

Time Zone Cube Design

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Introduction

A **Time Zone Cube** is a 3x3x3 **Rubik's Cube** used to display the names of most capital or main towns in the world *together* with their associated UTC Time Offsets. **DST** (Daylight Saving Time) can also be displayed as an option.

Time Zones – Useful Links	
http://en.wikipedia.org/wiki/List_of_time_zones	http://en.wikipedia.org/wiki/Daylight_saving_time
http://en.wikipedia.org/wiki/Central_European_Time	http://en.wikipedia.org/wiki/Coordinated_Universal_Time
http://en.wikipedia.org/wiki/List_of_capitals_and_largest_cities_by_country	

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 Time Zone Cube is designed by placing letters and numbers on a texture which is then laid down on a Virtual Cube (see <http://www.randelshofer.ch/> for more details).

Both names of selected capital or main towns *and* their associated UTC Time Offsets 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*.

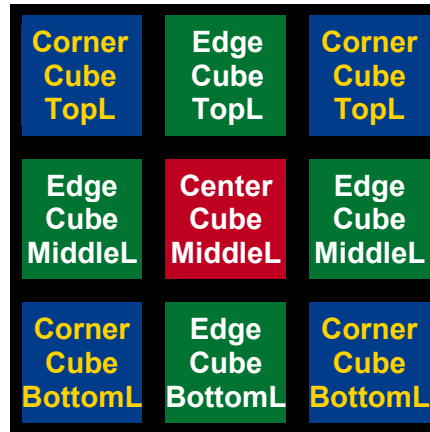
The following example shows an UTC Time Offset of '+ 0' for **LON** (LONDON – Great-Britain), which is the UTC Time Offset there in winter time. If the DST option had been used, then the offset would have been set to '**DST 0**' in winter time and to '**DST 1**' in summer time.

Time Zone Cube	
Time Zone Cube Original design 2008 by André Boulouard and Walter Randelshofer  Copyright © 2008 André Boulouard Walter Randelshofer Werner Randelshofer All rights reserved.	
Time Zone Cube Texture	Time Zone Cube
Download CubeTwister from: http://www.randelshofer.ch/	

Designing a Time Zone Cube that *works* is definitely *not* a trivial task but **Design Rules** exist that should be applied. Because it is nearly impossible to test all configurations, the placement of numbers and letters on a texture should be carefully checked at *the end* of the design process. This is carried out by applying a **Design Rules Check (DRC)** in the final design stage.

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
cube, 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 Gegenurzeigersinn

