

3. Orient the Corners Pg 35

Use  $(F \cdot V -)^3 (F - V)^3$  to

execute  $\begin{bmatrix} \leftarrow \\ \leftarrow \\ \leftarrow \end{bmatrix}$  = CCW rotation  
 $\begin{bmatrix} \rightarrow \\ \rightarrow \\ \rightarrow \end{bmatrix}$  = CW rotation  
 $\begin{bmatrix} + \\ + \\ + \end{bmatrix}$  status of element  
Other situations:

a.  $\begin{bmatrix} \rightarrow \\ \rightarrow \\ + \end{bmatrix}$  = in the ECC base frame

Use  $(F \cdot V -)^3 (F - V)^3 (F \cdot V -)^3 (F - V)^3$

$\begin{bmatrix} + \\ + \\ - \end{bmatrix}$

$(F \cdot V -)^3 (F - V)^3 (F \cdot V -)^3 (F - V)^3$

4. Align the Edges (keeping corners fixed) Pg 54



$$(V \cdot R_m)^2 (R_m \cdot V)^2$$

$$R_m = 2R, zL$$

$$U^+ R_m V^2 R_m^- U^-$$

$$R_m = 2R^2 zL$$

$$U^+ R_m V^2 R_m^- U^-$$

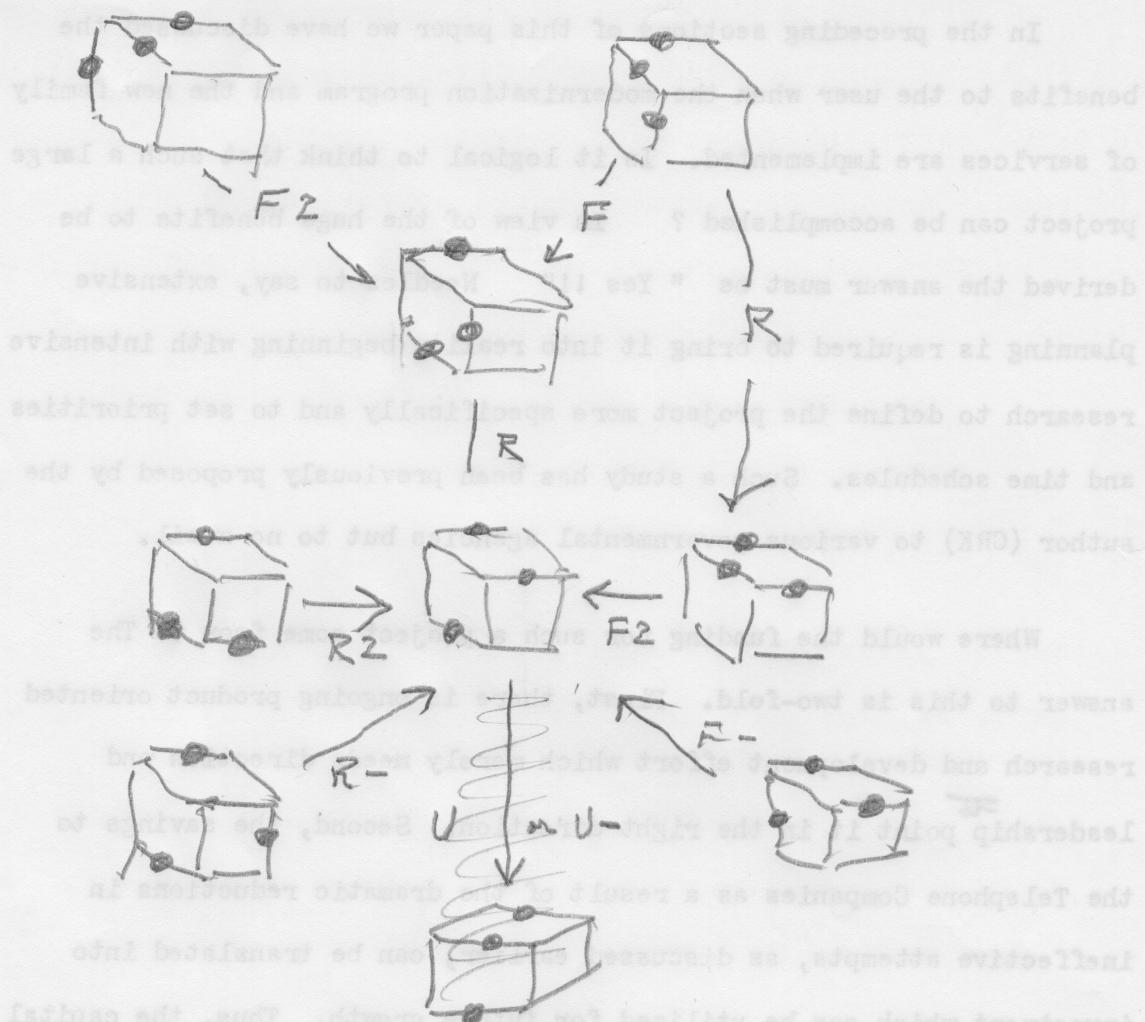
where  $U$  is a group of a rigid transformation that

maps the target space to the source space.

of frames. It is important to note that each frame is defined by its own coordinate system.

4. (cont)

To get edges into a V alignment Pg 55



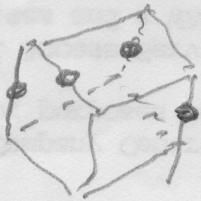
~~Then~~

After  $(F^2 R \wedge F^2 R')$  the V swap

the cube must be returned to correct edge alignment.

It appears that ~~other~~ the target slot ~~now~~ should be the b slot (prev page) and with a V move put a into it or with a V' move not c into it.

5. Flipping the two top edges at the main corner



$$(F U_m^-)^4$$

$$(R - U_m)^4$$

$$U_m = 2UD2D^-$$

$$U_m^- = 2U^-2D$$

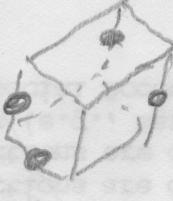
Together



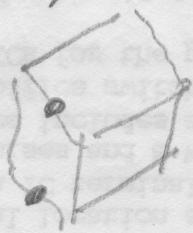
Flipping Two Opposite Edges on  
the Front Face.



$$(F U_m^-)^4$$



$$(F - U_m^-)^4$$



Problems To Rotate Entire Clock

→ Cut down CW  $\begin{matrix} ++ \\ -- \end{matrix} = \begin{matrix} - \\ + \end{matrix}$

$$\begin{bmatrix} - & + \\ - & + \end{bmatrix} = \begin{bmatrix} + & - \\ - & + \\ + & - \end{bmatrix}$$

$$\begin{bmatrix} (+) \\ (-) \\ OK \\ (-) \end{bmatrix}$$

$$\begin{bmatrix} OK & (-) \\ (-) & OK \\ (+) & (+) \end{bmatrix}$$

$$\begin{bmatrix} (-) \\ (-) \\ (+) \end{bmatrix}$$

$v-$

$$(Fv - s^3)(F - v)^3$$

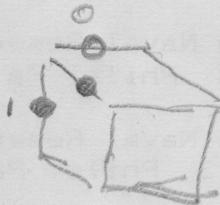
$$(Fv - s^3)(F - v)^3$$

$$\begin{bmatrix} (-) \\ OK \\ (+) \end{bmatrix}$$

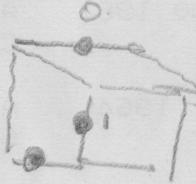
$$\begin{bmatrix} (+) \\ (-) \end{bmatrix}$$

$$\begin{bmatrix} - & + \end{bmatrix}$$

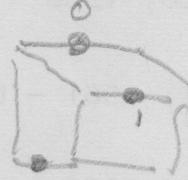
$$(Fu - s^3)(F - u)^3$$



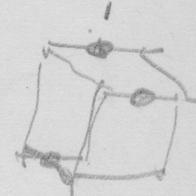
$F_2$



$R$



$v-$



$F_1$

# Examples of Using Transformation Tables - with Edge Swaps



Transformation -  $T_1$  or  $U \cdot (F \cdot U_m)^4$  OK  
 $\text{Use } (R \cdot U_m)^4 \cdot (B \cdot U_m)^4 \cdot (R \cdot U_m)^4 \cdot U \cdot$



Transformations  $T_4, T_4$  or  $R \cdot B \cdot U \cdot U$

$$(B \cdot L_m)^4 \cdot (R \cdot L_m)^4 \cdot (F \cdot U_m)^4$$

$$L_m = 2D - 2U \quad (R \cdot U_m)^4$$

$$L_m^+ = 2D + 2U \quad U \cdot B \cdot R$$



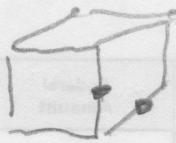
$$R = F \cdot (F \cdot U_m)^4 \cdot (R \cdot U_m)^4 \cdot F = R \cdot R \cdot \text{OK}$$

$$\text{or } R \cdot R = (F \cdot U_m)^4 \cdot (F \cdot U_m)^4 \cdot F = R \cdot R$$



Transformation  $T_4$

$$(U, 2B-, 2F)^4 \cdot (R - 2B, 2F - )^4 \text{ OK}$$



$T_7$

$$(F, 2R-, 2L)^4 \cdot (D-, 2R, 2L-)^4$$



$T_4 \cdot T_1$

$$(R \cdot 2B-, 2F)^4 \cdot (D - 2B, 2F - )^4 \text{ OK}$$

NO	YES
<input type="checkbox"/>	<input type="checkbox"/>

Write the name of the following country

# TRANSFORMATION TABLES

Pg 77

	F	2F	L	2L	B	2B	R	2R	D	2D	U	2U
T1 1/4 CW	R	2R	F	2F	L	2L	B	2B	D	2D	U	2U
T2 1/2 T	B	2B	R	2R	F	2F	L	2L	D	2D	U	2U
T3 1/4 T CW	L	2L	B	2B	R	2R	F	2F	D	2D	U	2U

	F	2F	L	2L	B	2B	R	2R	D	2D	U	2U
T4 1/4 T CW	U	L	D	R	F	P	H	B				
T5 1/2 T	B	L	F	R	U	D						
T6 1/4 T CW	D	L	U	R	B	P						

	F	2F	L	2L	B	2B	R	2R	D	2D	U	2U
T7 1/4 T CW	F	U	B	D	L	R						
T8 1/2 T	F	R	B	L	U	V	D					
T9 1/4 T CCW	F	D	B	V	R	L						

Apply Table in reverse order

i.e T4 + T1 read into T1 Table first then T4

reverse  
order

Date Due

Prepared

Date Submitted

Scored

Grade