

Assignment-6



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Problem statement:-

Write a python program to store first year percentage of student in array. Write a function for sorting array of floating point numbers in ascending order. using quick sort & display to a score.

Objective:-

- ① To understand Sort Algorithm.
- ② To understand primitive functions of list data structure in python.

Outcome:-

- ① To implement quick sort algorithm using list data structure in python.
- ② To write menu driven or modular program in python.

Hardware & software req:-

Operating system Fedora(64 bit),
pycharm.

Theory:

quicksort:

It's a divide and Conquer algorithm. It picks an element as a pivot. So partitions the given array around the picked pivot. There are many versions of quick sort that pick a pivot in different ways.

- ① Always pick 1st element as pivot.
- ② Always pick last element as pivot.
- ③ pick random element as pivot.
- ④ pick median as pivot.

The key process in quicksort is the partition. (i) Target: of partition is given an array an element x of array a pivot put x at its correct position in sorted array so put all smaller element before x so put all greater element after x .

* Algorithm

① Partition

Algorithm partition (arr [], int low, int high)

1. Begin.
2. $\text{pivot} = \text{arr}[\text{high}]$
3. $i = \text{low} - 1$
4. for $j = \text{low}$ to $j \leq \text{high} - 1$


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5   IF arr[i] < pivot.
6       i++
7       swap(arr[i], arr[j])
8   endif.
9   Endfor
10  swap(arr[j+1], arr[high])
11  end.

```

② Algorithm quicksort(arr, low, high)

```

1  Begin
2  IF low < high:
3      pi = partition(arr, low, high)
4      quicksort(arr, low, pi-1)
5      quicksort(arr, pi+1, high)
6  endif
7  return arr
end

```

Time Complexity:-

Quicksort $\rightarrow O(n^2)$

Test Case	Description	Exp inp \rightarrow	Output Exp act.	Status
1. Enter marks of students.	7.	Top 5.	Top 5	pass
	89.78	98.78	98.78	
	67.87	90.67	90.67	
	98.78	89.78	89.78	
	90.67	89.56	89.56	
	56.78	67.87	67.87	
	89.56			
	40.12			

Conclusion:-

Successfully implement the quick sort Algorithm for the Floating point number.