Spanish Calendar Cube Design

Designers	Alfonso Pérez Arnal	Walter Randelshofer
WebSites	▸ El Cubo de Rubik de la A a la Z	http://www.randelshofer.ch/

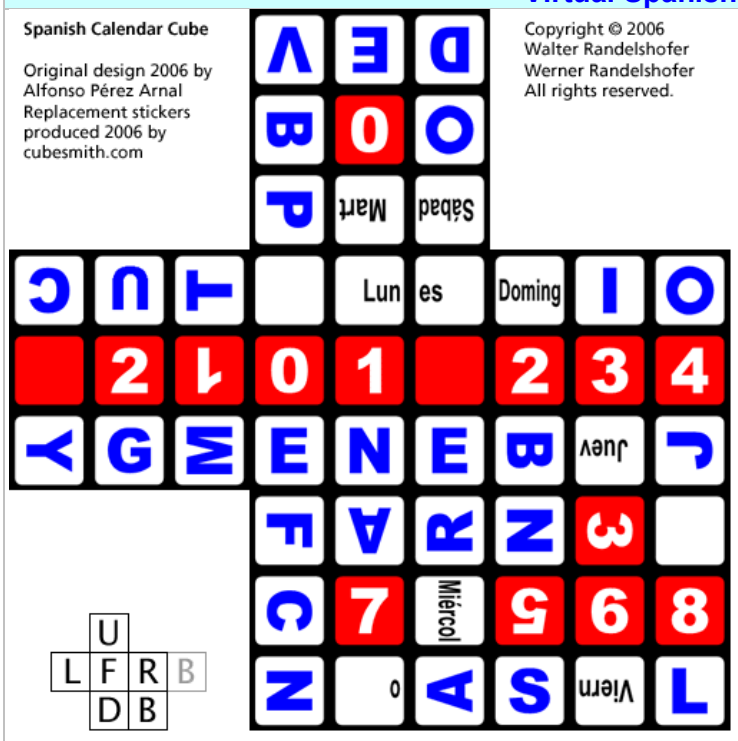
Introduction

The Magic Cube was invented in 1974 by Hungarian-born **Ernő Rubik** and was later called the **Rubik's Cube**. An English calendar cube was subsequently invented and calendar cubes have been designed in many other languages since then. A **Spanish Calendar Cube** is a 3x3x3 **Rubik's Cube** used as a **Spanish Calendar**. There are **Virtual Cubes** that can be *virtually* rotated and twisted on a computer screen and **Real Cubes** that can only be *physically* rotated and twisted by hand. A **Texture** is laid down on a Virtual Cube whereas real **Stickers** are stuck down on a Real Cube. A Spanish Calendar Cube is designed by placing letters, numerals and words on a texture which is then laid down on a Virtual Cube (see http://www.randelshofer.ch/).

Spanish Language – Useful Links	
http://en.wikipedia.org/wiki/Spanish_language	http://www.spanishlanguageguide.com/

The date of the day can be displayed on a *selected* Cube Face by rotating and twisting some parts of the Cube. When this has been achieved, we say that the Cube has been *solved*. The following example shows the *initial* state of the Cube (Monday, January 01).

Virtual Spanish Calendar Cube



Spanish Calendar Cube Texture

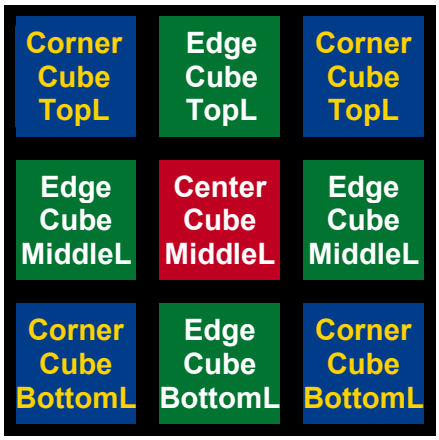
Virtual Spanish Calendar Cube

Design Particularities

The sum of left- and right-hand letters of the 12 Spanish abbreviated months equals 20 and the number of center letters equals 9, making the design difficulty level of this cube the greatest up to now for a calendar cube. The design of the Spanish calendar cube has been solved by Alfonso Pérez Arnal and introduced in the Spanish forum ▸ El Cubo de Rubik de la A a la Z. This is really a great achievement because calendar cubes in many other languages have been based on this design since. This is why design details are given here, just to show how great solutions can be found.

