

RUBIK'S CUBE SIMULATOR

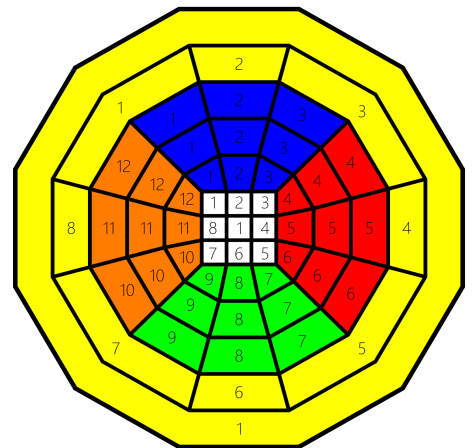
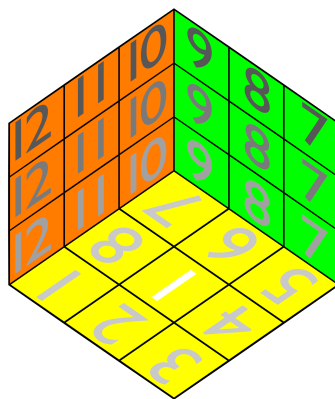
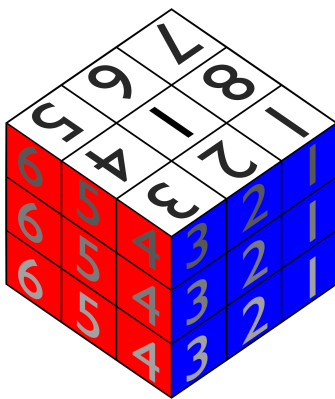
ICOSICON DOCUMENTATION



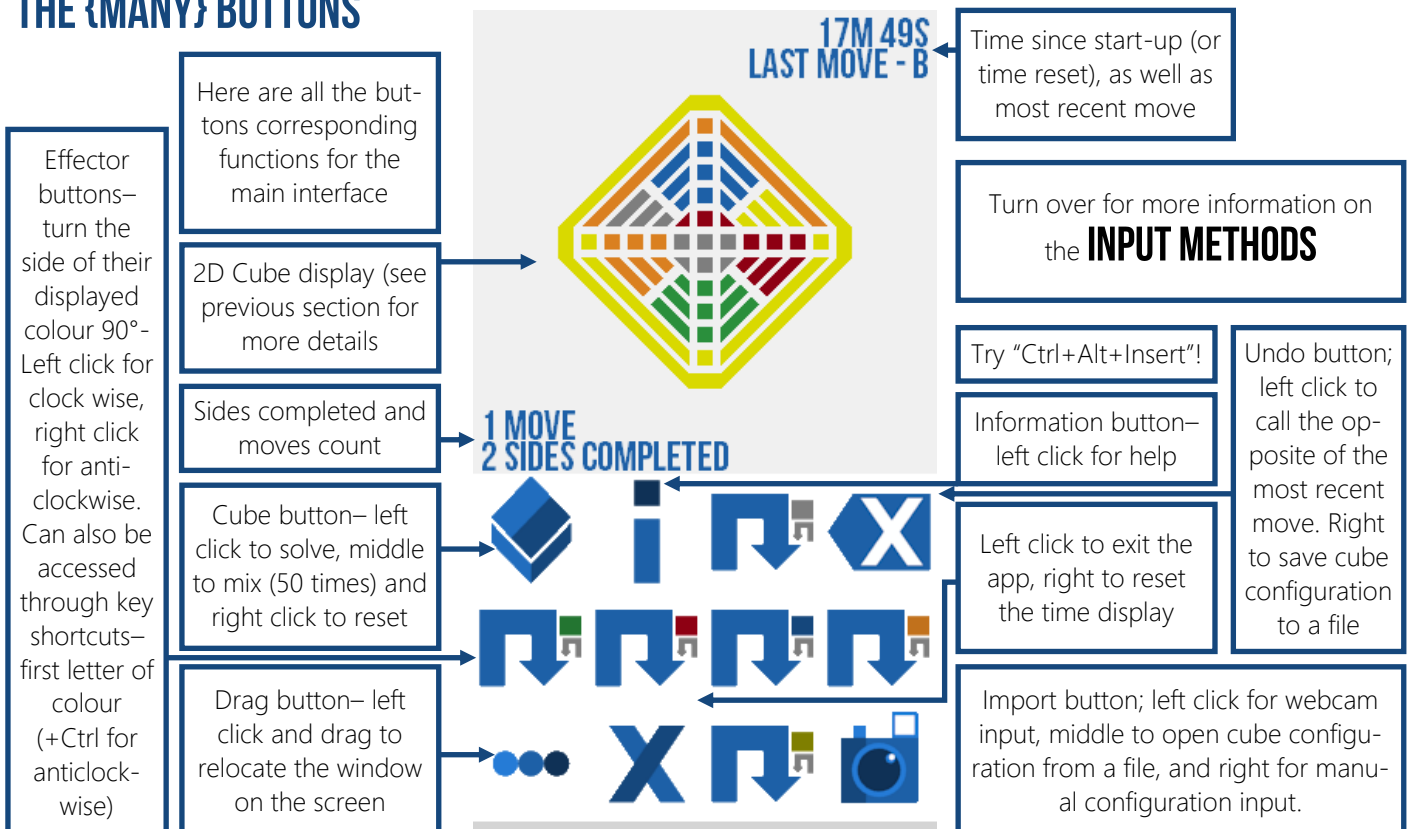
Welcome to the official documentation for the ICOSICON Rubik's Cube Simulator; compiled as a windows-based executable, featuring 32 & 64 bit versions. You'll need to navigate your way to the folder labelled with the specifications of your system, and run the .exe inside. After a brief loading screen, you will be presented with the application itself. The interface may at first seem un-intuitive and intimidating, so hopefully this documentation can help you to use the program with ease

