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Practical-9

Aim: Write program using array

- Write a Python program to create an array of 5 integers and display the array items.
Access individual element through indexes.
- Write a Python program to append a new item to the end of the array.
- Write a Python program to reverse the order of the items in the array.
- Write a Python program to insert a new item before the second element in an existing array.
- Write a program to create a square matrix and print it in spiral form

*a. Write a Python program to create an array of 5 integers and display the array items.
Access individual element through indexes.*

Program:

```
import array

#creating array of 5 integers
arr = array.array('i', [1, 2, 3, 4, 5])

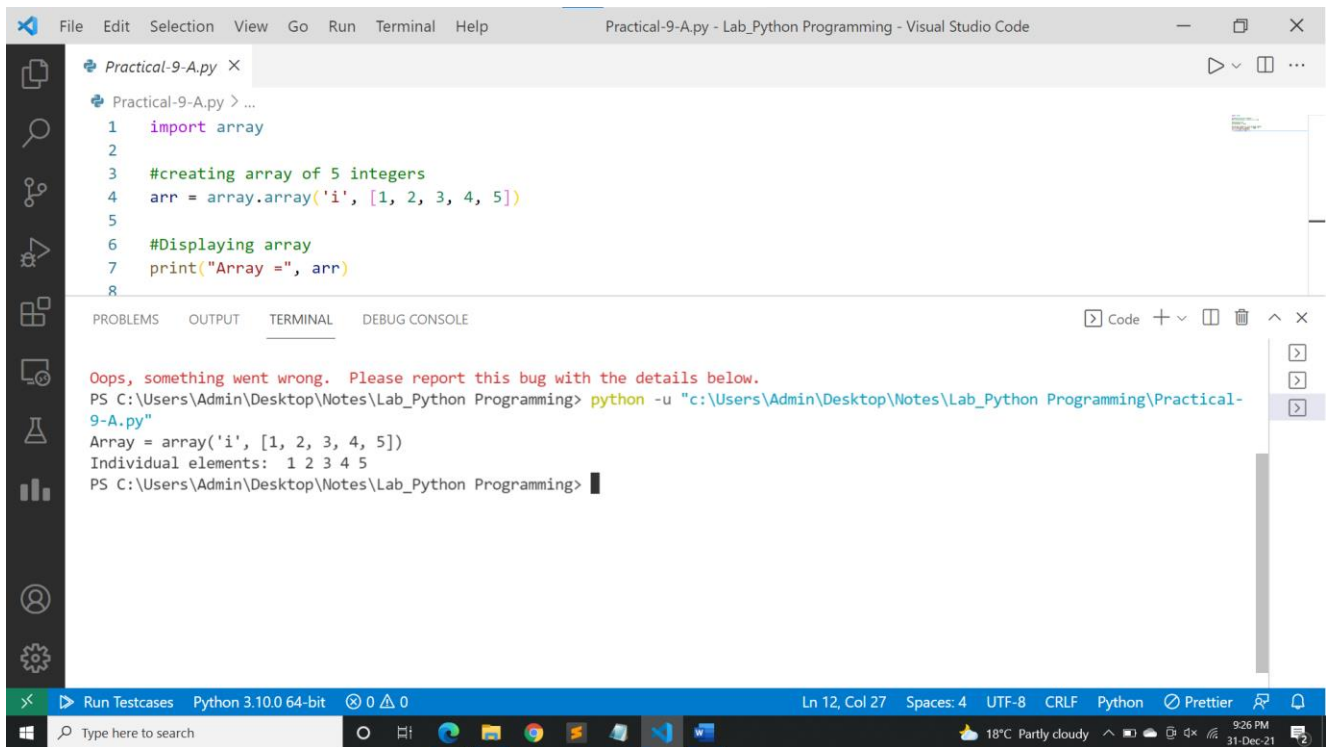
#Displaying array
print("Array =", arr)

#accessing element of array through indexes
print("Individual elements: ", end=' ')
for i in range (len(arr)):
    print(arr[i], end=' ')
```

Output:

```
Array = array('i', [1, 2, 3, 4, 5])
Individual elements: 1 2 3 4 5
```

Screenshot:



The screenshot shows the Visual Studio Code interface. The top menu bar includes File, Edit, Selection, View, Go, Run, Terminal, and Help. The title bar reads 'Practical-9-A.py - Lab_Python Programming - Visual Studio Code'. The editor window displays a Python file named 'Practical-9-A.py' with the following code:

```
1 import array
2
3 #creating array of 5 integers
4 arr = array.array('i', [1, 2, 3, 4, 5])
5
6 #Displaying array
7 print("Array =", arr)
8
```

The bottom panel shows the 'TERMINAL' tab with the following output:

```
Oops, something went wrong. Please report this bug with the details below.
PS C:\Users\Admin\Desktop\Notes\Lab_Python Programming> python -u "c:\Users\Admin\Desktop\Notes\Lab_Python Programming\Practical-9-A.py"
Array = array('i', [1, 2, 3, 4, 5])
Individual elements: 1 2 3 4 5
PS C:\Users\Admin\Desktop\Notes\Lab_Python Programming>
```

The status bar at the bottom indicates 'Run Testcases', 'Python 3.10.0 64-bit', '0 0 0', 'Ln 12, Col 27', 'Spaces: 4', 'UTF-8', 'CRLF', 'Python', 'Prettier', and the system clock shows '9:26 PM 31-Dec-21'.

b. Write a Python program to append a new item to the end of the array.

Program:

```
import array

#declaring empty integer array
arr = array.array('i', [])
n = int(input("Enter no. of element you want to append: "))

#appending element at end
for i in range(n):
    arr.append(int(input("Enter element : ")))

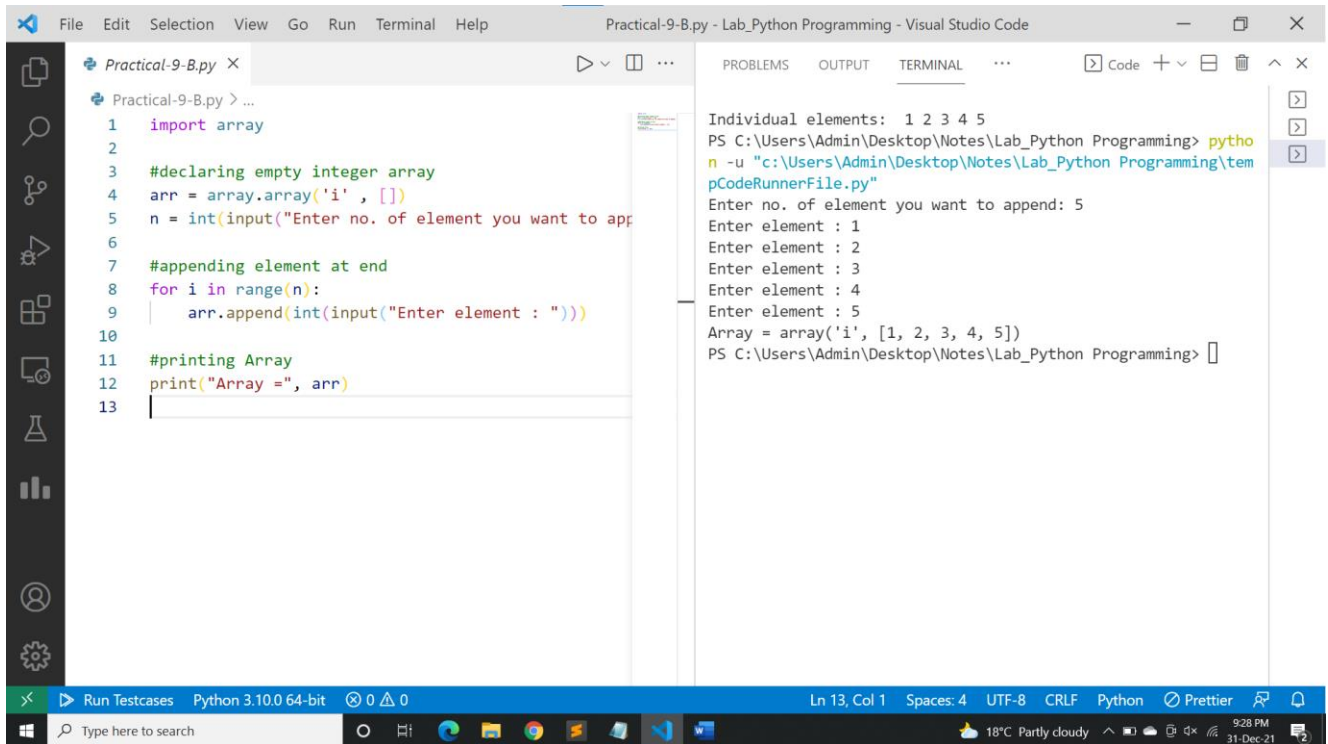
#printing Array
print("Array =", arr)
```