Terminology

In a 3x3x3 **Rubik's Cube**, there are 8 *Corner Cubes*, 12 *Edge Cubes*, 6 *Center Cubes* and 6 *Cube Faces*. There are also 4 Corner Cube faces, 4 Edge Cube faces and 1 Center Cube face *per Cube Face*, as shown below.



There are 1 face per Center Cube, 2 faces per Edge Cube and 3 faces per Corner Cube.

There are also 3 horizontal *Layers* called *Top*, *Middle* and *Bottom Layers*.

Cube Lexicon		
English	**Français**	**Deutsch**
Cube	Cube	Würfel
cubie, cube	cube, petit cube	Würfelteil, Teil des Würfels
face	face	Seite, Seitenfläche
front face	face avant	vordere Seite, vorne
back face	face arrière	hintere Seite, hinten
left face	face gauche	linke Seite, links
right face	face droite	rechte Seite, rechts
top face	face supérieure	obere Seite, oben
bottom face	face inférieure	untere Seite, unten
sticker	étiquette (autocollante), plaquette	Kleber, Farbkleber
tile	tuile, plaquette	Plättchen, Farbplättchen
center cube, center	cube central, centre	Mittelwürfel, Mittelstein, Mitte
edge cube, edge	cube-arête, arête	Kantenwürfel, Kantenstein, Kante
corner cube, corner	cube de coin, coin	Eckwürfel, Eckstein, Ecke
layer	couronne	Schicht, Scheibe
top layer	couronne supérieure	obere Schicht, obere Scheibe
middle layer	couronne intermédiaire	mittlere Schicht, mittlere Scheibe, Mittelschicht, Mittelscheibe
bottom layer	couronne inférieure	untere Schicht, untere Scheibe
orientation, direction	orientation	Orientierung
to solve	résoudre	lösen, zusammen drehen
to twist	pivoter	drehen
to rotate	tourner, effectuer une rotation	drehen
clockwise	dans le sens horaire	im Uhrzeigersinn
anticlockwise, counter-clockwise	dans le sens anti-horaire	im Gegenuhrzeigersinn

Spanish Calendar Cube Design

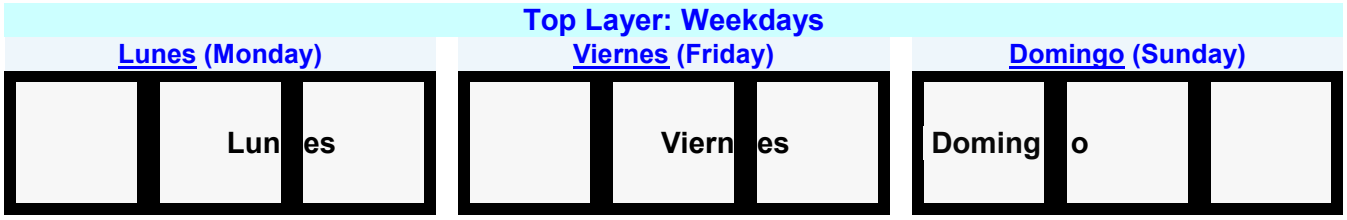
Spanish Calendar

Spanish Calendar				
Months			**Weekdays**	
English	**Spanish**		**English**	**Spanish**
January	ENEro	Enero	Monday	Lunes
February	FEBrero	Febrero	Tuesday	Martes
March	MARzo	Marzo	Wednesday	Miércoles
April	ABRil	Abril	Thursday	Jueves
May	MAYo	Mayo	Friday	Viernes
June	JUNio	Junio	Saturday	Sábado
July	JULio	Julio	Sunday	Domingo
August	AGOsto	Agosto		
September	SEPtiembre	Septiembre		
October	OCTubre	Octubre		
November	NOViembre	Noviembre		
December	DICiembre	Diciembre		
9 letters on **B**ottom **L**eft corner cubes			E F A S D M J N **O**	
9 letters on **B**ottom **C**enter cubes			O B N G U A C I **E**	
11 letters on **B**ottom **R**ight corner cubes			V P T Y C N R B L E **O**	
Letter '**E**' **B**ottom **C**enter is placed on an edge cube common to both **B**ottom and **M**iddle **L**ayers.				
Letter '**O**' **B**ottom **L**eft can also be used **B**ottom **R**ight, when drawn as a *perfect* circle.				

