CS 200 Lab 11 Spring 2018

Introduction to Programming

(CS200)

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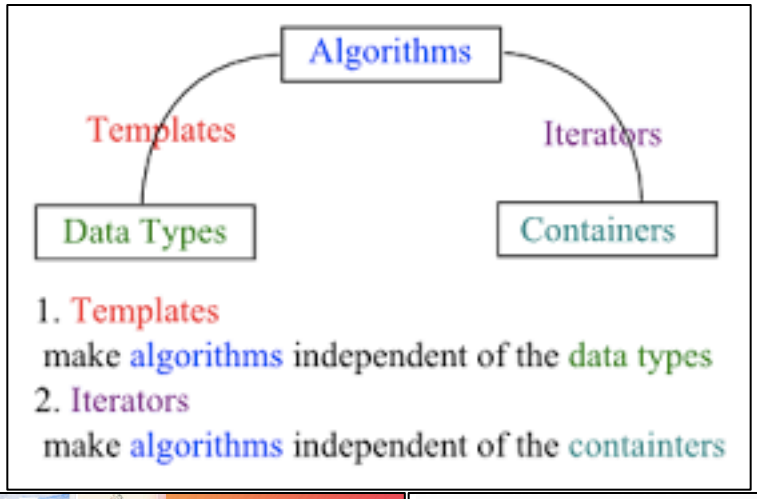
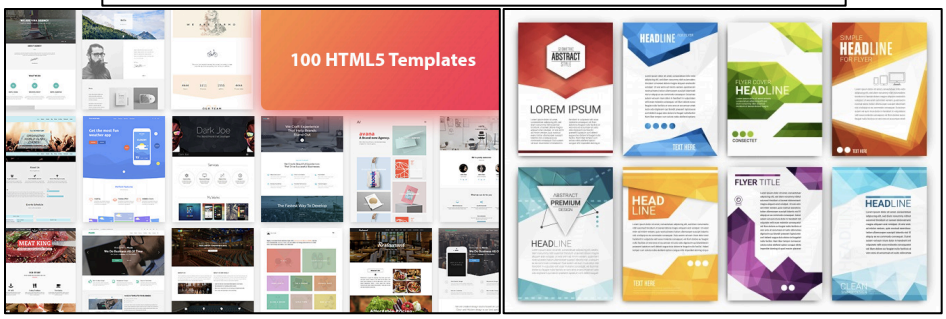
Templates and STL

20-April-2018





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Lab Guidelines

1. Make sure you get your work graded before the lab time ends.
2. You put all your work onto the LMS folder designated for the lab (i.e. “Lab10”) before the time of the lab ends.
3. Talking to each other is NOT permitted. If you have a question, ask the lab assistants.
4. The object is not simply to get the job done, but to get it done in the way that is asked for in the lab.
5. Any cheating case will be reported to Disciplinary Committee without any delay.

NOTE: Define a class interface separately and its methods separately. Do not write inline code.

Marks: Name: _____ Roll #: _____

Task 1	1	2	3					Total
	10	10	10					30

Task 2	1	2	3					Total
	10	10	10					30

Task 3	1	2	3	4				Total
	10	10	10	10				40

Let’s Begin……

Total marks Obtained

/100

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Task 1: **(30)**

1. Write a template function which when passed a vector of integers or doubles, returns sum of cubes of all numbers stored in that vector. 10
2. Now you are asked to accommodate vector of strings also. However, in case of strings you just need to return a single string made by concatenation of all strings in the input vector. (Hint: This part may not require templates, but overloaded functions. :-) 10
3. Write a main function that tests the functions written in (1) and (2) by using a vector of integers, by a vector of doubles, and by a vector of strings. 10

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Task 2: **(30)**

1. Make a template class whose constructor should take a sequence of integers (not starting from 0) or a sequence of characters and it should make a vector with input integers or characters as elements. 10
2. Now make a method which should return the reversed vector without using STL iterators. 10
3. Make another method which should also return a reversed vector, but it should do this work by using STL iterators. 10

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Task 3: **(40)**

1. Create a Vehicle class to store information: 10
    - Attributes (private):
        - make (you can also think of this as the Manufacturer)
        - model
        - color
        - year
        - mileage
        -
    - Behaviors:
        - Create mutator (Set) and accessor (Get) functions for all attributes
        - Create a default constructor that initializes all of the attributes to default values (blanks in the case of strings or 0 in the case of numbers.)
        - Make sure to have validation to ensure that the mileage is never set to a number less than 0.
        - Create a constructor that takes the make, model, year, color, and mileage values and sets them for a newly created vehicle.
        - Create a virtual function called ***details*** that does not do anything. (This will force the cars, trucks, and motorcycles that inherit from this class to overload this function.)
2. Create a Car class that inherits from the vehicle class: 10
    - Attributes:
        - There are no additional attributes
    - Behaviors:
        - Override the details function to print the details for this car.
        - (Example on an output line of a car's details:
          "The current car is a 2008 Red Ford Mustang with 5000 miles.")
3. Create a Truck class that inherits from the vehicle class: 10
    - Attributes:
        - Bedsize
    - Behaviors:
        - Create mutator (Set) and accessor (Get) functions for all attributes
        - Override the details function to print the details for this truck.
        - (Example on an output line of a truck's details:
          "The current truck is a 2006 Black Ford F150 with 10000 miles and a 10-foot bedsize.")
4. Create a program with a main() to be used by the inventory manager to keep track of all of the vehicles on the lot. 10
    - Create the following vehicles of the correct type
      Make Model Color Year Type BedSize
        - Porsche 911 Silver 2005 Car
        - Ford Mustang Red 2007 Car
        - Ford F150 White 2007 Truck 10-foot
        - Voltzwagon Jetta Black 2006 Car

- Toyota Tacoma Blue 2002 Truck 12-foot
- <<Your dream vehicle here>>

- Create an array of pointers to these objects and use a loop to call the details() function for each one in turn and print out the details for all vehicles on the lot.

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Zip your tasks into one folder with format:

YourRollNo-Lab11

Example "**2001001-Lab11**" and upload on LMS before the tab is closed.

You will not be given extra time.