PART-A

QUESTION 1.

LOGIC – When you roll six sided die there are 6 possible outcomes numbered from 1 to 6.

When you roll second die its an independent event. The second die also have six possible outcomes.

When you roll both dice together each outcome from the first die can be paired with each outcome from the second die. For instance if Die A shows a 1 and Die B shows a 1 that is one combination. If Die A shows a 1 and Die B shows a 2 that's another combination, and so on.

Mathematical solution,

Number of outcomes for die A =6

Number of outcomes for die B =6

Total combination = 6\*6=36

QUESTION 2.

LOGIC- Using nested loops it calculates the sum of faces on Die A and Die B for all possible combinations and stores these sums in the respective cells of the matrix.

Finally, it prints out the distribution matrix, displaying the sums of the combinations

MATHEMATICAL EXPLANATION-

The sums are calculated using (i + 1) + (j + 1) in nested loops where i and j represent the faces of the dice

The total combinations when rolling both dice are found by multiplying the number of outcomes for each die (6 \* 6 = 36).

QUESTION 3.

LOGIC-

There are 36 total combinations when rolling two six-sided dice.

A loop goes through all possible combinations (faces of both dice) and counts how many times each sum from 2 to 12 occurs.

Probability for each sum = Number of occurrences of that sum / Total number of combinations (36)

MATHEMATICAL EXPLAINATION-

Probability of a particular sum = Number of occurrences of that sum / Total number of combinations

For example, if a sum occurs 3 times out of 36 combinations the probability for that sum is 3/36​.

Each index in the array corresponds to a sum value (index 0 represents sum = 2, index 10 represents sum = 12)

PART-B

LOGIC-

Die A: Represents a standard six-sided die [1, 2, 3, 4, 5, 6].

Die B: Also represents a standard six-sided die [1, 2, 3, 4, 5, 6].

The sum 2 has a probability of 1/36, while the sums 3, 4, 5, 6, and so on, increase incrementally up to 1/36 for sum 12

Die A has a limitation where no face can have more than 4 spots.

Calculate the original probabilities of obtaining each sum from rolling Die A and Die B.

Generate the current counts of each sum based on the given dice.

Determine the target counts for each sum based on the original probabilities.

Iterate through Die A's faces, checking for faces with more than 4 spots.

MATHEMATICAL CALCULATION-

P(Sum = 2) = 1/36

P(Sum = 3) = 2/36

P(Sum = 4) = 3/36

P(Sum = 5) = 4/36

P(Sum = 6) = 5/36

P(Sum = 7) = 6/36

P(Sum = 8) = 5/36

P(Sum = 9) = 4/36

P(Sum = 10) = 3/36

P(Sum = 11) = 2/36

P(Sum = 12) = 1/36