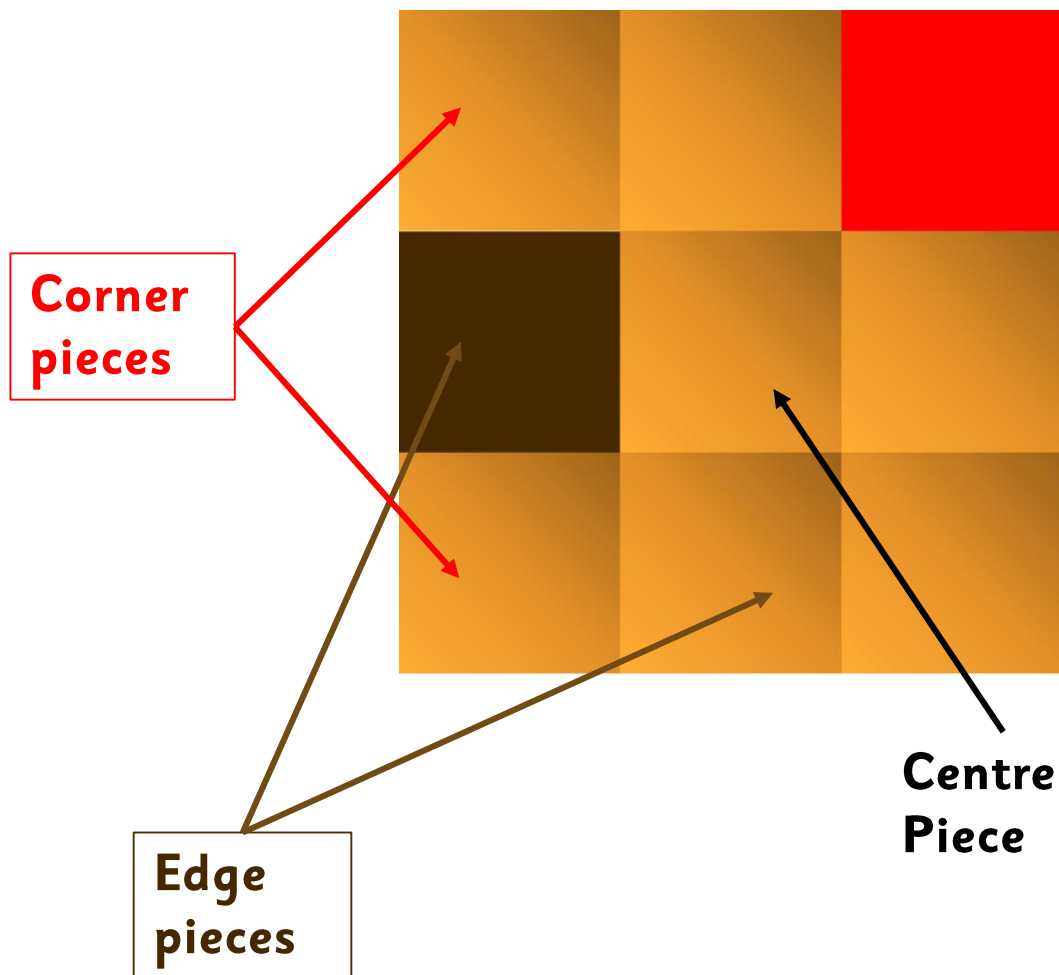


## Challenge On Boarding – Analysing the Square



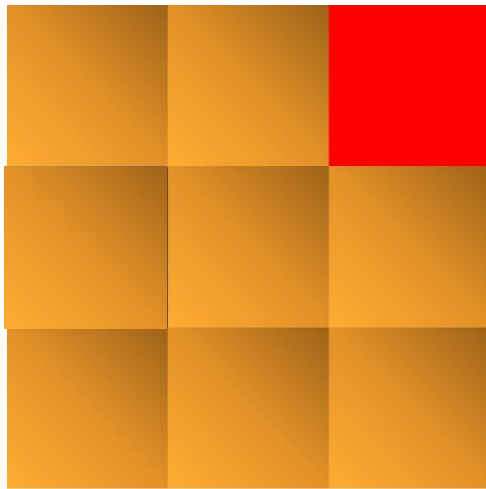
### Components of the square

- This square is a bit like one face on a Rubik's cube.
- It has one centre piece, 4 edge pieces and 4 corner pieces.
- In this we colour a corner piece and an edge piece
- The coloured edge and corner should not be touching

## Challenge On Boarding – Different Orientations

### The corner piece

How many corners are there on the square?



