

The Ultimate Brain Teaser

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Revenge 4x4



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Revenge 4x4

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Solutions Hints Booklet

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4x4 Revenge – The Ultimate Challenge

RUBIK'S 4x4 Revenge is the big brother of the best selling, original Rubik's Cube. Some of the moves that you might know that work on the original Cube also work on Rubik's 4x4 Revenge – but be warned: the similarity stops there.

Rubik's 4x4 Revenge presents a completely new challenge. You must mix up the puzzle with a few twists and turns and then try to match up the pieces until each face is a single colour. However, you are advised to read the first few sections of this booklet first.














Try to solve the puzzle logically, but be careful. Be very, very careful. Your success will depend on how well you grapple with the totally unexpected problems you will meet.

With millions more combinations than the original Cube, plus its own special devilry, you should be wary of Rubik's 4x4 Revenge – *the Ultimate Challenge*.

Meet Your 4x4 Revenge

RUBIK'S 4x4 Revenge has 6 faces. Each face will be a single solid colour when the puzzle is solved.

The puzzle has 12 different layers and each can be turned independently of the others.

 01	 A TOP	 I Mid-Left Layer
	 B FRONT	 J Mid-Right Layer
	 C RIGHT	 K Right Layer
	 D Top Layer	 L Front Layer
	 E Mid-Top Layer	 M Mid-Front Layer
	 F Mid-Bottom Layer	 N Mid-Back Layer
	 G Bottom Layer	 O Back Layer
	 H Left Layer	

Meet Your 4x4 Revenge


4x4 *Revenge* is made of 56 smaller cube pieces.


24 have a single colour – these are *Face Pieces*,

24 have two colours – these are *Edge Pieces*; and


8 have three colours – these are *Corner Pieces*;

 02  **A** Corner Piece

 **B** Face Piece

 **C** Edge Piece

When the puzzle is solved, the *Yellow* face is always opposite the *White* face; *Blue* is opposite *Green*, and *Red* is opposite *Orange*.


Also, when the *Yellow* face is on top, *Blue* is at the front when *Red* is on the right, as in the diagram  02.

Twisting Hints


There are two kinds of twist that can be given to any layer: a quarter twist and a half twist.

A quarter twist rotates one layer of the puzzle 90° clockwise or anticlockwise. A half twist rotates one layer 180°. (Twisting a layer through three quarters is the same as twisting it one in the opposite direction.)


 03  **A** TOP

 **B** FRONT

 **C** RIGHT

 **D** Right Layer: *Quarter twist clockwise*

 **E** Right Layer: *Quarter twist anticlockwise*

 **F** Right Layer: *Half twist*

Twisting Hints

Think of the orientation. For example, moving the back right *corner piece* with a *half twist* will put it diagonally opposite and upside down.

 04



A TOP



B FRONT



C RIGHT



D Right Layer: *Half twist*



E Bottom Layer: *Quarter twist anticlockwise*



F Front Layer: *Quarter twist anticlockwise*

If the same piece were instead moved by *two quarter twists* of two different layers, it would end in the same position but in a different orientation.

Twisting Hints

Whenever you move a piece, performing the moves you made *backwards* will return the puzzle to its *original position*.

 05

As an exercise in twisting, try this: from the solved position, twist two *adjacent layers* at a time (as though the cube were 2x2), and try to get each face with four 2x2 blocks of four different colours as shown here.

Now try to put the puzzle back into the solved position. This is the same as trying to solve the *Mini-Cube* or just the corners of the *4x4 Revenge*.

Don't worry if your *4x4 Revenge* gets muddled up, there are some *General Hints* in the next section.

General Hints

If you haven't jumbled your 4x4 Revenge up, now is the time to start. Then, try to solve the puzzle logically.

Unlike Rubik's Cube, the face pieces do not determine which face is which colour. In fact, there are four face pieces of each colour. It is best to start from a corner piece.

 **06**  **A** TOP  **B** FRONT  **C** RIGHT


Turn the puzzle so that your chosen corner is on the top layer. In the example here, the Red/Yellow/Blue piece has been used. This piece shows what colour the faces must be. Remember, Blue is opposite Green; Red is opposite Orange; and Yellow is opposite White.


