

6 Dec

oop Assignment 05

21118



Problem statement:

Write a function template for selection sort that inputs, sorts & outputs an integer array & float array.

Objectives

To learn the concept of template.

Outcomes

Implement generic sort algorithms.

Hardware requirement:

Manufacturer & Model: Acer Swift-3 (Intel i5 8th gen)

Installed Memory: 8GB RAM, 512GB SSD.

Architecture: 64-bit

Software Requirement:

Operating System: Windows-10 home Single language

IDE: Code Blocks: version 20.03

Compiler: g++ (version: 10.1.0)

Theory

Templates: templates are the foundation of generic programming, which involves writing code in a way is independent of any particular types.

function templates:

general form:

template <class type>

ret. type func-name (parameter-list) {

//code

}

class template:

~~temp~~ general form:

template <class type>

class class name {

//body of class

}

Selection Sort:

1. it is a sorting algorithm. (in-place, comparison)
2. $O(n^2)$ time complexity & $O(1)$ space complexity.

Pseudo code

selection sort:

1. start
2. Declare the template parameter T
3. Define template function for selection sort.
4. In main define two arrays, one for integer & another for float & take a input for both arrays & call sorting function template to sort the number.
5. stop

Testcases

sr.	Testcase	Expected output	Actual Output.
1	integer array size = 7 $arr[] = \{3, 5, 1, 2, 4, 7, 0\}$	sorted integer array	$arr[] = \{0, 1, 2, 3, 4, 5, 7\}$
2	float array size = 7 $arr[] = \{9.5, 4.5, 3.5, 8.6, 2.8, 4.9, 0.1\}$	sorted float array	$arr[] = \{0.1, 2.8, 3.5, 4.5, 4.9, 8.6, 9.5\}$

Conclusion

Hence, we have studied the concept of function template.

Which array do you want to sort??

1 for integer array

2 for float array

0 to exit

:1

Enter size: 7

Enter element number - 1: 3

Enter element number - 2: 5

Enter element number - 3: 1

Enter element number - 4: 2

Enter element number - 5: 4

Enter element number - 6: 7

Enter element number - 7: 0

Before Sorting: 3 5 1 2 4 7 0

After Sorting: 0 1 2 3 4 5 7

Which array do you want to sort??

1 for integer array

2 for float array

0 to exit

:2

Enter size: 7

Enter element number - 1: 9.5

Enter element number - 2: 4.5

Enter element number - 3: 3.5

Enter element number - 4: 8.6

Enter element number - 5: 2.8

Enter element number - 6: 4.9

Enter element number - 7: 0.1

Before Sorting: 9.5 4.5 3.5 8.6 2.8 4.9 0.1

After Sorting: 0.1 2.8 3.5 4.5 4.9 8.6 9.5