



# **REPORT FOR MATRIX ARRANGEMENT USING PYTHON PROGRAMMING**

**AS A PROJECT WORK FOR THE COURSE**

**PYTHON PROGRAMMING (INT 108)**

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## **DECLARATION**

I hereby Vikram Kumar Jha Reg. No. 12207883 declare that the project work reported entitled " MATRIX ARRANGEMENT" in partial fulfilment of the requirement for the award of Degree for Bachelors of Technology in CSE at Lovely Professional University, Phagwara, Punjab is an authentic work carried out under supervision of my supervisor Dr. Gauri Mathur The content of this project represents authentic and honest effort conducted, in its entirety, by me. I am fully responsible for the contents of my project work.

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# PYTHON

## 1.1 INTRODUCTION:

Python is a popular programming language. It was created by Guido van Rossum, and released in 1991.

It is used for:

- web development (server-side)
- software development
- mathematics
- system scripting.

### Python Syntax compared to other programming languages

- Python was designed for readability, and has some similarities to the English language with influence from mathematics.
- Python uses new lines to complete a command, as opposed to other programming languages which often use semicolons or parentheses.

## 1.2 LOOPS/FUNCTION/

Python has two primitive loop commands:

- **While** loops
- **for** loops

### The While Loop:

With the **while** loop we can execute a set of statements as long as a condition is true.

## Python For Loops:

A **for** loop is used for iterating over a sequence (that is either a list, a tuple, a dictionary, a set, or a string).

This is less like the **for** keyword in other programming languages, and works more like an iterator method as found in other object-orientated programming languages.

With the **for** loop we can execute a set of statements, once for each item in a list, tuple, set etc.

## Python Functions:

A function is a block of code which only runs when it is called.

You can pass data, known as parameters, into a function.

A function can return data as a result.

## Creating a Function

In Python a function is defined using the **def** keyword:

For example:

```
def my_function():  
    print("Hello from a function")
```

## 1.3 PROJECT :

A basket is given to you in the shape of a matrix. If the size of the matrix is  $N \times N$  then the range of number of eggs you can put in each slot of the basket is 1 to  $N^2$ . Your task is to arrange the eggs in the basket such that the sum of each row, column and the diagonal of the matrix remain same.

## 1.4 CODE:

```
File Edit Selection View Go Run Terminal Help vikram proj.py - python - Visual Studio Code
vikram proj.py X
vikram proj.py > forOddNumber
1 def forEvenNumber(n):
2     a = [[(n * y) + x + 1 for x in range(n)] for y in range(n)]
3     for i in range(0, n // 4):
4         for j in range(0, n // 4):
5             a[i][j] = (n * n + 1) - a[i][j];
6     for i in range(0, n // 4):
7         for j in range(3 * (n // 4), n):
8             a[i][j] = (n * n + 1) - a[i][j];
9     for i in range(3 * (n // 4), n):
10        for j in range(0, n // 4):
11            a[i][j] = (n * n + 1) - a[i][j];
12    for i in range(3 * (n // 4), n):
13        for j in range(3 * (n // 4), n):
14            a[i][j] = (n * n + 1) - a[i][j];
15    for i in range(n // 4, 3 * (n // 4)):
16        for j in range(n // 4, 3 * (n // 4)):
17            a[i][j] = (n * n + 1) - a[i][j];
18    print("\nSum of all row, column and diagonals = ",
19          n * (n * n + 1) // 2, "\n")
20    for i in range(n):
21        for j in range(n):
22            print('%2d ' % (a[i][j]), end=" ")
23        print()
24 def forOddNumber(n):
25     b = [[0 for x in range(n)]
26          | | for y in range(n)]
27     r = n // 2
28     c = n - 1
29     num = 1
30     while num <= (n * n):
```

```
File Edit Selection View Go Run Terminal Help vikram proj.py - python - Visual Studio Code
vikram proj.py X
vikram proj.py > forEvenNumber
31     if r == -1 and c == n:
32         c = n - 2
33         r = 0
34     else:
35         if c == n:
36             c = 0
37             if r < 0:
38                 r = n - 1
39             if b[int(r)][int(c)]:
40                 c = c - 2
41                 r = r + 1
42                 continue
43         else:
44             b[int(r)][int(c)] = num
45             num = num + 1
46             c = c + 1
47             r = r - 1
48     print("\nSum of all row, column and diagonals = ",
49           n * (n * n + 1) // 2, "\n")
50     for i in range(0, n):
51         for j in range(0, n):
52             print('%2d ' % (b[i][j]), end='')
53         print()
54     print("\n--|WELCOME|--\n")
55     n = int(input("Please Enter Number of Rows and Column- n*n (Square Matrix): "))
56     if n%2==0:
57         forEvenNumber(n)
58     else:
59         forOddNumber(n)
60     print("\n--|ThankYou|--\n")
```

## 1.5 RESULTS:

The image shows a screenshot of the Visual Studio Code (VS Code) interface. The top menu bar includes File, Edit, Selection, View, Go, Run, Terminal, and Help. The title bar indicates the current file is 'vikram proj.py' in the 'python' language, running in Visual Studio Code.

The interface is divided into several panes. On the left is the Explorer sidebar with icons for Explorer, Search, Source Control, Run and Debug, and Extensions. The main editor area displays a Python script named 'proj.py'. The script content is as follows:

```
Windows PowerShell
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Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\Users\91620\Desktop\python> & C:/Users/91620/AppData/Local/Programs/Python/Python310/python.exe "c:/Users/91620/Desktop/python/vikram proj.py"

--|WELCOME|--

Please Enter Number of Rows and Column- n*n (Square Matrix): 3

Sum of all row, column and diagonals = 15

 2  7  6
 9  5  1
 4  3  8

--|ThankYou|--

PS C:\Users\91620\Desktop\python> 
```

The bottom status bar shows the current cursor position at Line 8, Column 45. It also displays the file encoding as UTF-8, the line ending as CRLF, and the Python version as 3.10.6 64-bit. The system tray at the very bottom shows the date and time as 11:00 PM on 26-11-2022, along with weather information (11°C Haze) and various system icons.

The image shows a Windows desktop environment. A Visual Studio Code window is open, displaying a Python file named 'vikram proj.py'. The terminal window is active, showing the execution of a Python script. The script prompts the user to enter the number of rows and columns for a square matrix. The user has entered 4. The script then calculates the sum of all elements in the matrix and displays the result, which is 34. The taskbar at the bottom of the screen shows the system clock as 11:01 PM on 26-11-2022. The taskbar also includes icons for various applications, including the Start menu, Search, File Explorer, and several communication apps like WhatsApp and Telegram.