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Experiment 3.1

Student Name:Rajiv Paul   **UID:20BCS1812**
Branch: CSE   **Section/Group:607A**
Semester: 4th   **Date of Performance: 08/04/2022**
Subject Name:Programming in Python Lab   **Subject Code: 22E-20CSP-259**

1) Aim/Overview of the practical:

Q1. Write a Python program to implement linear search.

2) Task to be done/ Which logistics used:

To write a python program to implement linear search

3) Algorithm/Flowchart (For programming based labs):

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4) Steps for experiment/practical/Code:

linear_search.py - /Users/rajivpaul/Documents/python programs/linear_search...
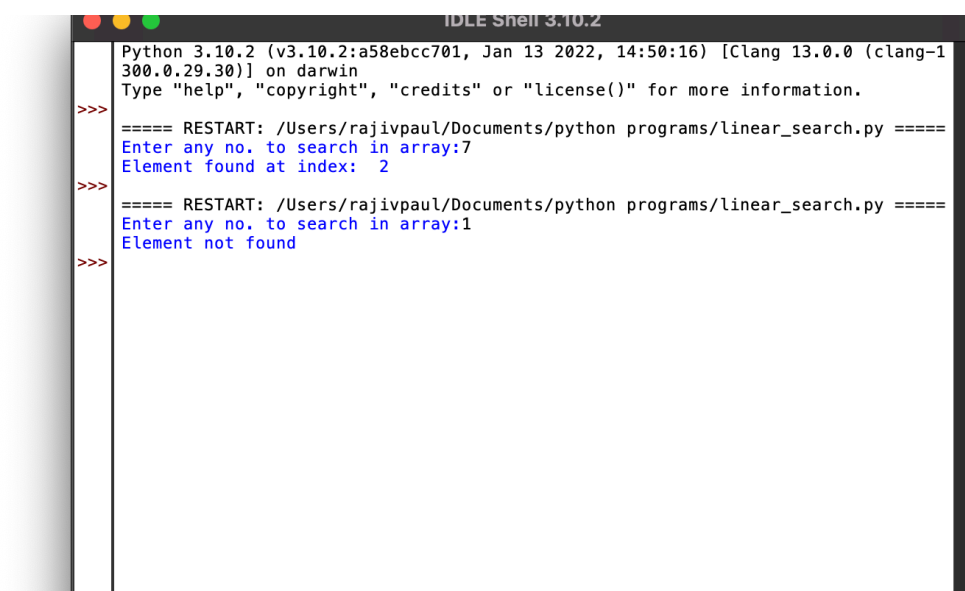
```python
def linearSearch(array, n, x):

    for i in range(0, n):
        if (array[i] == x):
            return i
    return -1

array = [2, 4, 7, 11, 9]
x = int(input("Enter any no. to search in array:"))
n = len(array)
result = linearSearch(array, n, x)
if(result == -1):
    print("Element not found")
else:
    print("Element found at index: ", result)
```

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5. Observations/Discussions/ Complexity Analysis:

6. Result/Output/Writing Summary:

```
IDLE Shell 3.10.2
Python 3.10.2 (v3.10.2:a58ebcc701, Jan 13 2022, 14:50:16) [Clang 13.0.0 (clang-1
300.0.29.30)] on darwin
Type "help", "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: /Users/rajivpaul/Documents/python programs/linear_search.py =====
Enter any no. to search in array:7
Element found at index:  2
>>>
===== RESTART: /Users/rajivpaul/Documents/python programs/linear_search.py =====
Enter any no. to search in array:1
Element not found
>>>
```

1) Aim/Overview of the practical:

Q2. Write a Python program to implement bubble sort.

2) Task to be done/ Which logistics used:

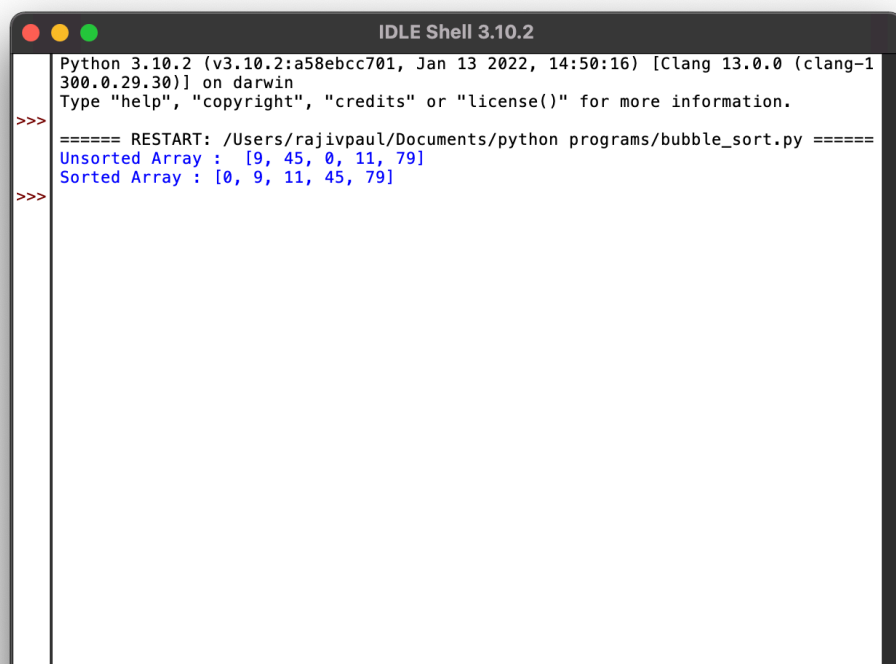**To write a python program to implement bubble sort**

