UNIVERSITY OF LAGOS
FACULTY OF ENGINEERING
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
EEG 311: COMPUTER PROGRAMMING LANGUAGES II
FIRST SEMESTER, 2010/2011 ACADEMIC SESSION
SECOND MID-SEMESTER EXAMINATION

Instructions: 1. <u>Answer ALL</u> questions
2. Build all your programs in a multifile organizational scheme
Time Allowed: 60 minutes

Question One

Write a complete C++ program that sets up a Date class with private ints for month and day-no year. (You may thank me later because this deletion simplifies the date validation process!) Other class data members are needed; I'll let you figure out what they are.

- One constructor function sets the date to January 1.
- Also needed is a GetDate class function that asks the user to input a date in an integer format. Another requisite is a WriteDate function that writes the date using the month name, such as January 1 instead of 1/1.
- Include a Validate function that returns a false (bool) value if the date is invalid and it writes an "invalid date" message to the screen. This function also resets this invalid date to January 1. (Thirty days hath September, April, June, and November. All the rest have thirty-one-except February, which has twenty-eight days.) You may assume this program is not dealing with a leap year.
- The Date class should also have a private HowManyDays function that calculates the number of days the date object is in a 365-day year. For example. January 31 is the thirty-first day and February 1 is the thirty-second day. This function is not called from the main but is called by the class functions.
- A last necessity of your program is an overloaded operator, <, that compares which day is "sooner" in the year. For example, January 31 is less than February 1 because January 31 occurs earlier in the year; however, November 3 is not less than March 8 because March 8 occurs sooner.
- Write a driver program that sets up two Date objects. The user will input two dates. If both dates are valid, the main should compare the dates and report which date occurs sooner in the year. Include a loop so that the user can input several sets of dates.

Question Two

The volume, V, and surface area, A, of a sphere of radius r are given respectively, by the expression

$$V = \frac{4 * \pi * r^3}{3}, \quad A = 4 * \pi * r^2$$

Write a complete C++ program, with class Sphere containing private and public members, that asks the user to enter the radius of a sphere, calculates the volume and the area of the sphere, and prints the results (to two decimal places) as well as all associated dimensional information.