



National University of Sciences and Technology (NUST)
School of Electrical Engineering and Computer Science

Department of Computing

CS250: Data Structure and Algorithms

Class: BESE 7AB

Lab 1: Pointers & Inheritance

Date: 15th September, 2017

Time: 9 am- 12 pm & 2 pm -5 pm

Instructor: Dr. Muhammad Shahzad



Lab 1: Inheritance and Pointers

Introduction

This lab is about the pointers, inheritance and memory occupied by the data variables.

Objectives

This lab will revise the old concepts of the students, taught in the previous semesters.

Tools/Software Requirement

Visual Studio c++

Description

Pointers are used to point towards a particular memory address. In this lab we will use the pointers and perform task with the help of them. Other than this we will revise the concepts of inheritance; concept previously studied in OOP; and will create a small, very basic application.

Lab Tasks

You are required to upload the lab tasks on LMS and the name of that tasks must be in this format YourFullName_reg#.cpp

Remember to comment your code properly. Inappropriate or no comment will results in deduction of marks.



Task 1

Consider the following program and answer the questions.

```
void main()
{
    int a, *pa;    // Statement 1
    pa = &a;       // Statement 2
    cout<<"pa = &a --> pa = "<<pa<<endl<<endl;
    pa = pa + 1;   // Statement 3
    cout<<"pa = pa + 1 --> pa = "<<pa<<endl<<endl;
    pa = pa + 3;   // Statement 4
    cout<<"pa = pa + 3 --> pa = "<<pa<<endl<<endl;
    pa = pa - 1;   // Statement 5
    cout<<"pa = pa - 1 --> pa = "<<pa<<endl<<endl;
}
```

Output:

```
pa = &a --> pa = 0027FF0C
pa = pa + 1 --> pa = 0027FF10
pa = pa + 3 --> pa = 0027FF1C
pa = pa - 1 --> pa = 0027FF18
```

- 1) Why the memory address stored in pointer “pa” vary by 4?
- 2) Will the address still vary by 4 if I change the data type of the above mentioned code from “int” to “long”? Explain your answer.
- 3) If we try to multiply the address pointed to by “pa” then what will happen? Is this logically or programmatically correct? Attach screen shot of the output you get when you try this multiplication.



Task 2

Write a code to find the memory in bytes occupied by int, long, double, float and char.

Task 3

Write a program of bank management system to manage the account information using inheritance concept.

Create a class “Bank Account” with the customer_name, account_number etc. as member variables. Create the derived classes for two types of accounts i.e. current and saving. The derived classes will update the balance and handle the deposit and withdraw cases. Customers should be able to get updated balance after deposit and withdrawal amounts.

Deliverable

Students are required to upload the lab task on LMS before the deadline.