Time Zones and UTC Time Offsets

Capital, Main Towns or Place Names and their UTC Time Offsets – Sorted by Time Offsets			
Town Name	Abbreviated Name	Country Name	UTC Time Offset
<u>BAK</u> er	BAK	Baker Island, USA	UTC-12
<u>PAL</u> myra	PAL	Palmyra Atoll, USA	UTC-11
<u>BOR</u> a Bora	BOR	Leeward Islands, French Pol.	UTC-10
<u>HON</u> olulu	HON	Hawaii, USA	UTC-10
<u>MEH</u> etia Island	MEH	Windward Islands, French Pol.	UTC-10
<u>SOC</u> iety Archipelago	SOC	Society Islands, French Pol.	UTC-10
<u>TAH</u> iti	TAH	French Polynesia	UTC-10
<u>TOK</u> elau Islands	TOK	New Zealand Territory	UTC-10
<u>MAR</u> quesas Islands	MAR	French Polynesia	UTC-9:30
<u>MAN</u> gareva	MAN	Gambier Islands, French Pol.	UTC-9
<u>LAS</u> Vegas	LAS	Nevada, USA	UTC-8 (PST), UTC-7 (PDT)
<u>Los A</u> ngeles	LA	California, USA	UTC-8 (PST), UTC-7 (PDT)
<u>Los A</u> ngeles Airport	LAX	California, USA	UTC-8 (PST), UTC-7 (PDT)
<u>PORT</u> land	POR	Oregon	UTC-8 (PST), UTC-7 (PDT)
<u>SAN</u> Diego	SAN	California, USA	UTC-8 (PST), UTC-7 (PDT)
<u>SAN</u> Francisco	SAN	California, USA	UTC-8 (PST), UTC-7 (PDT)
<u>SAN</u> Jose	SAN	California, USA	UTC-8 (PST), UTC-7 (PDT)
<u>DEN</u> ver	DEN	Colorado, USA	UTC-7 (MST), UTC-6 (MDT)
<u>EI PA</u> so	PAS	Texas, USA	UTC-7 (MST), UTC-6 (MDT)
<u>MEX</u> ico City	MEX	Mexico	UTC-7 (CDT), UTC-6 (CST)
<u>BEL</u> ize City	BEL	Belize	UTC-6
<u>BEL</u> mopan	BEL	Capital, Belize	UTC-6
<u>MAN</u> agua	MAN	Nicaragua	UTC-6
<u>SAN</u> José	SAN	Costa Rica	UTC-6
<u>SAN</u> Salvador	SAN	San Salvador	UTC-6
<u>DAL</u> las	DAL	Texas, USA	UTC-6, UTC-5, Central
<u>MON</u> terrey	MON	Nuevo León, Mexico	UTC-6 (CST), UTC-5 (CDT)
<u>PAN</u> ama City	PAN	Panama	UTC-5
<u>PORT</u> -au-Prince	POR	Haiti	UTC-5
<u>NAS</u> sau	NAS	The Bahamas	UTC-5 (EST), UTC-4 (EDT)
<u>BAL</u> timore	BAL	Maryland, USA	UTC-5 (EST), UTC-4 (EDT)
<u>BOS</u> ton	BOS	Massachussets, USA	UTC-5, UTC-4, Eastern, DST
<u>COL</u> umbus	COL	Ohio, USA	UTC-5 (EST), UTC-4 (EDT)
<u>MON</u> treal City	MON	Quebec, Canada	UTC-5 (EST), UTC-4, Eastern, EDT
<u>New-York</u> City	NYC	New York, USA	UTC-5 (EST), UTC-4 (EDT)
City of <u>TOR</u> onto	TOR	Canada	UTC-5 (EST), UTC-4 (EDT)
<u>CAR</u> acas	CAR	Capital, Venezuela	UTC-4:30 (VST)
<u>BAS</u> seterre	BAS	Saint Kitts and Nevis	UTC-4
<u>CAS</u> tries	CAS	Saint Lucia	UTC-4
<u>La PAZ</u>	PAZ	Bolivia	UTC-4
<u>PORT</u> of Spain	POR	Trinidad and Tobago	UTC-4
<u>SAN</u> Juan	SAN	Puerto Rico	UTC-4
<u>SAN</u> to Domingo	SAN	Dominican republic	UTC-4
<u>MAR</u> igot	MAR	Island, Saint Martin, France	UTC-4, UTC-3 (DST)
<u>SAN</u> tiago	SAN	Capital, Republic of Chile	UTC-4, UTC-3 (DST)
<u>PAR</u> amaribo	PAR	Suriname	UTC-3, ART
<u>BELO</u> Horizonte	BEL	Brazil	UTC-3, UTC-2
<u>MAR</u> del Plata	MAR	Argentina	UTC-3, UTC-2, ART
<u>MON</u> tevideo	MON	Uruguay	UTC-3 (UYT), UTC-2 (UYST)
<u>RIO</u> de Janeiro	RIO	Brazil	UTC-3, UTC-2
<u>SAO</u> Paulo	SAO	Brazil	UTC-3, UTC-2
<u>MAR</u> tim Vaz	MAR	Island, Brazilian Federation	UTC-2
<u>PON</u> ta Delgada	PON	Capital City, Azores, Portugal	UTC-1
<u>BAN</u> jul	BAN	Gambia	UTC+0
<u>CAS</u> ablanca	CAS	Morocco	UTC+0

