



# IBERO SOLVER 2X2X2 LBL GUI

VERSION 1.X.X

USER'S MANUAL

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# 1 Introduction

Ibero Solver 2x2x2 LBL GUI is a graphic user interface for Ibero Solver 2x2x2 LBL, which gives you the movements to solve a 2x2x2 cube, using the LBL (*Layer-By-Layer*) method. This GUI can be used on Windows, and it is designed for an easier utilization of the program (type data, read results...).

# 2 Download and installation

The program is written in Visual Basic, so running it will not be problematic; however, the kernel of the project is Ibero Solver 2x2x2 LBL, a console application written in Fortran. So before using the program, it is necessary to install a compiler that allows the computer to understand Fortran applications. We used gfortran, a compiler from the GNU project.

In the GCC Wiki (<http://gcc.gnu.org/wiki/GFortranBinaries>) there are many versions for Windows; the most easy-to-use (a typical installer) is this one:

<http://users.humboldt.edu/finneyb/gfortran-windows-20130301.exe>

After downloading it, run the file. A window like this will appear:

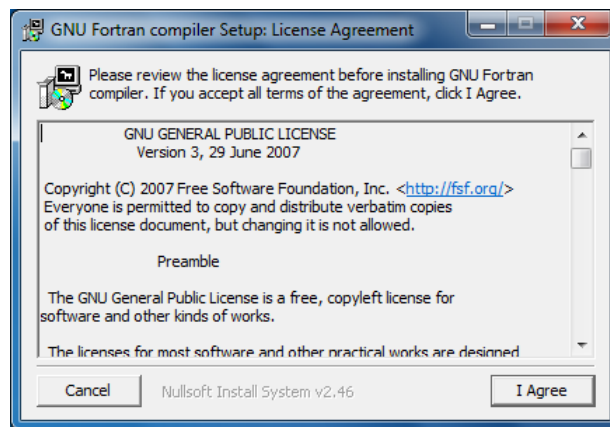


Figure 1: Window of the gfortran compiler installer.

And install it.

To install the program, download from [www.iberorubik.com](http://www.iberorubik.com) the compressed file of the project. Once it is downloaded, unzip it in a folder of your choice (Desktop, for instance).

**WARNING:** The name of the main folder can be changed, but its content (subfolders and EXE files) must stay in that folder. If any subfolder or EXE file is deleted, the program will not work.

### 3 Use

When you run “Ibero Solver 2x2x2 LBL GUI.exe”, you can see the window of Figure 2, which contains three buttons of the three steps of the process.

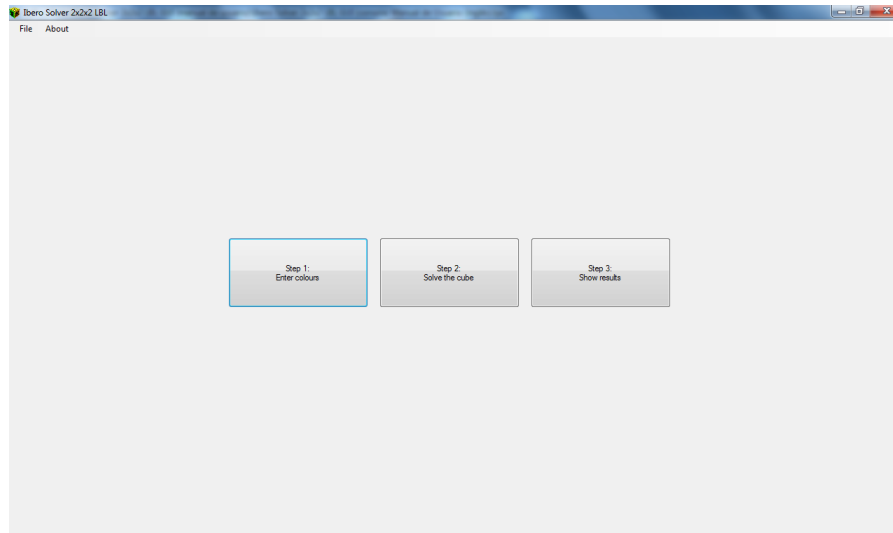


Figure 2: Main window of the program.