3) Algorithm/Flowchart (For programming based labs):

4) Steps for experiment/practical/Code:

```python
def bubbleSort(array):

  for i in range(len(array)):

    swapped = False

    for j in range(0, len(array) - i - 1):

      if array[j] > array[j + 1]:

        temp = array[j]
        array[j] = array[j+1]
        array[j+1] = temp

        swapped = True

    if not swapped:
      break
data = [9, 45, 0, 11, 79]
print('Unsorted Array : ',data)

bubbleSort(data)

print('Sorted Array :',data)
```

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5. Observations/Discussions/ Complexity Analysis:

6. Result/Output/Writing Summary:

```
                          IDLE Shell 3.10.2
Python 3.10.2 (v3.10.2:a58ebcc701, Jan 13 2022, 14:50:16) [Clang 13.0.0 (clang-1
300.0.29.30)] on darwin
Type "help", "copyright", "credits" or "license()" for more information.
>>>
====== RESTART: /Users/rajivpaul/Documents/python programs/bubble_sort.py ======
Unsorted Array :  [9, 45, 0, 11, 79]
Sorted Array : [0, 9, 11, 45, 79]
>>>
```
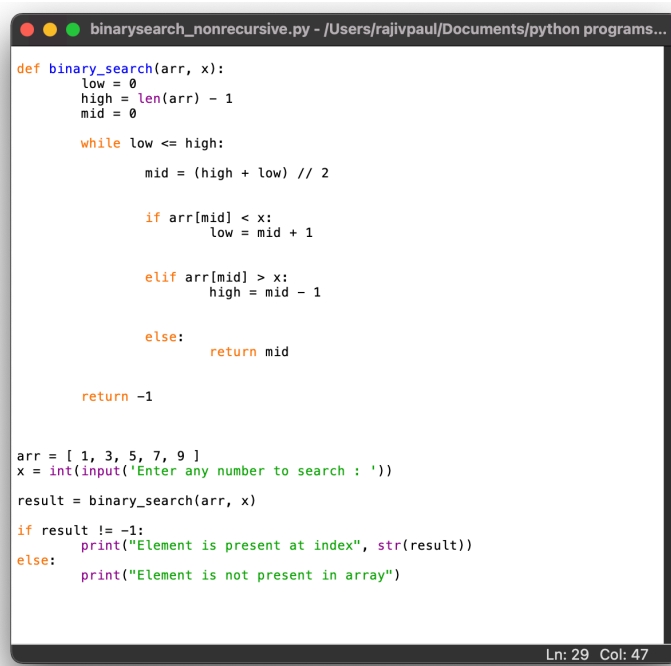
1) Aim/Overview of the practical:

Q3. Write a Python program to implement binary search without recursion.

2) Task to be done/ Which logistics used:

To write python program to implement binary search without recursion.

3) Algorithm/Flowchart (For programming based labs):

4) Steps for experiment/practical/Code:

```python
def binary_search(arr, x):
    low = 0
    high = len(arr) - 1
    mid = 0

    while low <= high:

        mid = (high + low) // 2

        if arr[mid] < x:
            low = mid + 1

        elif arr[mid] > x:
            high = mid - 1

        else:
            return mid

    return -1


arr = [ 1, 3, 5, 7, 9 ]
x = int(input('Enter any number to search : '))

result = binary_search(arr, x)

if result != -1:
    print("Element is present at index", str(result))
else:
    print("Element is not present in array")
```
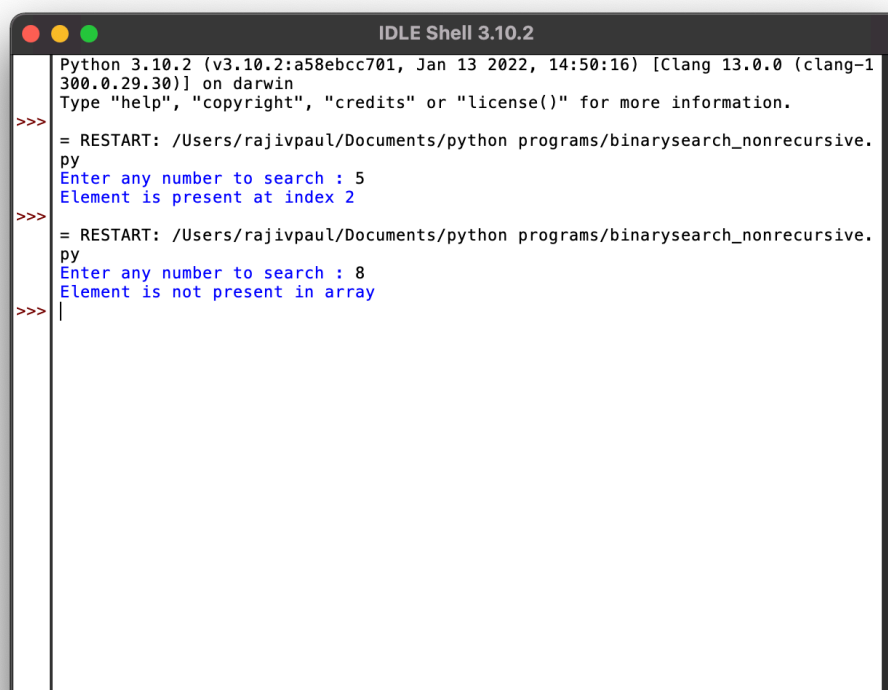
binarysearch_nonrecursive.py - /Users/rajivpaul/Documents/python programs...