Output:

```
Enter no. of element you want to append: 5
```

```
Enter element : 1
Enter element : 2
Enter element : 3
Enter element : 4
Enter element : 5
Array = array('i', [1, 2, 3, 4, 5])
```

Screenshot:



The screenshot shows the Visual Studio Code interface. The left pane displays the file 'Practical-9-B.py' with the following code:

```
1 import array
2
3 #declaring empty integer array
4 arr = array.array('i', [])
5 n = int(input("Enter no. of element you want to append: "))
6
7 #appending element at end
8 for i in range(n):
9     arr.append(int(input("Enter element : ")))
10
11 #printing Array
12 print("Array =", arr)
13
```

The right pane shows the 'TERMINAL' output:

```
Individual elements: 1 2 3 4 5
PS C:\Users\Admin\Desktop\Notes\Lab_Python Programming> python
n -u "c:\Users\Admin\Desktop\Notes\Lab_Python Programming\tem
pCodeRunnerFile.py"
Enter no. of element you want to append: 5
Enter element : 1
Enter element : 2
Enter element : 3
Enter element : 4
Enter element : 5
Array = array('i', [1, 2, 3, 4, 5])
PS C:\Users\Admin\Desktop\Notes\Lab_Python Programming>
```

c. Write a Python program to reverse the order of the items in the array.

Program:

```
import array

#declaring empty integer array
arr = array.array('i', [])
n = int(input("Enter no. of element you want to append: "))

#appending element at end
for i in range(n):
    arr.append(int(input("Enter element : ")))
```

```

#printing Array before reversing
print("Initial Array =", arr)

#reversing and printing array
arr.reverse()
print("Reversed Array =", arr)

```

Output:

```

Enter no. of element you want to append: 5
Enter element : 1
Enter element : 2
Enter element : 3
Enter element : 4
Enter element : 5
Initial Array = array('i', [1, 2, 3, 4, 5])
Reversed Array = array('i', [5, 4, 3, 2, 1])

```

Screenshot:

The screenshot shows the Visual Studio Code interface. The editor window displays a Python script named 'Practical-9-C.py'. The script imports the 'array' module, declares an empty integer array, and uses a loop to append five elements (1, 2, 3, 4, 5) based on user input. It then prints the initial array and reverses it before printing the reversed array. The output window on the right shows the execution of the script, displaying the same prompts and outputs as shown in the 'Output' section above. The status bar at the bottom indicates the file is at line 16, column 31, using Python 3.10.0 64-bit with UTF-8 encoding and CRLF line endings.

```

Practical-9-C.py
1  import array
2
3  #declaring empty integer array
4  arr = array.array('i', [])
5  n = int(input("Enter no. of element you want to append: "))
6
7  #appending element at end
8  for i in range(n):
9      arr.append(int(input("Enter element : ")))
10
11 #printing Array before reversing
12 print("Initial Array =", arr)
13
14 #reversing and printing array
15 arr.reverse()
16 print("Reversed Array =", arr)

```

```

PS C:\Users\Admin\Desktop\Notes\Lab_Python Programming> python -u "c:\Users\Admin\Desktop\Notes\Lab_Python Programming\tempCodeRunnerFile.py"
Enter no. of element you want to append: 5
Enter element : 1
Enter element : 2
Enter element : 3
Enter element : 4
Enter element : 5
Initial Array = array('i', [1, 2, 3, 4, 5])
Reversed Array = array('i', [5, 4, 3, 2, 1])
PS C:\Users\Admin\Desktop\Notes\Lab_Python Programming>

```

- d. Write a Python program to insert a new item before the second element in an existing array.

