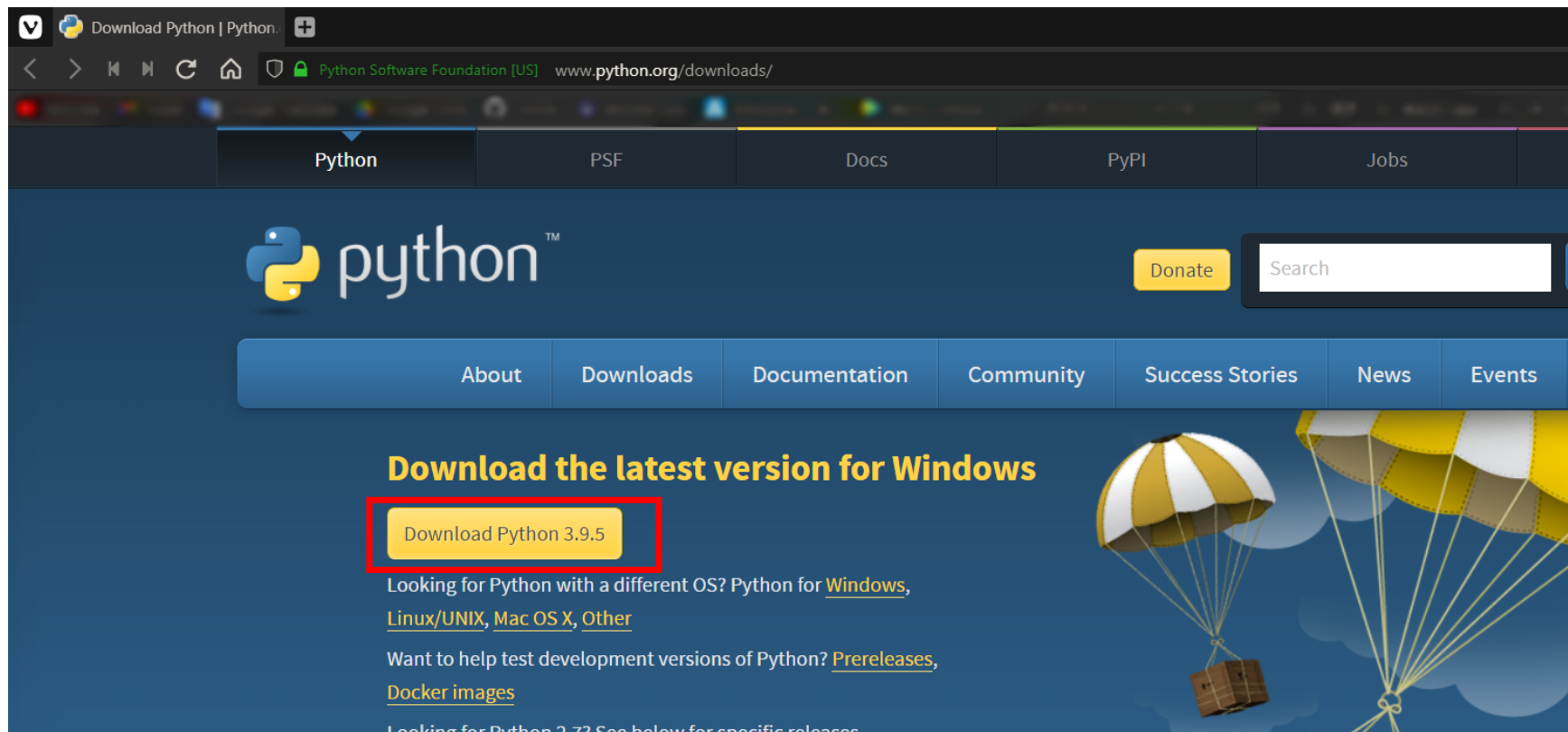


CFG-VERIFIER

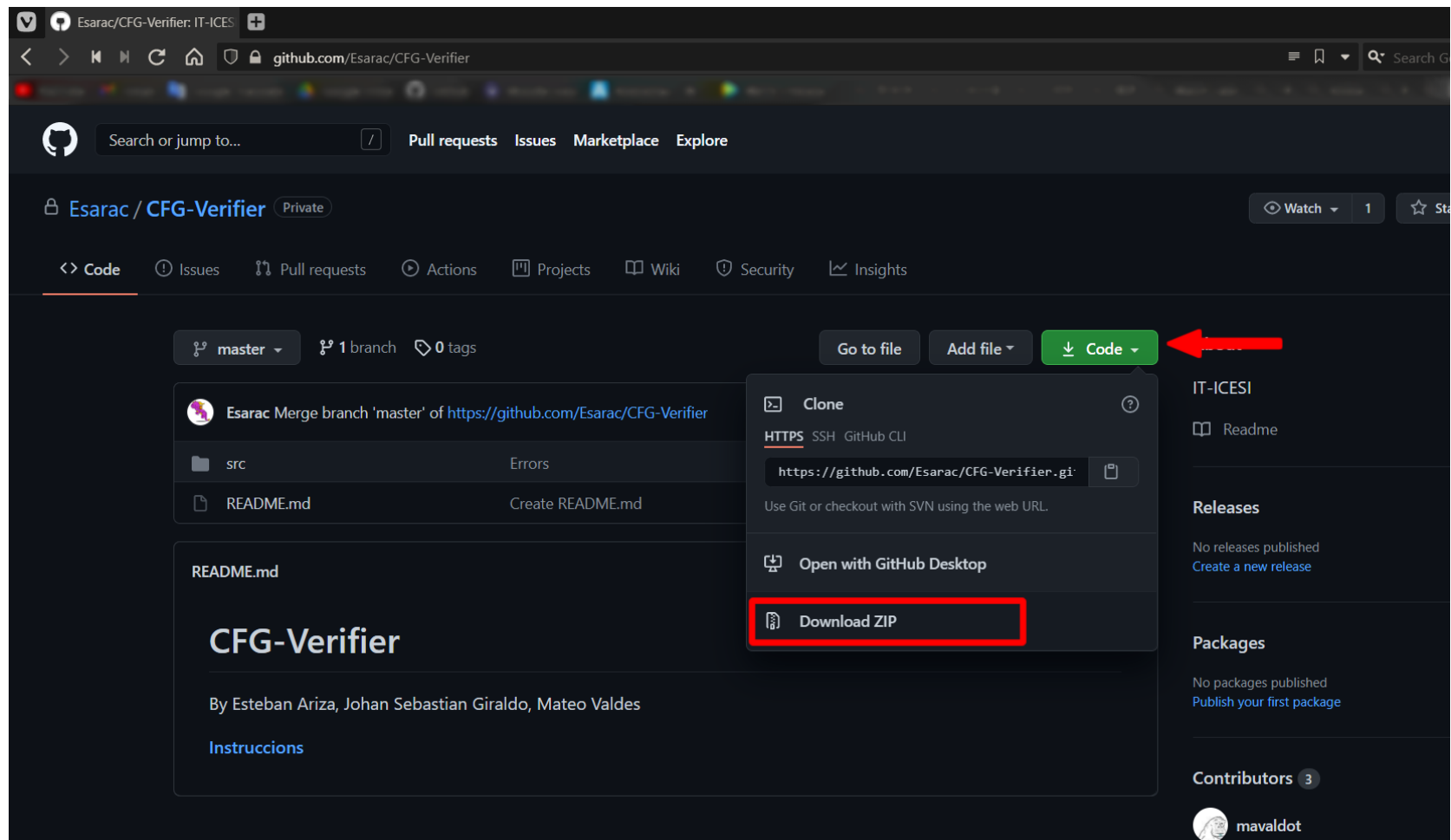
By Esteban Ariza, Johan Sebastian Giraldo, Mateo Valdes

Step 0 (Optional): Install Python [here](#) if you do not have it and you want to compile the program from the source code.

