Modern Education Society's
College of Engineering, Pune

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SEMESTER/YEAR: III	**ROLL NO: F20111040**
DATE OF PERFORMANCE:	**DATE OF SUBMISSION: 15/12/2021**
EXAMINED BY: prof. Anand Dhawale	**EXPERIMENT NO: DSL B-16**

TITLE : SORTING OPERATION

PROBLEM STATEMENT : Write a Python program to store first year percentage of students in array. Write function for sorting array of floating point numbers in ascending order using quick sort and display top five scores.

OBJECTIVES :

1. To understand structure of Array.
2. To understand How to sort elements of given array.

OUTCOME :

1. To operate on the various structured data.
2. To analyze the problem to apply suitable algorithm and data structure.

PRE-REQUISITES :

1. Knowledge of Python Programming
2. Knowledge of quick sorting method and array.

APPARATUS :

QUESTIONS :

1. Explain Merge sort with example and write C++ program for same.

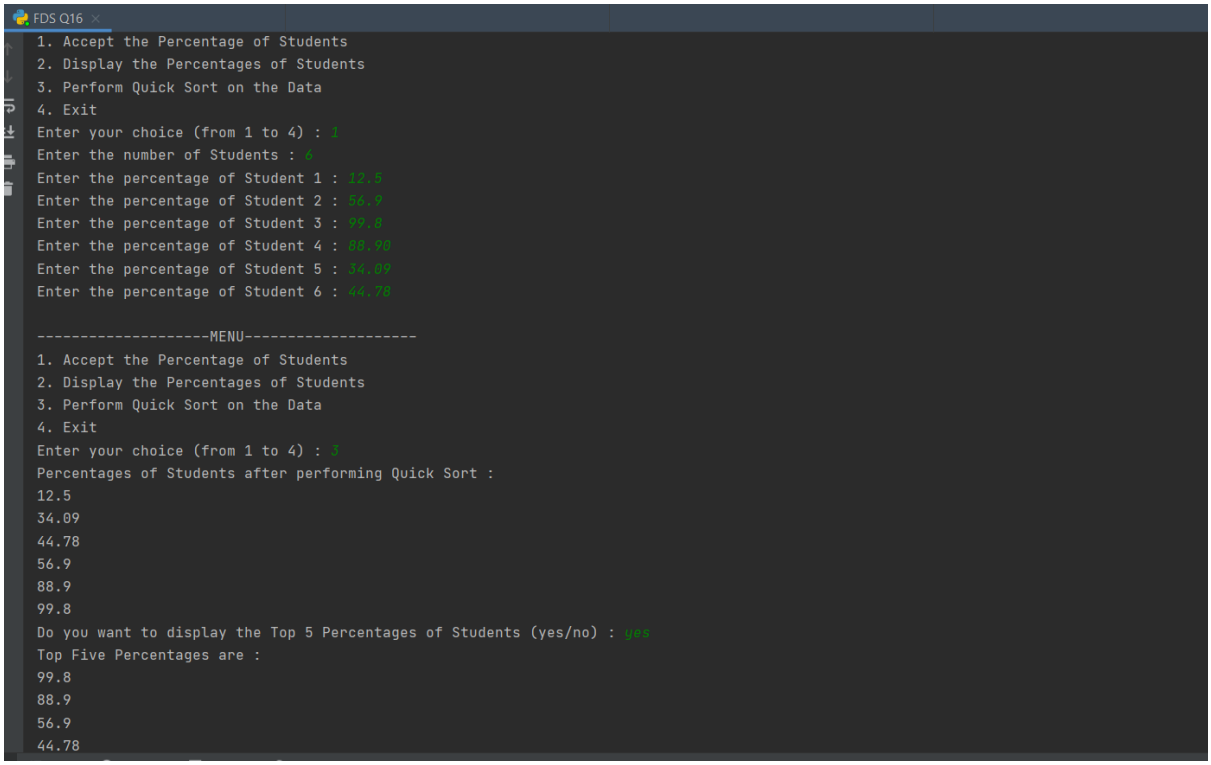
PROGRAM:

```
def input_percentage():
    perc = []
    number_of_students = int(input("Enter the number of Students : "))
    for i in range(number_of_students):
        perc.append(float(input("Enter the percentage of Student {0} : ".format(i+1))))
    return perc

#<-----------------------------------------------------------------------------------------------------------------------

# Function for printing the percentage of the Students

def print_percentage(perc):
    for i in range(len(perc)):
        print(perc[i],sep = "\n")

#<-----------------------------------------------------------------------------------------------------------------------

# Function for performing partition of the Data

def percentage_partition(perc,start,end):
    pivot = perc[start]
    lower_bound = start + 1
    upper_bound = end

    while True:
        while lower_bound <= upper_bound and perc[lower_bound] <= pivot:
            lower_bound += 1

        while lower_bound <= upper_bound and perc[upper_bound] >= pivot:
            upper_bound -= 1

        if lower_bound <= upper_bound:
            perc[lower_bound],perc[upper_bound] = perc[upper_bound],perc[lower_bound]

        else:
            break


    perc[start],perc[upper_bound] = perc[upper_bound],perc[start]

    return upper_bound

#<-----------------------------------------------------------------------------------------------------------------------

# Function for performing Quick Sort on the Data

def Quick_Sort(perc,start,end):
    while start < end:
        partition = percentage_partition(perc,start,end)
        Quick_Sort(perc,start,partition-1)
        Quick_Sort(perc,partition+1,end)
        return perc

#<-----------------------------------------------------------------------------------------------------------------------

# Function for Displaying Top Five Percentages of Students

def display_top_five(perc):
    print("Top Five Percentages are : ")
    if len(perc) < 5:
        start, stop = len(perc) - 1, -1
    else:
```

