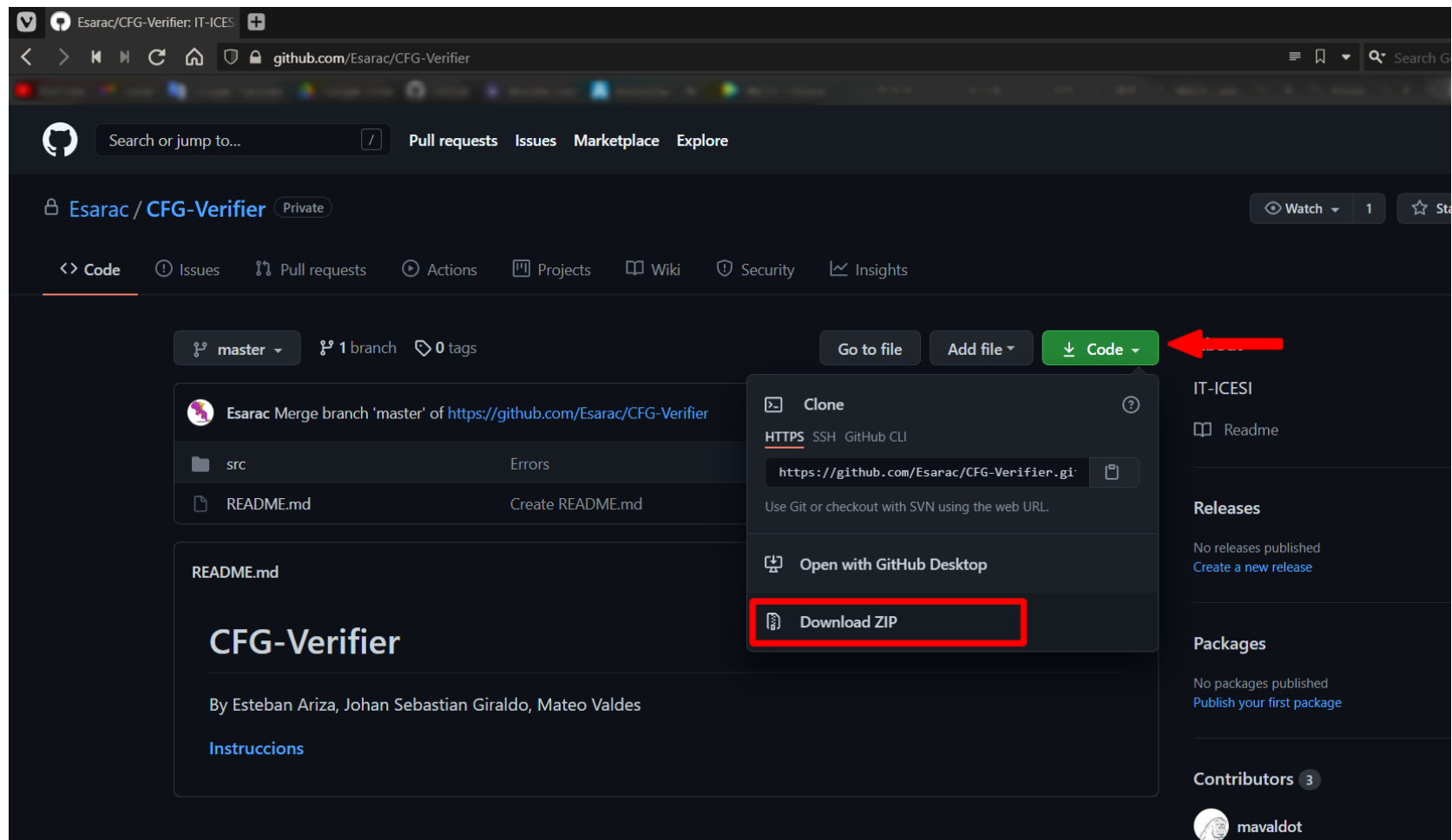


# CFG-VERIFIER

By Esteban Ariza, Johan Sebastian Giraldo, Mateo Valdes