<u>CON</u> akry	CON	Guinea	UTC+0
<u>DAK</u> ar	DAK	Senegal	UTC+0
<u>LAN</u> zarote	LAN	Canary Islands, Spain	UTC+0
<u>MON</u> rovia	MON	Liberia	UTC+0
<u>SAO</u> Tomé	SAO	São Tomé and Príncipe	UTC+0
<u>COR</u> k	COR	Ireland	UTC+0, UTC+1 (BST)
<u>LON</u> don	LON	England	UTC+0, UTC+1 (BST)
Isle of <u>MAN</u>	MAN	Self-governing Crown dependency	UTC+0, UTC+1, DST
<u>BAN</u> gui	BAN	Central African Republic	UTC+1
<u>BEN</u> in City	BEN	Southern Guinea	UTC+1, WAT
<u>MAL</u> abo	MAL	Equatorial Guinea	UTC+1, WAT
<u>POR</u> to Novo	POR	Benin	UTC+1, WAT
<u>PAL</u> ermo	PAL	Sicilia, Italy	UTC+1 (CET)
<u>TOR</u> shavn	TOR	Faroe Islands	UTC+1 (EST)
<u>BAR</u> celona	BAR	Spain	UTC+1 (CET), UTC+2 (CEST)
<u>BAS</u> el	BAS	Switzerland	UTC+1 (CET), UTC+2 (CEST)
<u>BEL</u> grade	BEL	Serbia	UTC+1 (CET), UTC+2 (CEST)
<u>BER</u> lin	BER	Germany	UTC+1 (CET), UTC+2 (CEST)
<u>BER</u> gen	BER	Norway	UTC+1 (CET), UTC+2 (CEST)
<u>BER</u> n	BER	Switzerland	UTC+1 (CET), UTC+2 (CEST)
<u>BOR</u> deaux	BOR	France	UTC+1 (CET), UTC+2 (CEST)
<u>COL</u> mar	COL	Alsace, France	UTC+1 (CET), UTC+2 (CEST)
<u>DAX</u>	DAX	France	UTC+1 (CET), UTC+2 (CEST)
<u>DOR</u> tmund	DOR	Germany	UTC+1 (CET), UTC+2 (CEST)
<u>LAN</u> dreger	LAN	Brittany, France	UTC+1 (CET), UTC+2 (CEST)
<u>LAN</u> niliz	LAN	Brittany, France	UTC+1 (CET), UTC+2 (CEST)
<u>LAN</u> nuon	LAN	Brittany, France	UTC+1 (CET), UTC+2 (CEST)
<u>MAR</u> seille	MAR	France	UTC+1 (CET), UTC+2 (CEST)
<u>MON</u> aco	MON	Principality of Monaco	UTC+1 (CET), UTC+2 (CEST)
<u>NAN</u> tes	NAN (see Note 1)	France	UTC+1 (CET), UTC+2 (CEST)
<u>NAR</u> bonne	NAR	France	UTC+1 (CET), UTC+2 (CEST)
<u>PAR</u> is	PAR	France	UTC+1 (CET), UTC+2 (CEST)
La <u>ROCH</u> elle	ROC	France	UTC+1 (CET), UTC+2 (CEST)
<u>SAN MAR</u> ino	SAN, MAR	Most Serene Republic of San Marino	UTC+1 (CET), UTC+2 (CEST)
<u>STO</u> ckholm	STO	Sweden	UTC+1 (CET), UTC+2 (CEST)
<u>TOR</u> ino	TOR	Italy	UTC+1 (CET), UTC+2 (CEST)
<u>LAR</u> naca	LAR	Republic of Cyprus	UTC+2 (EET)
<u>MAN</u> zini	MAN	Swaziland	UTC+2
<u>MAS</u> eru	MAS	Lesotho	UTC+2
<u>NIC</u> osia	NIC	Cyprus	UTC+2 (EET)
<u>ATH</u> ens	ATH	Greece	UTC+2 (EET), UTC+3 (EEST)
<u>BEI</u> rut	BEI	Lebanon	UTC+2 (EET), UTC+3 (EEST)
<u>CAI</u> ro	CAI	Egypt	UTC+2 (EET), UTC+3 (EEST)
<u>NAX</u> os City	NAX	Naxos Island, Greece	UTC+2 (EET), UTC+3 (EEST)
<u>PAL</u> myra	PAL	Syria	UTC+2 (EET), UTC+3 (EEST)
<u>TAL</u> inn	TAL	Estonia	UTC+2 (EET), UTC+3 (EEST)
<u>TEL</u> Aviv	TEL	Israel	UTC+2, UTC+3, IST
<u>ZAK</u> ynthos	ZAK (see Note 1)	Ionian Islands, Greece	UTC+2 (EET), UTC+3 (EEST)
<u>BAH</u> rain City	BAH	Bahrain	UTC+3
<u>DAR</u> es Salaam	DAR	Tanzania	UTC+3 (EAT)
<u>DOH</u> a	DOH	Qatar	UTC+3
<u>MAK</u> kah (Mecca)	MAK	Saudi Arabia	UTC+3 (EAT)
<u>MAN</u> ama	MAN	Bahrain	UTC+3
<u>MOR</u> oni	MOR	Comoros	UTC+3 (EAT)
<u>MOS</u> ul	MOS	Northern Iraq	UTC+3
<u>NAI</u> robi	NAI	Kenya	UTC+3 (EAT)
<u>RYA</u> dh	RYA	Saudi Arabia	UTC+3 (EAT)
<u>SAN</u> aa	SAN	Yemen	UTC+3
<u>TEH</u> ran	TEH	Iran	UTC+3:30, IRST
<u>MOS</u> cow	MOS	Russia	UTC+3 (MT), UTC+4 (MST)

