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

Department of Computing

CS212: Object Oriented Programming

Class: BSCS-5AB

Lab 3: Constructors

Date: 22nd Feb 2016

Time: 9am – 12pm / 2pm to 5pm

Instructor: Ms. Hirra Anwar

Lab 3: Constructors

Introduction

Constructors

Constructors are special class functions that are called when an object is created. You will implement constructors in a class in this lab.

Objectives

To understand the use of Constructors.

Tools/Software Requirement

Visual Studio 2010/2012

Description

There are three tasks. You need to do task 1, then task 2 and finally task 3 will incorporate both tasks 1 and 2. Use different types of constructors in your program while you implement them. Add a cout statement to each of your constructors to see when are they called in your program.

Lab Tasks

Task 1: In ocean navigation, locations are measured in degrees and minutes of latitude and longitude. Thus if you're lying off the mouth of Papeete Harbor in Tahiti, your location is 149 degrees 34.8 minutes west longitude, and 17 degrees 31.5 minutes south latitude. This is written as $149^{o}35.8$'W, $17^{o}31.5$'S. There are 60 minutes in a degree. Longitude is measured from 0 to 180 degrees, east or west from Greenwich, England, to the international dateline in the Pacific. Latitude is measured from 0 to 90 degrees, north or south from the equator to the poles.   (Read more to understand from (http://www.worldatlas.com/aatlas/imageg.htm).

Create a class angle that includes three member variables: an int for degrees, a float for minutes, and a char for the direction letter (N,S, E or W). This class can hold either a latitude variable or a longitude variable. Write one member function to obtain an angle value (in degrees and minutes) and a direction from the user, and a second to display the angle value in $149^{o}35.8$'W format. Also write a three-argument constructor. Write main() program that displays an angle initialized with the constructor, and then, within a loop, allows the user to input any angle value, and the

displays the value. You can use the hex character constant '\xF8' which usually prints the degree $^{\circ}$ symbol.

Task 2: Create a class that includes a data member that holds a serial number for each object created from the class. That is the first object created will be numbered 1, the second 2 and so on. To do this, you'll need another data member that records a count of how many objects have been created so far. Then, as each object is created, its constructor can examine this count member variable to determine the appropriate serial number for the new object. (Hint: create a static counter variable that would increment every time an object is created)

Task 3: Create a class ship that incorporates a ship's number and location. Use the approach of task 2 to number each ship object as it is created. Use two variables of the angle class from Task 1 to represent the ship's latitude and longitude. A member function of the ship class should get a position from the user and store it in the object another should report the serial number and position. Write a main() program the creates three ships, asks the user to input the position of each, and then displays each ship's number and position.

Deliverables

Source code of Task 3 (It automatically includes source codes (Classes) of task 1 and 2).