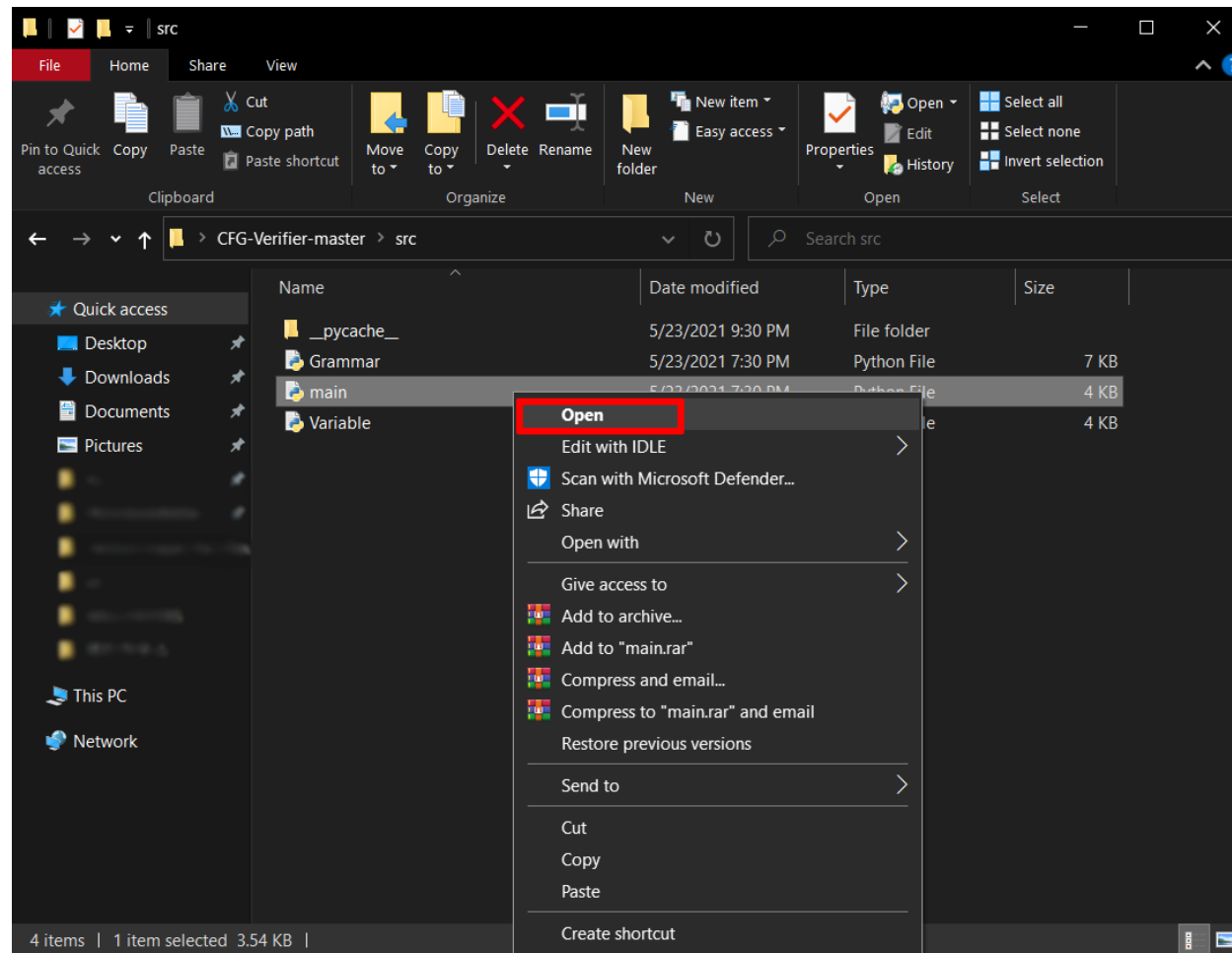
**Step 1:** Go to <https://github.com/Esarac/CFG-Verifier> and click on Code → Download ZIP.