General Hints


Now that you can see which pieces must go where, try to build up on your chosen corner piece. You can do this in several ways. *For example:*

Layer by Layer:

 **07**  **A** Step 1


 **B** Step 2


 **C** Step 3


 **D** Step 4

Edges; Corners, and Faces:

 **08**  **A** Step 1

 **B** Step 2

 **C** Step 3

 **D** Step 4

General Hints

Some methods will prove more difficult than others, so try different ways. (There is one that avoids the problems the others may encounter.) Whichever approach you use, you will need different sequences: some which just affect face pieces; some that just affect edge pieces; and some that just affect corner pieces.

Experiment with different sequences of twists to find out what they do. Try to find some that move pieces you have already positioned to one side and then put them back in place. You will often find that other pieces yet to be placed have either moved about or been reorientated. You should make a note of any effects that look useful so that you can repeat them to achieve a desired result.

General Hints

















However, to do this you must use a system to record your moves and the effects. Also, you will need to put numbered or lettered stickers onto your puzzle to differentiate between identical pieces. (For example, Blue face pieces could be numbered 1 to 4 and Blue/Red edge pieces tagged A and B. This makes it easier to see what has moved where.

A system for recording your sequences is given in the next section.

Notation System

The layers of Rubik's 4x4 Revenge are as labelled here.

The *front face* is the one that is facing you when you start the sequence. Keep that face towards you throughout the sequence.

 09	 A TOP	 I Mid-Left Layer
	 B FRONT	 J Mid-Right Layer
	 C RIGHT	 K Right Layer
	 D Top Layer	 L Front Layer
	 E Mid-Top Layer	 M Mid-Front Layer
	 F Mid-Bottom Layer	 N Mid-Back Layer
	 G Bottom Layer	 O Back Layer
	 H Left Layer	

Notation System

Remember to look for sequences that do not disturb pieces already positioned: those pieces should end up where they started. *Only record sequences that do this.*

Movement of a layer is recorded by the *layer's name* and *an arrow*. The arrow gives the direction that the front or top edge of that layer is moved *one quarter turn*. Thus, for example:

Notation	Indicates:
Front ↺	<i>Front layer one quarter twist to left.</i>
Back ↻	<i>Back layer one quarter twist to right.</i>
Top ↺	<i>Top layer one quarter twist to left.</i>
Bottom ↻	<i>Bottom layer one quarter twist to left.</i>
Left ↻	<i>Left layer one quarter twist down.</i>
Right ↺	<i>Right layer one quarter twist up.</i>
Mid-Left ↻	<i>Mid-Left layer one quarter twist down.</i>
Mid-Back ↺	<i>Mid-Back layer a quarter twist to left.</i>

Notation System

Remember, the direction relates to the *visible edge* of that layer at the top or front.

With a *half-twist*, direction is irrelevant, so this is shown by replacing the arrow with a 2. So, **Front2** means that the front layer is rotated a half-twist.

You may want to twist two layers together. This should be recorded as, say:

Bottom+Mid-Bottom ◁





You may find it tricky to twist a middle layer. In practice, it's easier to twist it with the *adjacent face layer* and then turn the face layer back.

There is a reason for the way the puzzle is viewed. This enables you to see how the pieces already positioned are moved out of the way and where they go to. If you can see this clearly, you will find it much easier to remember the sequence.

Notation System

To note the *start* and *finish* positions, so that you can see what has happened after a sequence of moves, copy and use the diagrams below.



This is the one used in this booklet. It represents the view of the *bottom layer* (and a false perspective of the sides) you would have if you tilt the puzzle away from you.


-
-  **10**  **A** Start Position
-  **B** Finish Position
-  **C** Sequence:
-

Notation System

Just record the effect that is relevant. For example, suppose you find a sequence that moves one edge piece from the *bottom layer* to the *mid-top layer* while leaving the pieces in the top layer and the other edge pieces in the mid-top layer unchanged. This is the only important effect. You do not need to note what happens to the other pieces on the *bottom* and *mid-bottom layers*. All you need to know is the start position of the piece that ended in the *mid-top layer*.

For example, your *start* and *end* position should simply be noted as here (along with your sequence of moves).

 **11**  Start Position




 End Position




(Asterisked pieces remain unmoved.)

Notation System




For each sequence that you find, there will also be a Reverse, a Mirror, and a Reverse, Mirror,

Suppose you have found a sequence that reads:

Mid-Left ; **Bottom** ; **Mid-Left** ; **Bottom2**;

Mid-Left ; **Bottom** ; **Mid-Left** .