<u>POR</u> t Louis	POR	Mauritius	UTC+4 (MUT)
<u>BAK</u> u	BAK	Azerbaijan	UTC+4, UTC+5, DST
<u>LAH</u> ore	LAH	Punjab, Pakistan	UTC+5 (PST)
<u>MAL</u> é	MAL	Maldives	UTC+5
<u>TAS</u> hkent	TAS	Uzbekistan	UTC+5
<u>BAN</u> galore	BAN	India	UTC+5:30, (IST)
<u>COL</u> ombo	COL	Sri Lanka	UTC+5:30
New <u>DEL</u> hi	DEL	Delhi, India	UTC+5:30 (IST)
<u>HYD</u> erabad	HYD	Andhra Pradesh, India	UTC+5:30 (IST)
<u>BAR</u> isal	BAR	Southern District, Bangladesh	UTC+6 (BST)
<u>RAN</u> goon (Yangon)	RAN	Myanmar	UTC+6:30 (MMT)
<u>BAN</u> dung	BAN	West Java, Indonesia	UTC+7, WIB
<u>BAN</u> gkok	BAN	Thailand	UTC+7
<u>HAN</u> oi	HAN	Vietnam	UTC+7
<u>HO</u> Chi Minh City	HOC	Vietnam	UTC+7
<u>BEI</u> jing	BEI	People's Republic of China (PRC)	UTC+8 (CST)
<u>HON</u> g Kong	HON, H K	People's Republic of China (PRC)	UTC+8, HKT
<u>MAN</u> ila	MAN	Philippines	UTC+8 (PST)
<u>NAN</u> jing	NAN (see Note 1)	People's Republic of China (PRC)	UTC+8 (CST)
<u>SIN</u> gapore City	SIN	Singapore	UTC+8 (SST)
<u>TAI</u> pei City	TAI	Republic of China (ROC)	UTC+8 (CST)
<u>PER</u> th	PER	Western Australia	UTC+8, UTC+9 (DST)
<u>MEL</u> bourne	MEL	Palau	UTC+9
<u>TOK</u> yo	TOK	Japan	UTC+9 (JST)
<u>DAR</u> win	DAR	Northern Territory, Australia	UTC+9:30 (ACST)
<u>POR</u> t MOREsby	POR, MOR	Papua New Guinea	UTC+10
<u>CAN</u> berra	CAN	Capital City, Australia	UTC+10 (AEST), UTC+11 (AEDT)
<u>MEL</u> bourne	MEL	Victoria, Australia	UTC+10 (AEST), UTC+11 (AEDT)
<u>SYD</u> ney	SYD	New South Wales, Australia	UTC+10 (AEST), UTC+11 (AEDT)
<u>LOR</u> d Howe Island	LOR	Australia	UTC+10:30, UTC+11 (DST)
New <u>CAL</u> edonia	CAL	Overseas Territory, France	UTC+11
<u>HON</u> iara	HON	Solomon Islands	UTC+11
<u>PAL</u> ikir	PAL	Capital, Fed. Stat. of Micronesia	UTC+11
<u>POH</u> npei State	POH	Federated States of Micronesia	UTC+11
<u>POR</u> t Vila	POR	Republic of Vanuatu	UTC+11
<u>NOR</u> folk Island	NOR (see Note 1)	Self-governing Territory, Australia	UTC+11:30
<u>MAL</u> oelap Atoll	MAL	Marshall Islands	UTC+12
<u>MAR</u> shall Islands	MAR	Republic of the Marshall Islands	UTC+12
<u>TON</u> ga Archipelago	TON	Kingdom of Tonga	UTC+13
South <u>TAR</u> awa	TAR	Capital, Republic of Kiribati	UTC+12, UTC+13, UTC+14

Examples of some other Place Names that can also be displayed on the Cube

Name	Abbreviated Name	Name	Abbreviated Name
<u>BAR</u> bados	BAR	<u>DOR</u> dogne	DOR
<u>BER</u> ing Strait or Sea	BER	<u>LE</u> sotho	LES
<u>BEL</u> ize	BEL	<u>MA</u> Laysia	MAL
<u>BOL</u> ivia	BOL	<u>MAR</u> tinique	MAR
<u>BOR</u> neo	BOR	<u>MOL</u> davia	MOL
<u>BOS</u> nia	BOS	<u>MOR</u> bihan	MOR
<u>BOS</u> phorus	BOS	<u>NOR</u> way	NOR
<u>CAI</u> cos Islands	CAI	<u>PAK</u> istan	PAK
<u>CAN</u> ada	CAN	<u>POL</u> and	POL
<u>CAN</u> ary Islands	CAN	<u>POR</u> tugal	POR
<u>CAR</u> ibbean	CAR	<u>TAN</u> zania	TAN
<u>CAS</u> pian Sea	CAS	<u>TEX</u> as	TEX
<u>DAN</u> ube	DAN		
<u>DEL</u> phi	DEL		
<u>DEN</u> mark	DEN	Passenger(s), Peace	PAX

Time Zone Cube Design

Cube Layout

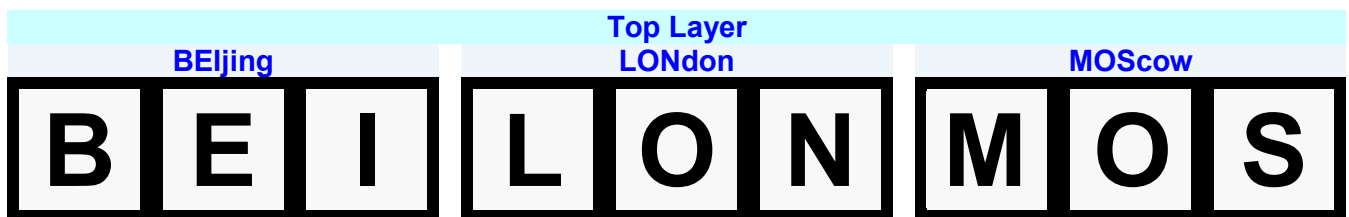
In this *particular* design, *all* the preceeding *abbreviated* town names can be displayed on a Cube, together with their UTC Time Offsets.

After many attempts, the best layout that I have designed is as follows:

- 1- Abbreviated town name *either* on the Top Layer *or* on the Middle Layer
- 2- UTC Time Offset on the Bottom Layer

Note 1 – A 'Z' on a **Top Right** Corner can be transformed into an 'N' on a **Top Left** corner if it is **redrawn**. Conversely, an 'N' on a **Top Left** Corner can be transformed into a 'Z' on a **Top Right** corner if it is **redrawn**.