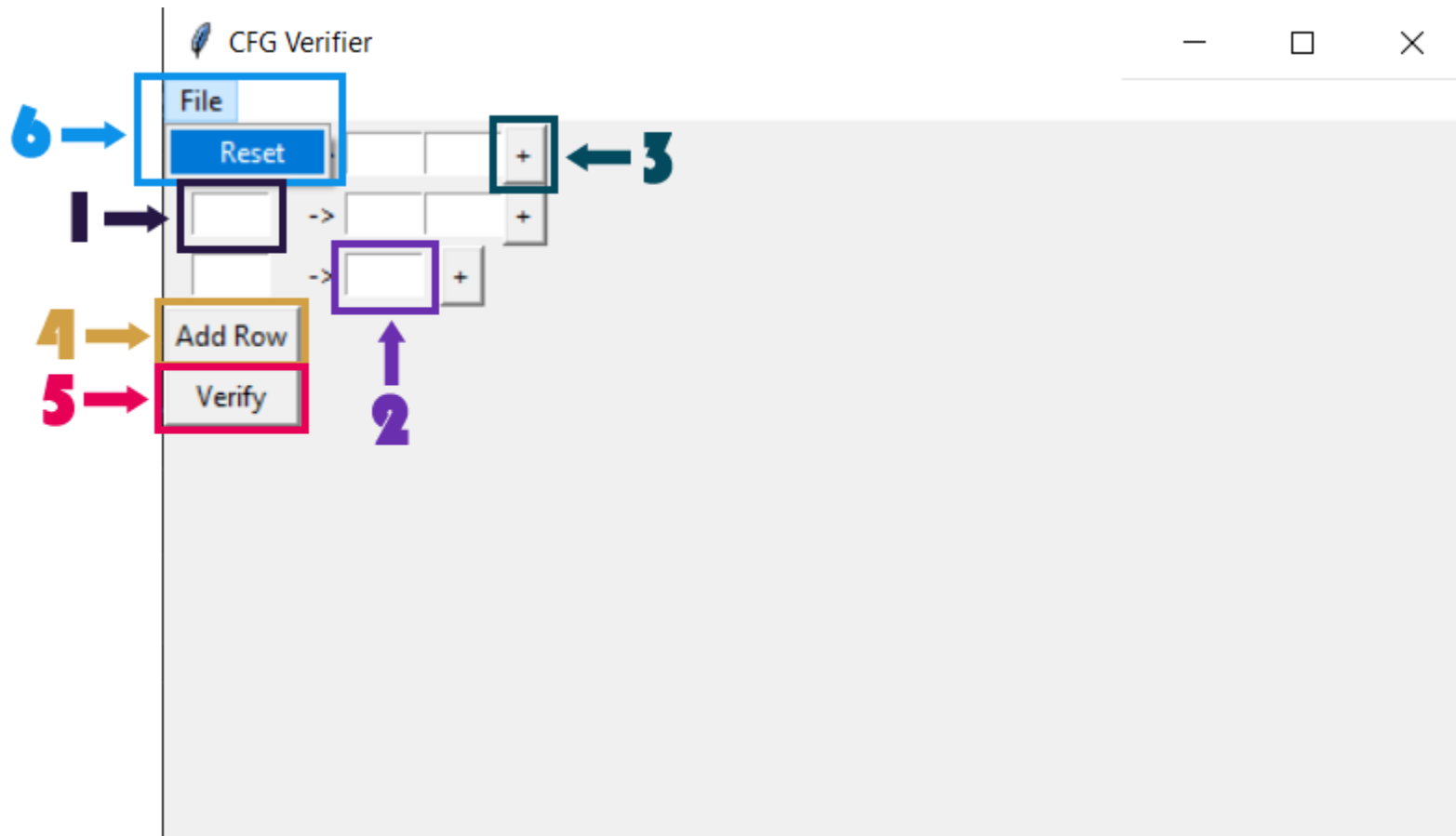
**Step 2:** Extract the ZIP file, open the extracted folder and follow this path: “CFG-Verifier-master/src”.

**Step 3:** 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 standard Windows-style title bar (minimize, maximize, close buttons). Below the title bar, the word "File" is displayed. The main area contains a text input field with the letter "S" inside. To the right of this field is a right-pointing arrow, followed by another empty text input field, and then a "+" button. Below these elements 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).