Cube Layout

In this design, weekdays are displayed on **T**op **L**ayer, days of the month on **M**iddle **L**ayer and months on **B**ottom **L**ayer.

Top Layer Layout



Weekdays on the **T**op **L**ayer are sorted out as follows:

1- 2 **T**op **L**eft weekday parts and 1 **T**op **R**ight weekday part on 1 corner cube: Sábad, Doming, es_**TR**
2- 6 **T**op **C**enter weekday parts on 3 edge cubes: Lun, Mart, Miércol, Juev, Viern, o
3- 2 blanks on 2 corner cubes from the **B**ottom **L**ayer: blank_**TL**/**TR**, blank_**TL**/**TR** (see **B**ottom **L**ayer) *

Weekdays are now combined on corner cubes:

1- 1 **T**op **L**eft corner cube: (Sábad,Doming,es_**TR**)
2- 3 **T**op **C**enter edge cubes: (Lun,Mart), (Miércol,Juev), (Viern,o)

* This ensures that there is at least 1 blank on a **T**op **L**eft corner cube for days 1 to 5 and 1 blank on a **T**op **R**ight corner cube for days 6 to 7.

So, now there are 7 corner and 9 edge cubes left that can be used for the 2 remaining layers.

Middle Layer Layout

Numbers on the **M**iddle **L**ayer are sorted out as follows:

1- 4 **M**iddle **L**eft numbers, 1 blank, 1 **B**ottom **C**enter letter on edge cubes: 0, 1, 2, 3, blank_**ML**/**MR**, **E_BC**
2- 7 **M**iddle **C**enter numbers on center cubes: 0, 1, 2, 3, 7, 6/9
3- 3 **M**iddle **R**ight numbers, 1 blank on edge cubes: 4, 5, 8, blank_**ML**/**MR**

Letters are now combined on edge cubes:

1- 3 **M**iddle **L**eft edge cubes: (0,1), (2,blank_**ML**/**MR**), (3,**E_BC**)
2- 2 **M**iddle **R**ight edge cubes: (4,5), (8,blank_**ML**/**MR**)

Note 1: Bottom **C**enter letter '**E**' is placed on an edge cube common to both **B**ottom and **M**iddle **L**ayers. This is the center letter of months FEBrero (February) and SEPtiembre (September). There are only 30 days in September, so there is no need for displaying 31 days fin this case. For this month, number '**30**' is displayed on the right, using **M**iddle **C**enter number '**3**'. Therefore letter '**E**' and **M**iddle **L**eft number '**3**' can be placed on a same edge cube.

So, now there are 7 corner and 4 edge cubes left that can be used for the Bottom Layer.

Bottom Layer Layout

Letters on the **B**ottom **L**ayer are sorted out as follows:

1- 9 **B**ottom **L**eft letters on a corner cube: E, F, A, S, D, M, J, N, **O**
4- 9 **B**ottom **C**enter letters on edge cubes: O, B, N, G, U, A, C, I, **E_BC** (**E_BC** already placed with '**3**')
2- 11 **B**ottom **R**ight letters on corner cubes: V, P, T, Y, C, N, R, B, L, E, **O** (**O_BL** is the same as **O_BR**)

Letters are now *logically* combined on corner and edge cubes:

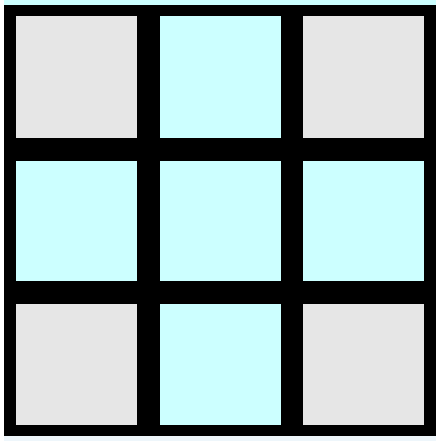
1- 3 **B**ottom **L**eft corner cubes: (E,F,M), (A,S,J), (N,D,**O**)
2- 4 **B**ottom **C**enter edge cubes: (O,I), (B,U), (G,C), (A,N)
3- 4 **B**ottom **R**ight corner cubes: (E,B,R), (N,L,Y), (P,T,blank_**TL**/**TR**), (V,C,blank_**TL**/**TR**)

