# Department of Computing

**CS250: Data Structure and Algorithms**

**Class: BSCS 11A**

# Lab 1: Inheritance and Pointers

**Date: 09 Sep**

**Time: 02pm- 5pm**

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# Lab 1: Inheritance and Pointers

**(Revision)**

**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

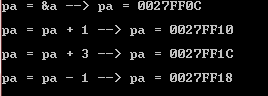
cout<<"pa = pa + 3 --> pa = "<<pa<<endl<<endl;

pa = pa - 1; // Statement 5

cout<<"pa = pa - 1 --> pa = "<<pa<<endl<<endl;

}

Output:



1. Why the memory address stored in pointer “pa” vary by 4?

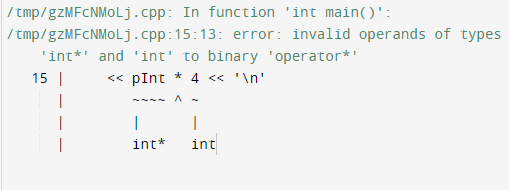
* “pa” is an int pointer therefor incrementing it will shift it by the memory size of int type, i.e. 4 bytes.

1. 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.

* No, as one long type take 8 bytes of data whereas int take 4.

1. 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.

* The multiply operator doesn’t work with one int and one int\* type.



**Task 2**

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

|  |
| --- |
| #include <iostream>  int main() {  std::cout << "Following is memory occupied by int, long, float, double and char respectively:\n"  << sizeof(int) << '\n'  << sizeof(long) << ‘\n’  << sizeof(float) << '\n'  << sizeof(double) << '\n'  << sizeof(char) << '\n';  return 0;  } |
|  |

**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.

|  |
| --- |
| #include<iostream>  #include<string>  using namespace std;  class Bank\_Account {  public:  string cutomer\_name ;  int account\_number;  int balance;  Bank\_Accout(string cust\_name, int acc\_num, int bal) \  :  cutomer\_name(cust\_name),  account\_number(acc\_num),  balance(bal) {}  void deposit();  void withdraw();  };  void Bank\_Account :: deposit(){  int \_amount ;  cout<<"ENTER THE AMOUNT YOU WANT TO DEPOSIT : ";  cin>>\_amount;  balance+=\_amount;  cout<<"YOU HAVE DEPOSITED "<<\_amount<<endl;  }  void Bank\_Account :: withdraw(){  int \_amount ;  cout<<"ENTER THE AMOUNT YOU WANT TO WITHDRAW : ";  cin>>\_amount;  if (balance-\_amount>0){  balance-=\_amount;  cout<<"YOU HAVE WITHDRAWN "<<\_amount<<endl;  }  }  class Current : public Bank\_Account {  };  class Saving : public Bank\_Account{  };  int main(){    return 0;  } |

**Deliverable**

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