THE DISPLAY

Perhaps one of the most confusing elements of the GUI is the cube display itself. The cube needed to be displayed in two dimensions– but we disliked the conventional grid method. Instead, we created a new representation of the cube; designed to show not only individual colours, but also the mechanical relationships between them, which allow a human to manipulate a physical cube. The display is designed to enable the user to quickly extrapolate the two dimensional data onto an imaginary 3D cube. The fundamental system is a series of rings that encompass the entire cube. These 7 layers of rings, from the central white to central yellow cubies, are then placed onto the 2D display in the order in which they occur on the cube. These diagrams illustrate the process of turning the 3D cube to the 2D diagram.



THE {MANY} BUTTONS



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CUBE INPUT

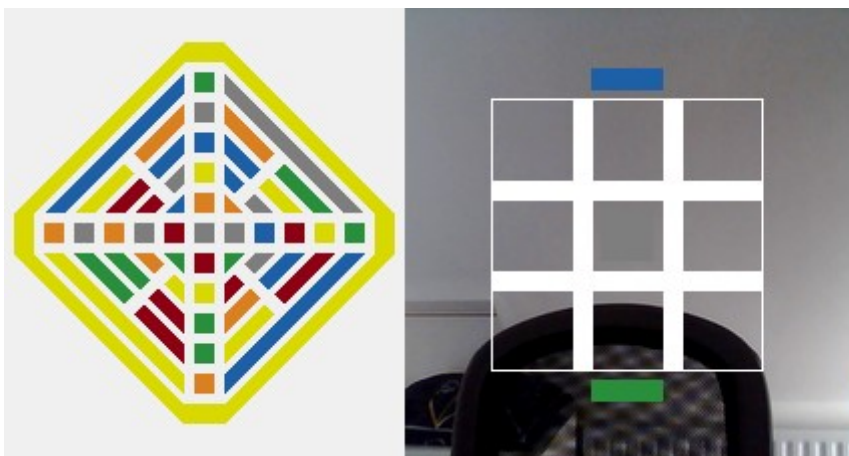


The webcam and manual input windows allow the user to scan a physical Rubik's cube into the editor. The windows can be accessed by left (webcam input) and right (manual input) clicking on the input button in the bottom right corner of the editor.

Before we look at the specific windows, we need to understand how they generally work. Both configure the cube not based on the cubies, but rather the individual grid squares of the cube. Therefore, it is important that you input the exact colours, as the input will not be accepted if the amount of each colour is imbalanced (9 per colour).

WEBCAM INPUT

As stated by a warning which pops up on the initialization of the window, webcam input requires an installed webcam with functional drivers, as well as the lighting on the cube to be undistorted vibrant white, as the program uses specific hues to



recognise the colours of the cubies. The GUI itself comprises of close and move buttons on the right, above capture button in the button right. In the centre lies the webcam display, under the guide line overlay. The live display is located on the left. To capture a side of your cube, simply line up the cube so that the top and bottom faces match the displayed colours, and the centre colour matches that of the central grid.

This grid piece cannot be

changed, as the mechanics of the cube do not allow this— meaning that the piece can be used as a reference for the face. The cube does not need to be perfectly lined up, as the program only samples one pixel from the centre of each grid square— but once you are happy, left click the accept button to capture the face and move onto the next. The program will request the faces in order W,Y,B,G,R,O. You can cycle through these as many or as few times as you like, and as you go, the display on the right will be updated to show you the detected colours. If the program has failed to correctly identify a colour, you will unfortunately need to cycle through the rest of the colours in order to re-scan that face. Once you are ready to load the scanned cube into the editor, right click on the accept button. If the quantities of the coloured squares are balanced, the cube will be loaded and the webcam window will close; if not, no notable change will occur. Press cancel to cancel at any time.

MANUAL INPUT

The manual input window is a more tedious alternative to the webcam input, for those without a webcam, or who do not own a cube with the standard white, yellow, blue, green, red, and orange face colours. The principle is the same as for the webcam input window, although the squares are altered by clicking each grid space to cycle through the colours. The display includes the top and bottom reference squares. Continue to the next side by left clicking the accept button (the same colour cycles as the webcam apply), and load the configured cube into the editor by right clicking the accept button; again the cube will only be loaded if the colour numbers are balanced. You can cancel at any time by pressing left clicking the cancel button.



THIS APPLICATION WAS BUILT BY **TOM WRIGHT** ON BEHALF OF **ICOSICON**
PLEASE REPORT ANY BUGS TO **ICOSICON@OUTLOOK.COM**