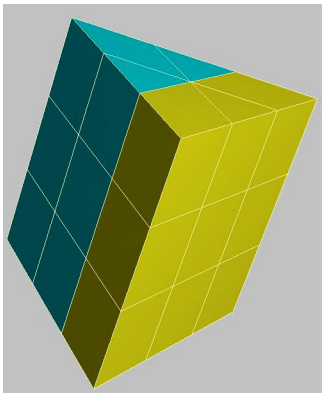
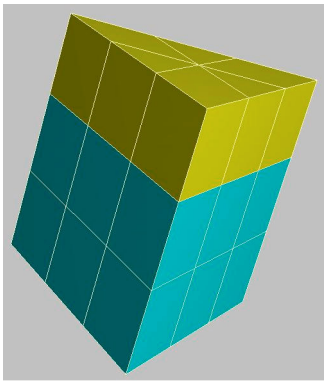
Virtual True Rubik Triangular Prism

by Eduard Baumann





Rotational puzzles can be played virtually in a computer programm. If real versions of such a rotational puzzle are available on the marketplace then there is no doubt that they are superior to any virtual version.

It is possible that very obvious generalisations of real rotational puzzles are very hard to realize. The necessary mechanics can be very difficult or impossible.

In such cases a virtual programm may be more convincing. Lets look at the Rhombododecahedron which still has a small number of faces (12). The illustrations which show the rotated parts (slices) in another color.

Only 180° turns are allowed. One element of this slice forms a hook so a mechanical realisation is certainly difficult.

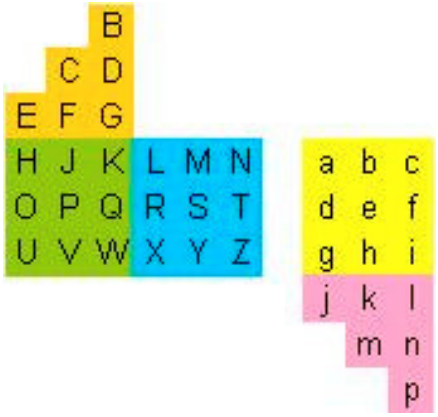
A programmed rotational puzzle can have the very big advantage of easy undo's and the automatic execution of compactly written sequences. It is also possible to retain the whole history of all movements done on the puzzle.

I recommend do this programming in a simple Excel worksheet. Use the following guidelines in doing so.

Principles

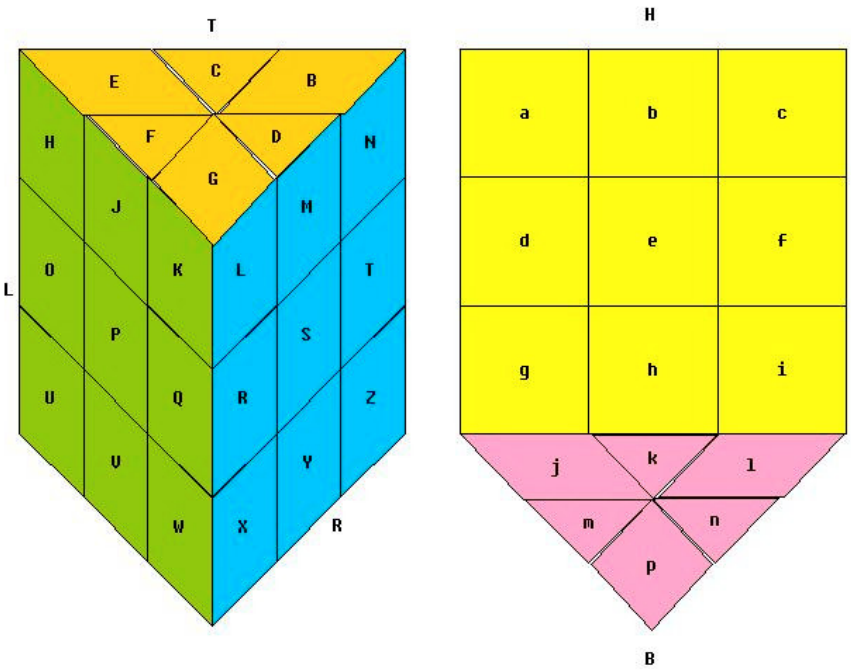
(a) record simple cell circulations
(b) give such recordings one letter names
(c) have one macro which calls all such recordings following a sequence given in form of a letter string in the selected cell
(d) the saving of positions are simple copy/pastes and ‘undo’ can also be prepared by copy/paste.

The forced cartesian arrangement of the cells in the Excelsheet shows as follows (shown are at left the front part and at right the back part seen from inside).



A better view is offered by a “showing” macro which transfers color and value of cells to the associated drawing elements. In order to not loose interesting aspects it is clear that all parts must be distinguishable. This can be obtained giving a individual letter for each label.

The sight with drawing elements is as follows



The following 90° clockwise trnings are defined: R for the right slice, B for the bottom slice, L for the left slice, H for the slice behind and T for the top slice.

Notation:

L is the inverse of L. The elements in round brackets change place in a cycle. [RL] is the commutator of R and L and means RLRL.

The commutator [LR] gives (KGL WXp) (HEa BNc) (QR DM FJ) in the cycle notation for corner and edge elements. This can be used to arrange edges in a first phase of a strategy whre effects on corners can be ignored.

The sequence for corners is then simply 3 times [LR].

The sequence Q=RBRLRLB gives a 2 cycle for edges (DM Tf) with corner effects. Executed two times it gives turning of edges on place DM+ Tf+

With all this sequences you can apply the following strategy

(a) place all edge elements with commutators like [LR]
(b) orient the edge elements with QQ
(c) place the corners with sequences like [LR]^3
(d) orient corners with the Rubik's cube sequence RBRLBLTLBLRBRT

An Excelsheet with the True Rubik Rhombododecahedron is available at baumann@mcnet.ch.