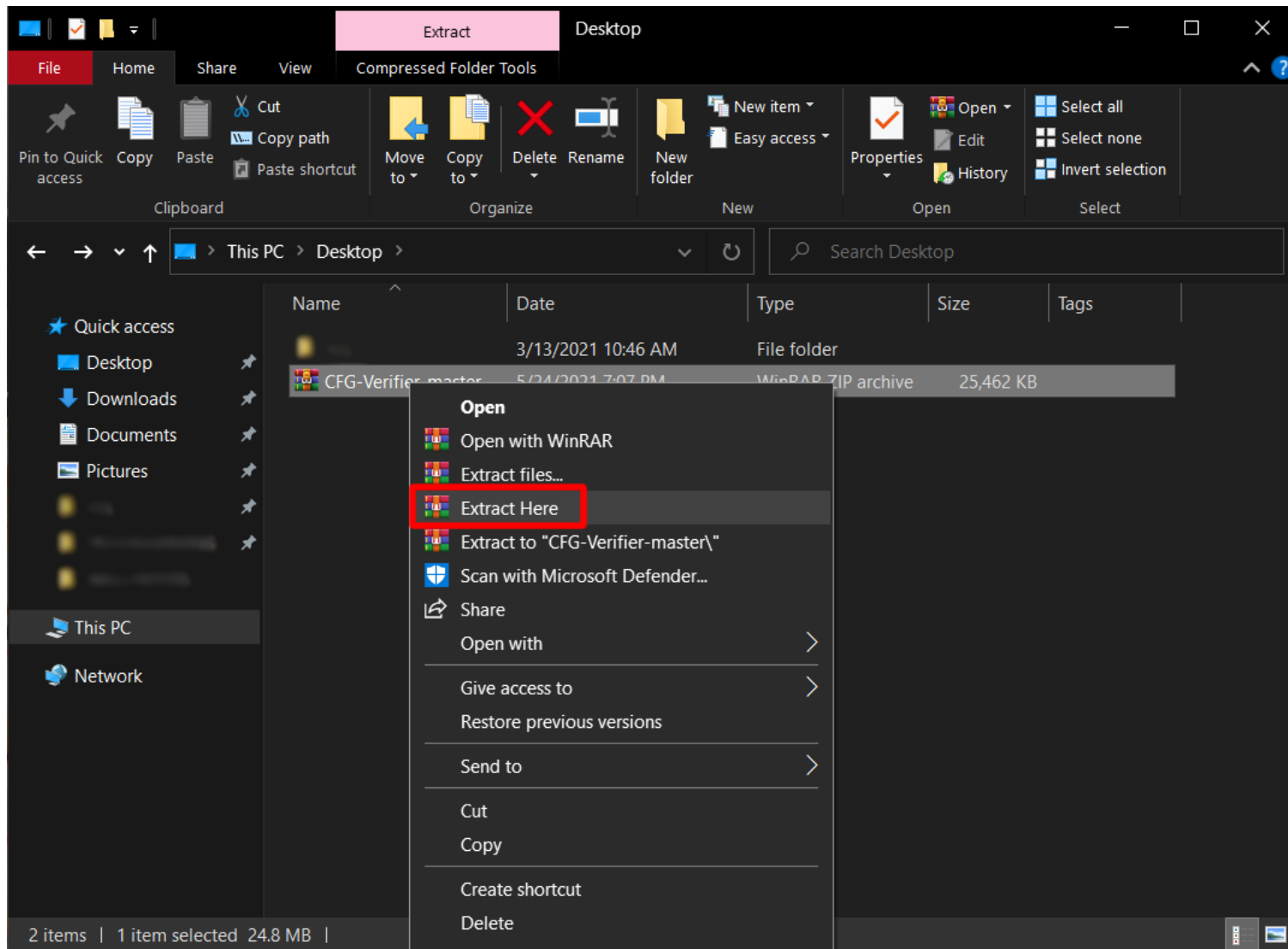
Note: You will find the source code in the folder “src”.