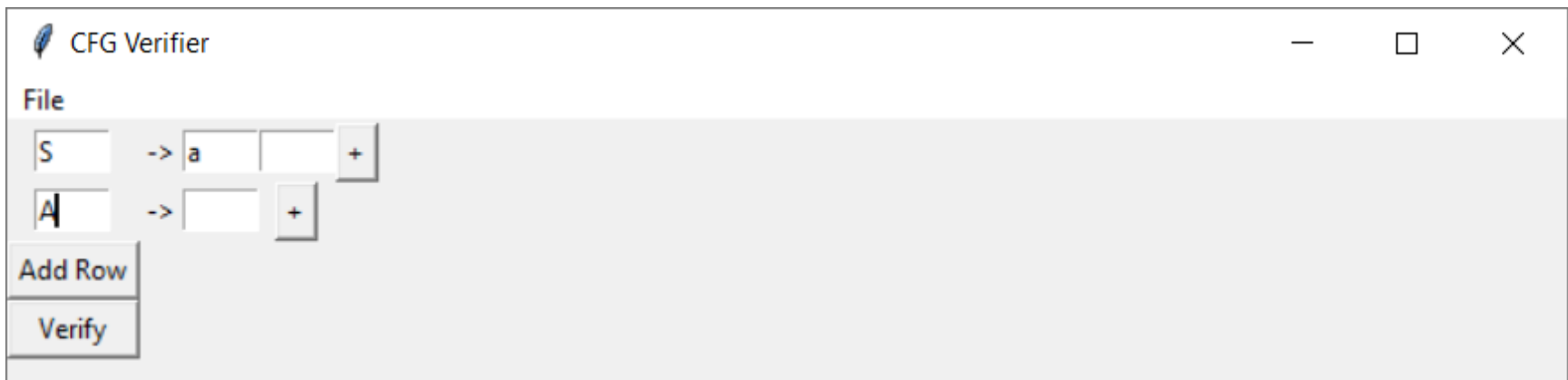
The image shows the same "CFG Verifier" window. In this state, the first text input field contains the letter "S". The right-pointing arrow is present, but the second text input field now contains the letter "a" instead of being empty. The "+" button remains to the right of the second field. The "Add Row" and "Verify" buttons are still at the bottom.

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



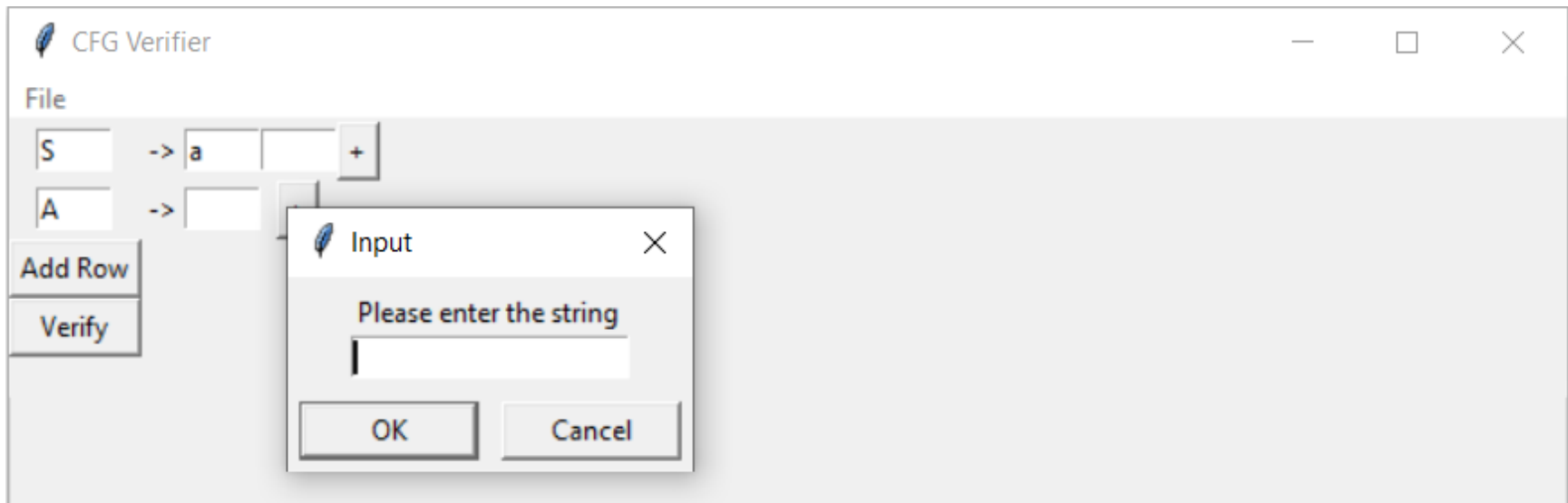
The image shows a window titled "CFG Verifier" with a feather icon. Below the title bar is a "File" label. The main area contains a single production rule: "S" in a text box, followed by "->", then "a" in a text box, and an empty text box followed by a "+" button. Below this are two buttons: "Add Row" 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 with two production rules. The first rule is "S -> a". The second rule is "A" in a text box, followed by "->", and an empty text box followed by a "+" button. The "Add Row" button is still present below the rules.