Top Layer Layout



If the town name is to be displayed on the Top Layer, then letters should be sorted out as follows:

- 1- 7 left-hand letters on corner cubes (**Top Left**): L, C, P, B, M, T, **D**, white
- 2- 3 center letters on edge cubes (**Top Center**): A, O, E, white
- 3- 9 right-hand letters on corner cubes (**Top Right**): N, R, S, Z, K, H, L, X, **I**, white

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

- 1- 2 edge cubes: (A,O), (E,white)
- 2- 5 corner cubes with *regular* letters: (L,C,P), (B,M,T), (N,R,S), (Z,K,H), (L,X,white)
- 3- 1 corner cube with *mixed* letters: (**D** **Top Left**, **I** **Top Right**, white)

Note 2 – There are no groups of 2 letters of the same town name on the same corner cube (**DRC**).

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

Middle Layer Layout



If the town name is to be displayed on the Middle Layer, then letters should be sorted out as follows:

- 1- 4 left-hand letters on edge cubes (**Middle Left**): R, S, N, **A**, white
- 2- 5 center letters on center cubes: A, I, O, T, Y, white
- 3- 4 right-hand letters on edge cubes (**Middle Right**): D, C, H, **O**, white

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

- 4- 2 edge cubes with *regular* letters **Middle Left**: (R,S), (N,white)
- 5- 2 edge cubes with *regular* letters **Middle Right**: (D,C), (H,white)
- 6- 1 edge cube with *mixed* letters: (**A** **Middle Left**, **O** **Middle Right**)
- 7- 6 center cubes: A, I, O, T, Y, white

Note 3 – There are no groups of 2 letters of the same town name on the same edge cube (**DRC**).

So, now there are 5 edge and 2 corner cubes left that can be used for the Bottom Layer.

Bottom Layer Layout

Bottom Layer – Displaying Time Offsets that are *inside* the [UTC-10, UTC+10] range

Honolulu UTC Time Offset

–

1

0

Summer Time in Moscow

DST

2

New Dehli UTC Time Offset

+

5

:30

The UTC Time Offset is displayed on the Bottom Layer. Then symbols and numbers should be sorted out as follows:

- 1- Symbols on the left-hand corner cube: +, -, DST or white
- 2- Numbers on the right-hand corner cube: 0, :30, white
- 3- Numbers on the bottom center edge cube, *logically* grouped two by two:
(0,1), (2,3) , (4,5) , (6,7), (8,9)

Note 4 – Due to Cube symmetry properties, an 'O' and an 'H' on a **Middle Right** edge cube are transformed into the same 'O' and 'H' on the opposite **Middle Left** edge cube. Conversely, an 'N' on a **Middle Left** edge cube is transformed into the same 'N' on a **Middle Right** edge cube. This would lead to the addition of more letters to be used on both sides of the Middle Layer.

Additional Letters (Some may have to be redrawn)		
Letters Top Left on corner cubes	Rotation	Letters Top Right on corner cubes
L, C, P, B, <u>M</u> , T, D		<u>N</u> , R, S, <u>Z</u> , K, H, L, <u>X</u> , I
Z (<u>N</u>), N (<u>Z</u>), X (<u>X</u>), — (I) – Z N X only if redrawn	←90°	
Letters Middle Left on edge cubes	Rotation	Letters Middle Right on edge cubes
R, <u>S</u> , <u>N</u> , A		D, C, <u>H</u> , O
H , O	←180°→	N , S (<u>S</u> if redrawn)
Letters and Numbers Orientation – Recap		
Top Left – Corner cubes	Top Center – Edge cubes	Top Right – Corner cubes
L, C, P, B, M, T, D	A, O, E, white	N, R, S, Z, K, H, L, X, I
Middle Left – Edge cubes	Middle Center – Center cubes	Middle Right – Edge cubes
R, S, N, A	A, I, O, T, Y, white	D, C, H, O
Bottom Left – Corner cubes	Bottom Center – Edge cubes	Bottom Right – Corner cubes
+, -, DST or white	0, 1, 2, 3, 4, 5, 6, 7, 8, 9	0, :30, white

Note 5 – There are letters that are lacking and which could also have been used. For example the 'K' of 'Kuala Lumpur' or 'Kabul' and the 'G' of 'BaGdad'. As it would have been impossible to have *all* 3 letters combinations on a 3x3x3 Cube, I have selected town or place names that provide a coverage of *nearly all* Time Offsets around the globe from UTC-10 up to UTC+10 in :30 steps. Remember that this cube is about UTC Time Offsets and *definitely not* about town names. BTW, a Global Town Names Composer Cube would be another great cube...

Note 6 – There is a list of Time Zones in http://en.wikipedia.org/wiki/List_of_time_zones stating that Time Offsets can vary from UTC-12 up to UTC+14 around the globe. However, in *this* design, I have chosen to display :30 min offsets, then there is no place left for a '1' or a '2' or a '3' or a '4' on a **Bottom Right**-hand corner cube. So, for displaying Time Offsets that are outside the [UTC-10, UTC+10] designed range, simply use the number on the **Bottom Center** layer as the *last* digit of the Time Offset value. See the following examples:

Bottom Layer – Displaying Time Offsets that are *outside* the [UTC-10, UTC+10] range

Baker Island (UTC-12=-10-2)

–

2

Tarawa (UTC+14=+10+4)

+

4

Tonga (UTC+13=+10+3)

+

3

Examples

TL	TC	TR	H	O	N	L	A	
ML	MC	MR						
BL	BC	BR	-	1	0	-	8	
D	E	N	B	A	L			
						N	Y	C
-	7		-	5		-	5	
C	A	R	M	O	N	L	O	N
-	4	:30	-	3		+	0	
P	A	R	B	E	R	M	O	S
DST	2		+	1		+	3	
T	E	H	B	A	K	H	Y	D
+	3	:30	+	4		+	5	:30

Solving a Time Zone Cube Step by Step

In this example, a step by step solving process is applied to the Time Zone Cube, just described before. Note that we only need to solve a *single* Face out of six. We will solve a Face for LONdon, Winter Time (UTC+0).

Solve the Cross First

Standard Rubik's Cube Solving

Then Solve the Corner Cubes

Standard Rubik's Cube Solving

Step 1

Center **White** on Front Face

Step 2

	O	

Top Layer: Edge Cube **O**

Step 3

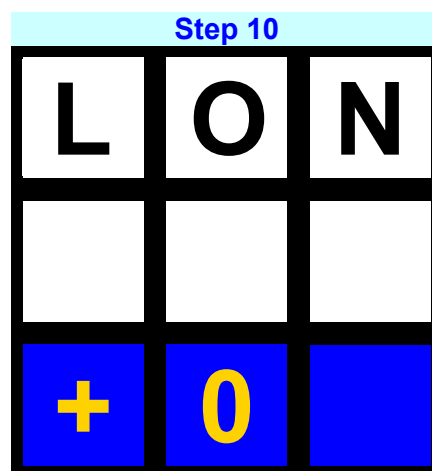
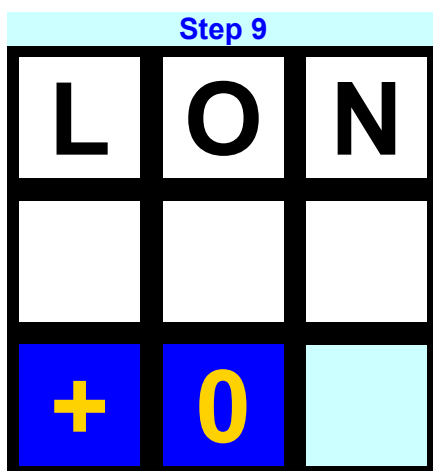
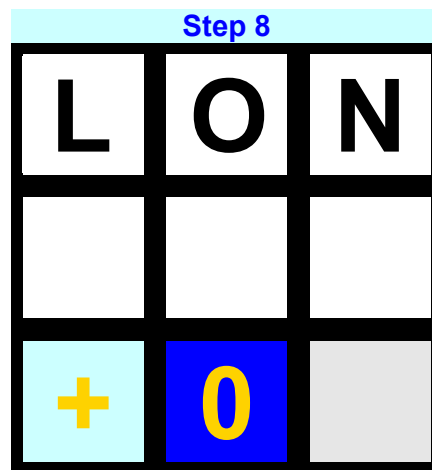
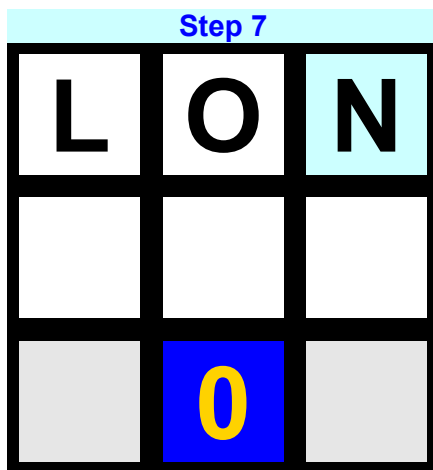
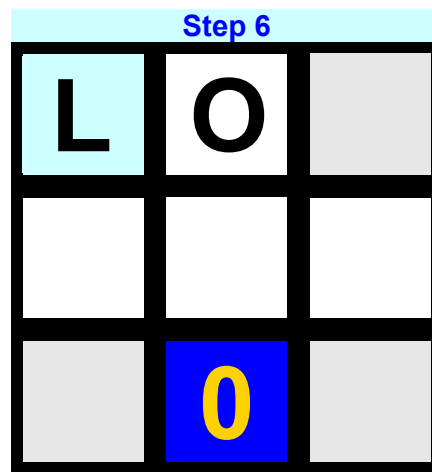
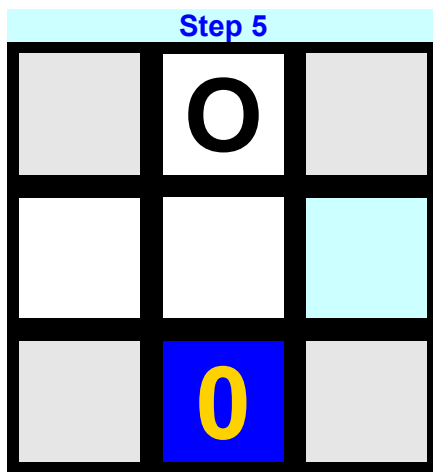
	O	
	0	