Spanish Calendar Cube – Layout Table		
Reading from Left to Right		
Top **L**eft – Corner cubes	**T**op **C**enter – Edge cube	**T**op **R**ight – Corner cube
Sábad, Doming, blank	Lun, Mart, Miércol, Juev, Viern, o	es, blank
Middle **L**eft – Edge cubes	**M**iddle **C**enter – Center cubes	**M**iddle **R**ight – Edge cubes
0, 1, 2, 3, blank	0, 1, 2, 3, 7, 6/9	4, 5, 8, blank
Bottom **L**eft – Corner cubes	**B**ottom **C**enter – Edge cubes	**B**ottom **R**ight – Corner cubes
E, F, A, S, D, M, J, N, **O**	O, B, N, G, U, A, C, I, **E**	V, P, T, Y, C, N, R, B, L, E, **O**

Solving a Spanish Calendar Cube Step by Step

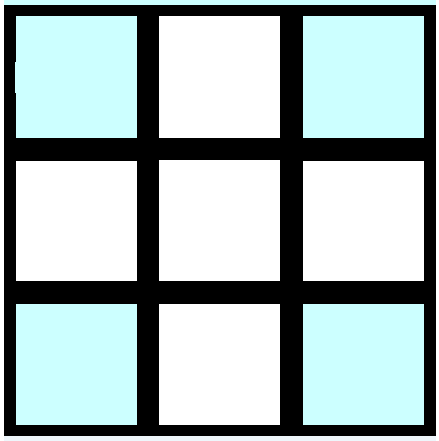
In this example, a step by step solving process is applied to the Spanish Calendar Cube, just described before. Note that we only need to solve a *single* Face out of six. We will solve a Face for Monday, January 01.

