introduce the production rules of each variable:



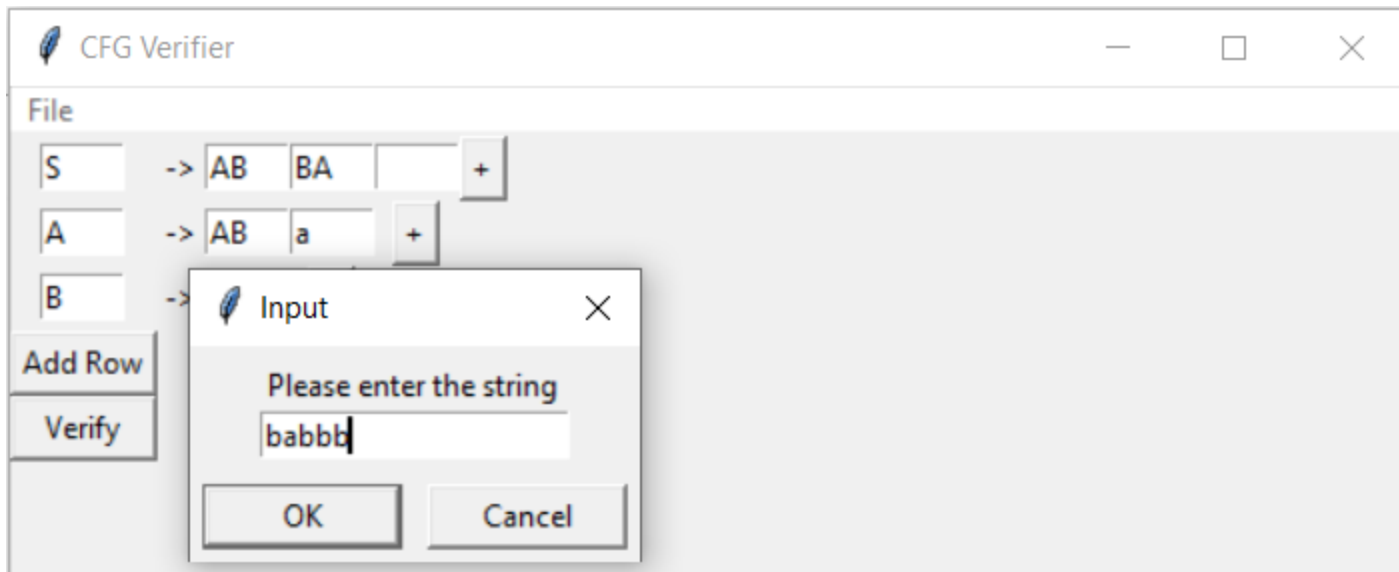
**Note:** Remember, to introduce  $\lambda$  add a field and let it empty.

The image shows a window titled "CFG Verifier" with a standard Windows-style title bar (minimize, maximize, close buttons). Below the title bar is a menu bar with a "File" menu. The main area of the window contains a table-like structure for defining grammar rules. It has three rows, each representing a rule. Each row consists of a variable (S, A, B), followed by a right-pointing arrow, and then a sequence of terminals and non-terminals. The first row is "S -> AB BA", the second is "A -> AB a", and the third is "B -> b". Each row ends with a small button containing a plus sign (+). Below the table are two buttons: "Add Row" and "Verify".

Variable	Right Arrow	Terminals/Non-terminals	Plus Button
S	->	AB BA	+
A	->	AB a	+
B	->	b	+

Buttons: Add Row, Verify

Use component **(5) Verify button** and enter the string you want to verify:



Finally, click on "OK" and you should see a message like this:

