**National University of Computer and Emerging Sciences**



Laboratory Exercise

Computer Programming Lab

Spring 2018

Lab # 7

**Department of Computer Science**

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| Objectives   * CLASSES * CONSTRUCTORS - DESTRUCTORS * PARAMETRIZED CONSTRUCTOR * OBJECTS AND FUNCTIONS * STATIC AND CONSTANT |

Note: Carefully read the following instructions.

1. Make a word document with the convention “ROLLNO\_SECTION\_LABNO” and put all your C++ source code in it.
2. After every question paste a screenshot of your working code below the source code in the document file.
3. At the end, when you are done with your lab tasks, make your submission on slate.

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| |  | | --- | | Problem 1: (DMA, constructor, destructor, accessors and mutator functions, constructor overloading, copy constructor, const method, Deep copy) | |

Write a class student with following data members and methods;

**Private Member Variables**

**Variable Description**

firstName A char pointer that hold the first name of employee

lastName A char pointer that hold the last name of employee

count A static variable count that count the total number of employees

**Public Member Functions**

**Function Description**

**Default Constructor** initialize all member variables with null value

**Overloaded Constructor** accepts two constant char pointers and initialize first and last name, it also increments the counter, count++;

**Copy constructor** It copy one object into other using deep copy

**Destructor** It release all dynamically allocated memory of that object with proper message

**getFirstName const** method that return first name using **this pointer**

**getLastName const** method that return last name using **this pointer**

**getCount** return the current value of count using **this pointer**

Now in main function create three objects (obj1, obj2) and each call different constructors. Now create obj3 and initialize it with obj2 using **deep copy.**

Constructor must **dynamically allocate memory**. Explicitly call **destructors** that release dynamically allocated memory for all objects with proper message.

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| Problem 2: (const method, accessors and mutator functions, shallow copy) |

Design an Inventory class that can hold information and calculate data for items in a retail store’s inventory. The class should have the following *private* member variables:

**Private Member Variables**

**Variable Description**

itemNumber An int that holds the item’s item number.

quantity An int for holding the quantity of the items on hand.

Cost A double for holding the wholesale per-unit cost of the item

totalCost A double for holding the total inventory cost of the item (calculated as quantity times cost).

**Public Member Functions**

**Method Description**

**Default Constructor** Sets all the member variables to 0.

**Constructor #2** Accepts an item’s number, cost, and quantity as arguments. The function should copy these values to the appropriate member variables and then call the setTotalCost function.

**Destructor** Release all memory with proper message

**setItemNumber** Accepts an integer argument that is copied to the itemNumber member variable.

s**etQuantity** Accepts an integer argument that is copied to the quantity member variable.

**setCost** Accepts a double argument that is copied to the cost member variable.

**setTotalCost** Calculates the total inventory cost for the item (quantity times cost) and stores the result in totalCost.

**getItemNumber** Returns the value in itemNumber.

**getQuantity** Returns the value in quantity.

**getCost** Returns the value in cost.

**getTotalCost** Returns the value in totalCost.

Create three objects, obj1, obj2 and obj3. Obj3 copy the contents of ob2 using **shallow copy** with default copy constructor.

*Discuss the process in short text.*

**Note:** *All* ***get*** *methods must be constant. Do not accept negative values for item number*, *quantity*, *or cost.*

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| Problem 3: |

1. Define a class person with data members Name (string), Age (int/float), Employment status (Boolean) and favorite sports (string).
2. Write a default constructor to initialize the data members to the following values:
   1. Name = null
   2. Age =0
   3. Employment status = 1/true (for employed)
   4. Favorite sports = swimming
3. Create an object p1.
4. Copy p1 object to p2 object using a copy constructor.

Output the values of p2 object

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| Problem 4: |

Create a class of player1 with data members Run and Count both of integer type. (Both integers are static).Player 1 have only five turns (generate random values against these turns).Count function and this function should be static. After that create class of Player 2 and perform all the functionality as player1. You have to Make two static member Functions first will count the Runs score by the player1 and player2.Now compare scores of both player and tell which player won.

**Note:**

**You have to do this task without using class object.**

**You have to use static type functions**

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| Problem 5:  **const, static or static const.** |

Suppose you want to create a class called employee with the following data:

* Id (assigned when employee joins the organization and not changed afterwards)
* Name (has maximum 20 characters. Make sure it is NULL terminated. You can use static allocation)
* Total hours (Total hours spent at work during the week.)
* Salary (Can change with time)
* Organization code (fixed and same for all employees and can never change)
* Home address (can change)
* Organization address (same for all employees but can change with time if the office moves elsewhere for exapansion)
* Max hours (should store the maximum hours spent at work during the week by any employee who ever existed. Same for all employees but can change with time)
* Organization city code (same for all employees and fixed and never changes)

Write the class declaration for employee after deciding which members are const, static or static const.