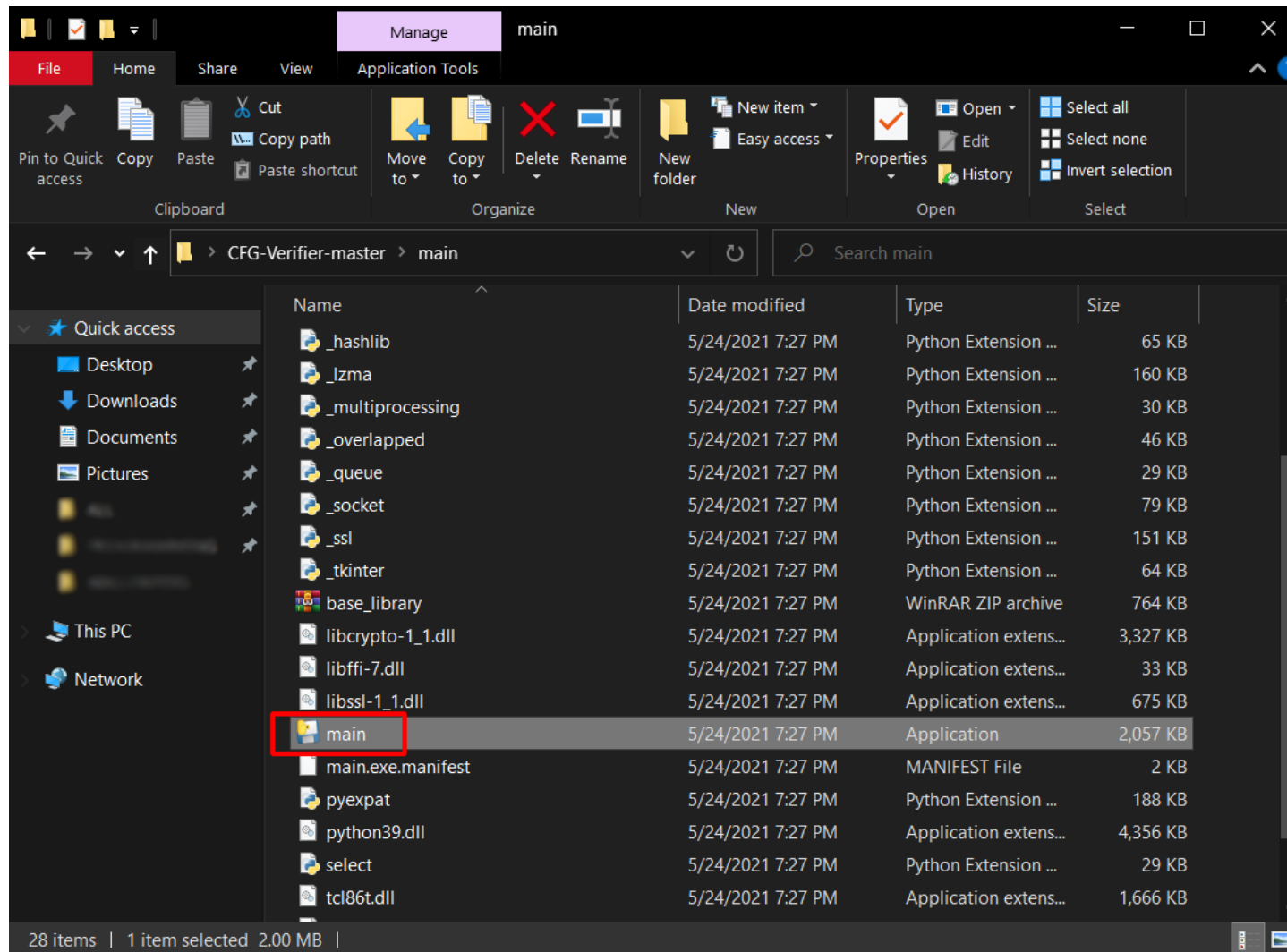
Step 1: Go to <https://github.com/Esarac/CFG-Verifier> and click on Code → Download ZIP.