Solve the Cross First



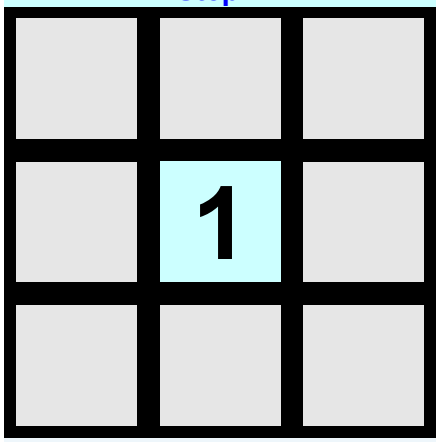
Standard Rubik's Cube Solving

Then Solve the Corner Cubes



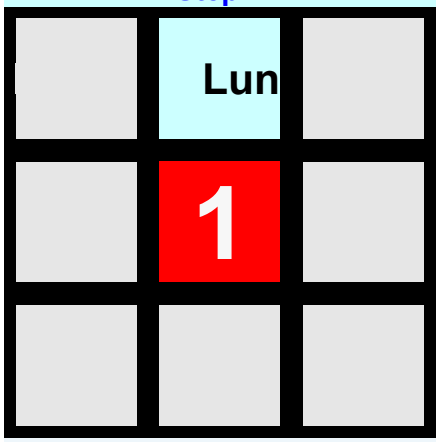
Standard Rubik's Cube Solving

Step 1



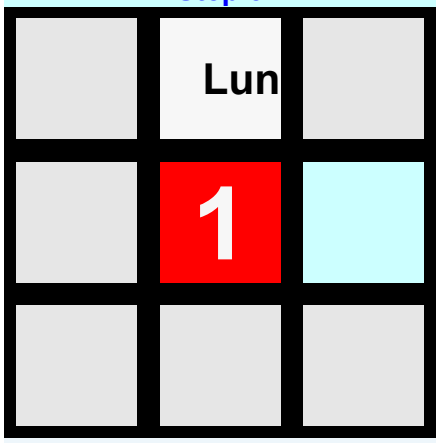
Center **1** on Front Face

Step 2



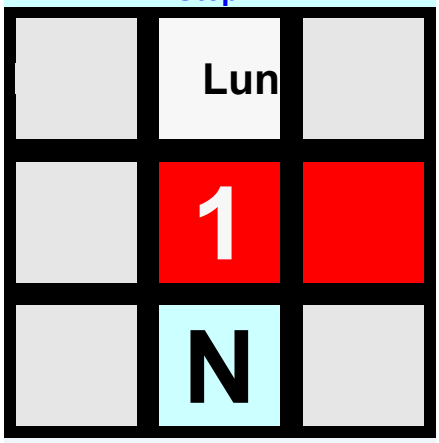
Top Layer: Edge Cube **Lun**

Step 3



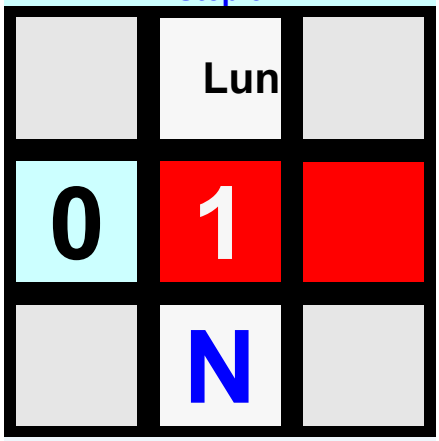
Middle Layer: Edge Cube **Blank**

Step 4



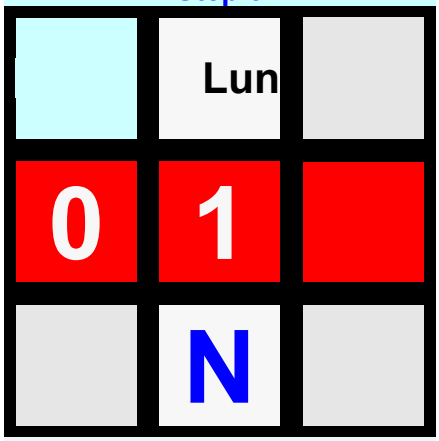
