

Introduction

There are many tutorials available for the classic 3X3X3 Rubiks Cube on the net. But if you are looking for bigger once like 5X5X5 or 7X7X7, it is getting very complicated, sometimes even wrong, or you are forced to use some u-tube videos, which you do not understand or which are too fast to recognize how it works.

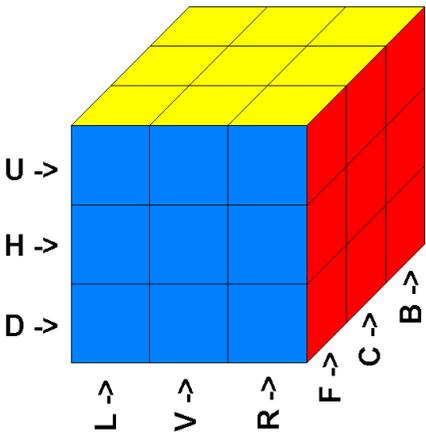
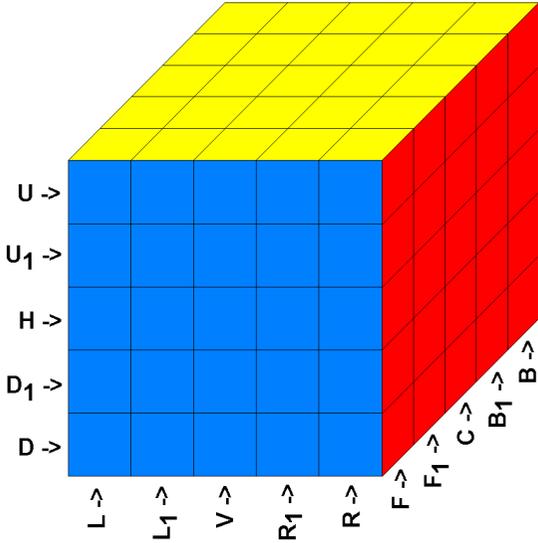
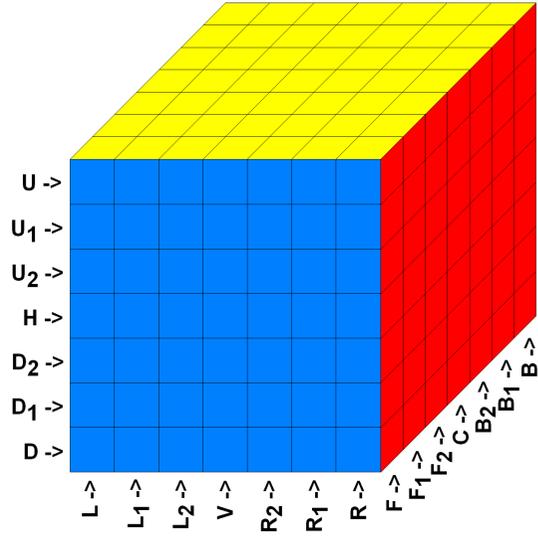
This tutorial is made for those of you, who are looking for a Rubiks Cube solution which is easy to understand complete and correct. The target was to find a solution for every "odd" number Rubiks Cube, where every solution for bigger cubes is based on the already learned facts of the smaller once, and only as few additional moves as necessary are to be learned. This is not the fastest solution like speedcuber would like to use.

First of all I will explain some definition, which are necessary to understand the following steps.

Notation

Level

The levels are defined as follows, to be able to use the same notation for the german and english tutorial.

3X3X3	5X5X5	7X7X7
		

Bezeichnung der Ebenen

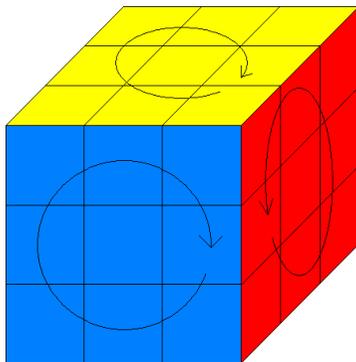
U = Up
H = Horizontal
D = Down
L = Left
V = Vertical
R = Right
F = Front
C = Centre
B = Back

All levels of the 3X3X3 cube you will also find on the 5X5X5 and 7X7X7 cubes. Each bigger cube has definitions of additional levels, which have an additional index to there base level.

Turns

The following turns are clockwise quarter turns (90°) and are defined by their level names, which has to be turned.

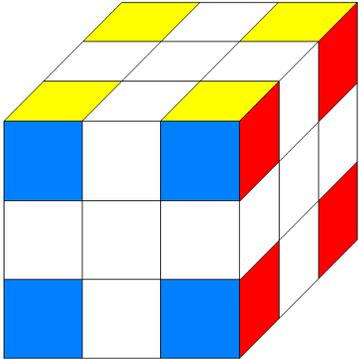
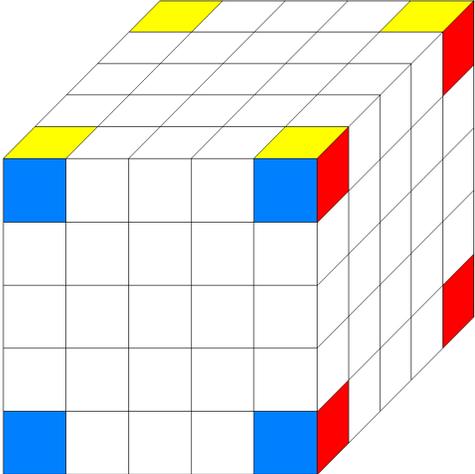
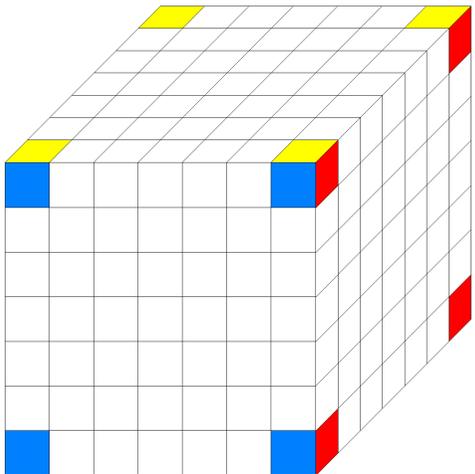
Counter clockwise turns are marked with a „ ' “ after their level names. For example **L** means a 90° clockwise turn of level **L** (like the arrow on the red surface, displayed on the picture below), and **L'** a 90° counter clockwise turn of level **L**. For a 180° turn, the notation would be **2L**. No matter which direction to turn.



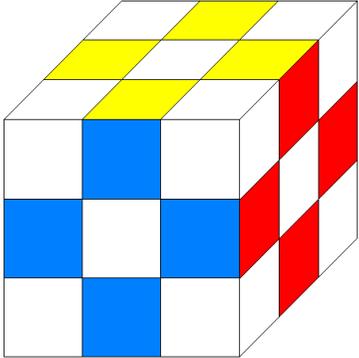
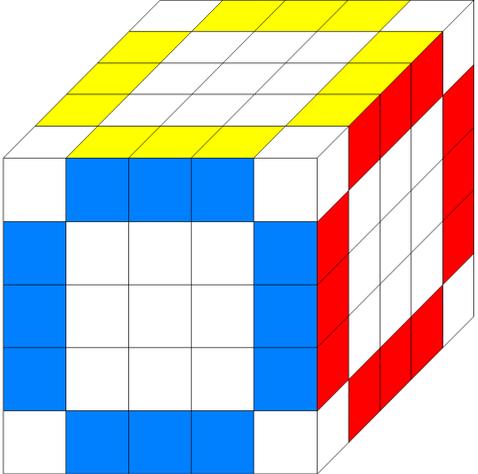
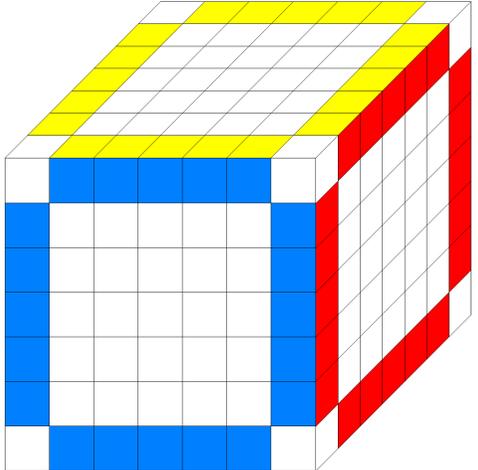
The elements of a cube

Each cube consists of the following elements.

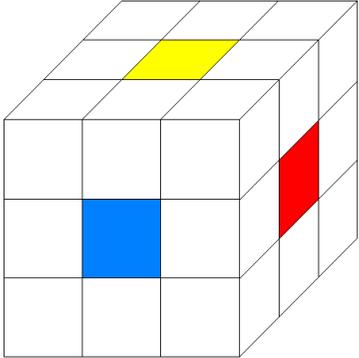
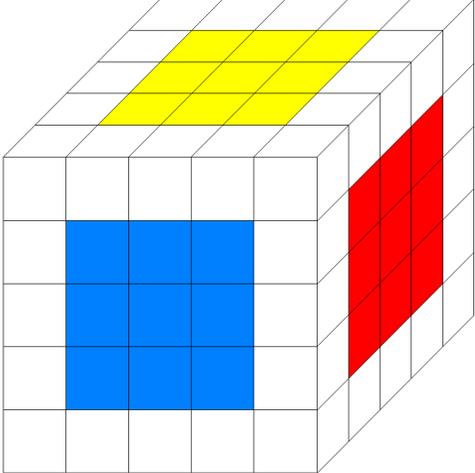
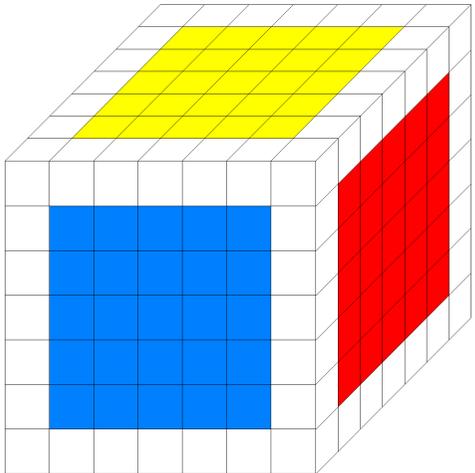
Corners

3X3X3	5X5X5	7X7X7
		

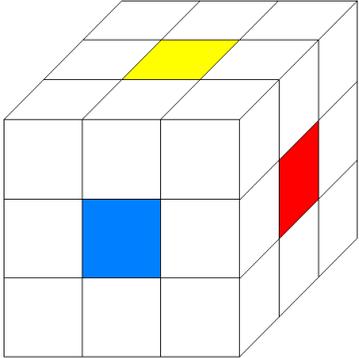
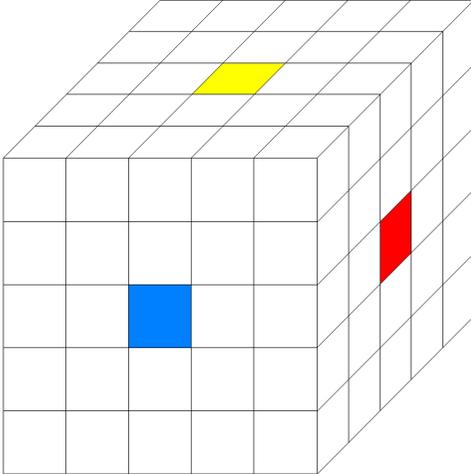
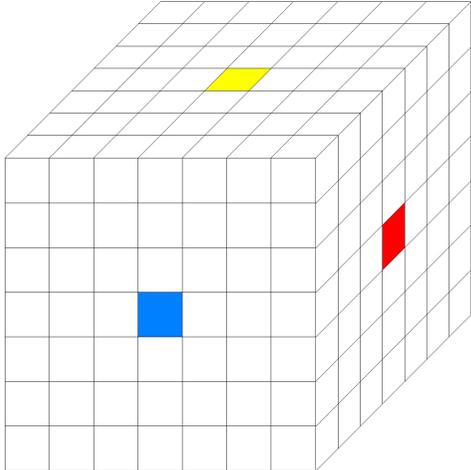
Edges

3X3X3	5X5X5	7X7X7
		

Planes

3X3X3	5X5X5	7X7X7
		

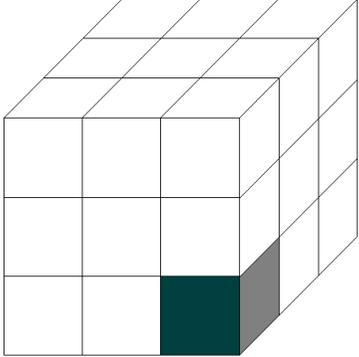
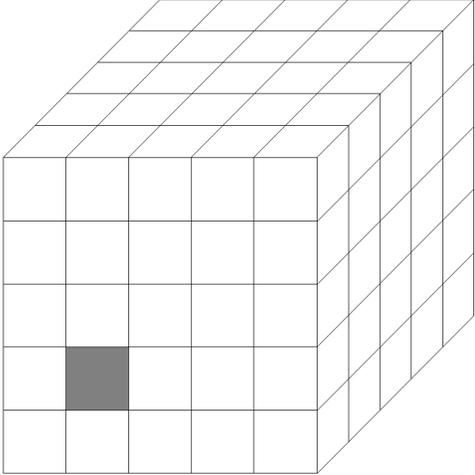
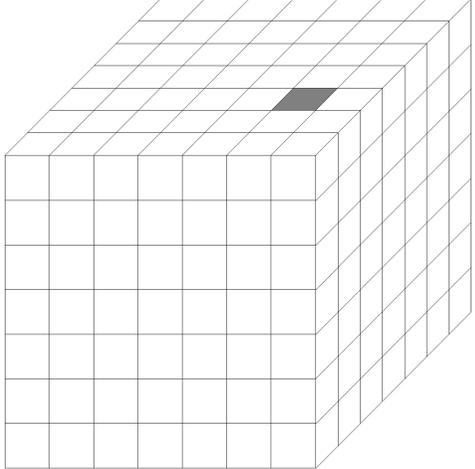
Center Planes

3X3X3	5X5X5	7X7X7
		

Note:
 The center planes of a cube are special, because these are the only elements which are fixed. They can not be moved or swapped against each other. That's the reason why it is important to adjust the colours according to their central planes.

