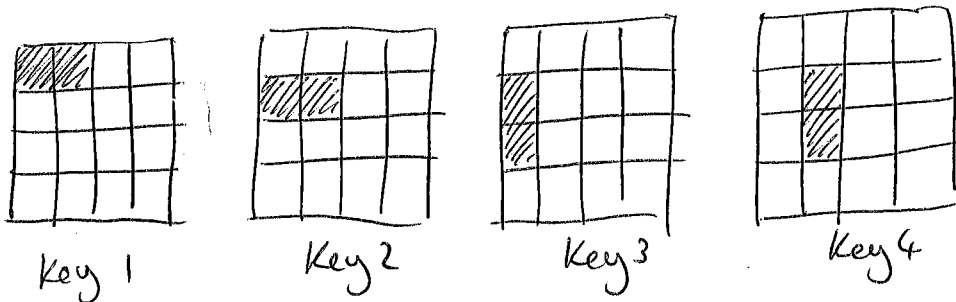
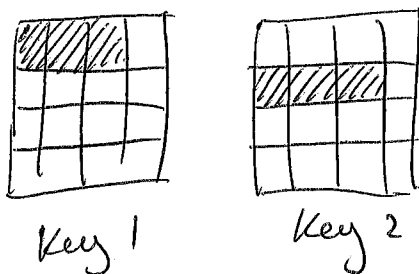



(a) There are four such keys. Keys 1 & 2 have an orbit of size 8. Keys 3 & 4 have orbits of size 4. In total, this gives 24 different colourings of the grid, as should be expected (3 places for a grey rectangle on each row and each column).



(b) There are two such keys, shown below, each in an orbit of size 8. In total, this gives 16 possible colourings (2 places for the shaded rectangle on each row & column), as expected.



(c) There are six such orbits. We only need consider the colourings with the shaded block in the orientation shown: , as every key can be rotated or reflected until it matches. No two of the six keys below are in the same orbit, as only one colouring in each orbit will match the given orientation.

