**PSG College of Technology**

**Department of Applied Mathematics and Computational Sciences**

**Object Computing Laboratory**

**Problem sheet II**

**Objects and Classes:**

1. Define a class **Country** that stores the name of the country, its population, and its area. Using that class, write a program that reads in set of countries and prints

* The country with the largest area
* The country with the largest population
* The country with the largest population density(people per square kilometer)

2. Create a class **Donor** that contains donor number, donor name, age address, sex, blood group.  
    Write a Menu driven C++ program to display the number, name and address of the donors for the      following categories using overloaded function display.  
              (a) blood donors having the blood group O+  
              (b) blood donors in the age group between 16 to 25  
              (c) female donors having blood group A in the age between 19 and 24.

1. Define a class to represent a bank **Account** which consists of the following details: A/c number, name, type of account (current / savings) and balance amount. Write member functions to do the following,
   * + Create a new account with default value of balance as 1000 and type of account as savings
     + deposit an amount
     + withdraw an amount
     + display the balance / Enquiry
     + and check the constraints such as minimum amount in the account
2. Create a class for **Time** which consists of hours, minutes and seconds as data members. Create 2 objects t1 and t2; write a member function to add these two objects, return the resultant object to the main program. Create a default constructor for reading values from the user. While reading and finding the sum of objects, use the following constraints.
   * + - Hours should not exceed 24, minutes and seconds should not exceed 60.
       - During addition, if seconds exceed 60, add 1 to the minutes. If minutes exceed 60, add 1 to hours.

Write appropriate member functions for the above calculations.

5. Create a class called **Employee**, which comprises of name, employee number, designation, location of     work place, and his basic pay. Create a list of ‘n’ employees. Read an employee’s name and location     of his work place, search it in the list, and display the corresponding details of that employee. Add     Static data member no\_of\_emp. Make the constructor to increment the no employees. Write a static      function to display the value of no\_of\_emp.

6. Design a class **Message** that models an email message. A message has a recipient, a sender, a time     stamp, and a message text. Support the following member functions:

A constructor that takes the sender and recipient and sets the time stamp to the current time

Trace the number of messages created.

A member function print that prints the message text.

7. Create a class named **Car** that contains the following data members engine size, body style, and color code. The function members should include a constructor that provides default values of 0 for each numeric data member and an ‘X’ for each character variable; a display function that prints the data members and a member function that performs a member wise assignment between two car objects for each instance variable.

8. Design a class named **Complex** withreal and imag as data members. Initialize the objects through appropriate constructors. Write a friend function to perform the following arithmetic operations:

c3 = c1 + c2;

c3 = c1 – c2;

c3 = c1 \* c2;

Where c1, c2, c3 are objects of class Complex. Invoke a destructor to release the memory used by the        objects.

9. Construct a class named **Coord** that contains, two double precision data members named xval and

yval are points in rectangular coordinates. The function members should include appropriate constructor, display functions, and a **friend function** named convPol( ). The convPol() function should accept two double precision numbers that represent a point in rectangular coordinates and convert them into polar coorninates. For conversion, use the formulas, x =rcos and y =r sin

10. Create a class **pensioner** that includes private data members such as name, age, gender,       social\_security\_no, pension\_amt and public member functions getdata( ) to get the values from the       user, isEligible( ) to determine the eligibility of the pensioner to avail discounts in fares in public       transport systems, print( ) to display the results. The criteria for eligibility are as follows:

* The pensioner should be in the income category below Rs. 1500.
* The pensioner should not be receiving any financial support from his/her off springs.

     Write a c++ program that creates dynamic objects to access the above mentioned data members.