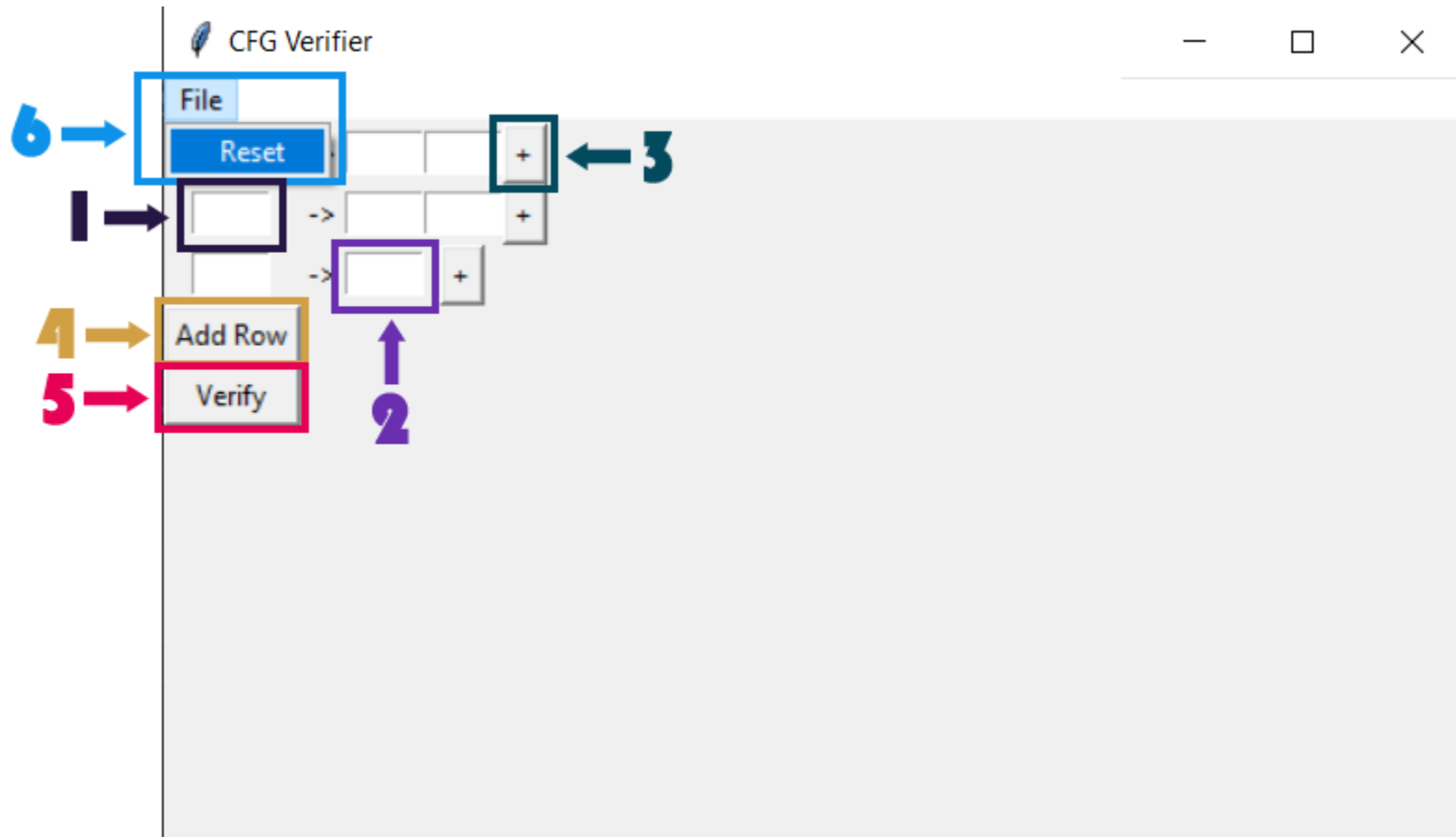
Step 2: Extract the ZIP file and follow this path in the extracted folder: “CFG-Verifier-master/main”.



Step 3: In the "main" folder, open the file called "main.exe"



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 standard window controls (minimize, maximize, close). Below the title bar is a "File" menu. The main area contains a row of input fields for a production rule. The first field contains the uppercase letter "S". To its right is a separator "->". The second field is empty. To the right of the second field is a "+" button. Below the input fields 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 λ , to enter λ 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).



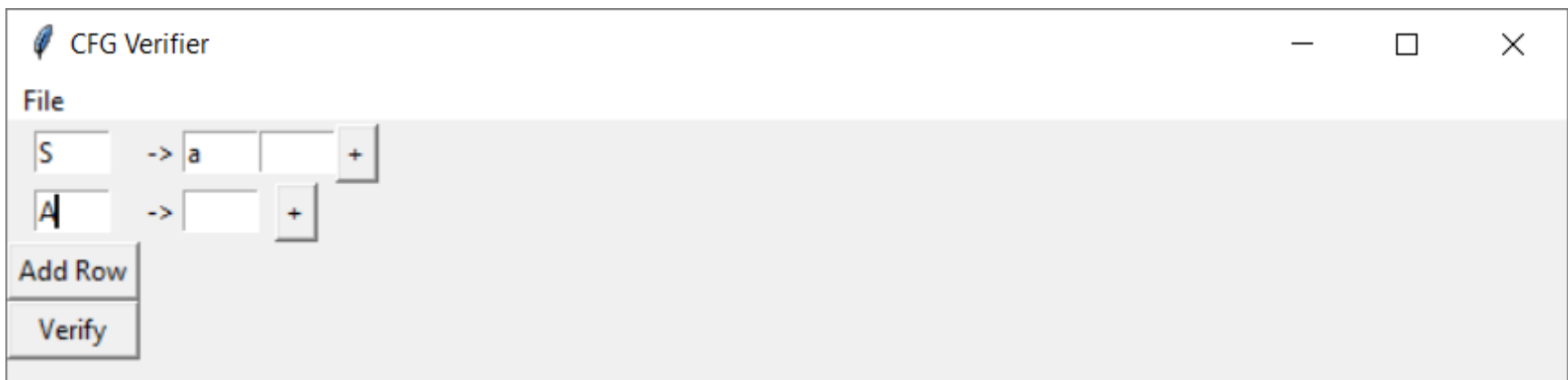
The image shows the same "CFG Verifier" window. In this state, the first input field contains the uppercase letter "S". The separator "->" is present. The second input field now contains the lowercase letter "a". The "+" button remains to the right of the second field. The "Add Row" and "Verify" buttons are still at the bottom.