First of all, press “Step 1: Enter colours”; when finished, press “Step 2: Solve the cube”, and finally “Step 3: Show results”.

#### 3.1 Enter colours

When you press the Step 1 button, the window of Figure 3 will appear:

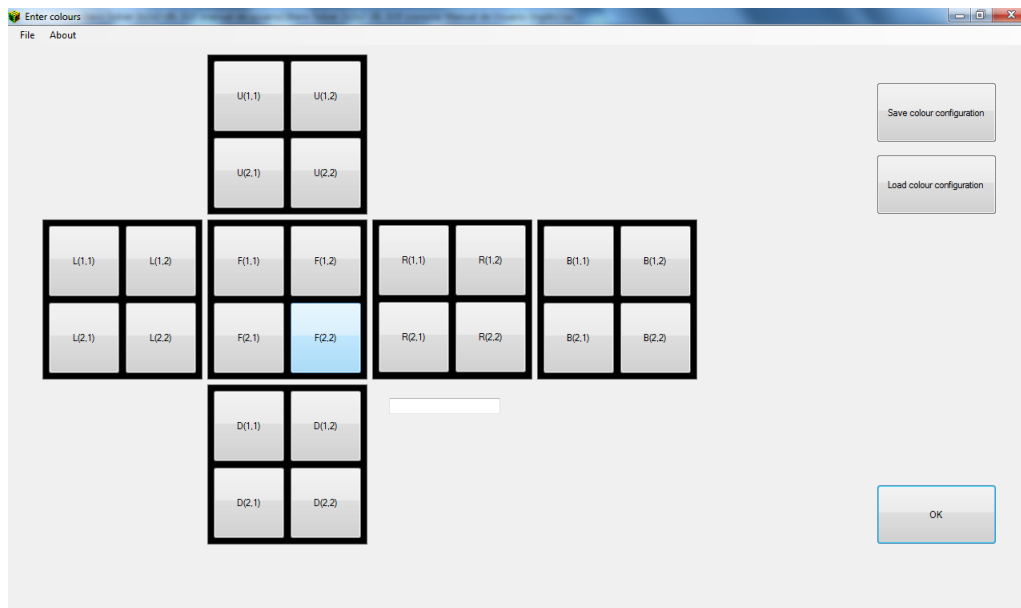


Figure 3: Window of Step 1.

This window shows an unfolded 2x2x2 cube, with four stickers per face, named as a matrix:  $U(1,1)$ ,  $U(1,2)$ ,  $U(2,1)$ ... To enter the colours of the cube:

1. Click on one sticker. Now you can see a box with different colours (Figure 4).
2. Choose the colour you like; the sticker you selected before will change its colour.
3. Repeat the process with every sticker of the cube.

