SECURIN - THE DOOMED DICE CHALLENGE

Part – A

Question 1) How many total combinations are possible?

Dice\_A and Dice\_B has 6 faces each, so with respect to Dice\_A there will be 6 combination with Dice\_B for each face in Dice\_A. So, we can just multiply the numbers of faces of Dice\_A and Dice\_B or we can use a for loop to count all the possible combinations and both will give us the same result i.e. 36 combinations.



Question 2) Calculate and display the distribution of all possible combinations that can be obtained when rolling both Die A and Die B together.

We can use a for loop to iterate through the values in Dice\_A and in Dice\_B to show the combinations. The resultant would be

**A black background with white text

Description automatically generated**

Question 3) Calculate the Probability of all Possible Sums occurring among the number of combinations.

To find the probability of all possible sums, we use a data structure called dictionary which uses key-value pairs to store the data. Here, we use the distinct sums as key and the associated pairs as values and in the end we can find the probability by simply finding the length of the value(stored as list of pairs) for each key by dividing the total number of combinations.

A screen shot of a computer

Description automatically generated

PART – B

Question) Loki dooms your dice for his fun removing all the “Spots” off the dice. You have the tools to re-attach the “Spots” back on the Dice.

However, Loki has doomed your dice with the following conditions:

● Die A cannot have more than 4 Spots on a face.

● Die A may have multiple faces with the same number of spots.

● Die B can have as many spots on a face as necessary i.e. even more than 6.

But in order to play your game, the probability of obtaining the Sums must remain the

same!

So if you could only roll P(Sum = 2) = 1/X, the new dice must have the spots reattached

such that those probabilities are not changed.

**APPROACH:**

Things that we know certainly:

The probabilities should remain the same and the maximum number of spots in Dice\_A is 4.

We can solve this problem by forming all the different kinds of combinations for Dice\_A and Dice\_B and check whether they satisfy the conditions or not. If it satisfies the that certain pairs of values are the combinations of the Dices.

We can limit the number of combinations by:

We know that the probability of sum 2 is 1, meaning the Dices will be rolled once the get the sum 2 so we need 1 in Dice\_A and Dice\_B.

Dice\_A: [1,\_,\_,\_,\_,\_]

Dice\_B: [1,\_,\_,\_,\_,\_]

Then we can go on filling the values in Dice\_A till 4, as they are need to meet the conditions and if Dice\_A has a 4 then Dice\_B must contain 8 so that they add upto 12 whose probability is also one. Now we have less number of possibilities than before and now we can form combinations which would solve the conditions.

Dice\_A: [1,2,3,4,\_,\_]

Dice\_B: [1,\_,\_,\_,\_,8]