Bottom Layer: Edge Cube **N**

Step 5



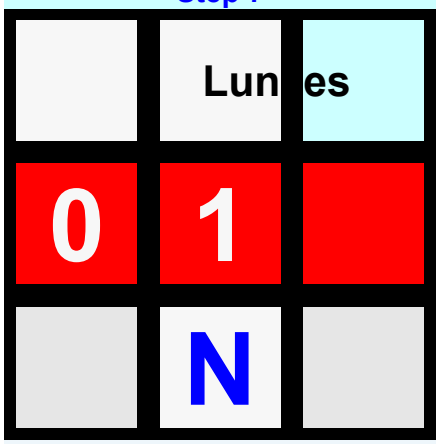
Middle Layer: Edge Cube **0**

Step 6



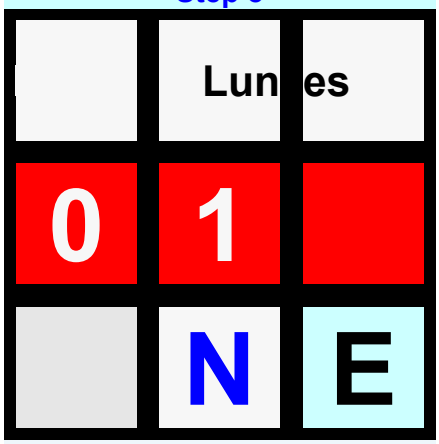
Top Layer: Corner Cube **Blank**

Step 7



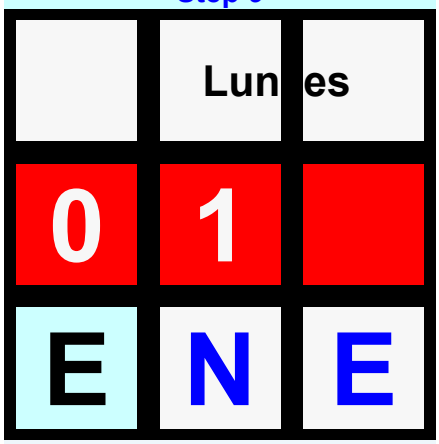
Top Layer: Corner Cube **es**

Step 8



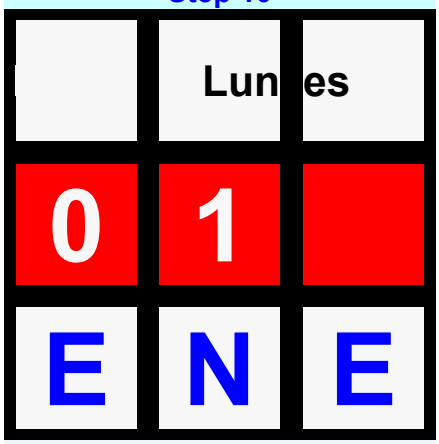
Bottom Layer: Corner Cube **E**

Step 9



Bottom Layer: Corner Cube **E**

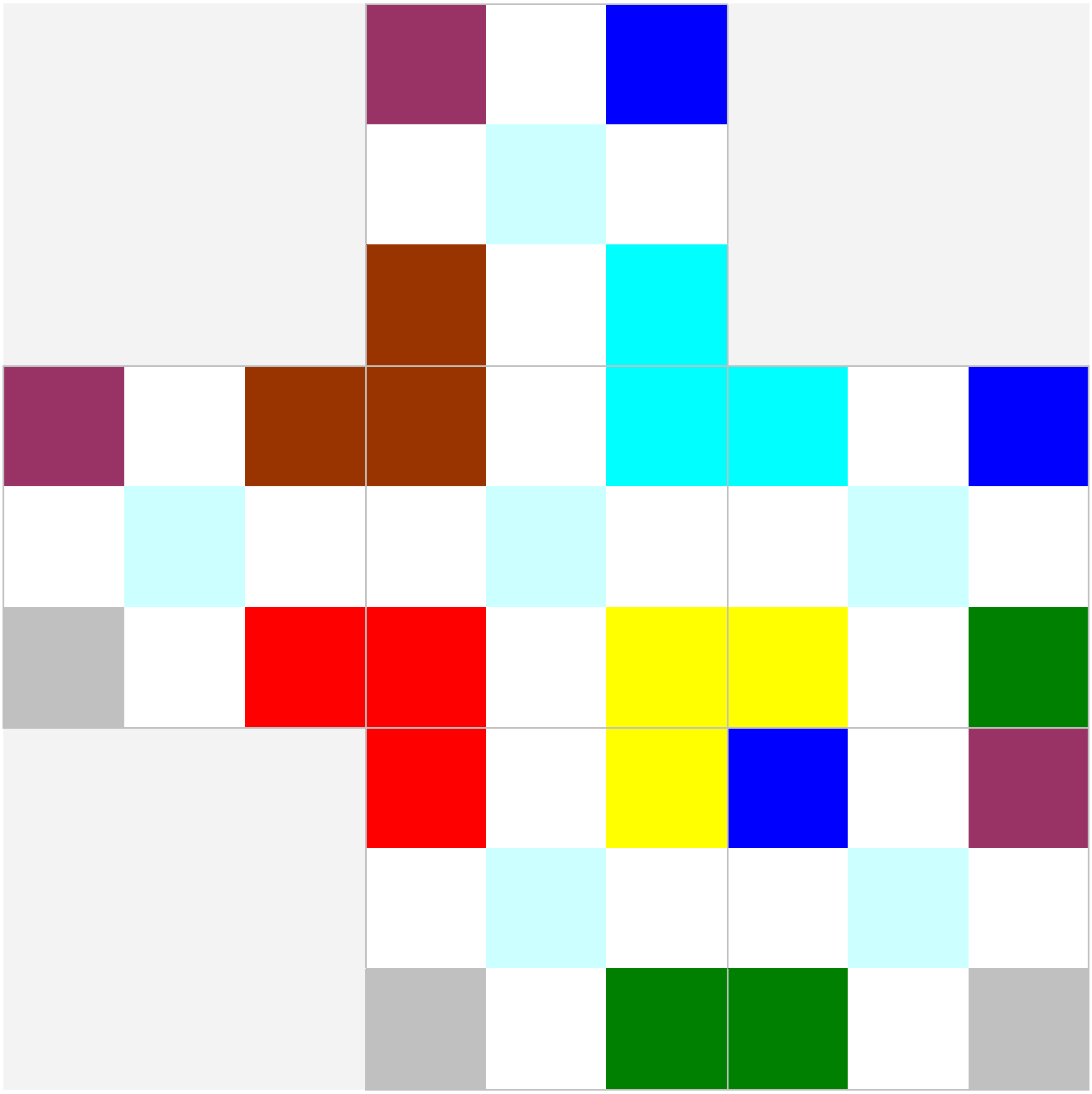
Step 10



That's it !