If the corner piece is in this position, how many possible places would there be for the edge piece?

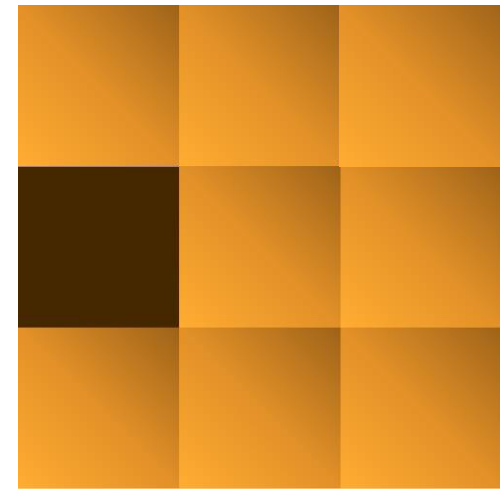
### Which Method?

You can find the total number of orientations by using seeing how many positions one piece can fit in.

Then for each of those positions, how many possibilities are there for the other piece.

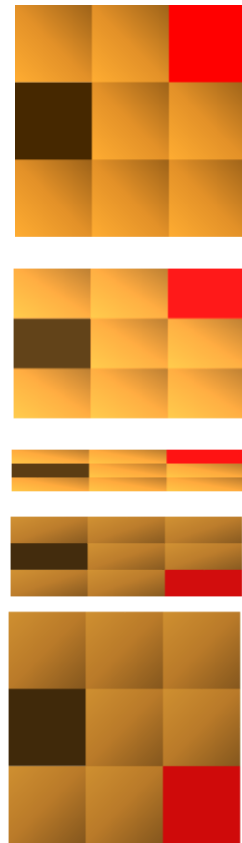
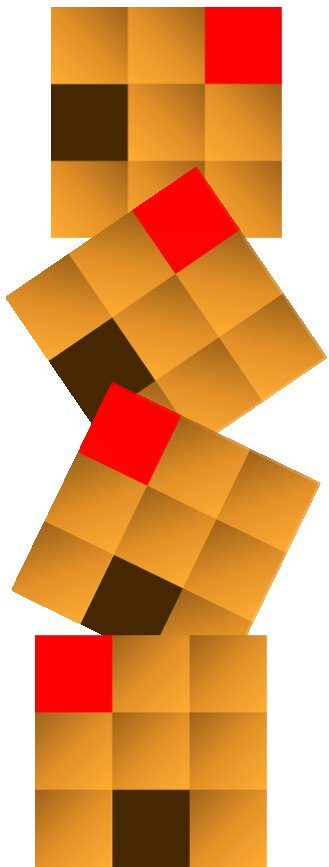
### The edge piece

How many edges are there on the square?



If the edge piece is in this position, where could the corner pieces go?

# Challenge On Boarding – The Transformations



## The seven transformations

There are 7 different ways to transform this square such that:

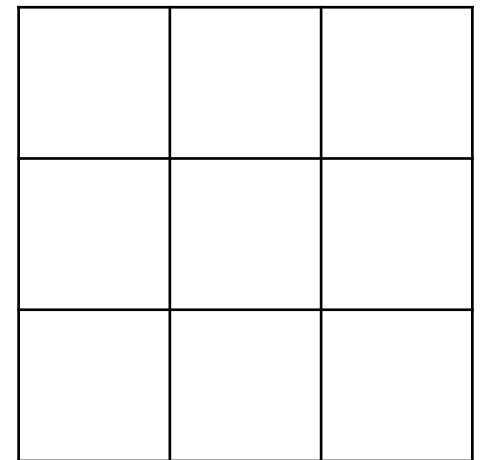
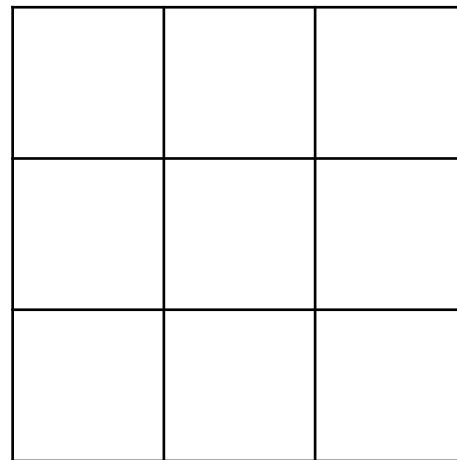
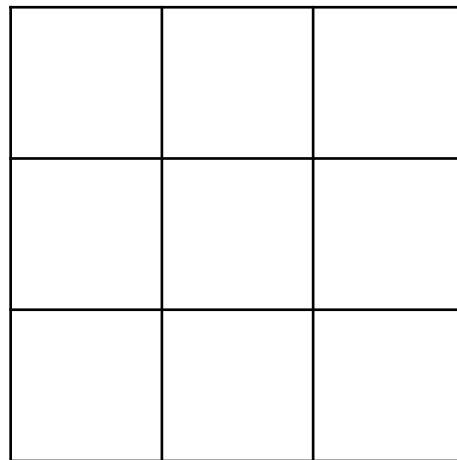
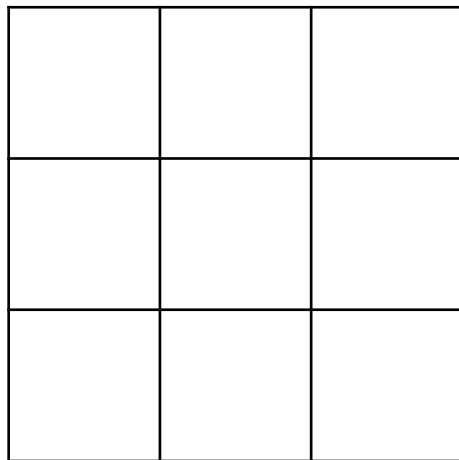
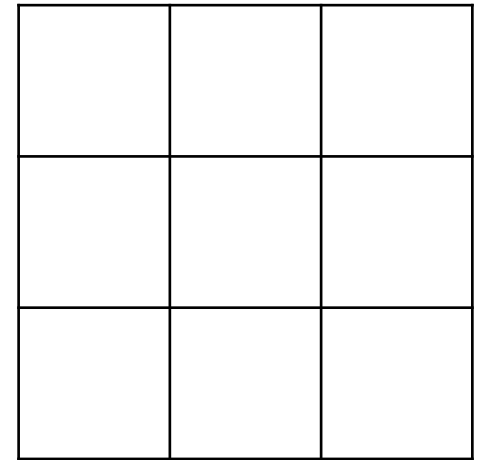
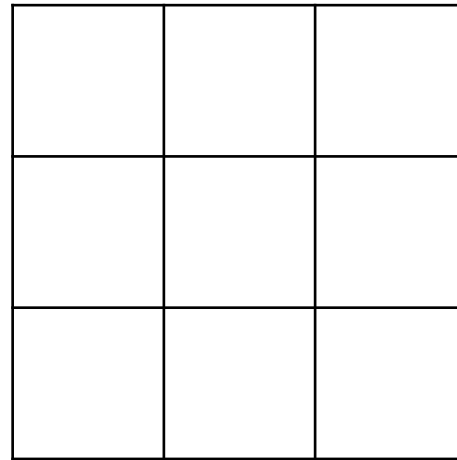
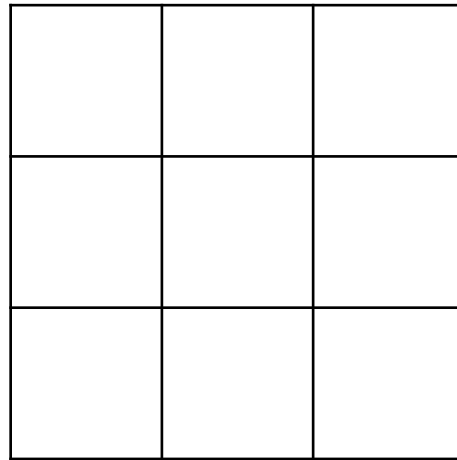
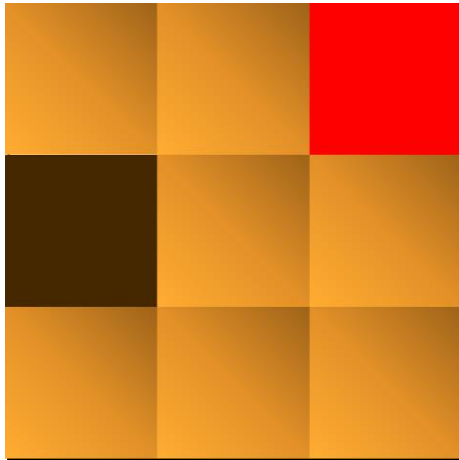
- The outline shape doesn't change in any way
- You do not take the square apart at all.

Each transformation changes a particular orientation into a different one.