Bottom Layer: Edge Cube **0**

Step 4

	O	
	0	

Middle Layer: Edge **White**

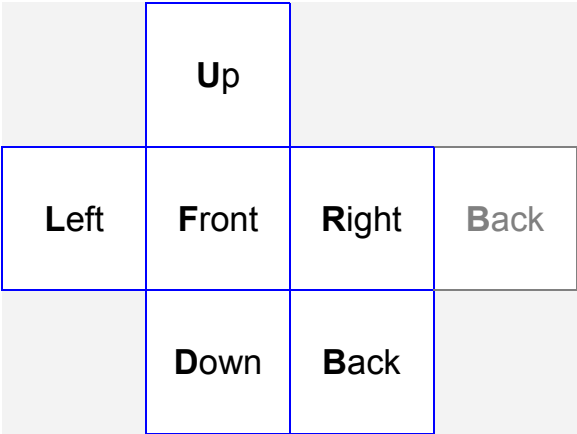
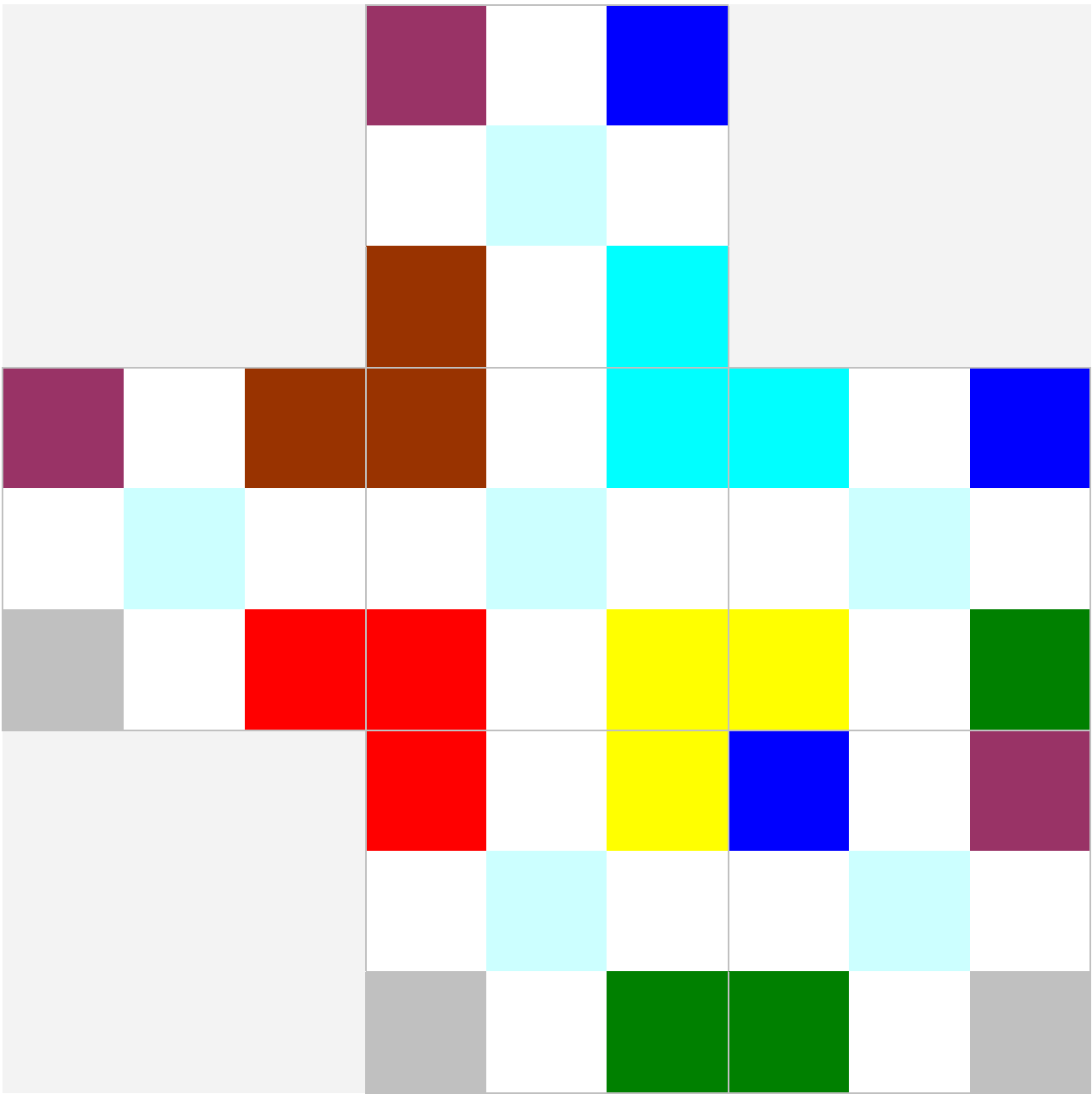


Print out this page and fill in the blank faces with *your* data. Then try to design your *own* Cube.

