**Interview - Technical Round 1 - Pinaca Technologies**

**Scenario**

Consider you are a person who will allows people inside a theatre (Consider a grid of m\*n as the theatre seats).You should be placing the people in the theatre, But here we should follow a rule which is

**Rule:**

If a person is seated in a particular place no person can sit ,to the left , to the right ,to the top , to the bottom , to the top-left , to the top-right ,to the bottom-left ,to the bottom-right which is simply around the person. Satisfying this rule you should be seating the people.

**Question 1**: After satisfying the rule, what is the maximum number of people can be seated?

**Question 2**: How many different ways are there?

**Solution For Question 1 using PYTHON:**

As this scenario uses array we should **import** the package **numpy**

**Step 1: import** numpy and give an alias name as np

**Step 2:** Get the values of rows and columns [R and C]

**Step 3:** Assign a matrix

**Step 4:** Using the **for** loop append 0 to all the indices of matrix. As the theatre to be empty we are assigning 0 to all the indices

**Step 5:** To place a person in a particular position, get the position values ie. Get the rows and columns [poirow and poicol]

**Step 6:** Put the condition which should satisfy our rule using **if…else Statement**

Conditions below:

**Top** [poirow-1][poicol])

**Bottom** [poirow+1][poicol])

**Right** [poirow][poicol+1])

**Left** [poirow][poicol-1])

**Top-right** [poirow-1][poicol+1])

**Top-left** [poirow-1][poicol-1])

**Bottom-right** [poirow+1][poicol+1])

**Bottom-left** [poirow+1][poicol-1])

**Explanation for the condition used:**

Decrementing the row -1 and the column remains same gives us the **Top index**

Incrementing the row +1 and the column remains same gives us the **Bottom index**

Incrementing the column +1 and the row remains same gives us the **Right index**

Decrementing the column -1 and the row remains same gives us the **Left index**

Decrementing the row -1 and incrementing the column +1 gives us the **Top-right index**

Decrementing the row -1 and decrementing the column -1 gives us the **Top-left index**

Incrementing the row +1 and incrementing the column +1 gives us the **Bottom-right index**

Incrementing the row +1 and decrementing the column -1 gives us the **Bottom-right index**

**Step 7:** If the condition satisfied then enter into the loop and get the values and store the value in matrix [poirow][poicol], by doing this we can place a person in the particular position.

**Step 8:** If the condition fails, which means our rule is not satisfied then it will throw a message saying “!!!According to our rule the person cannot be seated here” using the **else statement.**

**Step 9:** If the condition fails because of **InderError** then it will be caught by the exception which is **except InderError:** this error will be handled by the exception

**Step 10:** Once all the conditions are True, it will come out of the loop and Show us the Final structure of the matrix which is the theatre using another **for loop**

**Step 11:** To get the maximum number of people seated, count the non-zero values from the matrix, which can be done by using a built-function **count nonzero()**

**Conclusion:**

Although there are many different ways to solve this particular problem, I have used the above **model-technique** to solve this which is done by myself.

**Output:**

**Trying for 2\*2 matrix**

Enter the number of rows:2

Enter the number of columns:2

The sturcture of the theatre :

[[0, 0], [0, 0]]

0 0

0 0

Enter a position where a person can sit (row) :0

Enter a position where a person can sit (column) :0

0

Seat the person - Enter the value : 1

The sturcture of the theatre after the attempt:

[[1, 0], [0, 0]]

Enter a position where a person can sit (row) :0

Enter a position where a person can sit (column) :1

0

!!!According to our rule the person cannot be seated here

The sturcture of the theatre after the attempt:

[[1, 0], [0, 0]]

Enter a position where a person can sit (row) :1

Enter a position where a person can sit (column) :0

0

The sturcture of the theatre after the attempt:

[[1, 0], [0, 0]]

Enter a position where a person can sit (row) :1

Enter a position where a person can sit (column) :1

0

!!!According to our rule the person cannot be seated here

The sturcture of the theatre after the attempt:

[[1, 0], [0, 0]]

The final sturcture after placing all the people:

[[1, 0], [0, 0]]

The maximum number of person can be seated in this theatre :

1

**Trying for 3\*2 matrix :**

Enter the number of rows:3

Enter the number of columns:2

The sturcture of the theatre :

[[0, 0], [0, 0], [0, 0]]

0 0

0 0

0 0

Enter a position where a person can sit (row) :0

Enter a position where a person can sit (column) :0

0

Seat the person - Enter the value : 1

The sturcture of the theatre after the attempt:

[[1, 0], [0, 0], [0, 0]]

Enter a position where a person can sit (row) :0

Enter a position where a person can sit (column) :1

0

!!!According to our rule the person cannot be seated here

The sturcture of the theatre after the attempt:

[[1, 0], [0, 0], [0, 0]]

Enter a position where a person can sit (row) :1

Enter a position where a person can sit (column) :0

0

The sturcture of the theatre after the attempt:

[[1, 0], [0, 0], [0, 0]]

Enter a position where a person can sit (row) :1

Enter a position where a person can sit (column) :1

0

!!!According to our rule the person cannot be seated here

The sturcture of the theatre after the attempt:

[[1, 0], [0, 0], [0, 0]]

Enter a position where a person can sit (row) :2

Enter a position where a person can sit (column) :0

0

Seat the person - Enter the value : 2

The sturcture of the theatre after the attempt:

[[1, 0], [0, 0], [2, 0]]

Enter a position where a person can sit (row) :2

Enter a position where a person can sit (column) :1

0

!!!According to our rule the person cannot be seated here

The sturcture of the theatre after the attempt:

[[1, 0], [0, 0], [2, 0]]

The final sturcture after placing all the people:

[[1, 0], [0, 0], [2, 0]]

The maximum number of person can be seated in this theatre :

2