(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:

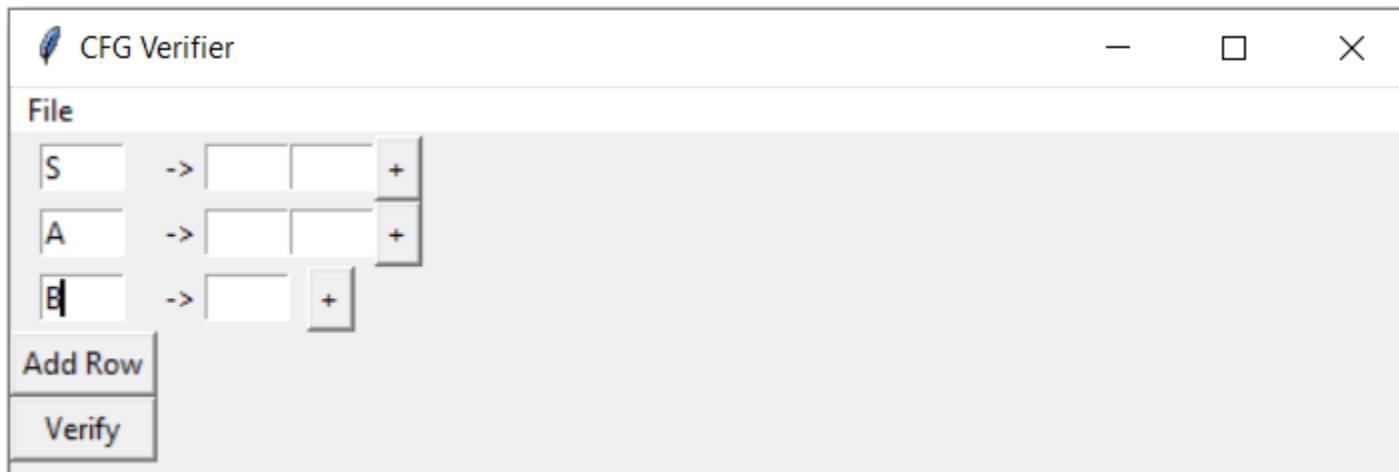


## How to use the program:

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  $B$ :



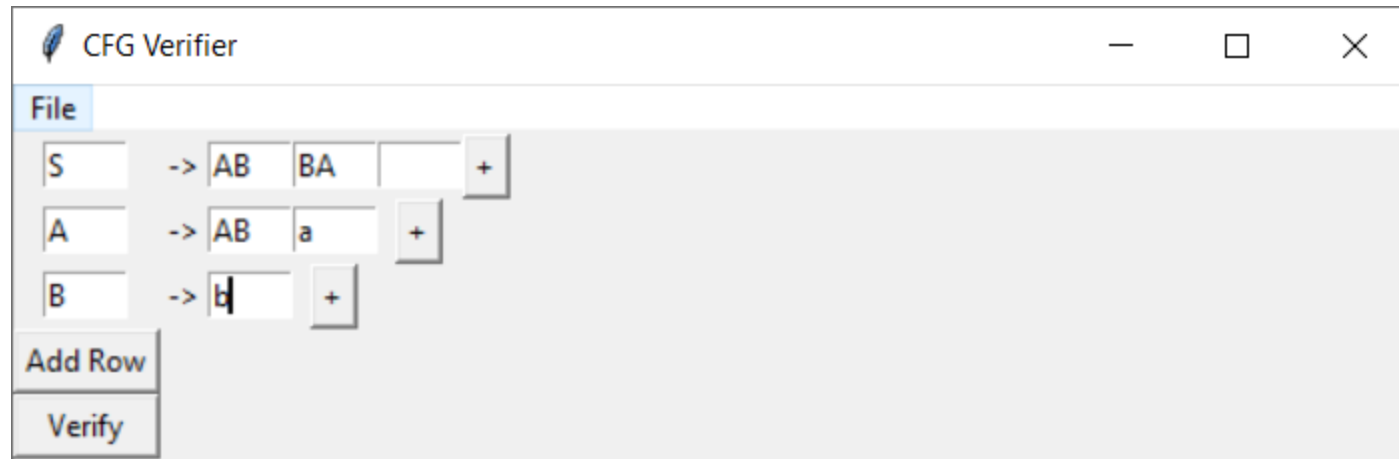
The screenshot shows a window titled "CFG Verifier" with a "File" menu. The main area contains a table for defining grammar rules. The table has three rows, each representing a variable and its productions. The first row is for variable  $S$ , with productions  $AB$  and  $BA$ , and a plus sign to add more. The second row is for variable  $A$ , with productions  $AB$  and  $a$ , and a plus sign. The third row is for variable  $B$ , with production  $b$ , and a plus sign. Below the table are two buttons: "Add Row" and "Verify".