TL	TC	TR
ML	MC	MR
BL	BC	BR

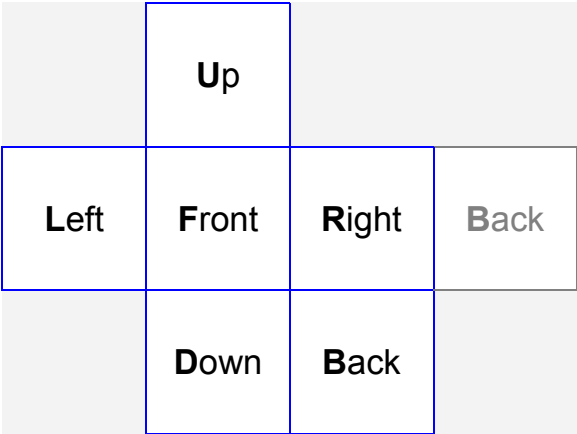
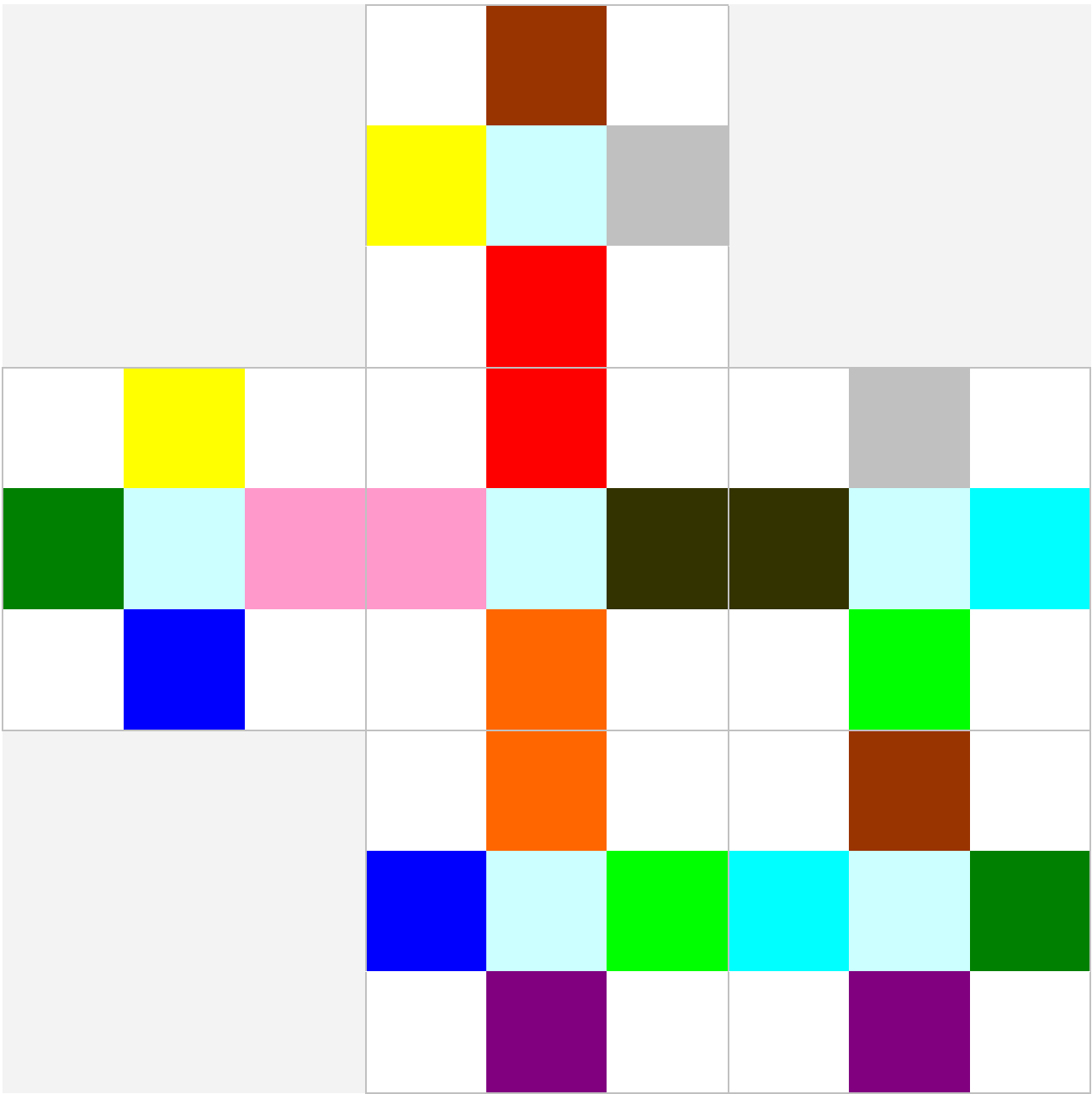
Corner Cubes Final Check

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.

