PROBLEM STATEMENT: THE DOOMED DICE CHALLENGE

PART-A

1. How many total combinations are possible?

LOGIC:

The logic of the code is:- The number of faces in a die is 6.Thus when a die is rolled the total possibilities would be 6. Since here two dices are rolled together,

The total combinations would be 6 X 6=36 that is 62.

HOW DID I COME UP WITH THE SOLUTION:

Firstly when one dice is rolled the outcomes would be 6 that is [1,2,3,4,5,6].

Thus when two dices are rolled together the outcomes will be 6 X 6 ie.62.

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2. The distribution of all possible combinations that can be obtained when rolling both Die A and Die B together.

LOGIC:

The logic of the code is:- The goal is create a 6 X 6 matrix with each cell having all the possible combinations that is obtained each time the two dices are rolled together. Thus while traversing through each cell of the 6 X 6 2-D matrix through indices [i][j] (range from 1 to 6) the possible distribution will be [ i , j ] each time. Thus they are printed along with their sum i+j.

HOW DID I COME UP WITH THE SOLUTION:

I observed that the indices if started from 1 and ended to 6, with an outer FOR loop and an inner FOR loop all the possible combinations can be found by [ i , j ].

3.Calculate the Probability of all possible sums.

LOGIC:

The logic of the code is:- The probability of all possible sums is calculated by calculating the favorable occurrences of the each sum (from 2 to 12), in all rows of the 6X6 dice matrix. Declare a dictionary and store the sum value as KEY and the probability (which is P=favorable occurrences/total occurrences) as VALUE in the dictionary each time. Then traverse the dictionary items to get the output. The probability is further formatted upto three decimal places for better understanding and make the output more presentable.

HOW DID I COME UP WITH THE SOLUTION:

To calculate of all possible sums we have to calculate the favorable occurrences of each sum first. So for finding the favorable occurrences I calculated the sum of the count of the particular sum in each and every row of the 6X6 dice matrix and the calculated the probability by using the formula favorable outcome/ total outcome.

**PART B**

1. DIE A cannot have more than 4 spots on a face.

2. DIE A may have multiple faces with same no of spots.

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

LOGIC:

Thus by using function calculateProbability() we first calculate the number of occurrences for each possible sum and store the occurrences in a list.

Then we create a function findDieA() which when the spots in a face of dieA is greater than 4 reduces it by 3 to find the faces of undoomed die A.

Now we declare a recursive function calculateCombinations which calls itself to find the faces of undoomed die B.

Finally we call the undoomDice() is called which calls the function findDieA() that finds doomed die A and calculates the probability using calculateProbability() and then calls the recursive function calculateCombinations() to find the doomed die B.

HOW DID I COME UP WITH THE SOLUTION:

Since the constraint given is that only maximum of 4 spots the Die A canm have in each of its face, thus if 4 spots exist in atleast one face of the die A then 8 spots must exist in Die B to give sum as 12 as well the occurrence of 12 is one for normal dices, thus 4 and 8 exists only one time in Die A and Die B respectively. Similarly 1 exist only one time in both Die A and Die B as their sum 1+1=2 and the sum 2’s occurrence is only 1 for normal dices. With this is created a function which tried each combinations until the probability of possible sums of the doomed dices are same as the probability of possible sums of initial dices.