BACKTRACKING QUESTIONS

Note - These are classical questions. Please positively solve them.

Question 1 :

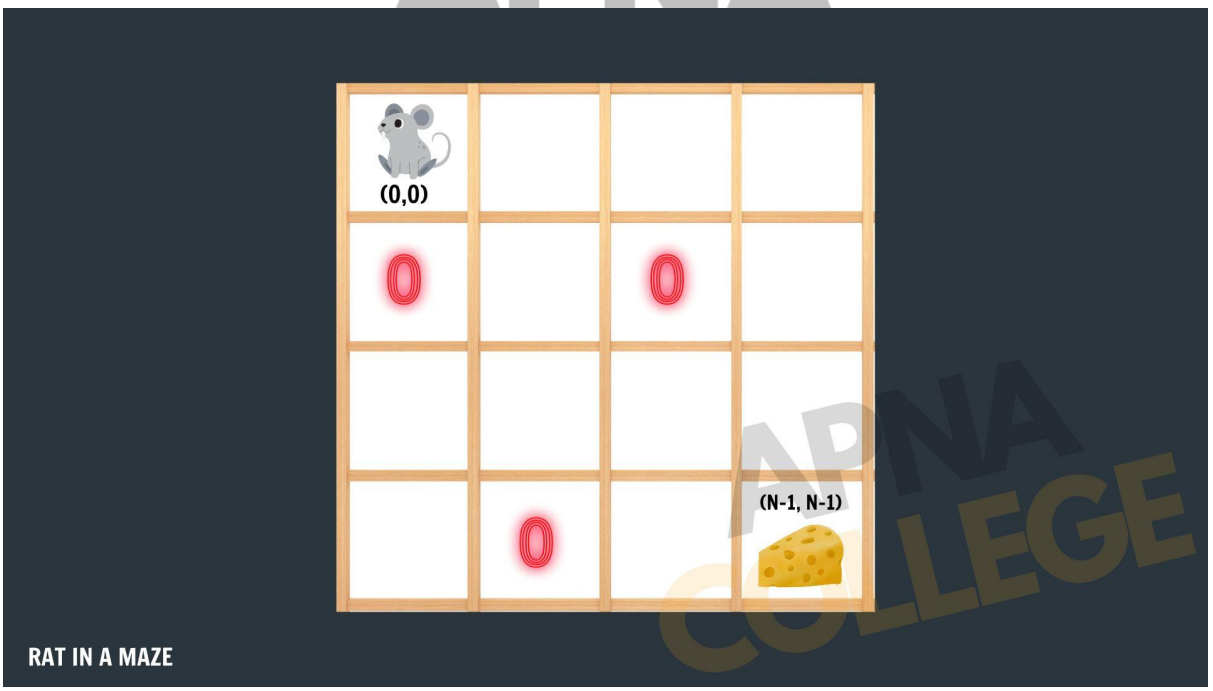
Rat in a Maze

You are given a starting position for a rat which is stuck in a maze at an initial point (0, 0) (the maze can be thought of as a 2-dimensional plane). The maze would be given in the form of a square matrix of order N * N where the cells with value 0 represent the maze's blocked locations while value 1 is the open/available path that the rat can take to reach its destination. The rat's destination is at (N - 1, N - 1).

Your task is to find all the possible paths that the rat can take to reach from source to destination in the maze.

The possible directions that it can take to move in the maze are 'U'(up) i.e. (x, y - 1) , 'D'(down) i.e. (x, y + 1) , 'L' (left) i.e. (x - 1, y), 'R' (right) i.e. (x + 1, y).

(This problem is similar to Grid ways.)



Sample Input : int maze[][] = { { 1, 0, 0, 0 },
{ 1, 1, 0, 1 },
{ 0, 1, 0, 0 },
{ 1, 1, 1, 1 } };

Sample Output : 1 0 0 0
1 1 0 0
0 1 0 0
0 1 1 1

Question 2 :

Keypad Combinations

Given a string containing digits from 2-9 inclusive, print all possible letter combinations that the number could represent. You can print the answer in any order.

A mapping of digits to letters (just like on the telephone buttons) is given below. Note that 1 does not map to any letters.

Sample Input 1 : digits = "23"
Sample Output 1 : "ad", "ae", "af", "bd", "be", "bf", "cd", "ce", "cf"

Sample Input 2 : digits = "2"
Sample Output 2 : "a", "b", "c"

Sample Input 3 : digits = ""
Sample Output 3 : ""

Question 3 :

Knight's Tour

Given a N*N board with the Knight placed on the first block of an empty board. Moving according to the rules of chess, knights must visit each square exactly once. Print the order of each cell in which they are visited.

Sample Input 1 : N = 8

Sample Output 1 :

```
0  59  38  33  30  17   8  63
37  34  31  60   9  62  29  16
58   1  36  39  32  27  18   7
35  48  41  26  61  10  15  28
42  57   2  49  40  23   6  19
47  50  45  54  25  20  11  14
56  43  52   3  22  13  24   5
51  46  55  44  53   4  21  12
```

(**Hint** : Similar to N Queens)