percentage_partition()

```
        start, stop = len(perc) - 1, len(perc) - 6

    for i in range(start, stop, -1):
        print(perc[i], sep = "\n")


#<-----------------------------------------------------------------------------------------------------------

# Main

unsorted_percentage = []
sorted_percentage = []
flag = 1

while flag == 1:
    print("\n--------------------MENU--------------------")
    print("1. Accept the Percentage of Students")
    print("2. Display the Percentages of Students")
    print("3. Perform Quick Sort on the Data")
    print("4. Exit")

    ch = int(input("Enter your choice (from 1 to 4) : "))

    if ch == 1:
        unsorted_percentage = input_percentage()

    elif ch == 2:
        print_percentage(unsorted_percentage)

    elif ch == 3:
        print("Percentages of Students after performing Quick Sort : ")
        sorted_percentage = Quick_Sort(unsorted_percentage, 0, len(unsorted_percentage)-1)
        print_percentage(sorted_percentage)
        a = input("Do you want to display the Top 5 Percentages of Students (yes/no) : ")
        if a == 'yes':
            display_top_five(sorted_percentage)

    elif ch == 4:
        print("Thanks for using this program!!")
        flag = 0

    else:
        print("Invalid Choice!!")
```

OUTPUT


FDS Q16
1. Accept the Percentage of Students
2. Display the Percentages of Students
3. Perform Quick Sort on the Data
4. Exit
Enter your choice (from 1 to 4) : 1
Enter the number of Students : 6
Enter the percentage of Student 1 : 12.5
Enter the percentage of Student 2 : 56.9
Enter the percentage of Student 3 : 99.8
Enter the percentage of Student 4 : 88.90
Enter the percentage of Student 5 : 34.09
Enter the percentage of Student 6 : 44.78
--------------------MENU--------------------
1. Accept the Percentage of Students
2. Display the Percentages of Students
3. Perform Quick Sort on the Data
4. Exit
Enter your choice (from 1 to 4) : 3
Percentages of Students after performing Quick Sort :
12.5
34.09
44.78
56.9
88.9
99.8
Do you want to display the Top 5 Percentages of Students (yes/no) : yes
Top Five Percentages are :
99.8
88.9
56.9
44.78