

# Search party



## Background

Somebody in your neighbourhood has lost their dog, and we need to decide on an optimal strategy to find her. We've enlisted 5 different types of helpers to assist with the search: walkers, cyclists, cars, police, and firefighters. Seven of each type of helper are available to assist. To organize the search, we've divided the neighbourhood into a 3x3 grid, and for each of the 9 grid squares we've estimated the probability that the dog can be found there. Furthermore, each type of helper has a probability of finding the dog in each grid square (given that the dog is in fact in that grid square). Assume that all helpers, whether of the same or different type, are independent.

## Question

How many of each type of helper should be assigned to each grid square, to minimize the probability that the dog is not found?

## Datasets Provided

`PriorProbabilities.csv`: A vector giving the probability that the dog is in each of the 9 grid squares.

`FindingProbabilities.csv`: A matrix in which the  $(i,j)$ th element is the probability that a helper of type  $i$  will find the dog in grid square  $j$ , given that the dog is in grid square  $j$ .

## Solution Requirements

Submit a `.csv` file containing a single row of 45 comma-separated numbers. The first 9 numbers should be the number of helper type 1 to assign to grid squares 1 through 9; the second set of 9 numbers should be the number of helper type 2 to assign to grid squares 1 through 9; and so on.