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



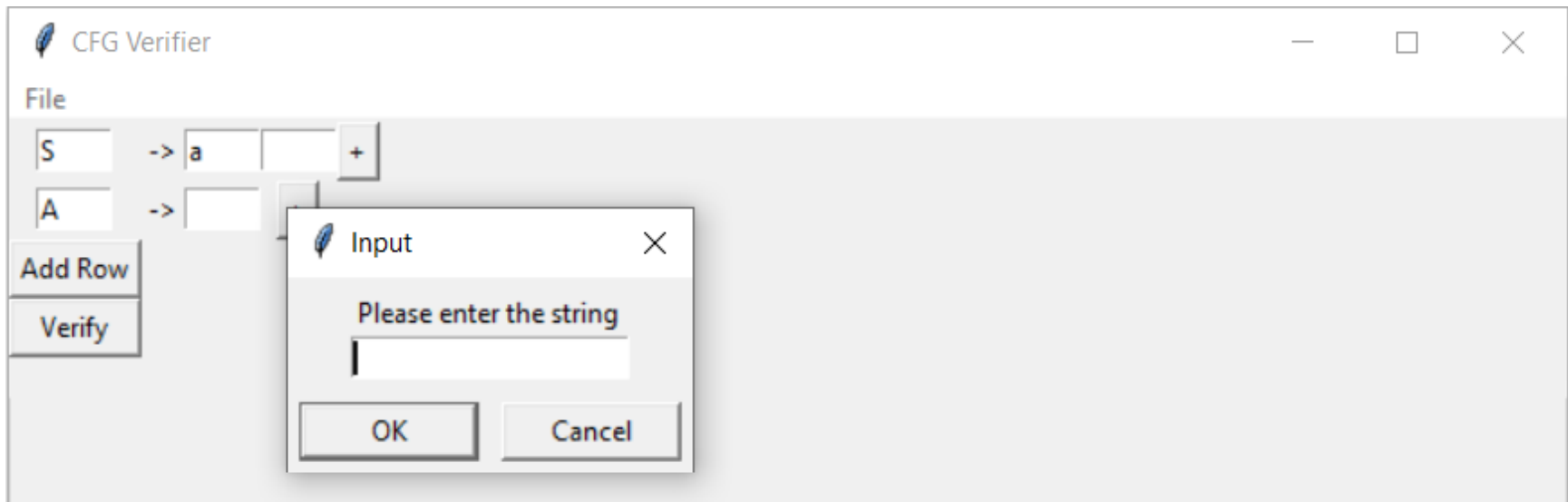
The image shows a window titled "CFG Verifier" with a feather icon. Below the title bar is a "File" label. The main area contains a single production rule field with the text "S -> a" followed by an empty box and a "+" button. Below this field are two buttons: "Add Row" and "Verify".

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

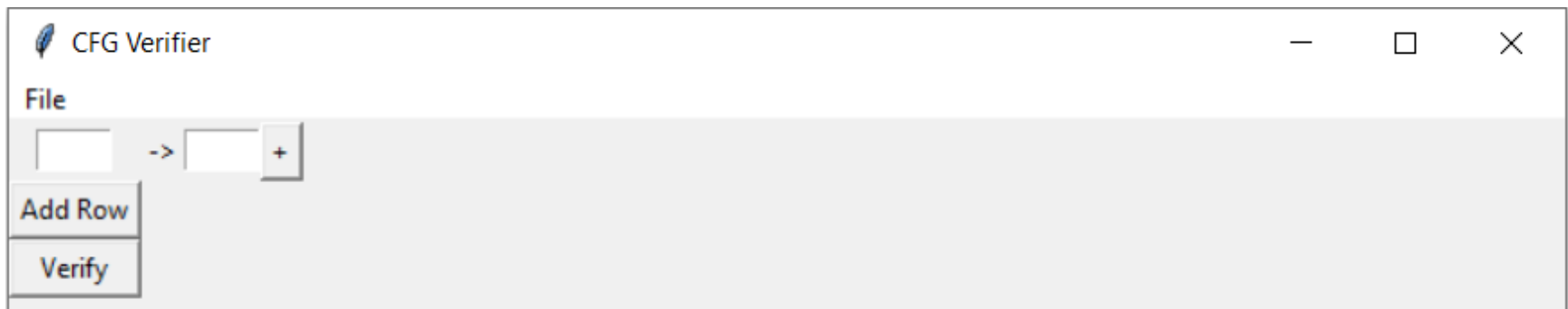


The image shows the same "CFG Verifier" window, but now it contains two production rule fields. The first field is "S -> a" followed by an empty box and a "+" button. The second field is "A" followed by "->" and an empty box, with a "+" button below it. The "Add Row" and "Verify" buttons are still present 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:

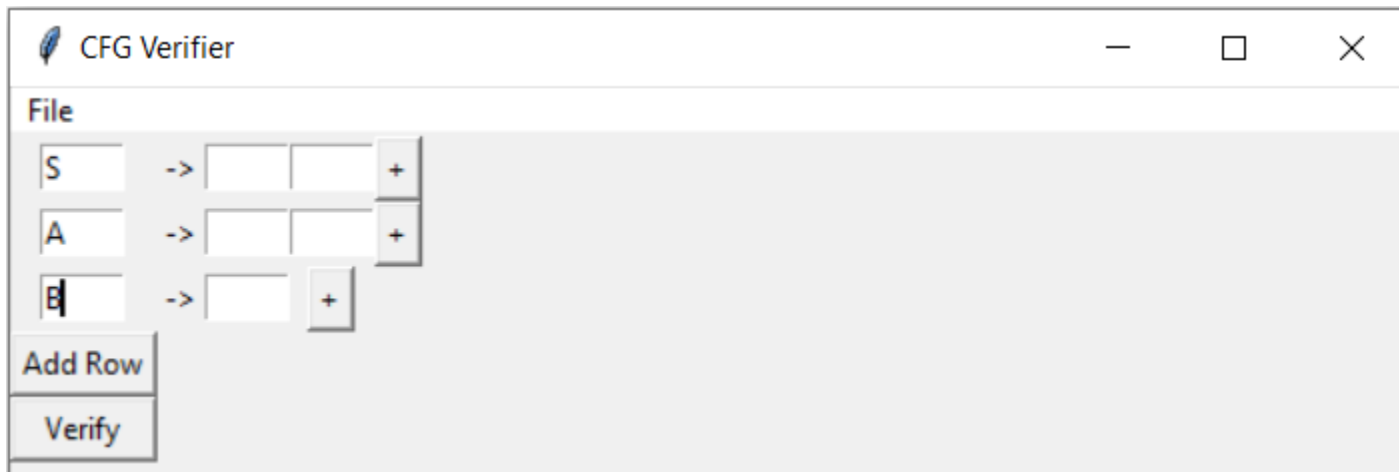


How to use the program:

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 :