Ln: 29 Col: 47

5. Observations/Discussions/ Complexity Analysis:

6. Result/Output/Writing Summary:

```
IDLE Shell 3.10.2

Python 3.10.2 (v3.10.2:a58ebcc701, Jan 13 2022, 14:50:16) [Clang 13.0.0 (clang-1
300.0.29.30)] on darwin
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: /Users/rajivpaul/Documents/python programs/binarysearch_nonrecursive.
py
Enter any number to search : 5
Element is present at index 2
>>>
= RESTART: /Users/rajivpaul/Documents/python programs/binarysearch_nonrecursive.
py
Enter any number to search : 8
Element is not present in array
>>>
```

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1) Aim/Overview of the practical:

Q4. Write a Python program to implement selection sort.

2) Task to be done/ Which logistics used:

To write a python program to implement selection sort.

3) Algorithm/Flowchart (For programming based labs):

4) Steps for experiment/practical/Code:

```python
def selectionSort(array, size):

    for step in range(size):
        min_idx = step

        for i in range(step + 1, size):

            if array[i] < array[min_idx]:
                min_idx = i

        (array[step], array[min_idx]) = (array[min_idx], array[step])

data = [2, 79, 7, 11, 9]
size = len(data)
selectionSort(data, size)
print('Sorted Array in Ascending Order:')
print(data)
```
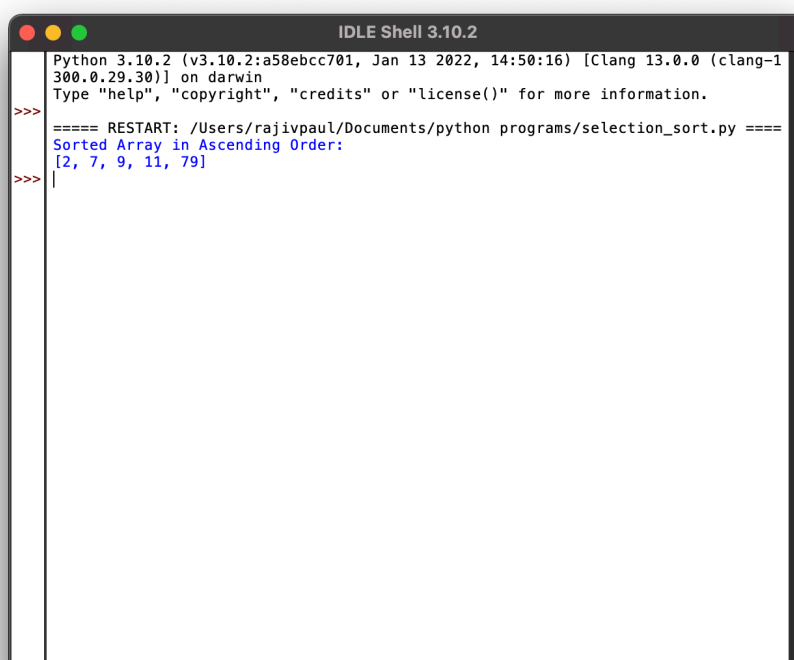
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5. Observations/Discussions/ Complexity Analysis:

6. Result/Output/Writing Summary:

```
IDLE Shell 3.10.2
Python 3.10.2 (v3.10.2:a58ebcc701, Jan 13 2022, 14:50:16) [Clang 13.0.0 (clang-1
300.0.29.30)] on darwin
Type "help", "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: /Users/rajivpaul/Documents/python programs/selection_sort.py ====
Sorted Array in Ascending Order:
[2, 7, 9, 11, 79]
>>>
```

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Evaluation Grid (To be created as per the SOP and Assessment guidelines by the faculty):

Sr. No.	Parameters	Marks Obtained	Maximum Marks
1.			
2.			
3.			