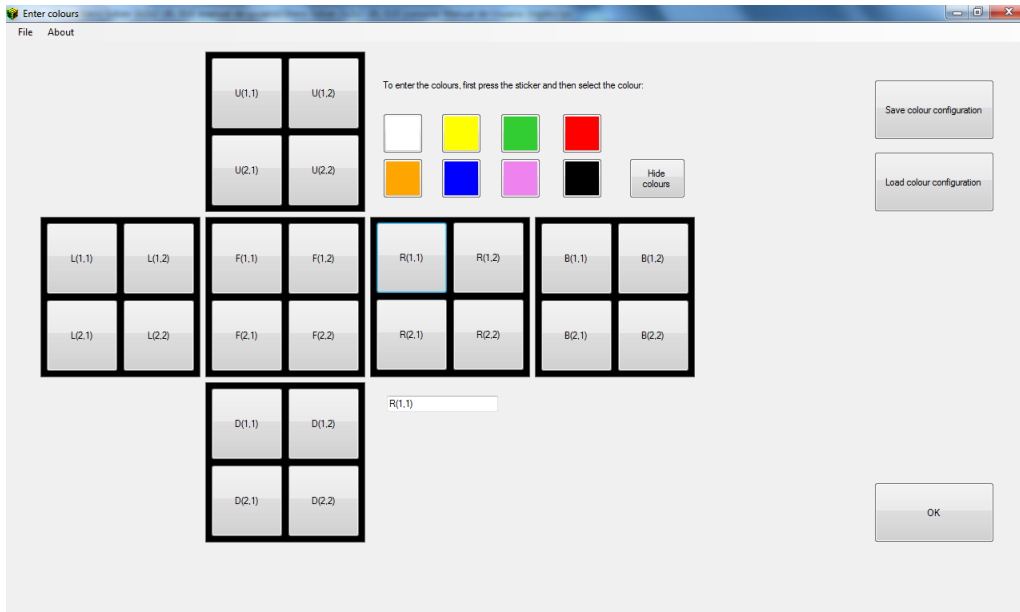


Figure 4: Window of Step 1 showing the colour menu.

At the beginning, it may be hard to visualize the unfolded cube, and to introduce the information of the top face and the bottom face. This is an example:

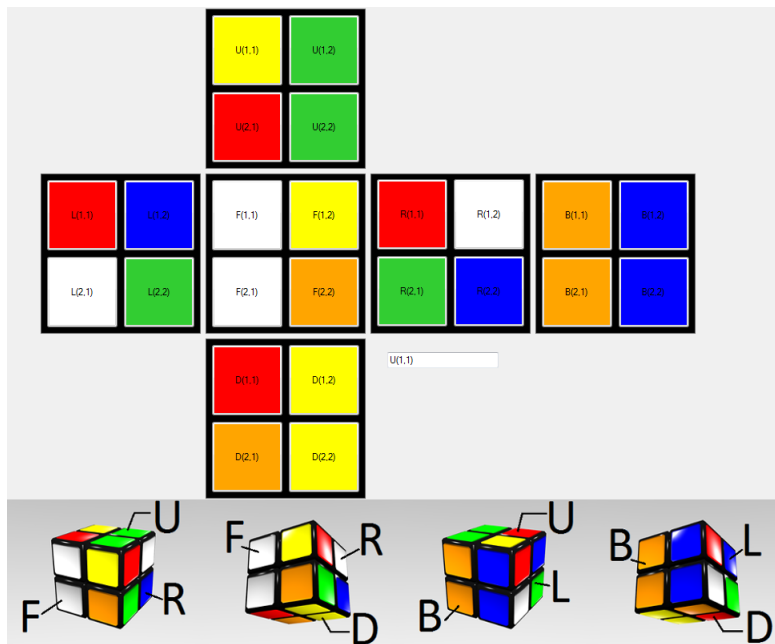


Figure 5: Example of how to enter the colours in the program.

## 3.2 Solve the cube

When Step 2 button is pressed, Ibero Solver 2x2x2 LBL runs. It is written in Fortran; it reads the data and calculates the movements necessary to solve the cube. In this step, errors during execution may occur; in that case, the program will show a message of the error, similar to 6:

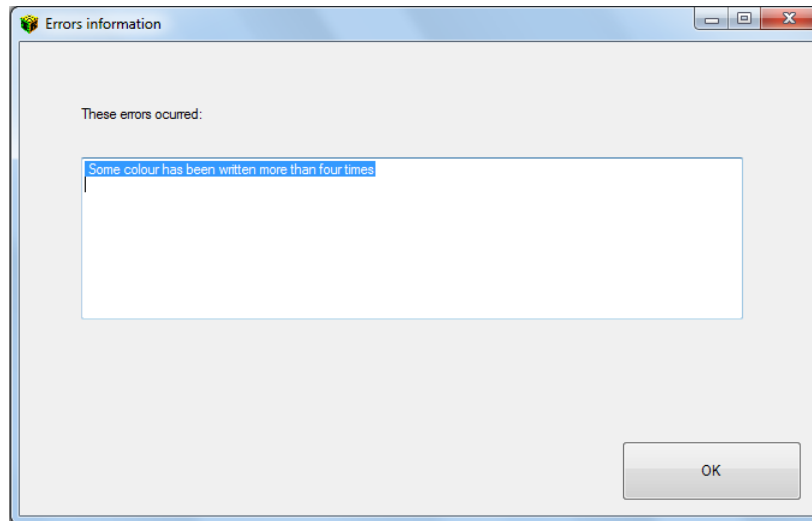


Figure 6: Example of an error during the resolution.

Errors that can happen:

- The user has written a colour more then four times.
- Wrong opening of the faces files.
- Wrong opening of the results files.
- Wrong allocation for vectors and matrices.

## 3.3 Show results

If you press the Step 3 button, it opens the window of Figure 7, where you can read all the movements that solve the cube. By pressing “Show the movements of each step”, the movements are divided into four text boxes.

- Step 0: It contains the single turn that places the most solved face on top (if necessary).
- Step 1: It contains the movements that complete the top layer.
- Step 2: It includes the  $180^\circ$  turn to place the unsolved layer on top, and the movements that place the yellow stickers in the upper face.
- Step 3: These movements permutate the pieces with yellow stickers and finish the cube.





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3. Charge for this distribution what they want (or not)
4. Modify the program
5. Distribute modified versions by themselves as binary files, although including the source code.

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- Say that the program does not have any warranty
- Give a copy of GPL with the program

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In the program you can find information about the license and the copyright (Figure 9) in “About” → “License”, and a copy of the General Public License in “help\_files” folder (you can see it by pressing “About” → “See User’s Manual”).

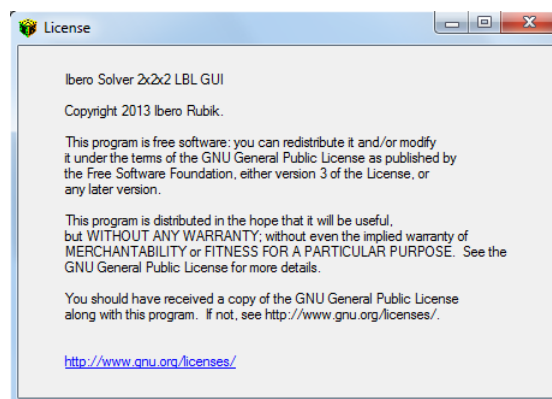


Figure 9: Window with information about the license.

## 5 FAQs

- **Why Fortran, and not another programming language?**

Fortran is still using a lot in engineering. Also, it is a very effective language to handle matrices, and quite fast (runtime of this program is below 50 ms). However, we are using other languages too, such as Visual Basic for GUIs.

- **Why do I need to install a compiler in order to run the program?**

This happens specially in Windows. Although Fortran is very effective in its field, is not massively used, so Windows does not “understand” it by default. So the compiler allows to create the binaries in Windows from the source code, and to run them.

- **I have accidentally deleted one of the folders of the program.**

The program will crash when executed. We recommend you to download again the program from [www.iberorubik.com](http://www.iberorubik.com).

- **I have accidentally deleted a file.**

If it is a file from “results” folder or “program\_files” folder, do not worry; they will be created again when the program is run. If it is from “faces” folder, the program will not work. You can create it manually, call it the same way as the rest of the files of that folder, and write the colours in it. If it is from another folder, we recommend you to download again the program from [www.iberorubik.com](http://www.iberorubik.com).

- **How can I use this program according to its license?**

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## 6 Links

[www.iberorubik.com](http://www.iberorubik.com)

<http://gcc.gnu.org/wiki/GFortranBinaries>

<http://users.humboldt.edu/finneyb/gfortran-windows-20130301.exe>

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