Addressing of elements

Each element of a cube can be addressed through the three levels where it resides.

3X3X3	5X5X5	7X7X7
 <p data-bbox="129 1018 492 1050">Example – Element: DRF</p>	 <p data-bbox="790 1023 1167 1054">Example – Element: D₁L₁F</p>	 <p data-bbox="1451 999 1827 1031">Example – Element: UR₁F₂</p>

Step by step

The colours of different cubes may differ. That's why the pictures of this tutorial do not use any colours.

The first steps of this tutorial should be manageable without an exact description. For all further steps, there will be a step by step description available.

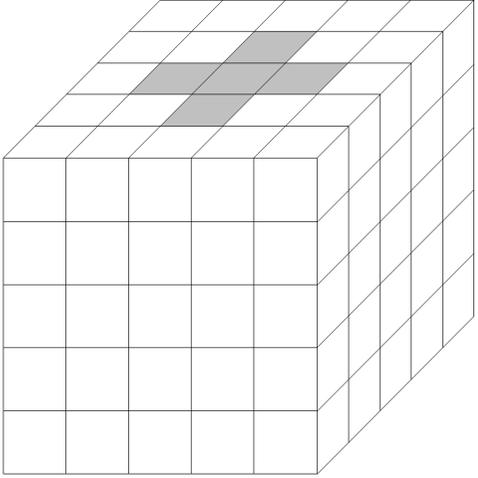
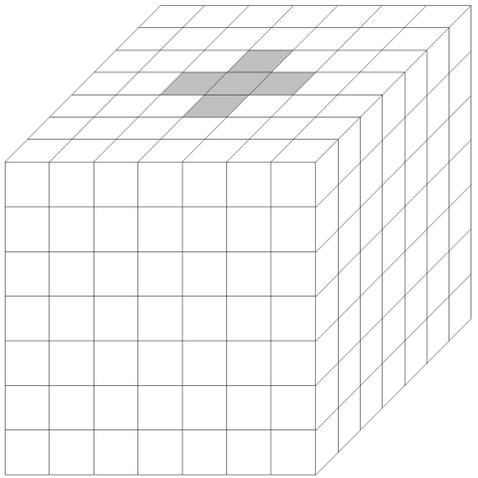
If there is no description available for your cube size, this means this step can be skipped.

Adjusting the inner planes of level UV and UC

Rubiks Cube Tutorial

for odd number cubes

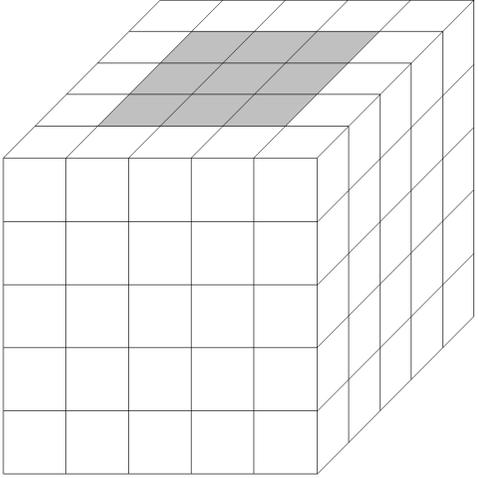
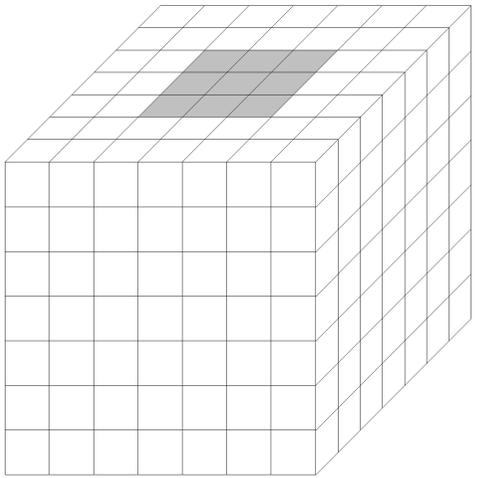
Choose a colour of your choice (center plane) and place the other inner planes as shown in the picture below.

3X3X3	5X5X5	7X7X7
	 <p>Place the following planes: UVF₁, UL₁C, UR₁C, UVB₁</p>	 <p>Place the following planes: UVF₂, UL₂C, UR₂C, UVB₂</p>

Rubiks Cube Tutorial

for odd number cubes

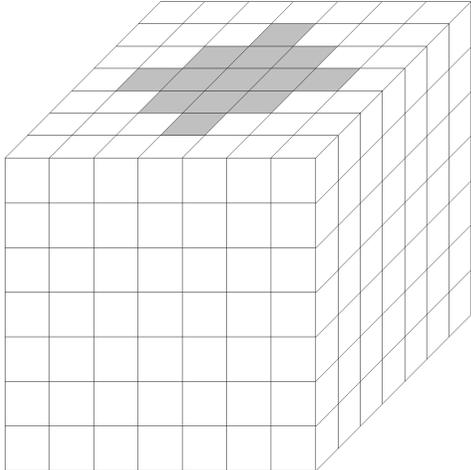
Place the remaining planes

3X3X3	5X5X5	7X7X7
	 <p>Place the following planes: UL₁F₁, UR₁F₁, UL₁B₁, UR₁B₁</p>	 <p>Place the following planes: UL₂F₂, UR₂F₂, UL₂B₂, UR₂B₂</p>

Rubiks Cube Tutorial

for odd number cubes

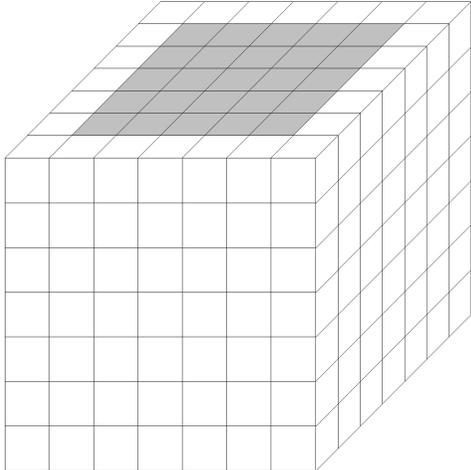
Place the center planes of UV and UC

3X3X3	5X5X5	7X7X7
		 <p data-bbox="1444 933 1825 1005">Place the following planes: UVF₁, UL₁C, UR₁C, UVB₁</p>

Rubiks Cube Tutorial

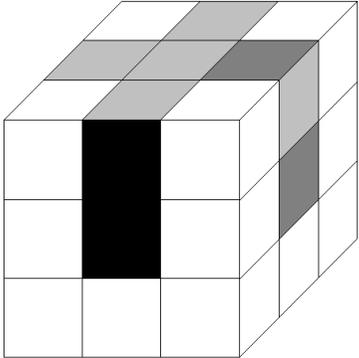
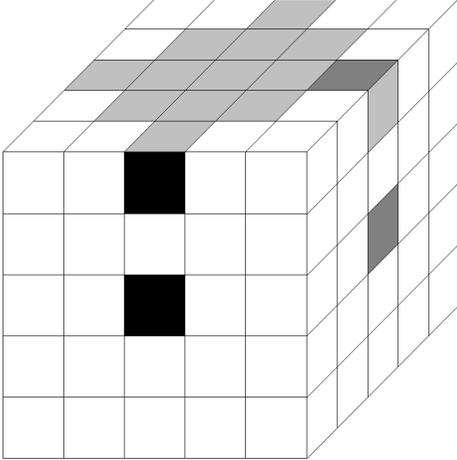
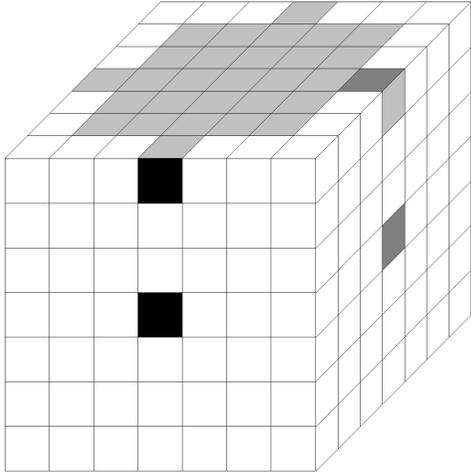
for odd number cubes

Place the remaining inner planes

3X3X3	5X5X5	7X7X7
		 <p>Place the following planes: UL₁F₁, UR₁F₁, UL₁B₁, UR₁B₁ UL₁F₂, UR₁F₂, UL₁B₂, UR₁B₂ UL₂F₁, UR₂F₁, UL₂B₁, UR₂B₁</p>

Place the edges of level U

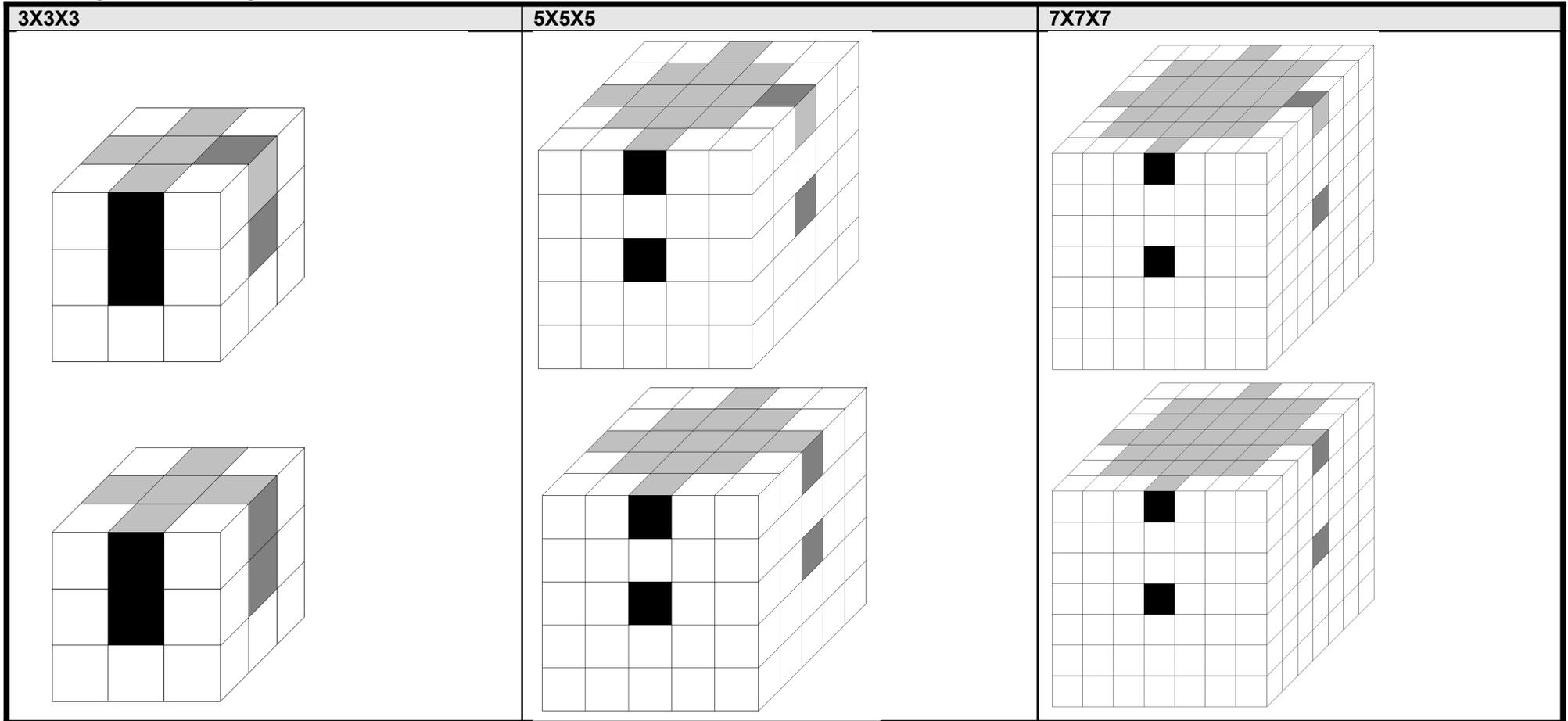
Start to place the edges of level U according to the central planes of level H. The orientation of the edges may be wrong at this time (see the pictures below). That does not matter. In the next step we can correct this.