Program:

```
import array

#creating array of 5 integers
arr = array.array('i', [1, 2, 3, 4, 5])

#Displaying array
print("Initial Array =", arr)

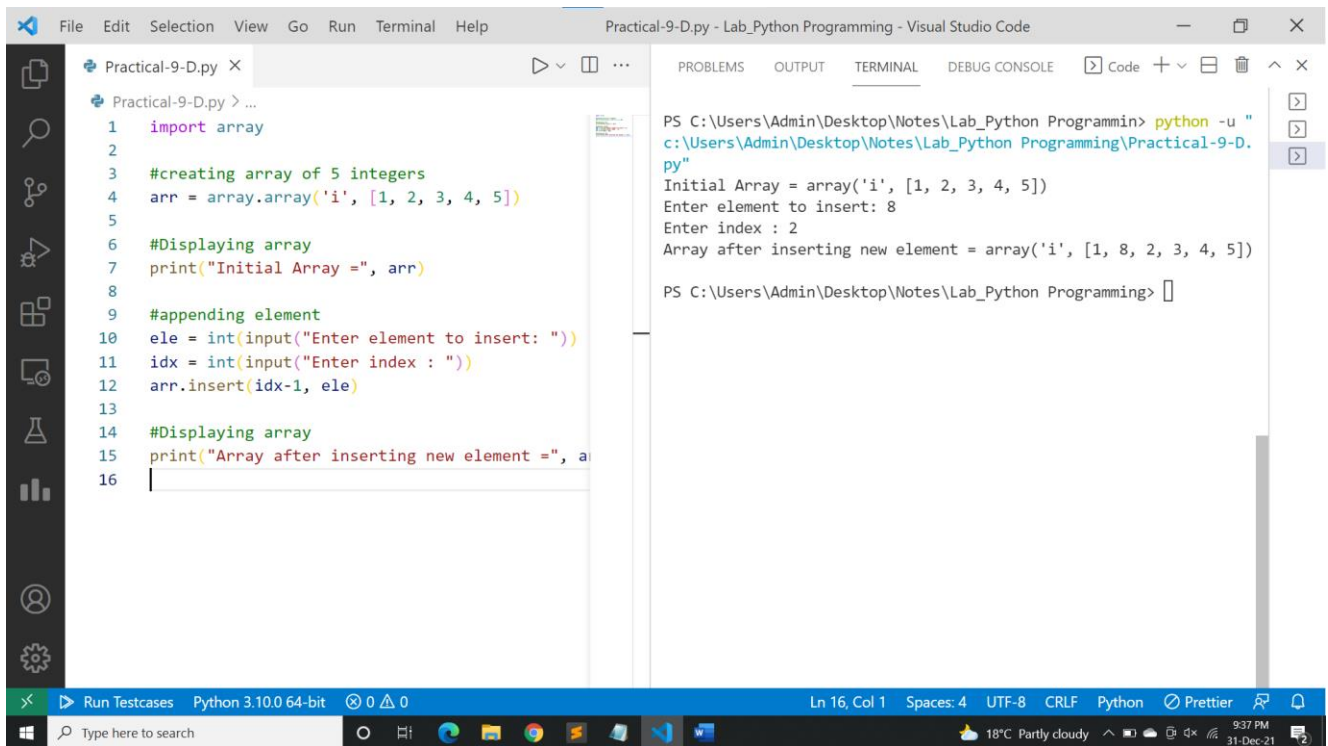
#appending element
ele = int(input("Enter element to insert: "))
idx = int(input("Enter index : "))
arr.insert(idx-1, ele)

#Displaying array
print("Array after inserting new element =", arr)
```

Output:

```
Initial Array = array('i', [1, 2, 3, 4, 5])
Enter element to insert: 8
Enter index : 2
Array after inserting new element = array('i', [1, 8, 2, 3, 4, 5])
```

Screenshot:



The screenshot shows a Visual Studio Code window titled 'Practical-9-D.py - Lab_Python Programming - Visual Studio Code'. The editor displays a Python script named 'Practical-9-D.py' with the following code:

```
1 import array
2
3 #creating array of 5 integers
4 arr = array.array('i', [1, 2, 3, 4, 5])
5
6 #Displaying array
7 print("Initial Array =", arr)
8
9 #appending element
10 ele = int(input("Enter element to insert: "))
11 idx = int(input("Enter index : "))
12 arr.insert(idx-1, ele)
13
14 #Displaying array
15 print("Array after inserting new element =", arr)
16
```

The terminal output on the right shows the execution of the script:

```
PS C:\Users\Admin\Desktop\Notes\Lab_Python Programmin> python -u "
c:\Users\Admin\Desktop\Notes\Lab_Python Programming\Practical-9-D.
py"
Initial Array = array('i', [1, 2, 3, 4, 5])
Enter element to insert: 8
Enter index : 2
Array after inserting new element = array('i', [1, 8, 2, 3, 4, 5])

PS C:\Users\Admin\Desktop\Notes\Lab_Python Programming>
```

The status bar at the bottom indicates 'Ln 16, Col 1', 'Spaces: 4', 'UTF-8', 'CRLF', 'Python', and 'Prettier'.

e. Write a program to create a square matrix and print it in spiral form

Program:

```
def spiralPrint(m, n, a):
    k = 0
    l = 0

    ''' k - starting row index
        m - ending row index
        l - starting column index
        n - ending column index
        i - iterator '''

    while (k < m and l < n):

        # Print the first row from
        # the remaining rows
        for i in range(l, n):
            print(a[k][i], end=" ")

        k += 1

        # Print the last column from
        # the remaining columns
        for i in range(k, m):
            print(a[i][n - 1], end=" ")
```

```

    n -= 1

    # Print the last row from
    # the remaining rows
    if (k < m):

        for i in range(n - 1, (l - 1), -1):
            print(a[m - 1][i], end=" ")

        m -= 1

    # Print the first column from
    # the remaining columns
    if (l < n):
        for i in range(m - 1, k - 1, -1):
            print(a[i][l], end=" ")

        l += 1

# Driver Code
a = [[1, 2, 3, 4, 5, 6],
      [7, 8, 9, 10, 11, 12],
      [13, 14, 15, 16, 17, 18]]

R = 3
C = 6

# Function Call
spiralPrint(R, C, a)

```

Output:

```
1 2 3 4 5 6 12 18 17 16 15 14 13 7 8 9 10 11
```

Screenshot:

The image shows a Visual Studio Code editor window with a Python file named 'Practical-9-E.py'. The code defines a function 'spiralPrint' that takes parameters 'm', 'n', and 'a'. It initializes 'k' to 0 and 'l' to 0. A docstring explains the parameters: 'k' is the starting row index, 'm' is the ending row index, 'l' is the starting column index, 'n' is the ending column index, and 'i' is the iterator. The function uses a while loop to print the first row from the remaining rows, then increments 'k'. It then prints the last column from the remaining columns and increments 'l'. The terminal shows the command 'python -u "c:\Users\Admin\Desktop\notes\Lab_Python Programming\Practical-9-E.py"' being executed, resulting in the output: '1 2 3 4 5 6 12 18 17 16 15 14 13 7 8 9 10 11'.

```
1 def spiralPrint(m, n, a):
2     k = 0
3     l = 0
4
5     ''' k - starting row index
6         m - ending row index
7         l - starting column index
8         n - ending column index
9         i - iterator '''
10
11     while (k < m and l < n):
12
13         # Print the first row from
14         # the remaining rows
15         for i in range(l, n):
16             print(a[k][i], end=" ")
17
18         k += 1
19
20         # Print the last column from
21         # the remaining columns
22         for i in range(k, m):
23             print(a[i][n - 1], end=" ")
24
```

PS C:\Users\Admin\Desktop\notes\Lab_Python Programming> python -u "c:\Users\Admin\Desktop\notes\Lab_Python Programming\Practical-9-E.py"

1 2 3 4 5 6 12 18 17 16 15 14 13 7 8 9 10 11

PS C:\Users\Admin\Desktop\notes\Lab_Python Programming>

Result: I have studied Array in Python and successfully performed practical-9.