## Challenge 1 – Find all the Orientations



Can you find the remaining 7 orientations that the square could be in?



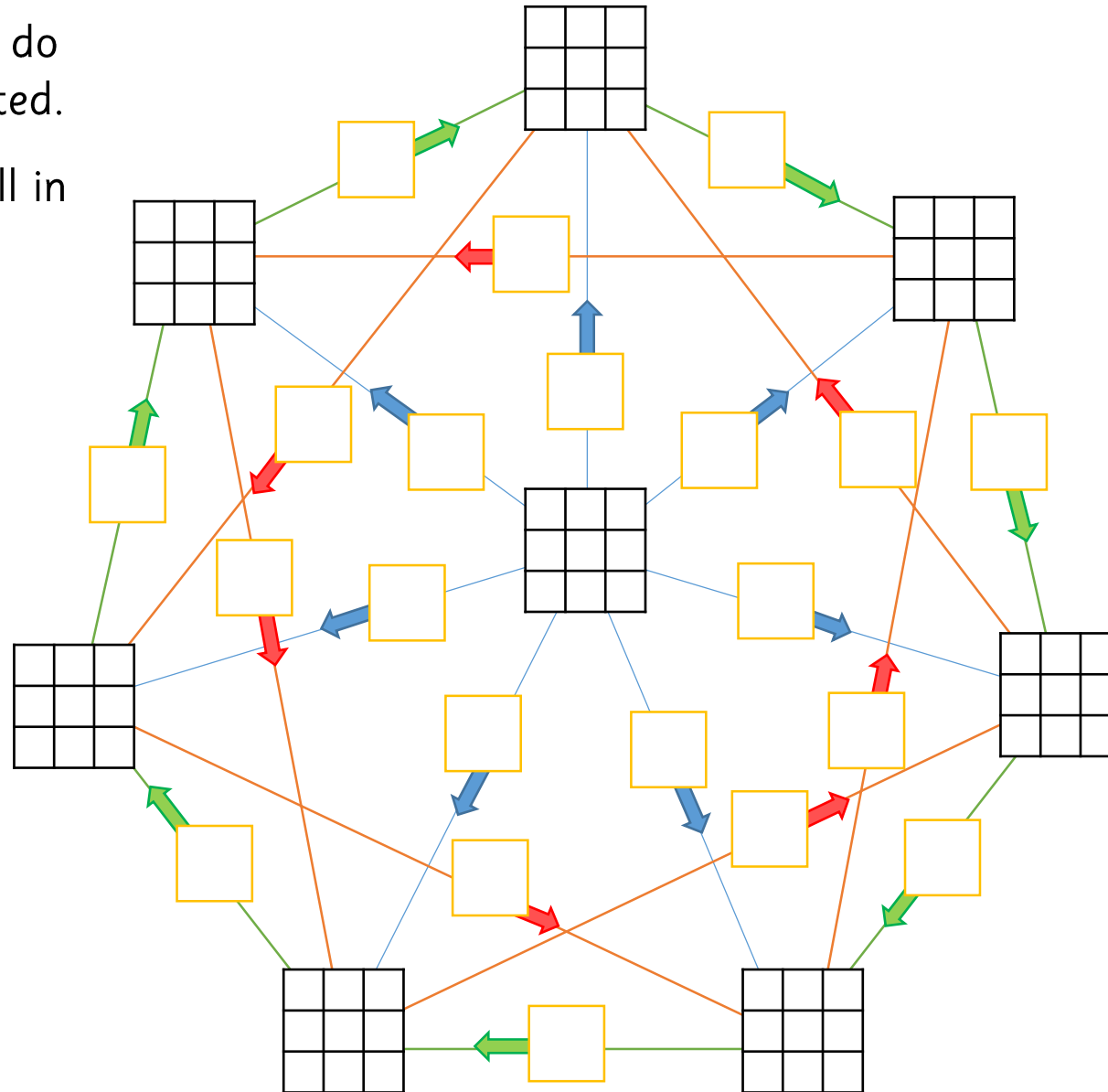
# Challenge 2 – Map the Transformations



Make sure that you can do all 7 transformations listed.

To complete this map, fill in each of the squares to represent each of the 8 possible orientations

Each line represents a transformation from one orientation to another.



E.g. a vertical flip could transform between these orientations

Spin

- 90°
- 90°
- 180°

Flip

- Vertical flip
- Horizontal flip
- Diagonal flip (top-left to bottom-right)
- Diagonal flip (top-right to bottom-left)



What do you notice...



**Observations**



...what do you wonder



**Questions**