Experiment No.9

Aim: Edit/compile/run a program to implement quick sort/ merge sort/ bubble sort.
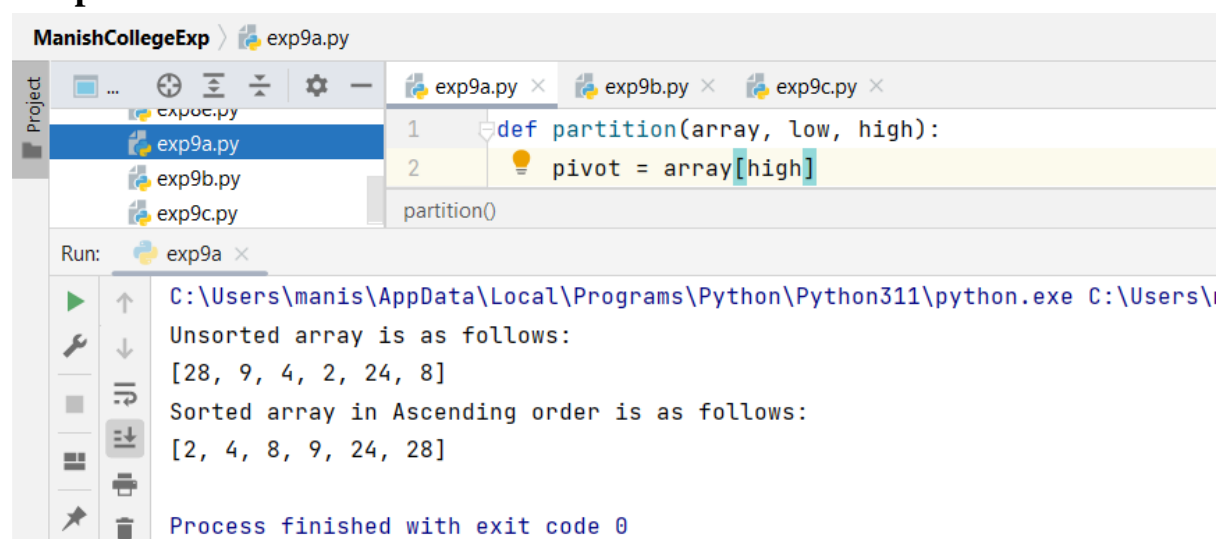
Program A: QUICK SORT ALGORITHM:

```python
def partition(array, low, high):
    pivot = array[high]
    i = low - 1
    for j in range(low, high):
        if array[j] <= pivot:
            i = i + 1
            (array[i], array[j]) = (array[j], array[i])
    (array[i+1], array[high]) = (array[high], array[i+1])
    return i+1

def quickSort(array, low, high):
    if low < high:
        pi = partition(array, low, high)
        quickSort(array, low, pi-1)
        quickSort(array, pi+1, high)

data = [28,9,4,2,24,8]
print("Unsorted array is as follows: ")
print(data)
size = len(data)
quickSort(data, 0, size-1)
print('Sorted array in Ascending order is as follows: ')
print(data)
```

Output:

Program B: MERGE SORT ALGORITHM

```python
def mergeSort(arr):
    if len(arr) > 1:
        mid = len(arr)//2
        L=arr[:mid]
        R=arr[mid:]
        mergeSort(L)
        mergeSort(R)
        i=j=k=0
        while i<len(L) and j<len(R):
            if L[i] <= R[j]:
                arr[k] = L[i]
                i+=1
            else:
                arr[k] = R[j]
                j+=1
            k+=1

        while i<len(L):
            arr[k] = L[i]
            i+=1
            k+=1

        while j<len(R):
            arr[k] = R[j]
            j+=1
            k+=1


def printList(arr):
    for i in range(len(arr)):
        print(arr[i], end=" ")
    print()

if __name__ == '__main__':
    arr=[248,904,477,289,245,]
    print("Given array is: ", end="\n")
    printList(arr)
    mergeSort(arr)
    print("Sorted array is: ", end="\n")
    printList(arr)
```

Output:

```
ManishCollegeExp  exp9b.py

Project  ▾                    ⊕ ≥ ≑ | ✿ —    exp9a.py ×    exp9b.py
         exp9c.py                          38      mergeSort(
         exp9a.py
         exp9b.py                          39      print("Sor
         exp9c.py                          40      printList(
   >  External Libraries
      Scratches and Consoles                   if __name__ == '__main__'

Run:    exp9b ×

  ▶   ↑    C:\Users\manis\AppData\Local\Programs\Python\Python311\python.
           Given array is:
  🔧   ↓
           248 904 477 289 245
  ■   ⇥    Sorted array is:
  ⇥↓       245 248 289 477 904
  ■■
  🖶
  📌   🗑    Process finished with exit code 0
```

Program C: BUBBLE SORT ALGORITHM

```python
def bubbleSort(arr):
    n =len(arr)
    for i in range(n):
        swapped = False

        for j in range(0,n-i-1):
            if arr[j]>arr[j+1]:
                arr[j], arr[j+1] = arr[j+1], arr[j]
                swapped = True
            if(swapped == False):
                break

if __name__ == "__main__":
    arr=[951, 753, 654, 258, 359,751,153]
    print("Given array is: ", end="\n")
    print(arr)

    bubbleSort(arr)

    print("Sorted Array is: ")
    for i in range(len(arr)):
        print("%d" %arr[i], end=" ")
```

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Output:

Practical Performance **(4)**	**Writeup & Oral** **(4)**	**Attendance** **(2)**	**Total** **(10)**