3X3X3	5X5X5	7X7X7
<p>Suchen Sie sich eine beliebige Farbe (zentrale Fläche) aus.</p>  <p>The edge URC may have the wrong orientation. This can be fixed during the next steps.</p>	 <p>The edge URC may have the wrong orientation. This can be fixed during the next steps.</p>	 <p>The edge URC may have the wrong orientation. This can be fixed during the next steps.</p>

Turning the URC edge

If one or more edges of level U have the wrong orientation, this can be corrected during the next steps. If additional edges of level U need to be corrected, you need to turn the level U (not the whole cube) until the edge is on position URC. After all edges have the corrected orientation, you need to turn the level U until it has the correct assignment to the central planes of level H again.

Turning the **URC** edge: **R', H', R', H', R', H', R', H'**

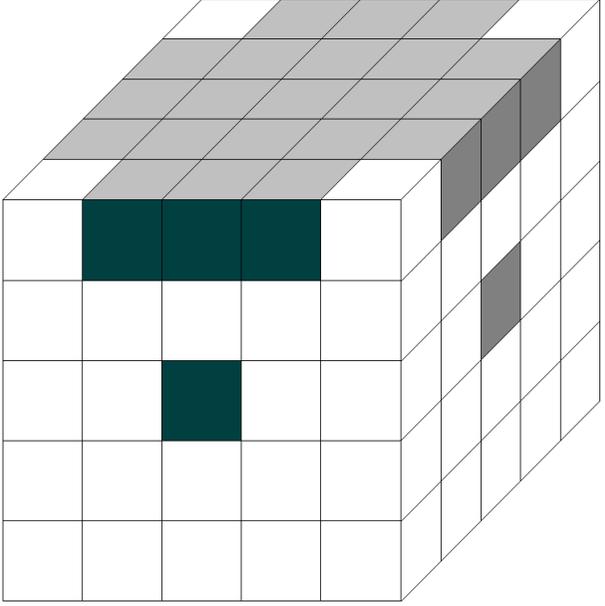
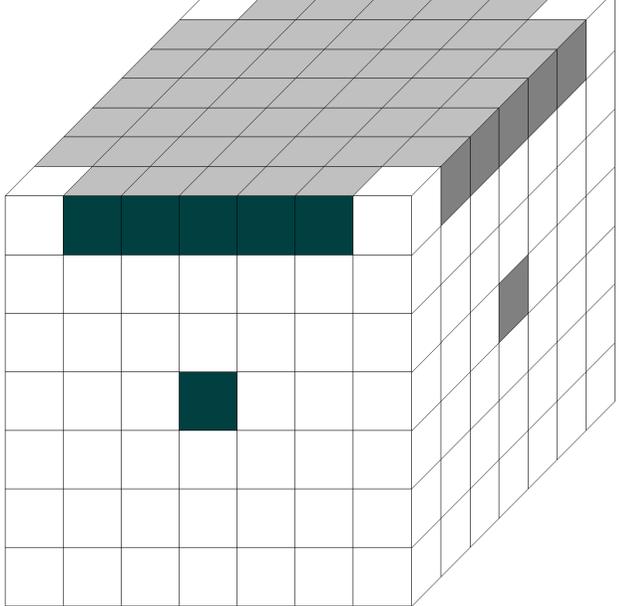


Rubiks Cube Tutorial

for odd number cubes

Place the remaining edges of level U

This can be done easily without any special instruction.

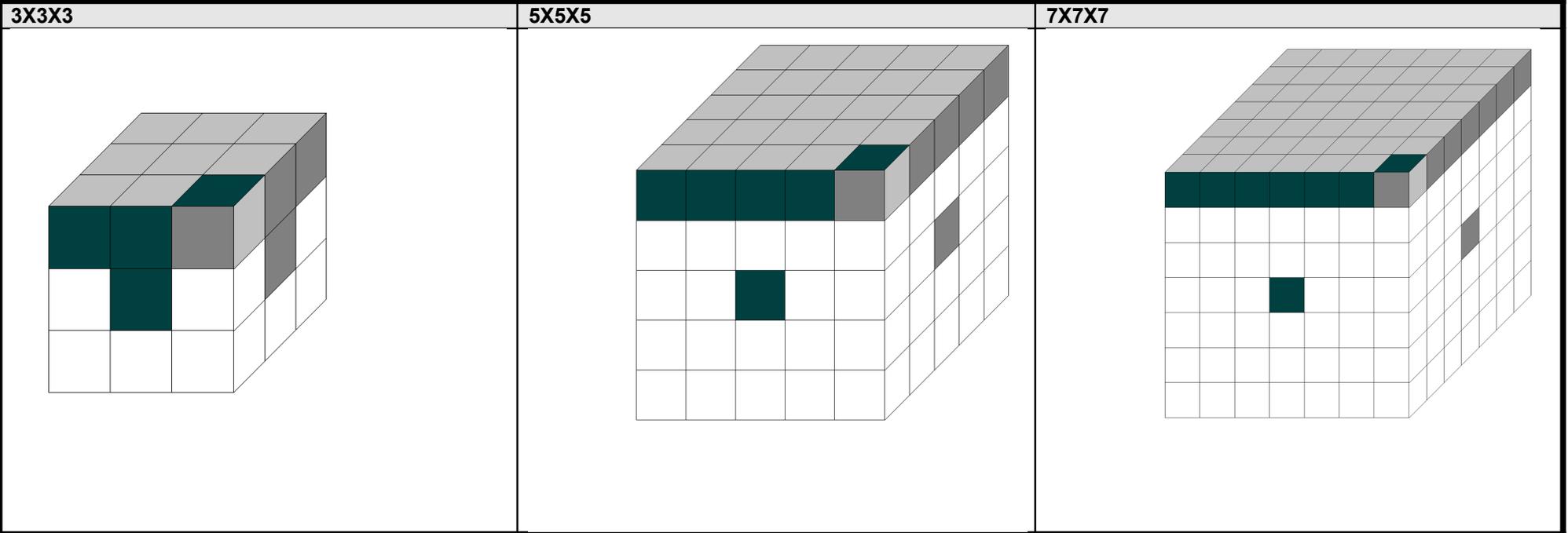
3X3X3	5X5X5	7X7X7
		

Rubiks Cube Tutorial

for odd number cubes

Place the corners of level U

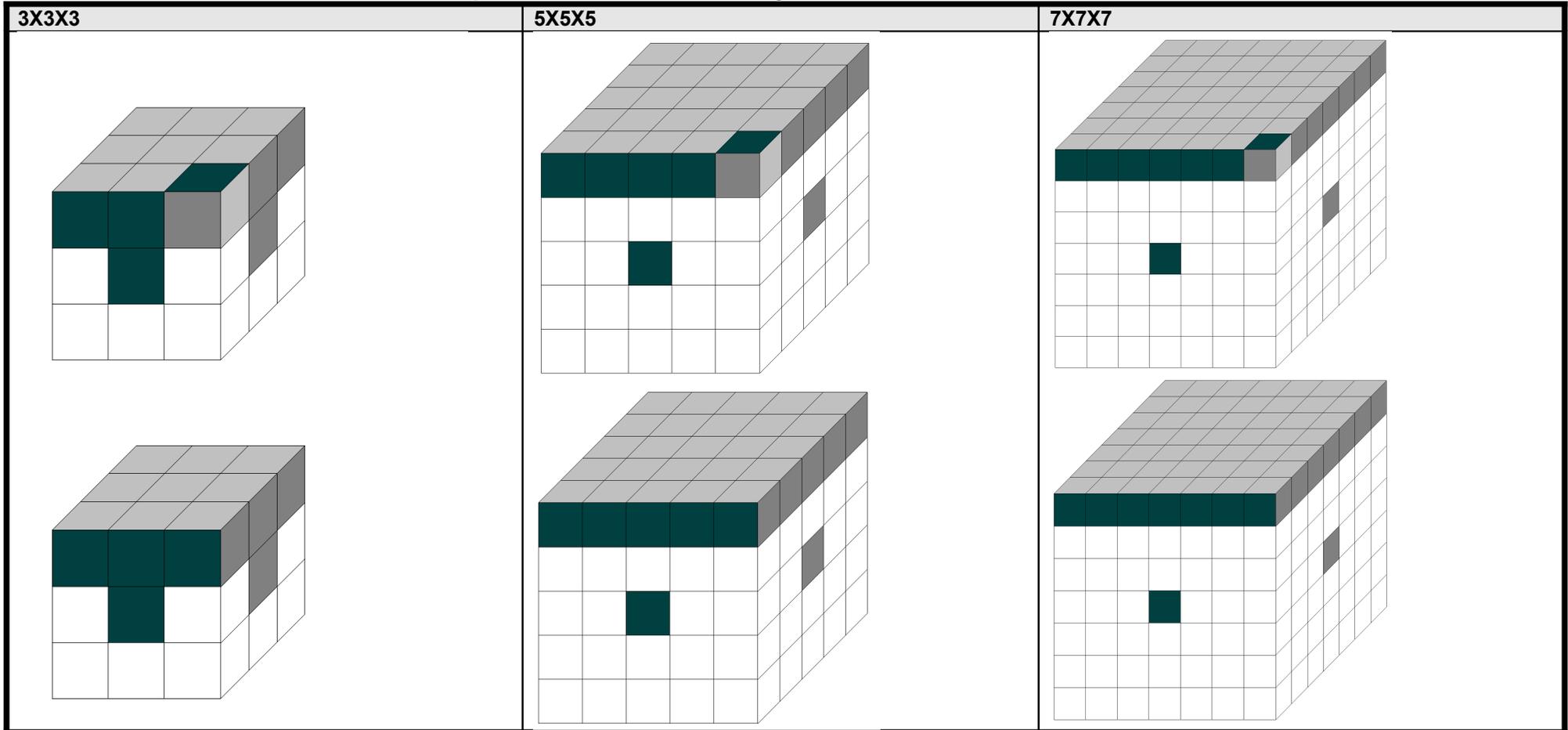
Start to place the corners of level U according to the central planes of level H. The orientation may still be wrong at this point. This can be corrected during the next steps.



Turn the corner URF

If one or more corners of level U have the wrong orientation, you need to do the following steps to correct this. If there is more than one corner to be adjusted, you need to turn level U (not the whole cube) until this corner is on position URF. After all corners have been set to the correct orientation, you may need to turn level U again to have the correct assignment to their central planes of level H.

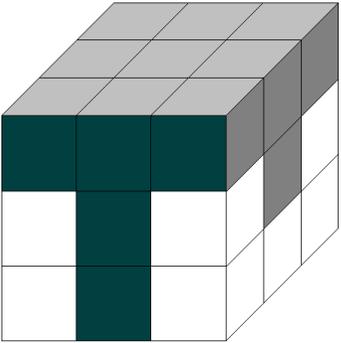
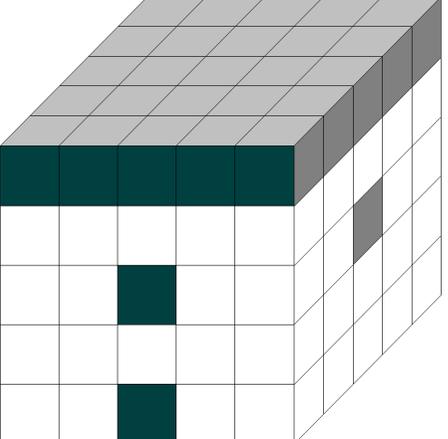
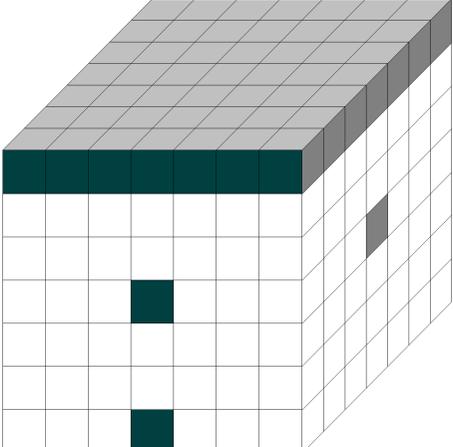
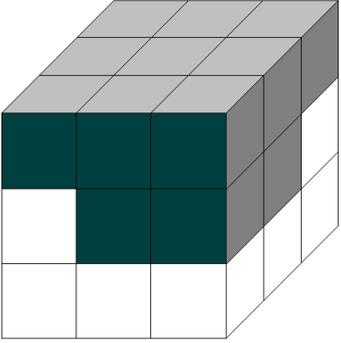
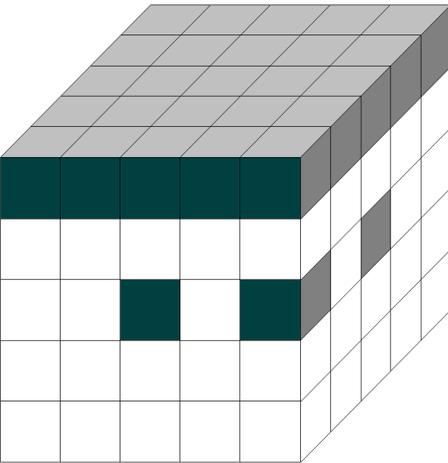
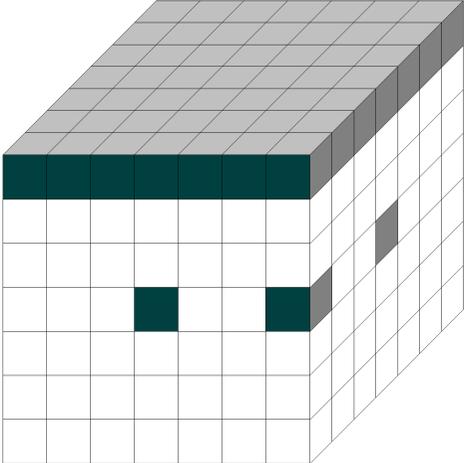
Turn the corner URF: R', F', R, F... repeat as often as necessary, until the corner has the correct orientation.



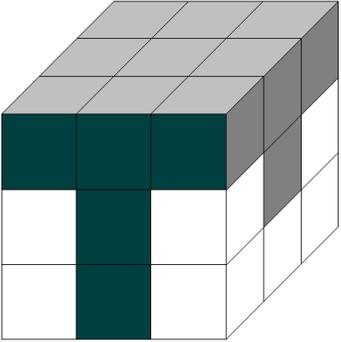
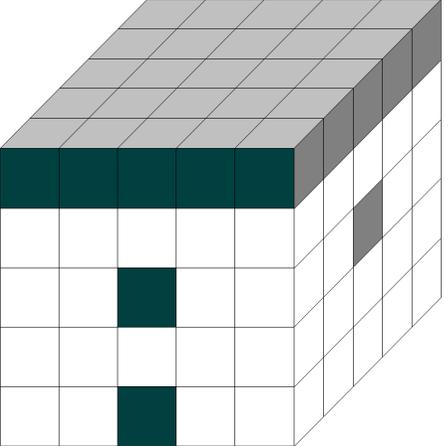
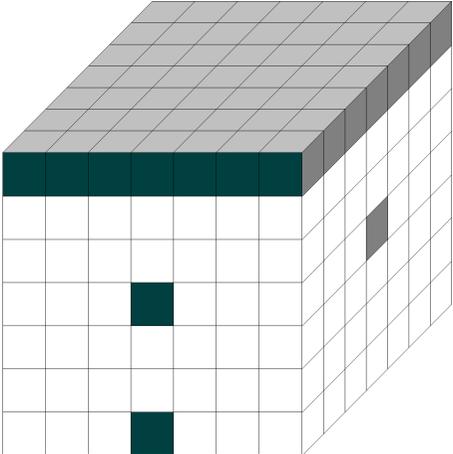
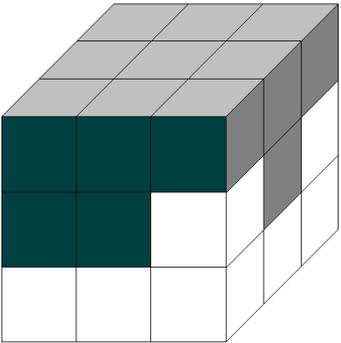
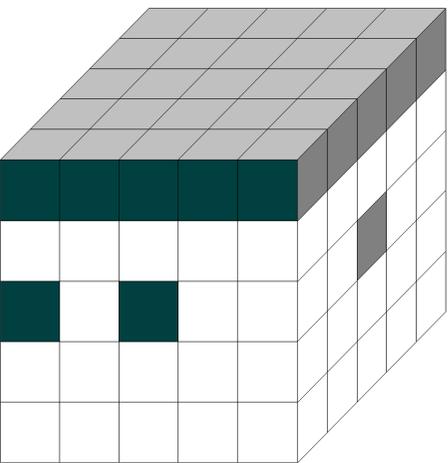
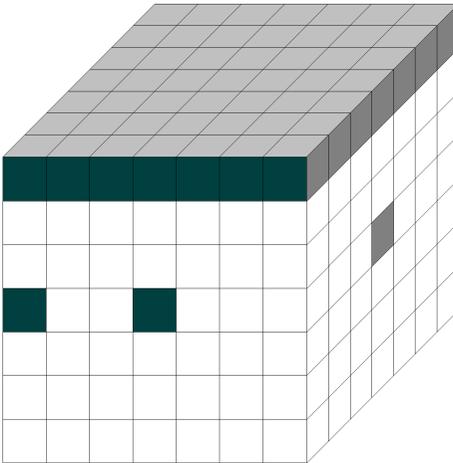
Swapping edges DVF ↔ HLF or DVF ↔ HRF

The target is to place the edges of level H correctly. To achieve this you can swap the edges of level D with the ones on level H. Depending on the location of the edge (left or right) you can use one of the following steps.

Swapping edges DVF ↔ HRF: D, R, D', R', D', F, D, F'

3X3X3	5X5X5	7X7X7
		
		

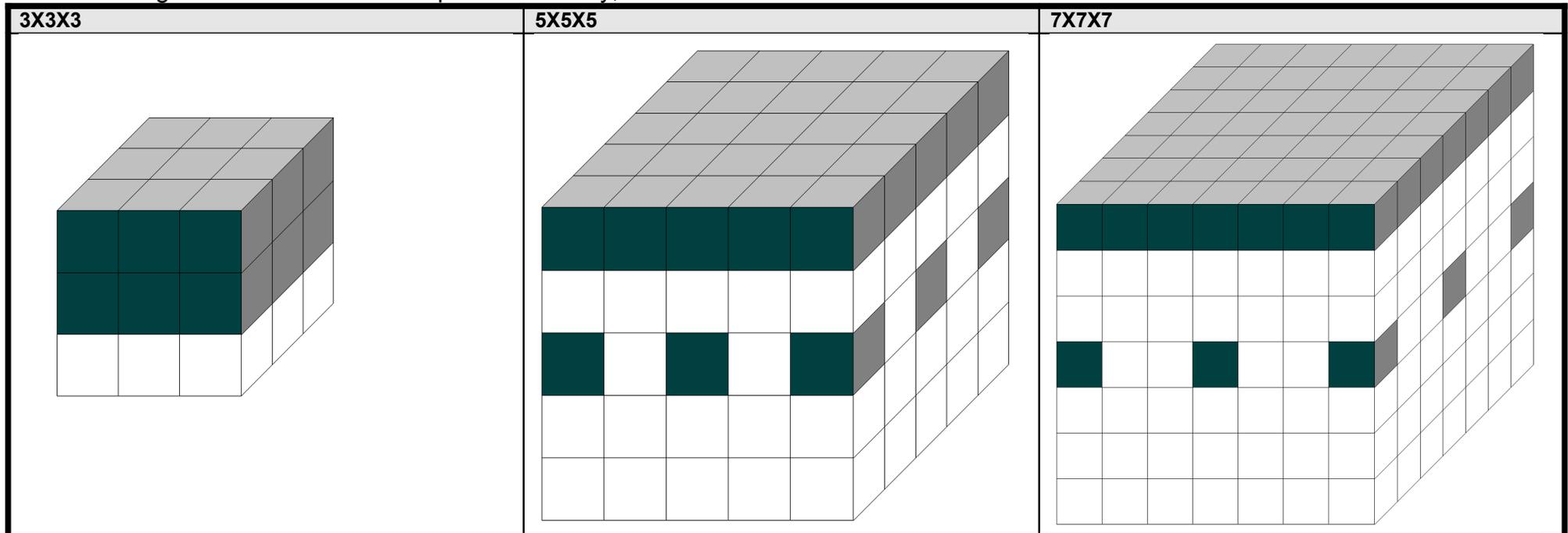
Swapping edges DVF $\leftarrow \rightarrow$ HLF: D', L, D, L', D, F', D', F

3X3X3	5X5X5	7X7X7
		
		

Rubiks Cube Tutorial

for odd number cubes

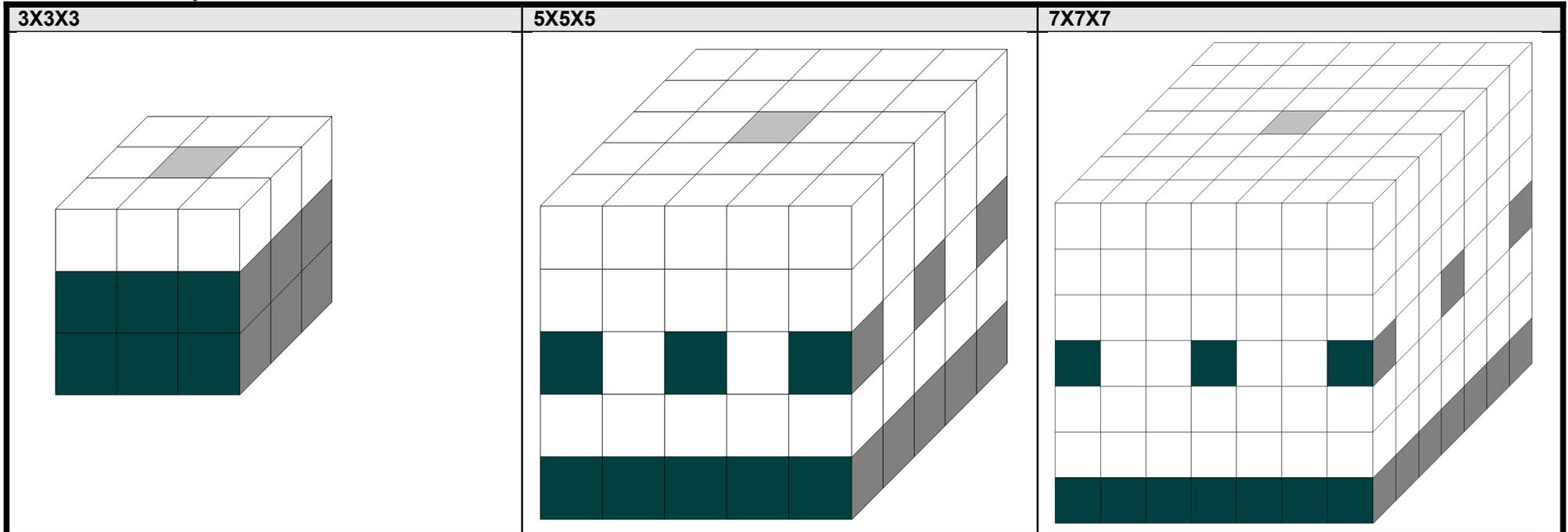
When all edges of level **H** have been placed correctly, the cube should look like this:



Note:

For the following steps, the cube will be turned upside down (Level U \leftarrow \rightarrow Level D).
This simplifies not only the drawings, but also the view on the cube and its elements.

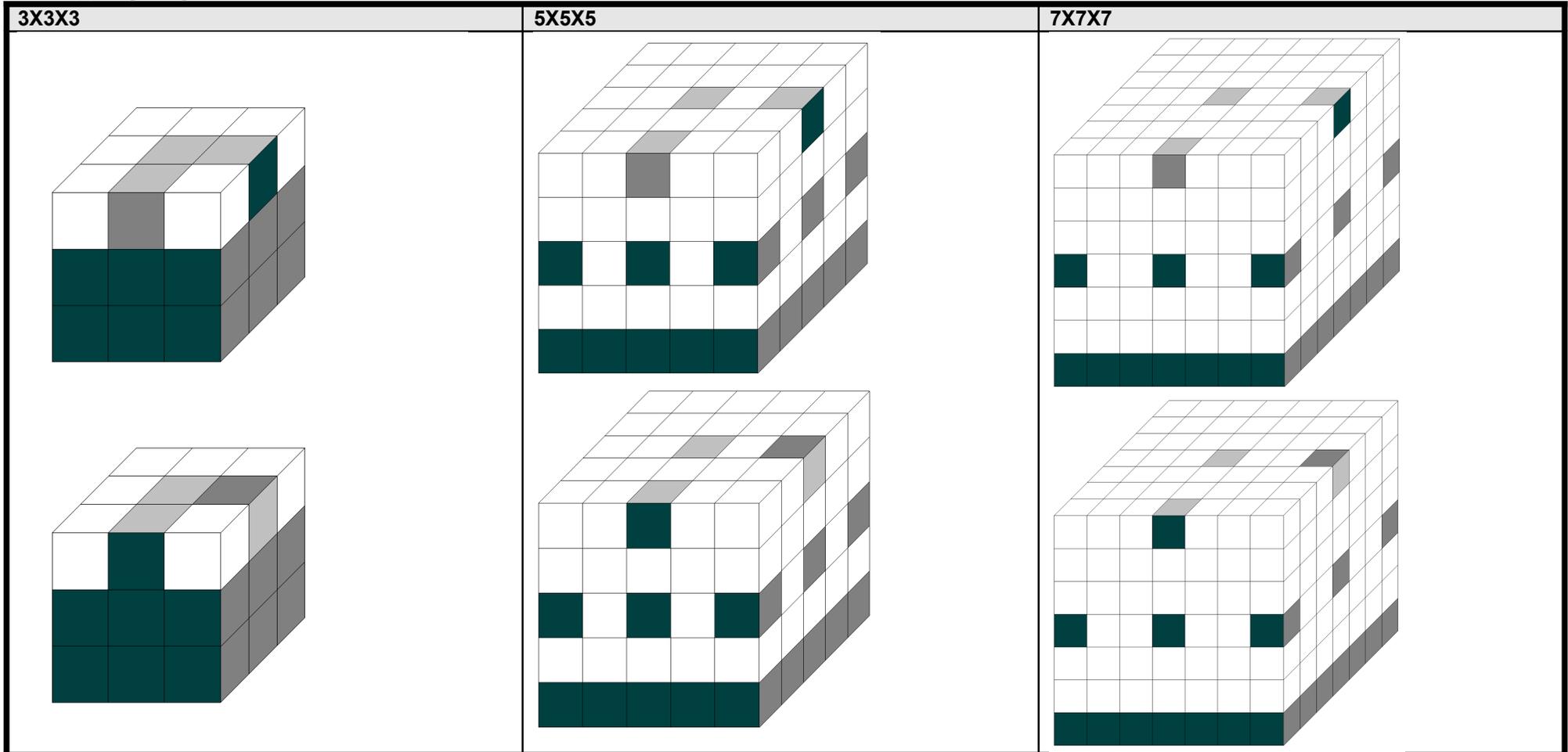
Cube turned upside down:



Place the edges of level U

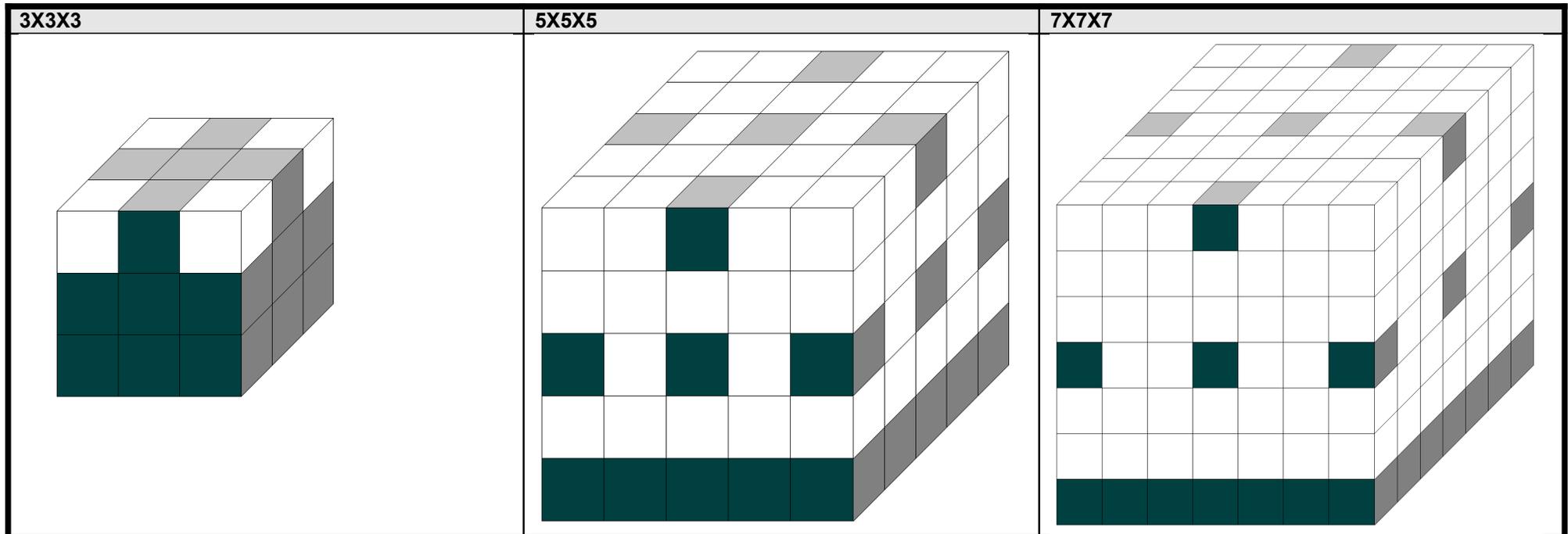
The target of this step is to assign the edges of level U to their central planes of level H. If all edges of level U can be placed correctly just by turning level U, this step can be skipped, otherwise the edges of level U can be corrected step by step, by swapping two edges of level U against each other. In the last step it may be needed to turn level U again to adjust all edges correctly.

Swapping edges UVF $\leftarrow \rightarrow$ URC: U, R', B', U, B, U', R



Note:

If one or more edges have the wrong orientation, this can be corrected as described under „Turning edge URC“ at the beginning of this tutorial. Afterwards the cube should look like this:

**Place the corners of level U:**

If all corners of level U are already placed correctly, this step can be skipped.

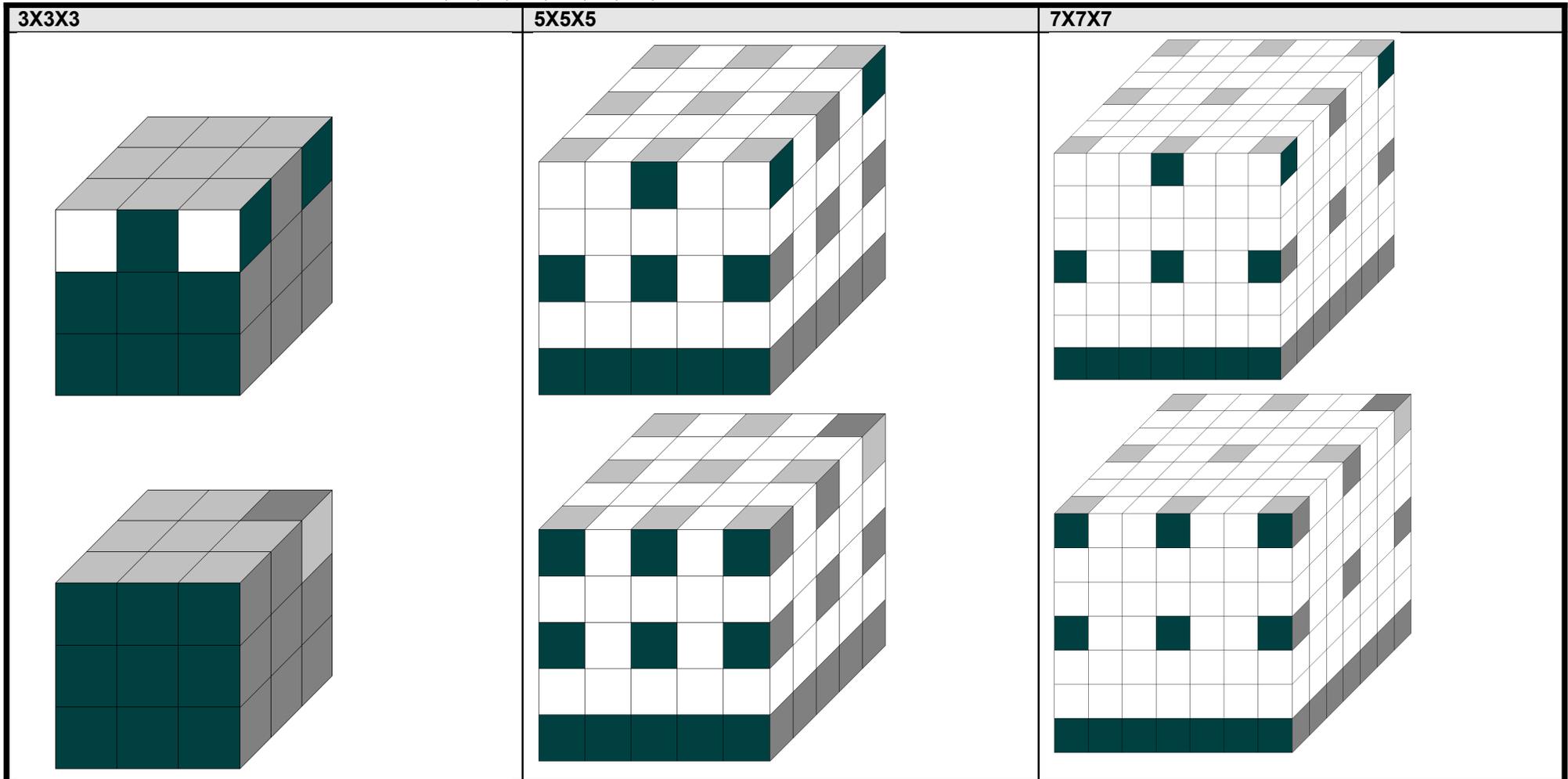
If not, level U needs to be turned so, that **only one corner** is placed at its correct position. The correct orientation is not important at this step.

If there are always two corners placed correctly, this step has to be used one time, no matter what position level U has. This will ensure the right starting point for the next steps.

Move corners **ULF** → **URB** → **URF**:

Turn the cube in a position, where the only correctly placed corner is at position ULB. Afterwards use the following step one or two times (depending on the position of the corners).

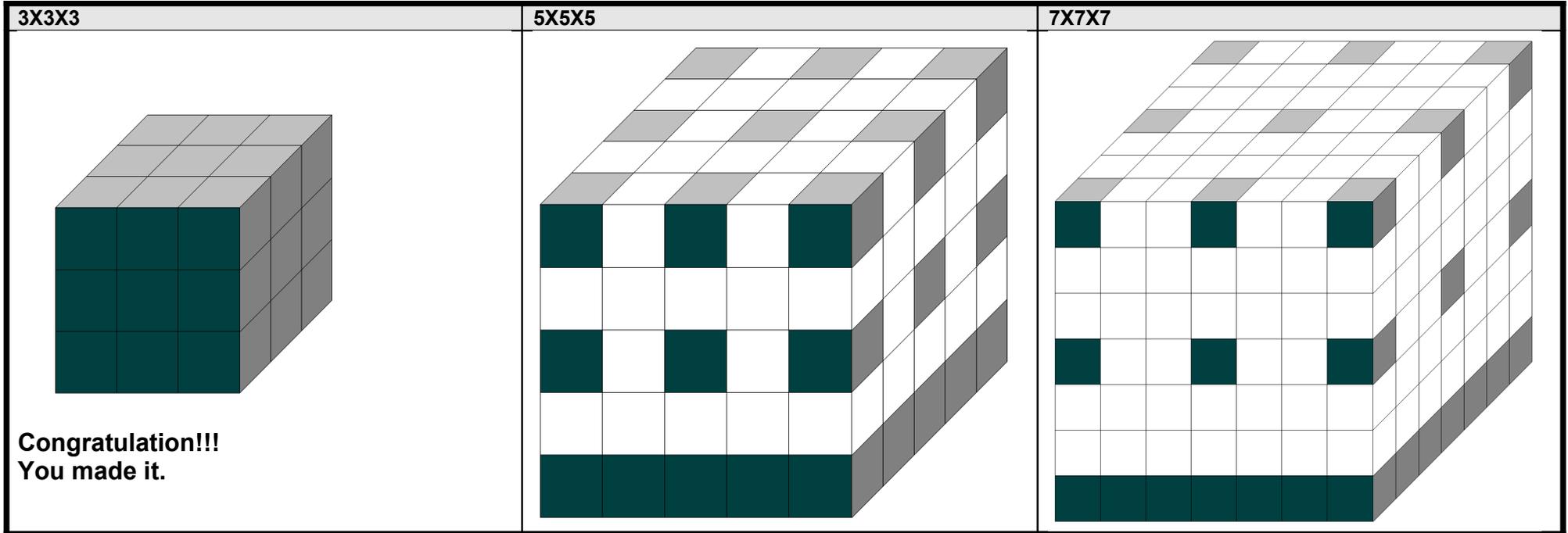
Move corners **ULF** → **URB** → **URF**: **R, U, L, U', R', U, L', U'**



Rubiks Cube Tutorial

for odd number cubes

Note:
If one or more corners have a wrong orientation, this can be fixed as described under „Turn corner URF“ at the beginning of this tutorial. Afterwards the cube should look like this.

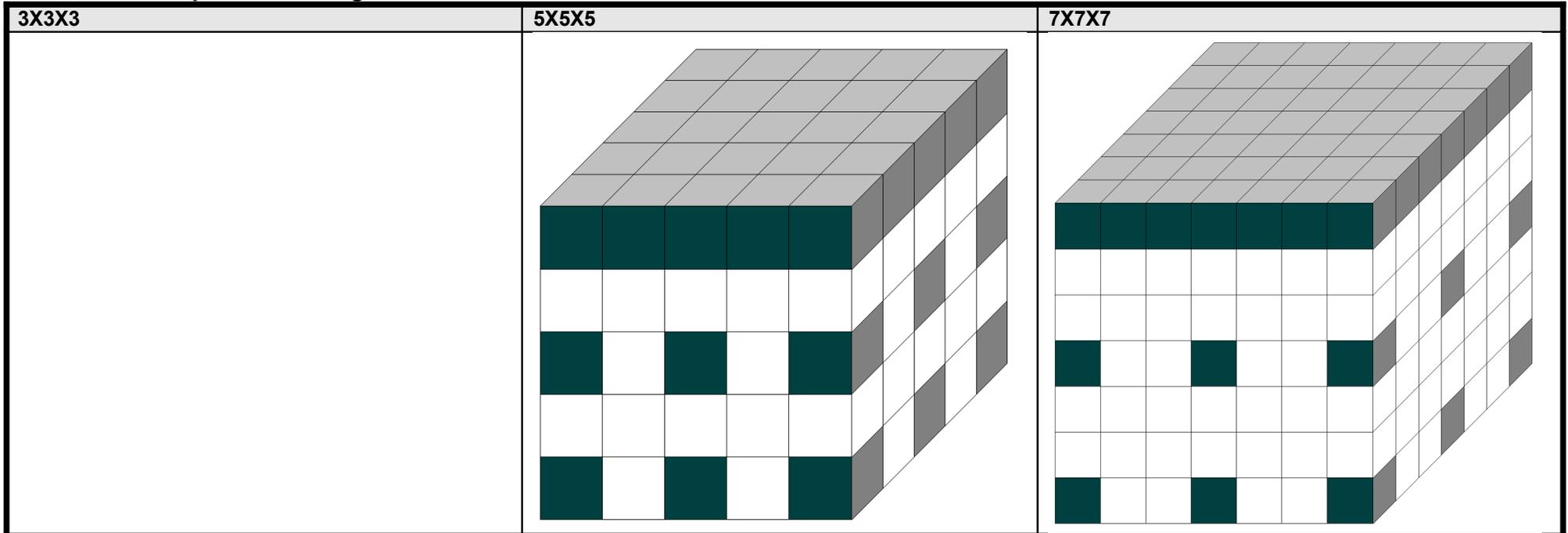


Note:
For the following steps, the cube will be turned upside down again (level U ← → )

Rubiks Cube Tutorial

for odd number cubes

Cube turned upside down again:

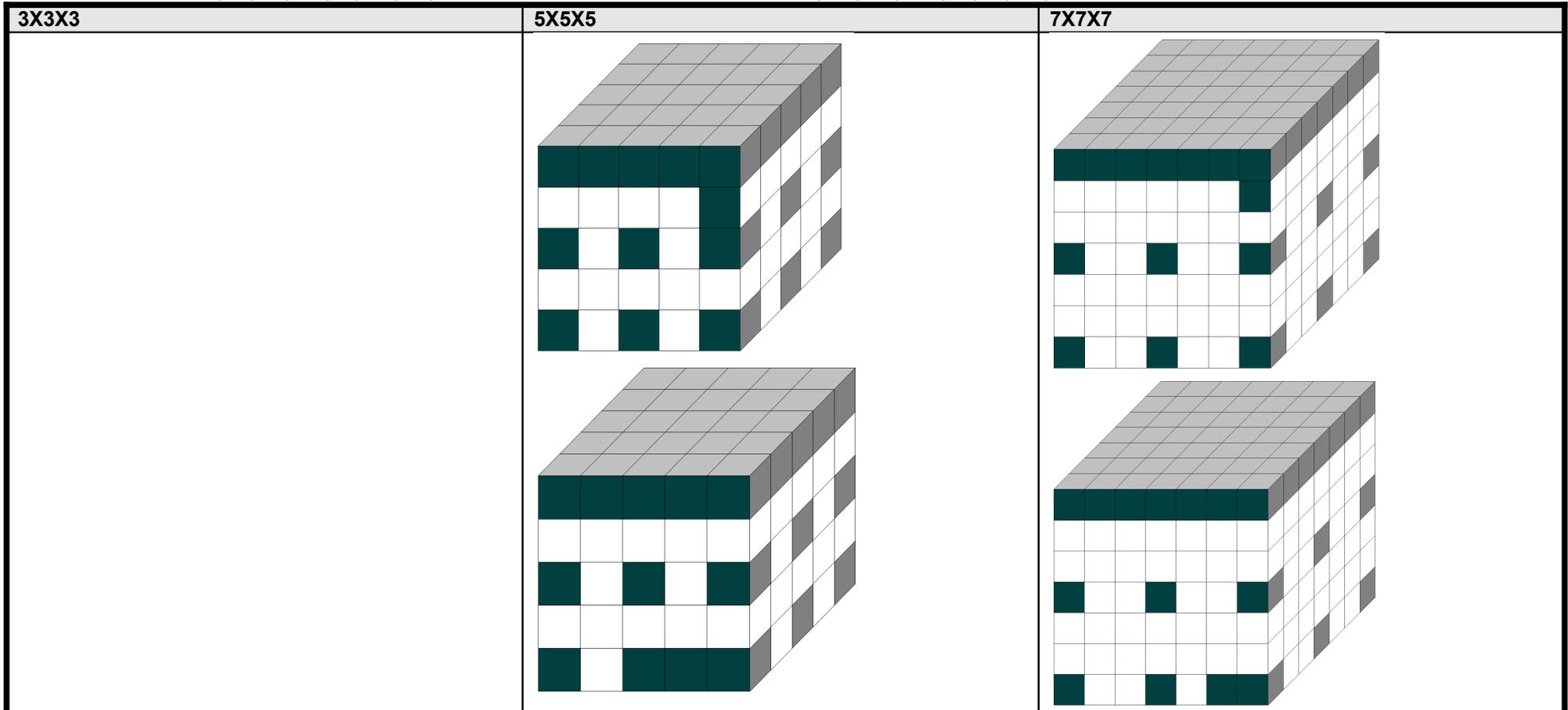


Fill the edges of level D:

This step is used to move edges from the inner layers to level D. This can be done from the left or from the right edge.

Before you start, you need to turn the level D until the colour of the edge of the middle layer matches the colour of level D.

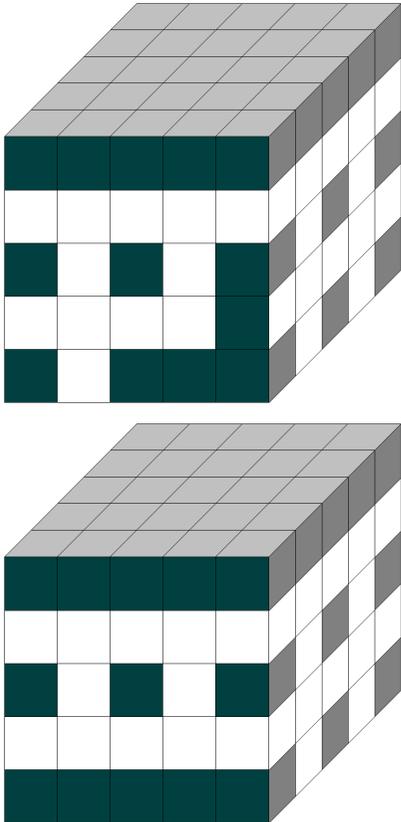
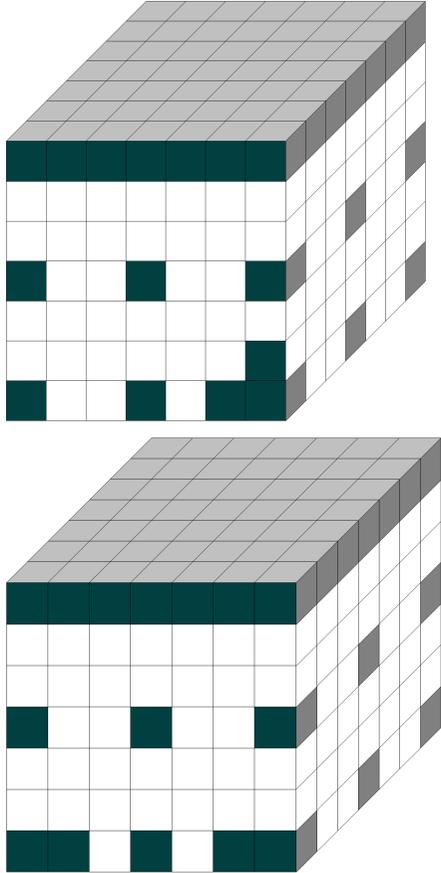
$U_1RF \rightarrow DR_1F : L, D, L', U_1, L, D', L', U_1'$ or mirrored: $U_1LF \rightarrow DL_1F : R, D', R', U_1', R, D, R', U_1$



Rubiks Cube Tutorial

for odd number cubes

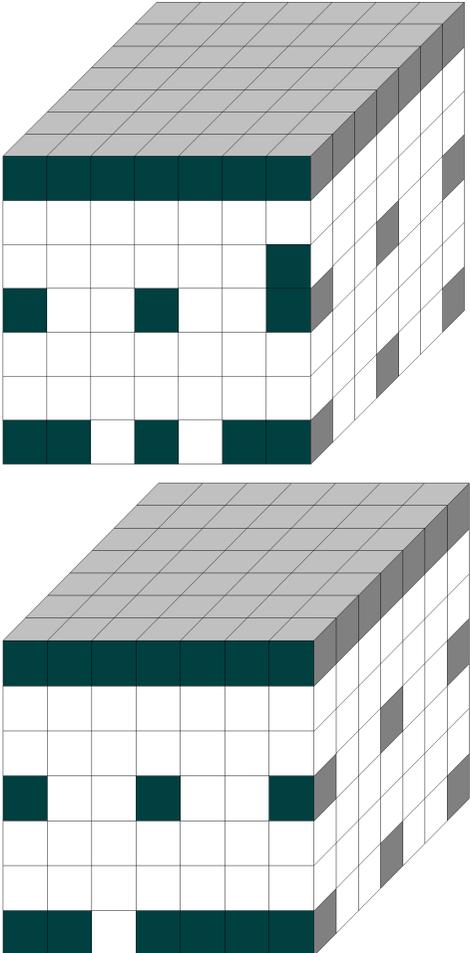
$D_1RF \rightarrow DL_1F$: L, D, L', D₁, L, D', L', D₁' or mirrored: $D_1LF \rightarrow DR_1F$: R, D', R', D₁', R, D, R', D₁

3X3X3	5X5X5	7X7X7
		

Rubiks Cube Tutorial

for odd number cubes

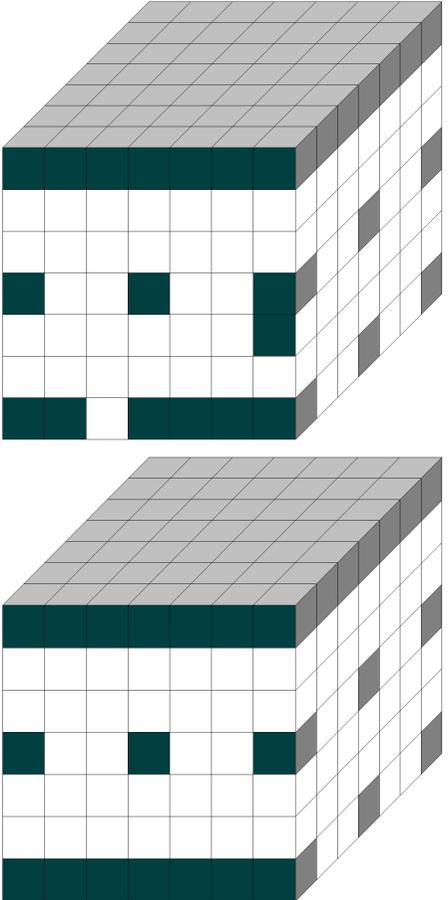
$U_2RF \rightarrow DR_2F$: L, D, L', U_2 , L, D', L', U_2' or mirrored: $U_2LF \rightarrow DL_2F$: R, D', R', U_2' , R, D, R', U_2

3X3X3	5X5X5	7X7X7
		

Rubiks Cube Tutorial

for odd number cubes

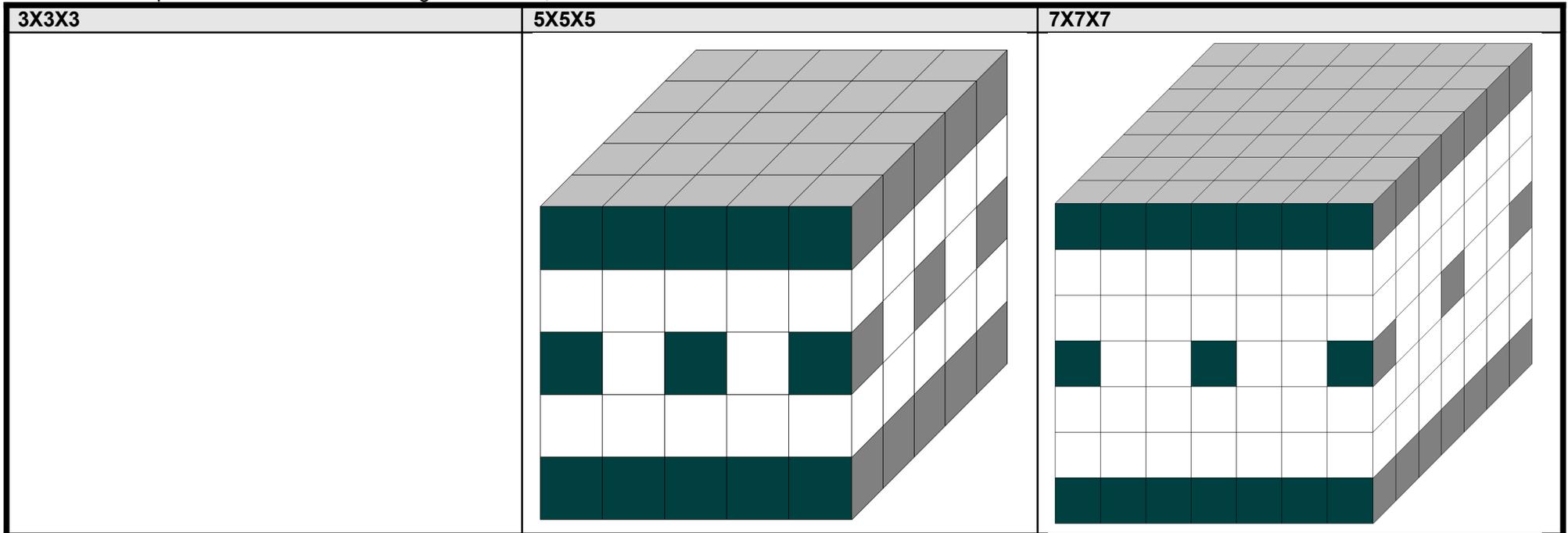
$D_2RF \rightarrow DL_2F$: L, D, L', D₂, L, D', L', D₂' or mirrored: $D_2LF \rightarrow DR_2F$: R, D', R', D₂', R, D, R', D₂

3X3X3	5X5X5	7X7X7
		

Rubiks Cube Tutorial

for odd number cubes

After these steps have been done for all edges of level D, the cube should look like this:



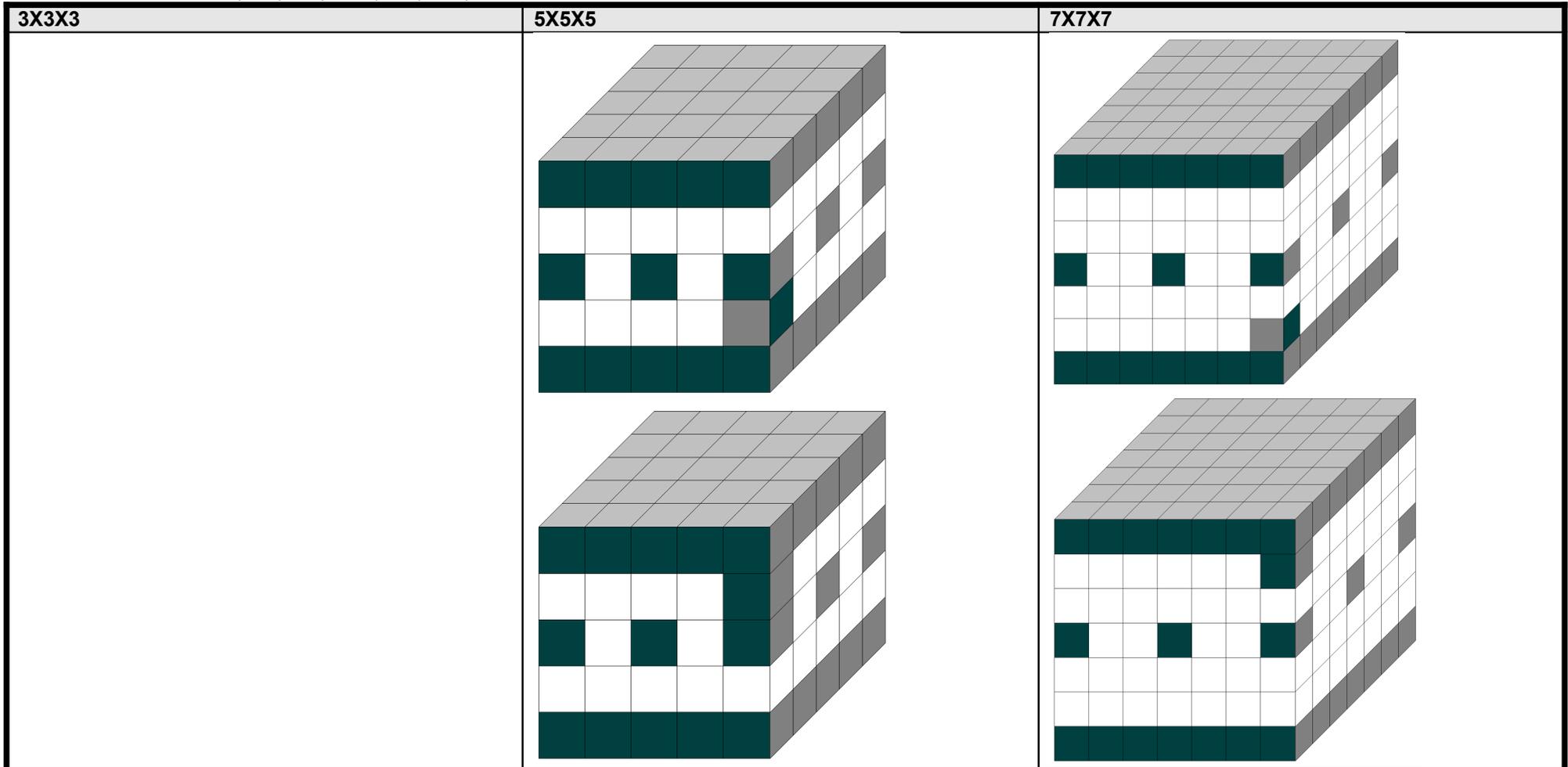
Rubiks Cube Tutorial

for odd number cubes

Swap edges of level $U_1 \leftrightarrow D_1$ (edges will be twisted):

Turn the level D_1 until an edge for level U_1 has been found. It may be necessary to swap edges from level U_1 to level D_1 before, to be able to swap them back again to level D_1 but have them twisted to the right orientation. The target is to have all edges of level U_1 in the right place and correct orientation.

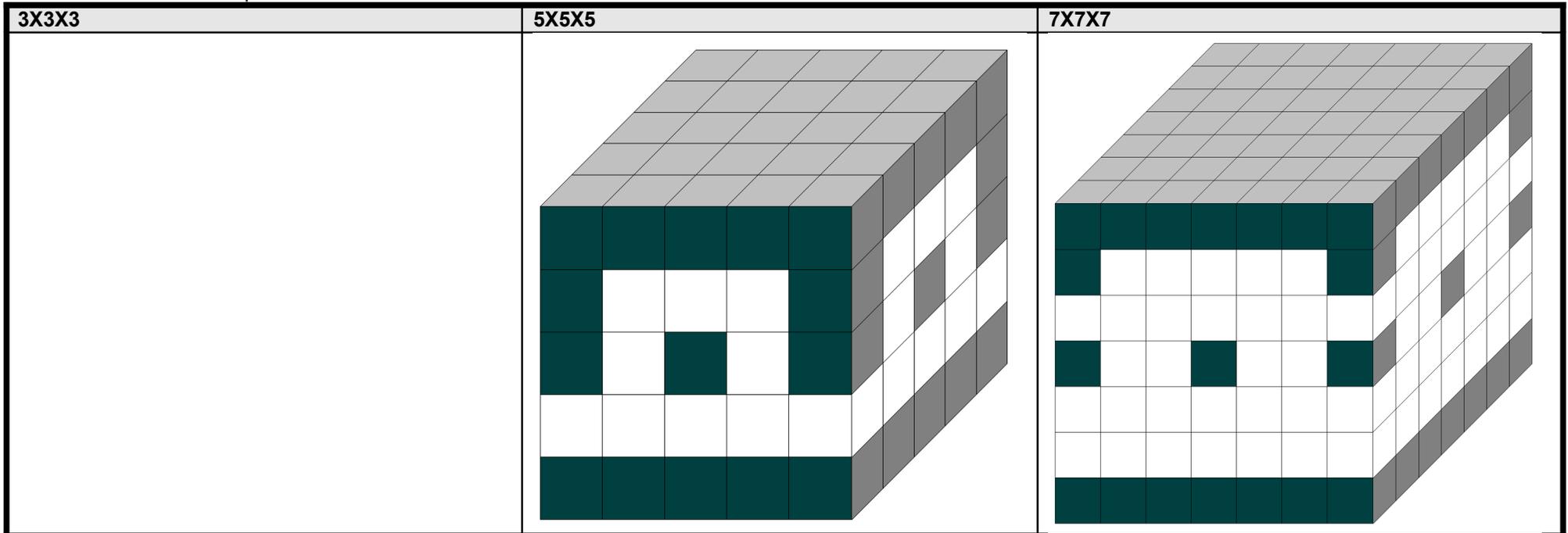
$U_1RF \leftrightarrow D_1RF: 2F, D_1, 2F, 2D_1, 2F, D_1', 2F$



Rubiks Cube Tutorial

for odd number cubes

After execution of all steps for level U_1 the cube should look like this:

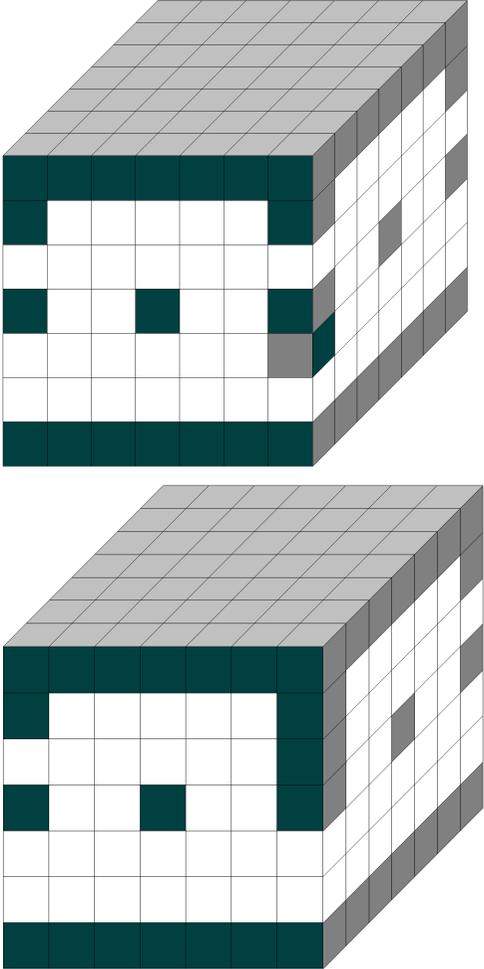


Rubiks Cube Tutorial

for odd number cubes

Swap edges of level $U_2 \leftrightarrow D_2$ (edges will be twisted):