Corner Cubes Final Check

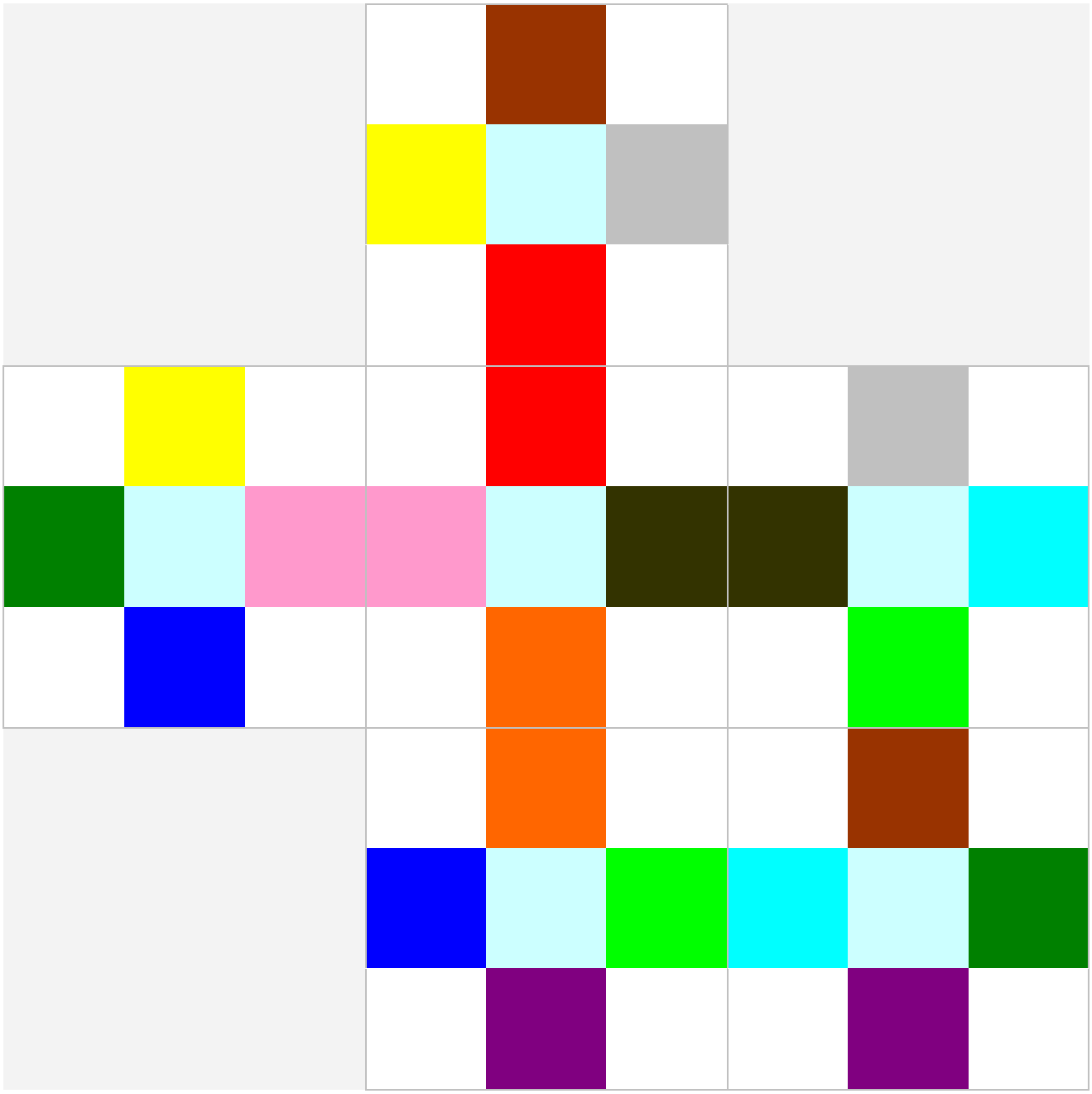
There are 8 Corner Cubes and 3 faces per Corner Cube. In the diagram below, each Corner Cube is displayed in 8 different colors and with the same color applied to each of its 3 faces. This diagram can be used as a convenient *visual aid* to check Design Rules (DRC).



	Up		
Left	**F**ront	**R**ight	**B**ack
	Down	**B**ack	

Edge Cubes Final Check

There are 12 Edge Cubes and 2 faces per Edge Cube. In the diagram below, each Edge Cube is displayed in 12 different colors and with the same color applied to each of its 2 faces. This diagram can be used as a convenient *visual aid* to check Design Rules (DRC).



	Up		
Left	**F**ront	**R**ight	Back
	Down	**B**ack	

Texture Template

This is a texture template that can be printed out and used for writing down numbers and letters by hand *prior to* texture design. All is needed are pencil, rubber…and time.