The *Reverse* is the sequence in reverse order with the direction of arrows also reversed, as here:

Mid-Left ; **Bottom** ; **Mid-Left** ; **Bottom2**;

Mid-Left ; **Bottom** ; **Mid-Left** .



The *start* position of the *Reverse* is the *end* position of the original sequence, and the *Reverse* *ends* with the *start* position of the original. So, if you perform a sequence and then wish to put the puzzle back as it was, simply do the *Reverse* of the one you did to *restore the original position*.


Notation System

A *Mirror* sequence is a left-right reflection of the original. This *swaps* left and right without changing the arrows and *reverses* all other arrows. The *Mirror* of the previous sequence would be:

Mid-Right ↔; **Bottom** ⇨; **Mid-Right** ⇨; **Bottom2**;
Mid-Right ↔; **Bottom** ⇨; **Mid-Right** ⇨.

Start and *end* positions are reflections of those for the original sequence. For example, the diagrams here are the reflections of those on page 16.

 **12**  **Start Position**

 **End Position**

Whenever you find a useful sequence, make sure you also record these other versions. If you have trouble finding your own sequences, some useful ones are given in the next section.

4x4 Revenge Sequences

This section contains some general sequences to cover many situations. (There are other more specific sequences for you to find.) The system of notation is as described in the previous section.

The *start* and *end* positions show the bottom face. (That is, the view you would have if you tilt the puzzle away from you.) *Start* and *end* positions for the *Reverse* and *Mirror* versions have been omitted for reasons of space.

Always hold the puzzle so that the piece you wish to move is in the appropriate start position.

Asterisked pieces remain unmoved as do all the other pieces of the puzzle.

The relevant pieces to be moved are hatched to avoid confusion with the colours you might be placing.

4x4 Revenge Sequences

Three-Corner Shuttle

This *shuttles* a triangle of corner pieces one place clockwise around the bottom layer.

Left ◊; Bottom ◊; Left ◊; Front ◊; Bottom ◊; Front ◊;
Left ◊; Bottom ◊; Left ◊; Bottom ◊.

13



Start Position



End Position

Reverse

Bottom ◊; Left ◊; Bottom ◊; Left ◊; Front ◊; Bottom ◊;
Front ◊; Left ◊; Bottom ◊; Left ◊.

Mirror

Right ◊; Bottom ◊; Right ◊; Front ◊; Bottom ◊; Front ◊;
Right ◊; Bottom ◊; Right ◊; Bottom ◊.

Reverse Mirror

Bottom ◊; Right ◊; Bottom ◊; Right ◊; Front ◊; Bottom ◊;
Front ◊; Right ◊; Bottom ◊; Right ◊.

4x4 Revenge Sequences

Three-Corner Flipper

This *flips* three corner pieces on the bottom layer without changing their position.

Right ◊; Bottom ◊; Right ◊; Bottom ◊; Right ◊;
Bottom2; Right ◊; Bottom2.

14



Start Position



End Position

Reverse

Bottom2; Right ◊; Bottom2; Right ◊; Bottom ◊; Right ◊;
Bottom ◊; Right ◊.

Mirror

Left ◊; Bottom ◊; Left ◊; Bottom ◊; Left ◊; Bottom2;
Left ◊; Bottom2.

Reverse Mirror



Bottom2; Left ◊; Bottom2; Left ◊; Bottom ◊; Left ◊;
Bottom ◊; Left ◊.


4x4 Revenge Sequences

Low-Edge Shuttle

By *shuttling* a triangle of edge pieces clockwise around the front layer, this moves an edge piece from the mid-bottom layer into the bottom layer.

Left \leftrightarrow ; Bottom \leftrightarrow ; Left \leftrightarrow ; Mid-Bottom \leftrightarrow ; Left \leftrightarrow ;
Bottom \leftrightarrow ; Left \leftrightarrow ; Mid-Bottom \leftrightarrow .

 **15**  **A** Start Position

 **B** End Position

Reverse

Mid-Bottom \leftrightarrow ; Left \leftrightarrow ; Bottom \leftrightarrow ; Left \leftrightarrow ; Mid-Bottom \leftrightarrow ;
Left \leftrightarrow ; Bottom \leftrightarrow ; Left \leftrightarrow .

Mirror

Right \leftrightarrow ; Bottom \leftrightarrow ; Right \leftrightarrow ; Mid-Bottom \leftrightarrow ; Right \leftrightarrow ;
Bottom \leftrightarrow ; Right \leftrightarrow ; Mid-Bottom \leftrightarrow .

Reverse Mirror



Mid-Bottom \leftrightarrow ; Right \leftrightarrow ; Bottom \leftrightarrow ; Right \leftrightarrow ;
Mid-Bottom \leftrightarrow ; Right \leftrightarrow ; Bottom \leftrightarrow ; Right \leftrightarrow .


4x4 Revenge Sequences

High-Edge Shuttle

By *shuttling* a triangle of edge pieces clockwise around the front layer, this moves an edge piece from the mid-top layer into the bottom layer.

Left \leftrightarrow ; Bottom \leftrightarrow ; Left \leftrightarrow ; Mid-Top \leftrightarrow ; Left \leftrightarrow ; Bottom \leftrightarrow ;
Left \leftrightarrow ; Mid-Top \leftrightarrow .

 **16**  **A** Start Position

 **B** End Position

Reverse

Mid-Top \leftrightarrow ; Left \leftrightarrow ; Bottom \leftrightarrow ; Left \leftrightarrow ; Mid-Top \leftrightarrow ; Left \leftrightarrow ;
Bottom \leftrightarrow ; Left \leftrightarrow .

Mirror

Right \leftrightarrow ; Bottom \leftrightarrow ; Right \leftrightarrow ; Mid-Top \leftrightarrow ; Right \leftrightarrow ;
Bottom \leftrightarrow ; Right \leftrightarrow ; Mid-Top \leftrightarrow .

Reverse Mirror



Mid-Top \leftrightarrow ; Right \leftrightarrow ; Bottom \leftrightarrow ; Right \leftrightarrow ; Mid-Top \leftrightarrow ;
Right \leftrightarrow ; Bottom \leftrightarrow ; Right \leftrightarrow .

4x4 Revenge Sequences

Face-Lifter

This *shuttles* three face pieces.

Mid-Left+Mid-Right ◊; **Bottom** ◊; **Mid-Right** ◊; **Bottom** ◊;
Mid-Left ◊; **Bottom** ◊; **Mid-Right** ◊; **Bottom** ◊; **Mid-Right** ◊.

 **17**  **A** Start Position

 **B** End Position

Reverse

Mid-Right ◊; **Bottom** ◊; **Mid-Right** ◊; **Bottom** ◊; **Mid-Left** ◊;
Bottom ◊; **Mid-Right** ◊; **Bottom** ◊; **Mid-Left+Mid-Right** ◊.

Mirror

Mid-Left+Mid-Right ◊; **Bottom** ◊; **Mid-Left** ◊; **Bottom** ◊;
Mid-Right ◊; **Bottom** ◊; **Mid-Left** ◊; **Bottom** ◊; **Mid-Left** ◊.

Reverse Mirror



Mid-Left ◊; **Bottom** ◊; **Mid-Left** ◊; **Bottom** ◊; **Mid-Right** ◊;
Bottom ◊; **Mid-Left** ◊; **Bottom** ◊; **Mid-Left+Mid-Right** ◊.


4x4 Revenge Sequences

Mid-Swapper

This *swaps* two adjacent edge pieces in the front middle layers.

Front2; **Mid-Bottom** ◊; **Front2**; **Mid-Bottom2**; **Front2**;
Mid-Bottom ◊; **Front2**.

 **18**  **A** Start Position

 **B** End Position

Mirror

Front2; **Mid-Bottom** ◊; **Front2**; **Mid-Bottom2**; **Front2**;
Mid-Bottom ◊; **Front2**.

In both cases the *reverse* is the same as the sequence.

4x4 Revenge Sequences

Mid-Shuttle

This *shuttles* a triangle of edge pieces clockwise around the mid-bottom layer.

Back ◊; Bottom2; Left ◊; Bottom ◊; Left ◊; Mid-Bottom ◊;
Left ◊; Bottom ◊; Left ◊; Mid-Bottom ◊; Bottom2; Back ◊.



Start Position



End Position

Reverse

Back ◊; Bottom2; Mid-Bottom ◊; Left ◊; Bottom ◊; Left ◊;
Mid-Bottom ◊; Left ◊; Bottom ◊; Left ◊; Bottom2; Back ◊.

4x4 Revenge Sequences

Mirror

Back ◊; Bottom2; Right ◊; Bottom ◊; Right ◊;
Mid- Bottom ◊; Right ◊; Bottom ◊; Right ◊;
Mid-Bottom ◊; Bottom2; Back ◊.





Reverse Mirror

Back ◊; Bottom2; Mid-Bottom ◊; Right ◊; Bottom ◊;
Right ◊; Mid-Bottom ◊; Right ◊; Bottom ◊; Right ◊;
Bottom2; Back ◊.

With this sequence (as with any that *shuttles* three pieces), performing it twice has the same effect as doing the *Reverse* once. You should try and solve the puzzle for yourself using the sequences provided. They are all you need – plus a little imagination. If you are still having trouble, a full solution guide is given in the next section.

Solving Rubik's 4x4 Revenge

Once you start twisting, it's easy to get Rubik's 4x4 Revenge completely muddled. Don't worry – it can always be put right from any state. The following steps will help you solve the puzzle.

 20  TOP  FRONT  RIGHT

1. Select any corner piece as your starting corner. Turn the puzzle so that this piece is in the top face. It is automatically in the correct position. (In our example, Yellow is the top face and Blue is the front.)
2. Find a second piece that's a side-by-side match and twist it into place.

NB – Of two identically coloured edge pieces, only one can be placed in a particular position with the colours correctly orientated.

Solving Rubik's 4x4 Revenge

 21  TOP  FRONT  RIGHT

3. Position all edge and corner pieces of the top face. If you have trouble, use the sequences. (The Three-Corner, High-Edge, and Low-Edge Shuttles can all be used if you turn the puzzle so that your top face becomes the relevant face in the sequence diagrams.)





 22  TOP  FRONT  RIGHT

4. Position the face pieces of the top layer by using the Face-Lifter.

NB – When using the Face-Lifter, you may first need to twist faces to align the pieces to be moved. Note these so you can reverse them afterwards.

Solving Rubik's 4x4 Revenge

5. Next, and most importantly, complete the bottom face.

 23  TOP  FRONT  RIGHT

6. Start by using the *Three-Corner Shuttle* to correctly position the corner pieces. If two seem to be correctly placed, turn the layer so one of the other two is correctly placed. The *Three-Corner Shuttle* will then position the other three. If the two that need to be swapped are diagonally opposite, you will need to use the *Three-Corner Shuttle* *twice*.
7. Once the corner pieces are in the right positions, use the *Three-Corner Flipper* to orientate them correctly.

Solving Rubik's 4x4 Revenge





 24  TOP  FRONT  RIGHT

8. Use the *Low-Edge* and/or *High-Edge Shuttles* to drop the edge pieces into their correct positions on the bottom face. If a piece you want is already in the bottom face, use one of the *shuttles* to remove it.

 25  TOP  FRONT  RIGHT

9. Complete the bottom face by using the *Face-Lifter*.
10. Use the *Mid-Swapper* to correctly position the edge pieces of the mid-top layer. If a piece you want is already in that layer, use the *swapper* to remove it.)

Solving Rubik's 4x4 Revenge

 26  A TOP  B FRONT  C RIGHT

11. Turn the mid-bottom layer so that only one edge piece is correctly positioned. Then use the *Mid-Shuttle* to correctly position the other three. If two diagonally opposite edge pieces need to be swapped, you will need to use the *shuttle* twice.

 27  A TOP  B FRONT  C RIGHT

12. Finally, complete the centre faces by using the *Face Lifter*.

More 4x4 Revenge

Once you've mastered the puzzle, there is more fun to be had.

 28

Try solving the puzzle layer by layer from the top down. There's a fifty-fifty chance you'll either solve it or reach the position shown here. From this position, see if you can find the *shortest sequence* that will solve the puzzle.

 29

Other patterns can be made. For example, is it possible to make all the faces a *checkerboard pattern*?

Rubik's 4x4 Revenge isn't over yet.

Solution Hints Booklet

The following conventions are used throughout these RUBIK'S 4x4 Revenge Solution Hints Booklets:



This symbol denotes a link to a graphic in the accompanying booklet, together with an identifying number.



This symbol denotes a link to an annotation on the corresponding graphic in the accompanying booklet. The annotation itself follows the symbol.