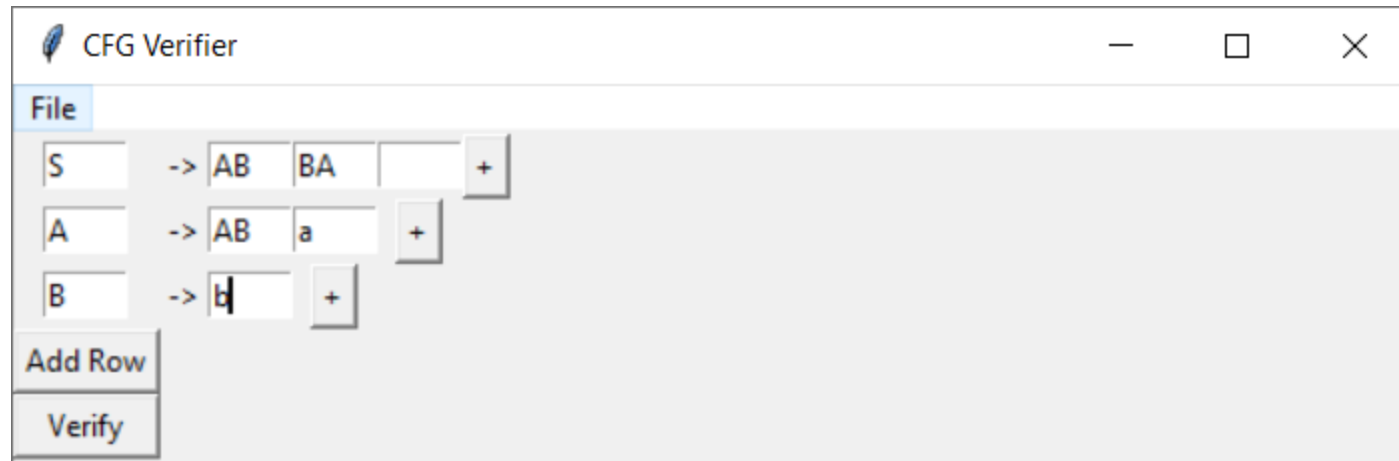


The screenshot shows a window titled "CFG Verifier" with a "File" menu. The main area contains a table for defining grammar rules. The table has three rows, each representing a variable and its productions. The first row is for variable S , the second for A , and the third for B . Each row has a "Variable field" (a text box containing the variable name), a "->" symbol, and a list of productions separated by "+" signs. The productions for S are empty boxes, for A are empty boxes, and for B is an empty box. Below the table are two buttons: "Add Row" and "Verify".

Variable	Productions
<input type="text" value="S"/>	-> <input type="text"/> <input type="text"/> + <input type="text"/>
<input type="text" value="A"/>	-> <input type="text"/> <input type="text"/> + <input type="text"/>
<input type="text" value="B"/>	-> <input type="text"/> + <input type="text"/>

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

Note: Remember, to introduce λ add a field and let it empty.

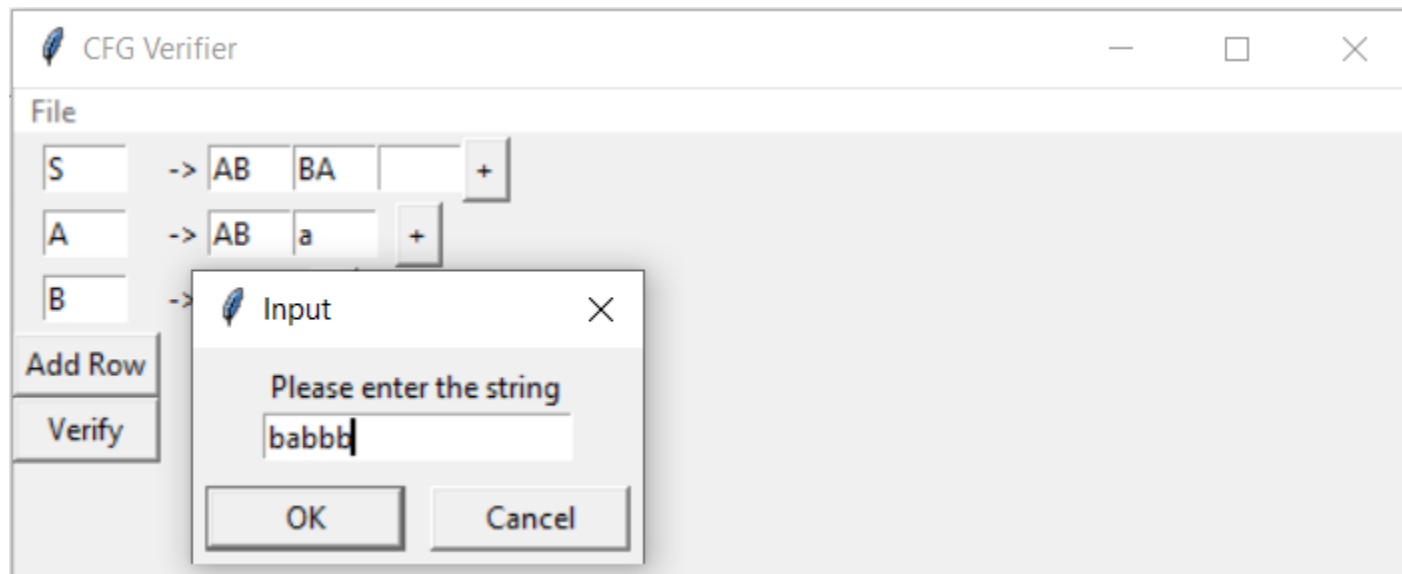


The image shows a window titled "CFG Verifier" with a menu bar containing "File". Below the menu bar, there is a table for defining production rules. The table has three rows, each representing a variable and its possible productions. The first row is for variable 'S', with productions 'AB' and 'BA'. The second row is for variable 'A', with productions 'AB' and 'a'. The third row is for variable 'B', with a production 'b'. Each row has a '+' button to the right of the production fields. Below the table, there are two buttons: "Add Row" and "Verify".

Variable	Production 1	Production 2	...
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:

