Reasoning and Modelling Assesment #1

Day #9

Competency Task:

You have two colours of paint. In how many different ways can you paint the faces of a cube if each face is painted? Painted cubes are considered to be the same if you can rotate one cube so that it matches the other one exactly.

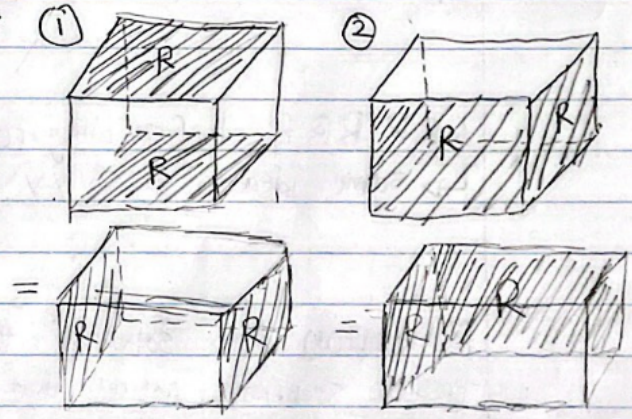
Solution:

Since a cube has 6 sides

Estimation: My estimation is that there at least 6 ways to paint the cube, The goal is to create a combination of colors where if you rotate the cube, it will not be the same combinations as the previous ones.

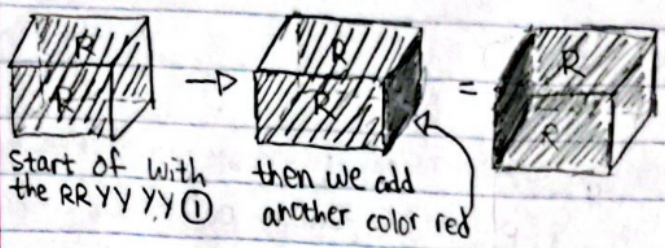
Two colours of Paint: Yellow & red

1. YYYYYY 1 Possibility/result → no matter how you rotate it, the sides will all be yellow, so there would only be 1 result.
2. RYYYYY 1 Possibility/result → no matter how you rotate the cube, the side with the color red would be on one side only
3. RRYYYY 2 possibility/result →



4. RRRYYY 2 possibilities / result →

①



Start of with the RRYYYY ①

then we add another color red

②

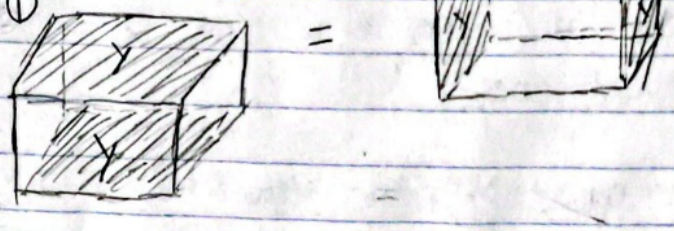
start of with RRYYYY ②

then we add another color red

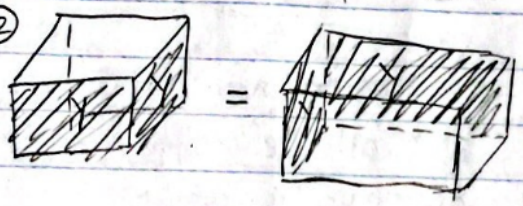
5. RRRRYY 2 possibilities / result →

↳ Basically the same as 'RRYYYY'

①



②



6. RRRRRY 1 possibility / result → no matter how you rotate the Cube, the side with the color Yellow would be on one side only

↳ same idea as 'RYYYYY'

7. RRR RRR 1 possibility / result → no matter how you rotate it, the sides would all be red. So there would only be 1 result

↳ same idea as 'YYYYYY'

Reflection: After solving the competency task, I figured out that there is 7 possible sceneries. I noticed that each scenerio has at most two possible results. It leads me to wonder whether the amount of color used affects the results. For example, in this case we used two color paints: red and Yellow. and each scenerio at most would only have two possible

results, which leads me to a conclusion where because we only used two colors in this problem there would only be two results at most and to test this claim I would attempt to do a three color Problem instead of two colors.

Extension (3 colors)

Three colored paint : A, B, C

Estimation:
The goal is the same as the previous problem, my guess is the same as the previous cube problem. There would only be 6 possibilites, Insted of two possible scenerios, there would be 3 Instead for each possibilities

1. AAAAAA 1x
2. BBBBBB 1x
3. CCCCCC 1x

4. AABBBB 2x
5. BBCCCC 2x
6. AACCCC 2x
7. CCAAAA 2x
8. CCBBBB 2x
9. BBAAAA 2x

10. AAABBB 2x
11. AAACCC 2x
12. BBBCCC 2x

Hilroy