ANALYSIS & DESIGN OF ALGORITHIM

PRACTICAL-3

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IN-LAB:

1)

```
def merge(l,r):
    result = []
    leftIndex,rightIndex = 0,0
    i = 0
    while (i<len(l)+len(r)):
        i += 1
        if (rightIndex>=len(r) or (leftIndex<len(l) and
l[leftIndex]<=r[rightIndex])):
            result.append(l[leftIndex])
            leftIndex += 1
        else:
            result.append(r[rightIndex])
            rightIndex += 1
    return result

def merge_sort(arr):
    n = len(arr)
    if n<=1:
        return arr
    l = merge_sort(arr[:n//2])
    r = merge_sort(arr[n//2:])

    return merge(l,r)
    n = int(input())
y = [int(i) for i in input().split()]
x = merge_sort(y)
print(x)
```

PYTH 3.6 (Python 3.6)

```python
def merge(l,r):
    result = []
    leftIndex,rightIndex = 0,0
    i = 0
    while (i<len(l)+len(r)):
        i += 1
        if (rightIndex>=len(r) or (leftIndex<len(l) and l[leftIndex]<=r[rightIndex])):
            result.append(l[leftIndex])
            leftIndex += 1
        else:
            result.append(r[rightIndex])
            rightIndex += 1
    return result

def merge_sort(arr):
    n = len(arr)
    if n<=1:
        return arr
    l = merge_sort(arr[:n//2])
    r = merge_sort(arr[n//2:])

    return merge(l,r)

n = int(input())
y = [int(i) for i in input().split()]
x = merge_sort(y)
print(x)

```

Custom Input

```
4
1 9 0 3 6 8
```

Status Successfully executed **Date** 2021-08-04 16:26:22 **Time** 0.02 sec **Mem** 17.968 kB

Input

```
4
1 9 0 3 6 8
```

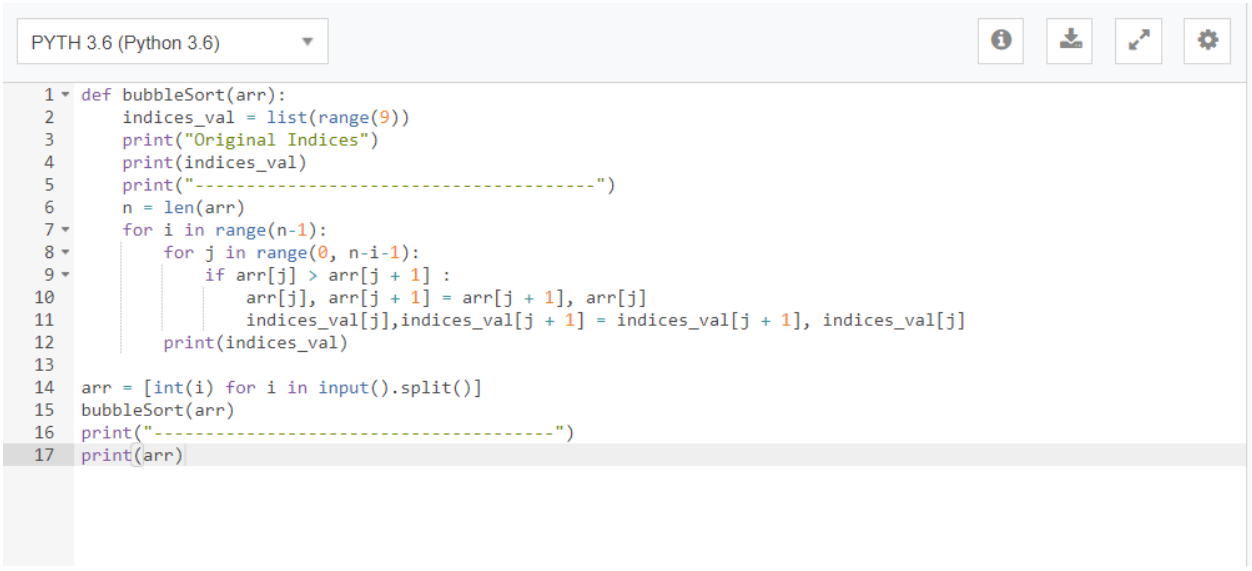
Output

```
[0, 1, 3, 6, 8, 9]
```

2)

```
def bubbleSort(arr):
    indices_val = list(range(9))
    print("Original Indices")
    print(indices_val)
    print("---------------------------------------")
    n = len(arr)
    for i in range(n-1):
        for j in range(0, n-i-1):
            if arr[j] > arr[j + 1] :
                arr[j], arr[j + 1] = arr[j + 1], arr[j]
                indices_val[j],indices_val[j + 1] = indices_val[j + 1], indices_val[j]
        print(indices_val)

arr = [int(i) for i in input().split()]
bubbleSort(arr)
print("---------------------------------------")
print(arr)
```



Status Successfully executed **Date** 2021-08-04 16:21:10 **Time** 0.03 sec **Mem** 17.968 kB

Input

```
9 5 7 4 3 2 1
```

Output

```
Original Indices
[0, 1, 2, 3, 4, 5, 6, 7, 8]
--------------------------------------
[1, 2, 3, 4, 5, 6, 0, 7, 8]
[1, 3, 4, 5, 6, 2, 0, 7, 8]
[3, 4, 5, 6, 1, 2, 0, 7, 8]
[4, 5, 6, 3, 1, 2, 0, 7, 8]
```

Status Successfully executed **Date** 2021-08-04 16:21:10 **Time** 0.03 sec **Mem** 17.968 kB

Input

```
9 5 7 4 3 2 1
```

Output

```
[3, 4, 5, 6, 1, 2, 0, 7, 8]
[4, 5, 6, 3, 1, 2, 0, 7, 8]
[5, 6, 4, 3, 1, 2, 0, 7, 8]
[6, 5, 4, 3, 1, 2, 0, 7, 8]
--------------------------------------
[1, 2, 3, 4, 5, 7, 9]
```