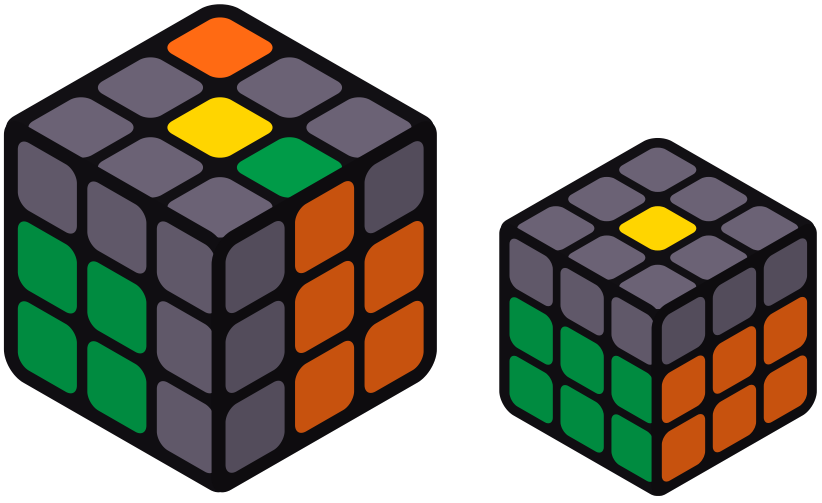
Cube Lab

PRINTABLE GUIDE

F2L: all 41 cases

First two layers, case by case.



1. The cross
2. F2L: the idea
3. All 41 cases

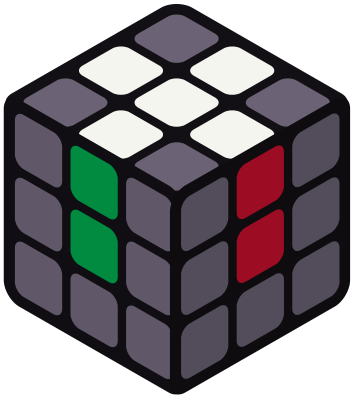
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CFOP (SPEEDSOLVING)

The cross, on the bottom

In CFOP you build the white cross **directly on the bottom** — not on top as in the beginner method, and with no daisy — so you never have to turn the cube over, and you can see the F2L pieces while you finish the cross.

- **Plan it during inspection.** In competitions you get 15 seconds to look before you start. Find all four white edges and plan how to put them in. A cross never needs more than 8 moves.
- **Solve it on the bottom.** Then you don't have to flip the cube over before F2L, and you can see the F2L pieces on top while you finish the cross.
- **Put edges in relative to each other.** The first edge can go anywhere. Make the others match it, then turn the bottom once at the end.
- **Start with the easy ones.** An edge on the bottom or in the middle layer often goes in with one or two moves.



The goal, seen from below

> COMMON MISTAKE
>
> Looking down at the bottom while you solve. Practise doing the cross while looking at the front and top: you'll learn to feel where the pieces are.

CFOP (SPEEDSOLVING)

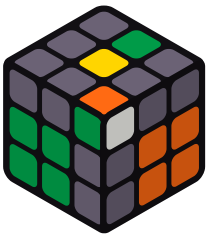
F2L: the idea

In the beginner method you put in a white corner, then a middle edge — two separate jobs. **F2L does both at once.** You join the corner and its edge in the top layer, then put them into the slot together.

Every F2L case is solved the same way:

1. Find a white corner and the edge that goes with it (the edge with its two side colours).
2. Join them into a **pair** in the top layer, using the empty slot to move them without breaking anything.
3. Put the pair into its slot.

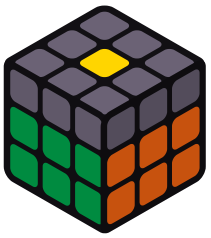
The simplest cases: the pair is already joined, and goes straight in.



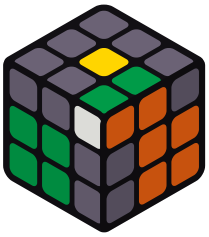
BEFORE

Joined pair, inserts with three moves

R U R'



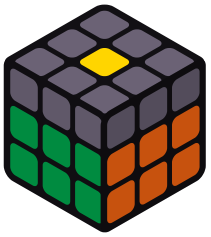
AFTER



BEFORE

Corner and edge apart: bring them together as you insert

U R U' R'



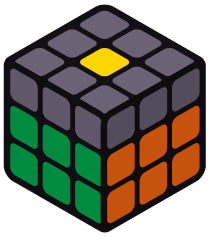
AFTER



BEFORE

The mirror, on the front

F' U' F



AFTER

TIP

The key to intuitive F2L: when you lift the slot up (`R`), the top is free to move pieces around without breaking the cross. Then the slot goes back down (`R'`), taking the pair with it.

Once the idea makes sense, browse all 41 cases in the next lesson. You don't need to memorise them: most follow from the idea.

CFOP (SPEEDSOLVING)

F2L: all 41 cases

Each case shows the front-right slot and its pair, with the last layer in grey.

Basic inserts 4



F2L 1

U R U' R'

Corner at top front-right, white facing front; edge at top right, front colour on top.



F2L 2

U' F' U F

Corner at top front-right, white facing right; edge at top front, right colour on top.



F2L 3

F' U' F

Corner at top front-right, white facing front; edge at top left, right colour on top.



F2L 4

R U R'

Corner at top front-right, white facing right; edge at top back, front colour on top.

Both on top, white facing sideways 12



F2L 5

U' R U R' U2 R U' R'

Corner at top front-right, white facing front; edge at top back, front colour on top.



F2L 6

U F' U' F U2 F' U F

Corner at top front-right, white facing right; edge at top left, right colour on top.



F2L 7

U' R U2 R' U2 R U' R'

Corner at top front-right, white facing front; edge at top left, front colour on top.



F2L 8

U F' U2 F U2 F' U F

Corner at top front-right, white facing right; edge at top back, right colour on top.



F2L 9

U' R U' R' U F' U' F

Corner at top front-right, white facing front; edge at top back, right colour on top.



F2L 10

U' R U R' U R U R'

Corner at top front-right, white facing right; edge at top left, front colour on top.



F2L 11

U' R U2 R' U F' U' F

Corner at top front-right, white facing front; edge at top right, right colour on top.



F2L 12

R U' R' U R U' R' U2 R U' R'

Corner at top front-right, white facing right; edge at top front, front colour on top.



F2L 13

U F' U F U' F' U' F

Corner at top front-right, white facing front; edge at top front, right colour on top.



F2L 14

U' R U' R' U R U R'

Corner at top front-right, white facing right; edge at top right, front colour on top.



F2L 15

R' D' R U' R' D R U R U' R'

Corner at top front-right, white facing front; edge at top front, front colour on top.



F2L 16

R U' R' U2 F' U' F

Corner at top front-right, white facing right; edge at top right, right colour on top.

Both on top, white facing up 8



F2L 17

R U2 R' U' R U R'

Corner at top front-right, white facing up; edge at top right, front colour on top.



F2L 18

F' U2 F U F' U' F

Corner at top front-right, white facing up; edge at top front, right colour on top.



F2L 19

U R U2 R' U R U' R'

Corner at top front-right, white facing up; edge at top back, front colour on top.



F2L 20

U' F' U2 F U' F' U F

Corner at top front-right, white facing up; edge at top left, right colour on top.



F2L 21

U2 R U R' U R U' R'

Corner at top front-right, white facing up; edge at top left, front colour on top.



F2L 22

U2 F' U' F U' F' U F

Corner at top front-right, white facing up; edge at top back, right colour on top.



F2L 23

U R U' R' U' R U' R' U R U' R'

Corner at top front-right, white facing up; edge at top front, front colour on top.



F2L 24

F U R U' R' F' R U' R'

Corner at top front-right, white facing up; edge at top right, right colour on top.

Corner in the slot, edge on top 6



F2L 25

U' R' F R F' R U R'

Corner in the slot, white facing down; edge at top right, front colour on top.



F2L 26

U R U' R' U' F' U F

Corner in the slot, white facing down; edge at top front, right colour on top.



F2L 27

R U' R' U R U' R'

Corner in the slot, white facing front; edge at top right, front colour on top.



F2L 28

F' U F U' F' U F

Corner in the slot, white facing right; edge at top front, right colour on top.



F2L 29

R' F R F' U R U' R'

Corner in the slot, white facing front; edge at top front, right colour on top.



F2L 30

R U R' U' R U R'

Corner in the slot, white facing right; edge at top right, front colour on top.

Edge in the slot, corner on top 6



F2L 31

U' R' F R F' R U' R'

Corner at top front-right, white facing up; edge in the slot, flipped.



F2L 32

U R U' R' U R U' R' U R U' R'

Corner at top front-right, white facing up; edge in the slot, the right way round.



F2L 33

U' R U' R' U2 R U' R'

Corner at top front-right, white facing front; edge in the slot, the right way round.



F2L 34

U R U R' U2 R U R'

Corner at top front-right, white facing right; edge in the slot, the right way round.



F2L 35

U' R U R' U F' U' F

Corner at top front-right, white facing front; edge in the slot, flipped.



F2L 36

U F' U' F U' R U R'

Corner at top front-right, white facing right; edge in the slot, flipped.

Both in the slot 5



F2L 37

R2 U2 F R2 F' U2 R' U R'

Corner solved in the slot; edge in the slot, flipped.



F2L 38

R U' R' U' R U R' U2 R U' R'

Corner in the slot, white facing front; edge in the slot, the right way round.



F2L 39

R U' R' U R U2 R' U R U' R'

Corner in the slot, white facing right; edge in the slot, the right way round.



F2L 40

r U' r' U2 r U r' R U R'

Corner in the slot, white facing front; edge in the slot, flipped.



F2L 41

R U F R U R' U' F' R'

Corner in the slot, white facing right; edge in the slot, flipped.