National University of Computer and Emerging Sciences



Lab Manual 01

Object Oriented Programming

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## Objectives

After performing this lab, students shall be able to:

* Have an improved understanding of pointers.
* Access and modify pointers in functions.
* How pointers and array can be related.
* Debugging with pointers.

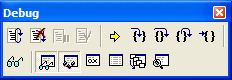
**TASK 1:**

Write the C++ code for a function swap(), which swaps the values of two integer variables.

Note: you cannot create global variables, and cannot pass integer variables by reference in the function.

Hint: Pointers

Debugging Commands of VS for help:

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| --- | --- | --- | --- |
| Short cut key | Icon | Menu | Explanation |
| F-9 |  |  | Insert/Remove breakpoint |
| F-5 |  | Debug-Go | Execute a program until the next breakpoint |
| Shift F-5 |  | Debug-Stop debugging | To stop debugging a program. It will stop executing the program |
| F-10 |  | Debug-StepOver | Go to the next statement |
| F-11 |  | Debug-Step Into | Go inside a function |
| Shift F-11 |  | Debug – Step Out | Come out of the function |
|  |  | Debug - Run to cursor | Execute all statements till the statement on which the cursor is placed or until the next breakpoint |
| Alt -3 |  | Debug-Windows-Watch | Show the window where only the variables in scope are shown |
| Alt-4 |  | Debug-Windows-Variables | Show the window in which you can type a variable name to see its value |
| Alt-7 |  | debug-windows-call stack | You can see the activation of stack of functions here |

**TASK 2:**

Write a program to reverse a string using pointers.

**TASK 3:**

Declare int variables x, y, z and int\* pointer variables p, q, r. Set x, y, z to three distinct values. Set p, q,r to the addresses of x, y, z respectively.

1. Print with labels the values of x, y, z, p, q, r, \*p, \*q, \*r.
2. Print the message: Swapping values.
3. Execute the swap code: z = x; x = y; y = z;
4. Print with labels the values of x, y, z, p, q, r, \*p, \*q, \*r.
5. Print the message: Swapping pointers.
6. Execute the swap code: r = p; p = q; q = r;
7. Print with labels the values of x, y, z, p, q, r, \*p, \*q, \*r

**TASK 4:**

If p and q are pointers to int and n is an int, which of the following are legal:

1. p + q
2. p – q
3. p + n
4. p – n
5. n + p
6. n – q

**TASK 5:**

What is wrong with the following code?

double \*firstPtr = new double; //Line 1

double \*nextPtr = new double; //Line 2

\*firstPtr = 62; //Line 3

nextPtr = firstPtr; //Line 4

delete firstPtr; //Line 5

delete nextPtr; //Line 6

firstPtr = new double; //Line 7

\*firstPtr = 28; //Line 8

cout << \*firstPtr << " " << \*nextPtr << endl; //Line 9

**TASK 6:**

Create two float pointers in the main function and write C++ code for the following functions and call them in order from main.

1- A function allocate(), which creates dynamic variables length and width and assigns their addresses to pointers created in main.

2- A function input() that takes input from the user in already created dynamic variables length and width.

3- A function Print() that prints values of dynamic variables length and width.

4- A function Area() that takes dynamic variables as parameters and returns the area of the rectangle.

5- A function deallocate() which deallocates the memory of dynamic variables length and width and update pointers too.