Variable	Productions
$S$	$AB \mid BA$
$A$	$AB \mid a$
$B$	$b$

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.



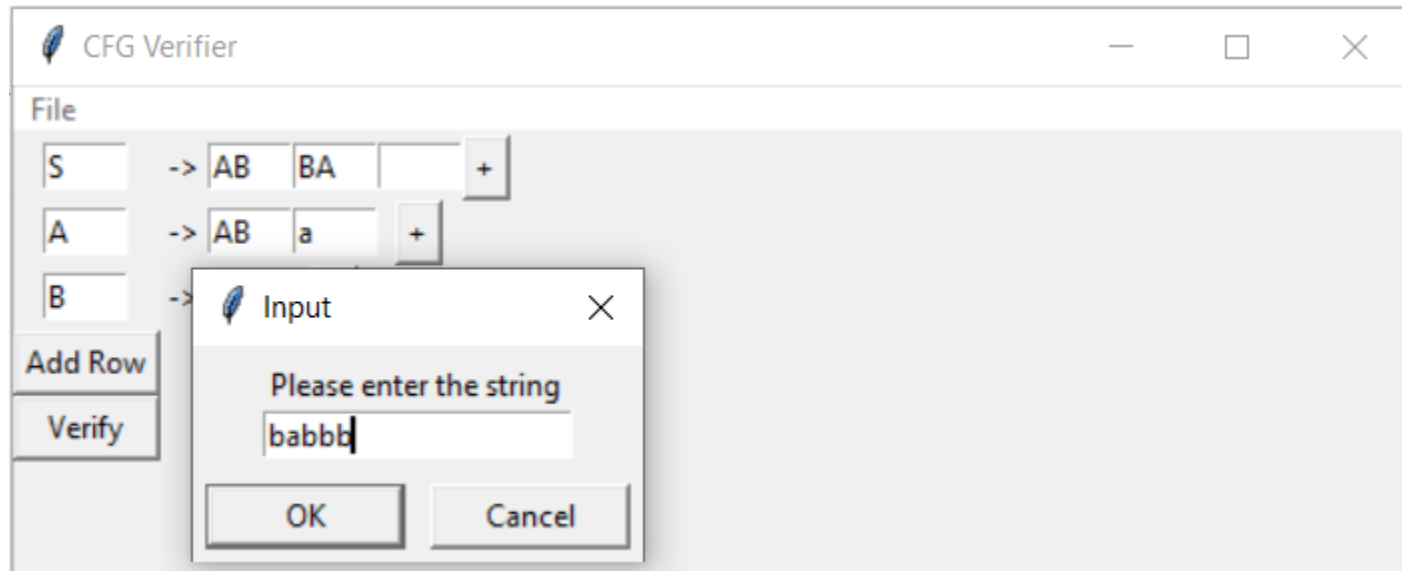
The image shows a window titled "CFG Verifier" with a menu bar containing "File". Below the menu bar, there is a table for defining production rules. The table has three columns: a variable, a right arrow, and a sequence of fields separated by plus signs. The first row shows S -> AB BA [empty] +. The second row shows A -> AB a +. The third row shows B -> b +. Below the table are two buttons: "Add Row" and "Verify".

Variable	Production Rule
S	-> AB BA [empty] +
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:

