

# Portuguese Calendar Cube Design 2

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## Introduction

A **Portuguese Calendar Cube** is a 3x3x3 **Rubik's Cube** used as a **Portuguese 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 Portuguese Calendar Cube is designed by placing letters and numerals on a texture which is then laid down on a Virtual Cube (see <http://www.randelshofer.ch/> for more details). 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 1).

### Virtual Portuguese Calendar Cube 2

**Portuguese Calendar Cube**  
Original design 2008  
by André Boulouard  
and Walter Randelshofer

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Portuguese Calendar Cube 2 Texture

Download **CubeTwister** from: <http://www.randelshofer.ch/>

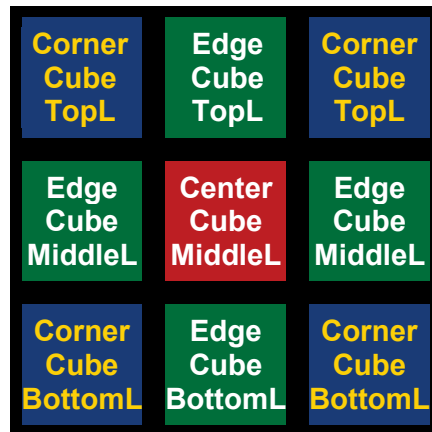
Virtual Portuguese Calendar Cube 2

## Design Particularities

Because the sum of weekdays middle letters and of months first and last letters is less or equal to 20, weekdays can be displayed as 3 letters on **Top Layer**. Months are displayed as 3 letters on the **Middle Layer**.

## 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
cubeie, cube	cube, petit cube	Würfeteil, 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

# Portuguese Calendar Cube Design 2

## Portuguese Calendar

Portuguese Calendar					
Months			Weekdays		
English	Portuguese		English	Portuguese	
January	<u>JAN</u> eiro	Janeiro	Monday	Segunda-feira	<u>SEG</u>
February	<u>FEV</u> ereiro	Fevereiro	Tuesday	Terça-feira	<u>TER</u>
March	<u>MAR</u> ço	Março	Wednesday	Quarta-feira	<u>QUA</u>
April	<u>ABR</u> il	Abril	Thursday	Quinta-feira	<u>QUI</u>
May	<u>MAI</u> o	Maio	Friday	Sexta-feira	<u>SEX</u>
June	<u>JUN</u> ho	Junho	Saturday	Sábado	<u>SAB</u>
July	<u>JUL</u> ho	Julho	Sunday	Domingo	<u>DOM</u>
August	<u>AGO</u> sto	Agosto	4 Top Left letters <b>S T Q D</b>		
September	<u>SET</u> embro	Setembro	4 Top Center letters <b>E U A O</b>		
October	<u>OUT</u> ubro	Outubro	7 Top Right letters <b>G R A I X B M</b>		
November	<u>NOV</u> embro	Novembro			
December	<u>DEZ</u> embro	Dezembro			
8 letters on <b>Middle Left</b> edge cubes (Months)			<b>J F M A S O N D</b>		
6 letters on <b>Middle Center</b> cubes (Months)			<b>A E B U G O</b>		
8 letters on <b>Middle Right</b> edge cubes (Months)			<b>N V R I L O T Z</b>		
Symmetrical letters ' <b>O</b> ' and ' <b>N</b> ' are used either <b>Middle Left</b> or <b>Middle Right</b> (Months)					

## Cube Layout

In this design, weekdays are displayed on **Top Layer**, months on **Middle Layer** and either day of the month or year on **Bottom Layer**.

## Top Layer Layout

Top Layer								
SEGunda-feira (Monday)			TERça-feira (Tuesday)			SABado (Saturday)		
<b>S</b>	<b>E</b>	<b>G</b>	<b>T</b>	<b>E</b>	<b>R</b>	<b>S</b>	<b>A</b>	<b>B</b>

Weekdays on **Top Layer** are sorted out as follows:

- 1- 4 **T**op **L**eft weekday letters on corner cubes: S, T, Q, D
- 2- 4 **T**op **C**enter weekday letters on edge cubes: E, U, A, O
- 3- 7 **T**op **R**ight weekday letters on corner cubes: G, R, A, I, X, B, **M**

Weekdays letters are now *logically* combined on corner cubes:

- 1- 2 **T**op **L**eft corner cubes: (D,S,T), (Q,**M**\_TopRight,blank)
- 2- 2 **T**op **C**enter edge cubes: (E,U), (A,O)
- 3- 2 **T**op **R**ight corner cubes: (G,R,A), (I,X,B)

**Note 1:** Top Right letter '**M**' can be displayed on the same corner cube as Top Left letter 'Q', because there is no weekday that begin with letter 'Q' and end with letter 'M'.

So, now there are 4 corner and 10 edge cubes left that can be used for the 2 remaining layers.

## Middle Layer Layout



Letters on the Middle Layer are sorted out as follows:

- 1- 8 **M**iddle **L**eft letters on edge cubes: J, F, M, A, **S**, **O**, **N**, D
- 2- 6 **M**iddle **C**enter letters on center cubes: A, E, B, U, G, O
- 3- 8 **M**iddle **R**ight letters on edge cubes: **N**, V, R, **I**, L, **O**, T, Z

**Note 2:** Middle **R**ight letter **N** is Middle **L**eft letter **N** that has been 180° rotated. **N** can then be used for displaying either JAN JUN or NOV.

**Note 3:** Middle **R**ight letter **O** is Middle **L**eft letter **O** that has been 180° rotated. **O** can then be used for displaying either AGO or OUT.

Letters are now *logically* combined on edge cubes:

- 1- 4 **M**iddle **L**eft edge cubes: (J,F), (M,A), (**S**,**O**), (**N**,D)
- 2- 4 **M**iddle **R**ight edge cubes: (V,R), (**I**,L), (T,Z), (blank,blank)

So, now there are 4 corner and 2 edge cubes left that can be used for the Bottom Layer.

## Bottom Layer Layout



Numerals and symbols on the Bottom Layer are sorted out as follows:

- 1- 2 **B**ottom **L**eft blanks on corner cubes
- 2- 3 **B**ottom **C**enter numerals plus 1 blank on edge cubes: 1, 2, 3, blank
- 3- 10 **B**ottom **R**ight numerals on corner cubes: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9

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

- 1- 2 **B**ottom **C**enter edge cubes: (1,2), (3,blank)
- 2- 4 **B**ottom **R**ight corner cubes: (1,2,3), (4,5,blank), (6,7,8), (9,0,blank)

Layout Table		
Reading from Left to Right		
<b>Top Left</b> – Corner cubes S, T, Q, D	<b>Top Center</b> – Edge cube E, U, A, O	<b>Top Right</b> – Corner cubes G, R, A, I, X, B, M
<b>Middle Left</b> – Edge cubes J, F, M, S, A, O, N, D	<b>Middle Center</b> – Center cubes A, E, B, U, G, O	<b>Middle Right</b> – Edge cubes N, V, R, I, L, O, T, Z
<b>Bottom Left</b> – Corner cubes blank	<b>Bottom Center</b> – Edge cubes blank, 1, 2, 3	<b>Bottom Right</b> – Corner cubes 0, 1, 2, 3, 4, 5, 6, 7, 8, 9

Portuguese Calendar Cube – Examples

Monday, June 30

S	E	G
J	U	N
	3	0

Tuesday, October 8

T	E	R
O	U	T
		8

Wednesday, December 24

Q	U	A
D	E	Z
	2	4

Thursday, July 31

Q	U	I
J	U	L
	3	1

Saturday, August 2

S	A	B
A	G	O
		2

Sunday, August 3

D	O	M
A	G	O
		3

# Solving a Portuguese Calendar Cube Step by Step

In this example, a step by step solving process is applied to the Portuguese 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 1.

**Solve the Cross First**


Standard Rubik's Cube Solving

**Then Solve the Corner Cubes**


Standard Rubik's Cube Solving

**Step 1**

	<b>A</b>	

Center **A** on Front Face

**Step 2**

	<b>E</b>	
	<b>A</b>	

Top Layer: Edge Cube **E**

**Step 3**

	<b>E</b>	
	<b>A</b>	<b>N</b>

Middle Layer: Edge Cube **N**

**Step 4**

	<b>E</b>	
	<b>A</b>	<b>N</b>

Bottom Layer: Edge Cube **blank**

**Step 5**

	<b>E</b>	
<b>J</b>	<b>A</b>	<b>N</b>

Middle Layer: Edge Cube **J**

**Step 6**

<b>S</b>	<b>E</b>	
<b>J</b>	<b>A</b>	<b>N</b>

Top Layer: Corner Cube **S**

**Step 7**

<b>S</b>	<b>E</b>	<b>G</b>
<b>J</b>	<b>A</b>	<b>N</b>

Top Layer: Corner Cube **G**

**Step 8**

<b>S</b>	<b>E</b>	<b>G</b>
<b>J</b>	<b>A</b>	<b>N</b>
		<b>1</b>

Bottom Layer: Corner Cube **1**

**Step 9**

<b>S</b>	<b>E</b>	<b>G</b>
<b>J</b>	<b>A</b>	<b>N</b>
		<b>1</b>

Bottom Layer: Corner **Blank**

**Step 10**

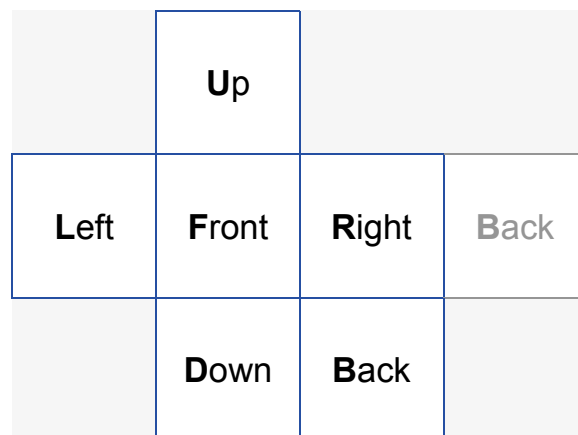
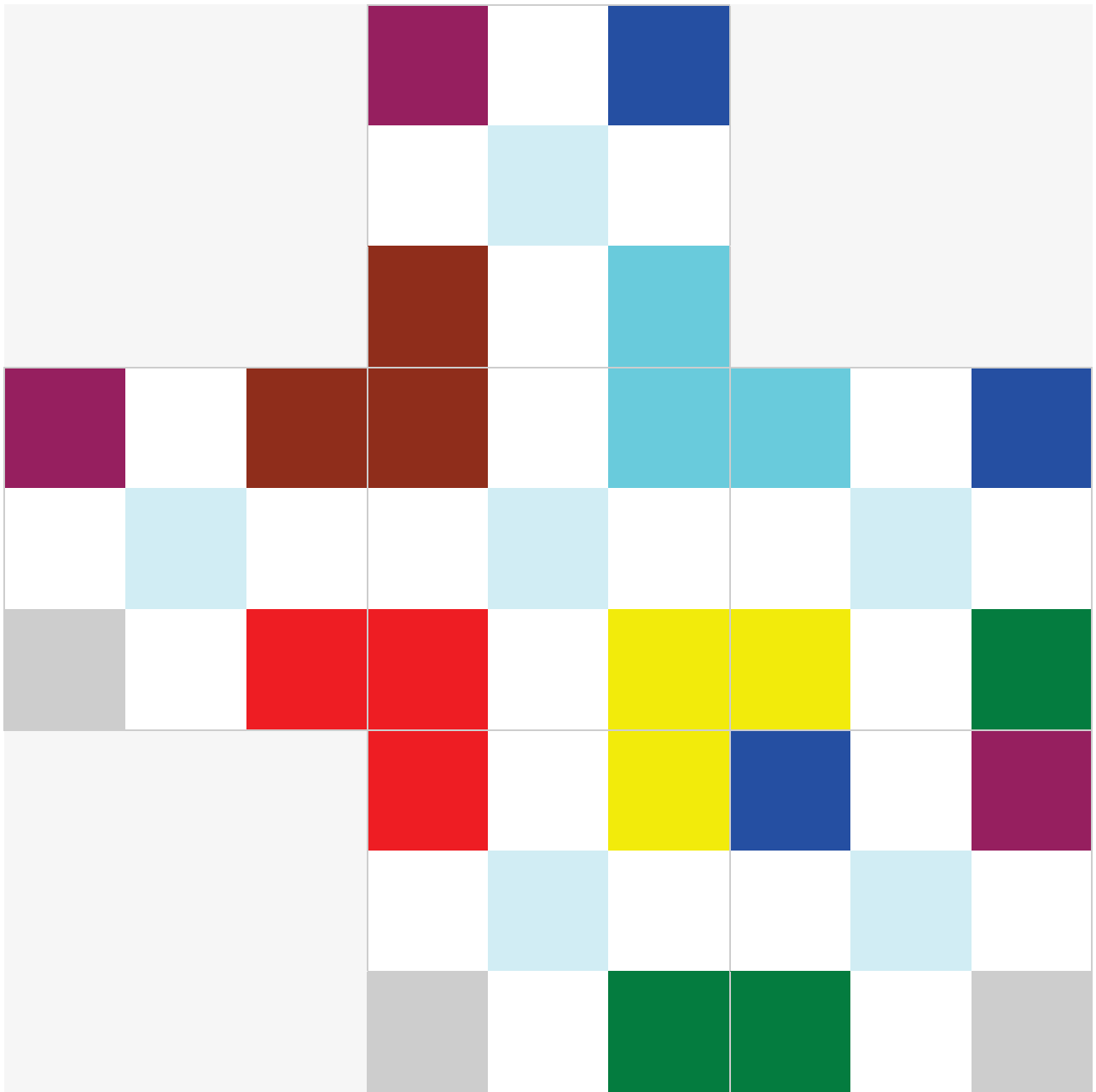
<b>S</b>	<b>E</b>	<b>G</b>
<b>J</b>	<b>A</b>	<b>N</b>
		<b>1</b>

That's it !



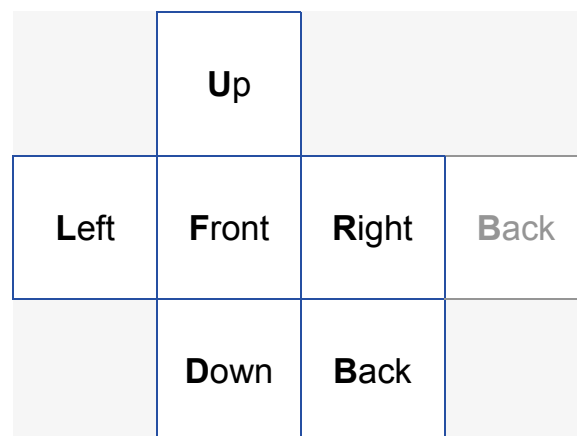
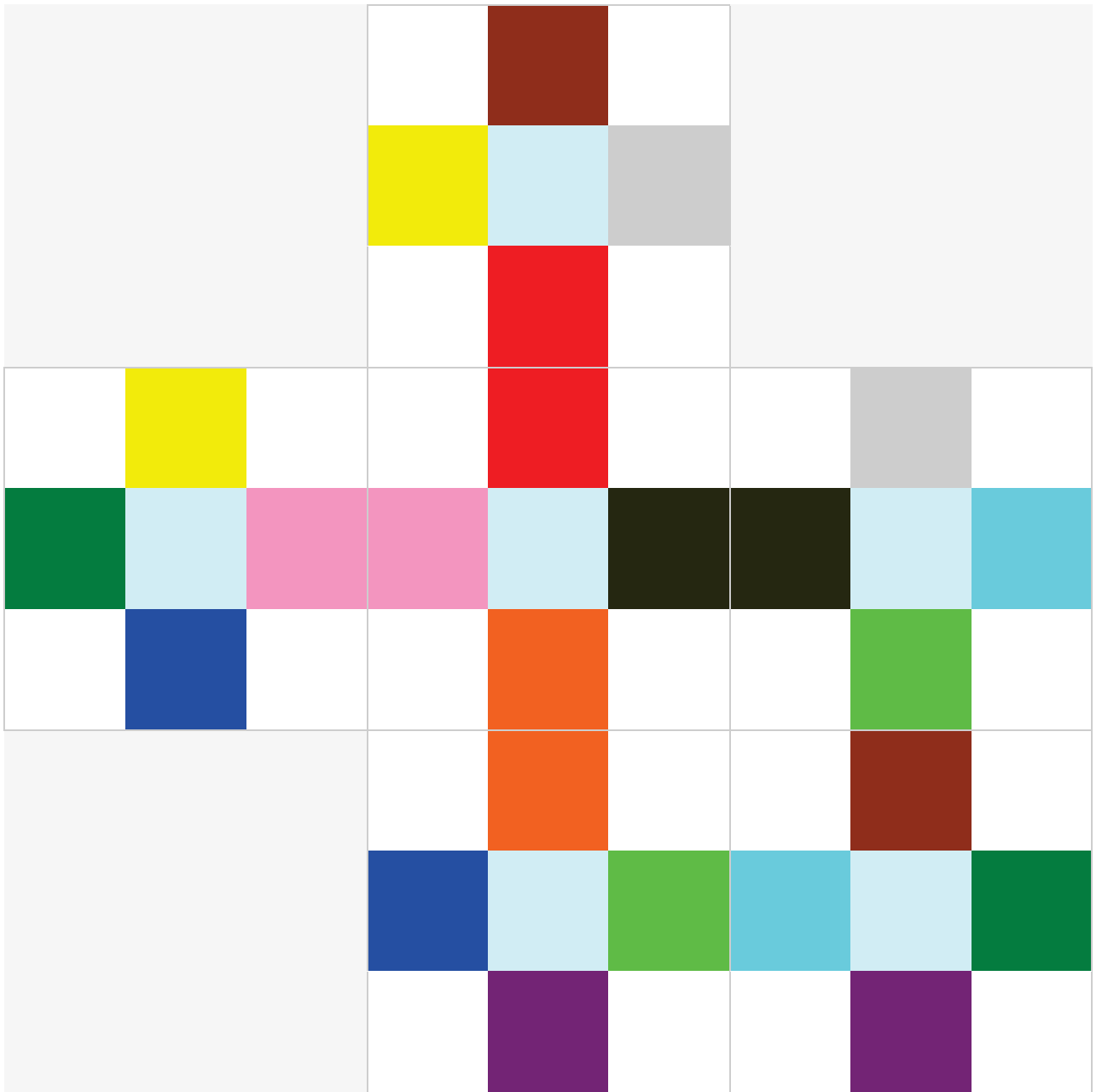
## Corner Cubes Final Check

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).



## 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).



## 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.