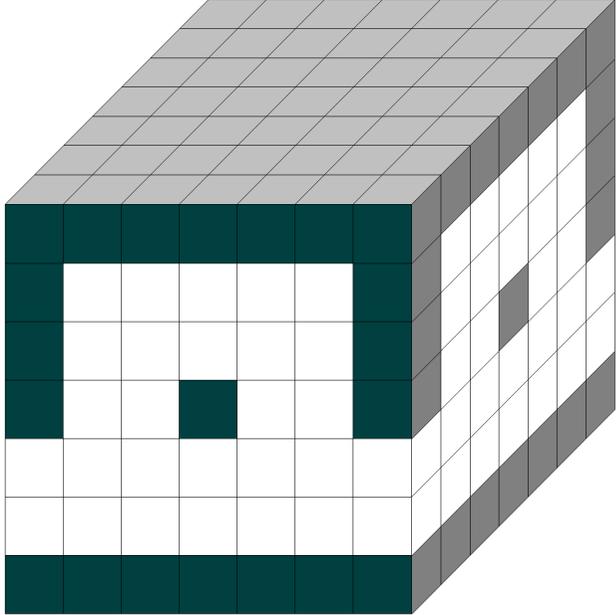
$U_2RF \leftrightarrow D_2RF: 2F, D_2, 2F, 2D_2, 2F, D_2', 2F$

3X3X3	5X5X5	7X7X7
		

Rubiks Cube Tutorial

for odd number cubes

After execution of all steps for level U_2 the cube should look like this:

3X3X3	5X5X5	7X7X7
		

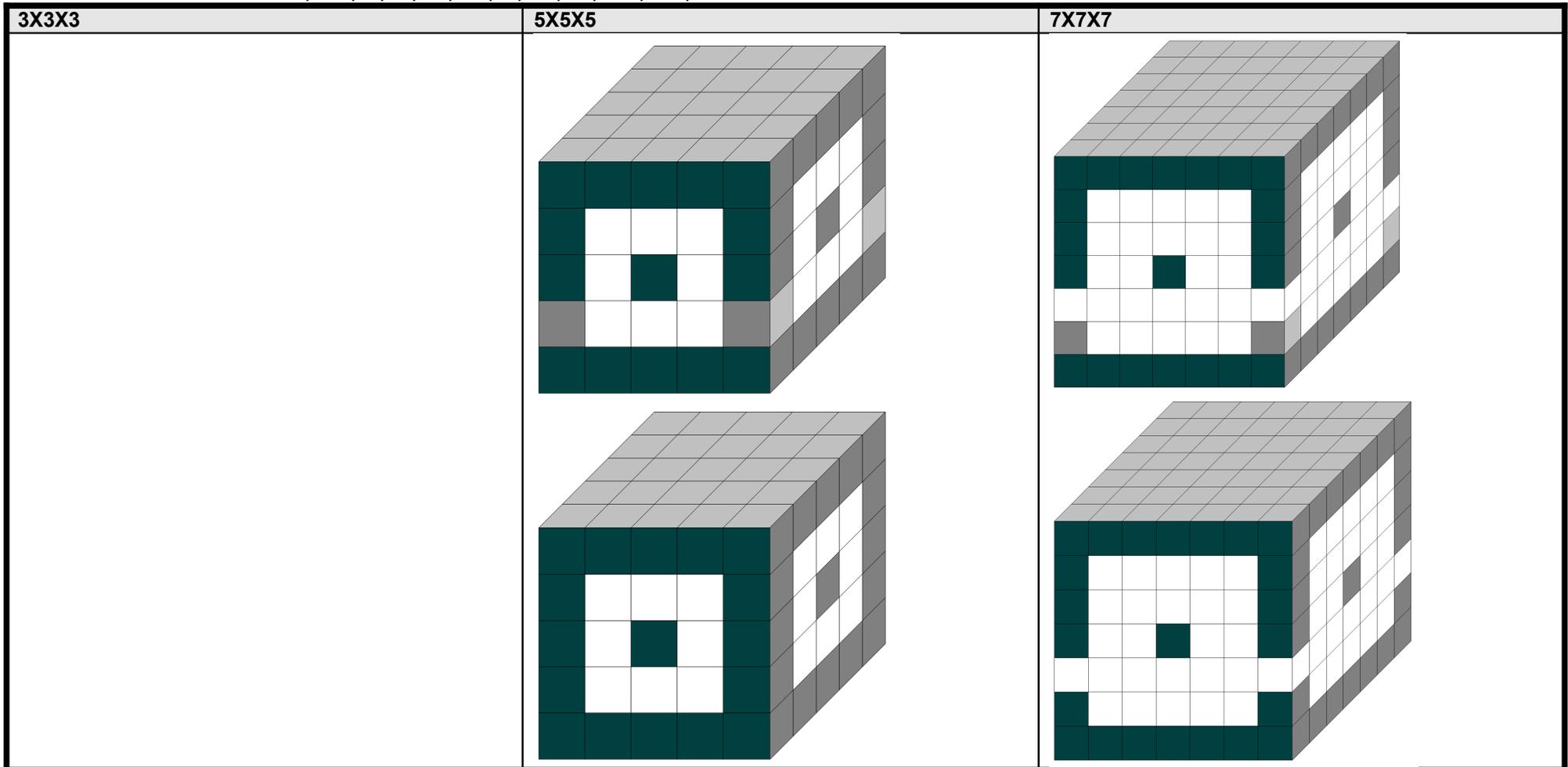
Rubiks Cube Tutorial

for odd number cubes

Place the edges of level D_1 :

Turn level D_1 in a way that only one edge is placed correctly. If this isn't possible, execute this step one time. After that it should be possible. Afterwards turn the cube until the correctly placed edge is at position D_1LB . Depending on the position of the edge, it may be necessary to do this step twice.

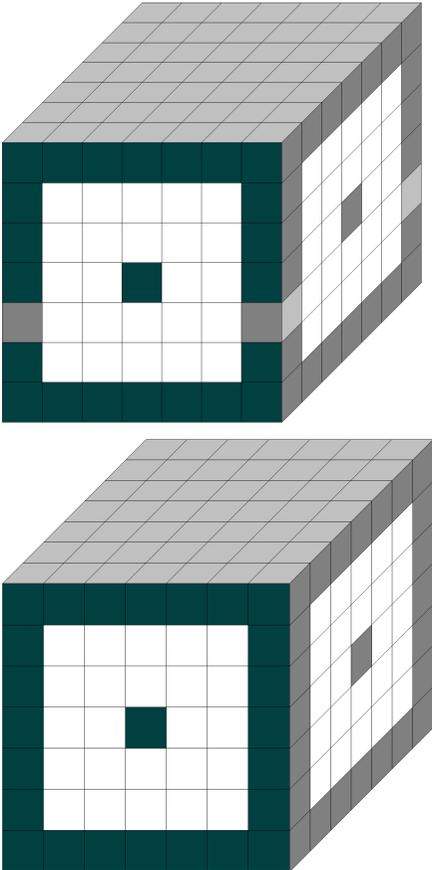
$D_1LF \rightarrow D_1RF \rightarrow D_1RB$: $L, 2D, F, D, F', D_1, F, D', F', D_1', 2D, L'$



Place the edges of level D_2 :

Turn level D_2 in a way that only one edge is placed correctly. If this isn't possible, execute this step one time. After that it should be possible. Afterwards turn the cube until the correctly placed edge is at position D_2LB . Depending on the position of the edge, it may be necessary to do this step twice.

$D_2LF \rightarrow D_2RF \rightarrow D_2RB$: $L, 2D, F, D, F', D_2, F, D', F', D_2', 2D, L'$

3X3X3	5X5X5	7X7X7
		

Swap planes of level **U** and level **F**:

This step is valid for all planes of the left front quarter of level **U** and left lower quarter of level **F** including the center levels. That's why I replaced the numbers for the level **L** with the index „n“ and the number for level **D** and **F** with the index „m“. In the following picture there is just one example displayed.

ULnFm -> FLnDm: U', Ln', Fm', Ln, Fm, U, Fm', Ln', Fm, Ln

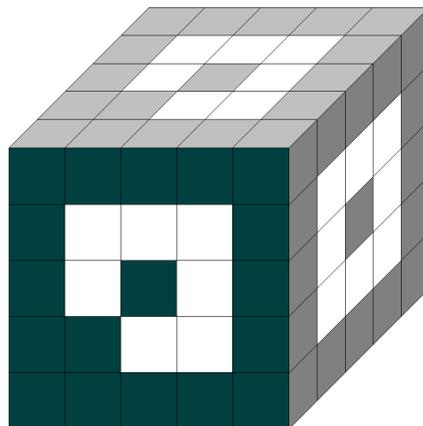
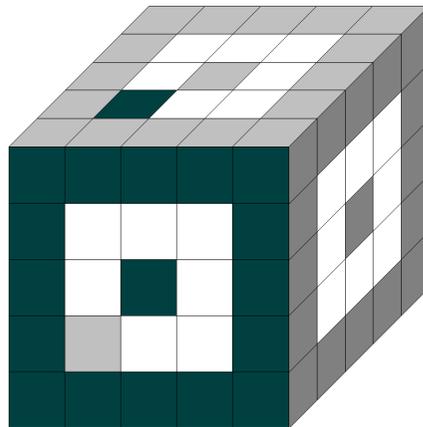
Rubiks Cube Tutorial

for odd number cubes

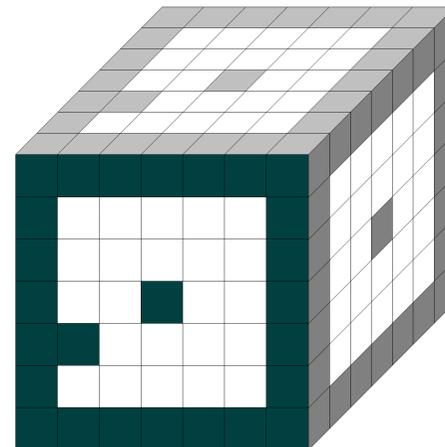
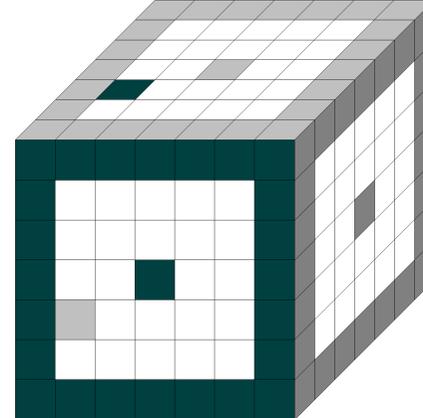
3X3X3

5X5X5

7X7X7



Example with $n = 1$ and $m = 1$

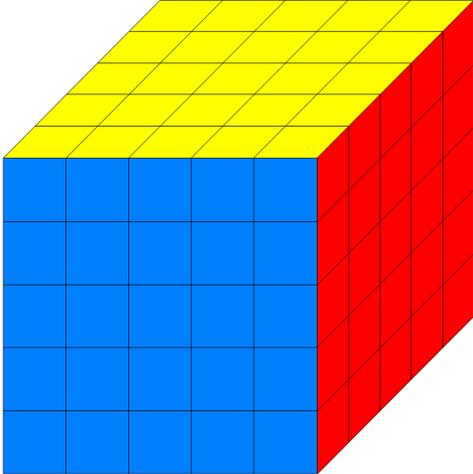
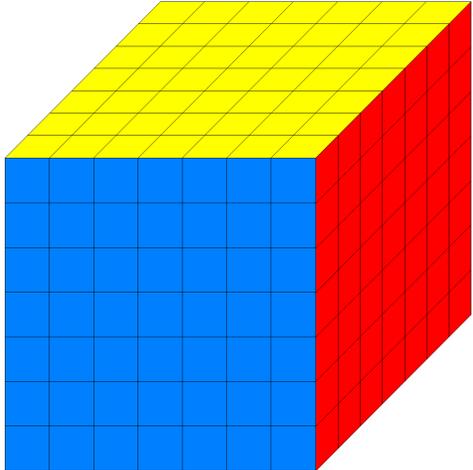


Example with $n = 1$ and $m = 2$

Rubiks Cube Tutorial

for odd number cubes

After completing all steps the cube should look like this:

3X3X3	5X5X5	7X7X7
	 <p data-bbox="786 959 1048 1027">Congratulation!!! You made it.</p>	 <p data-bbox="1444 970 1706 1038">Congratulation!!! You made it.</p>