

Programming Practice using C++ (IT594F)

Assignment

Class and object:

- P1.** Write a program in C++ to find area and perimeter of circle by creating objects.
- P2.** Write a program in C++ to find areas of triangle, rectangle and square by creating objects.
- P3.** Write a program in C++ to add two complex numbers by creating objects.
- A1.** Write a simple program that convert the temperature in degree Celsius to degree Fahrenheit and vice versa using the basic concept of class and object. Make separate class for Centigrade and Fahrenheit which will have the private member to hold the temperature value and make conversion functions in each class for conversion from one to other. For example you will have function to Fahrenheit () in class Celsius that converts to Fahrenheit scale and returns the value.
- A2.** Write a program in C++ to implement DATE class which will have 3 data members (day, month, and year) and some member functions. Use a function to get date. Create another function to validate a given date. (e.g. 30.02.2013 is not a valid date)

Constructor-Destructor:

- P4.** Write an object-oriented program to find area of rectangle. Include multiple constructors that set value of its sides. Also show the use of copy constructor.
- P5.** Write an object-oriented program to enter and display students' information.
Enter following information about students:
Roll Number
Name
Age
Address
- Use constructor to allocate the memory. Also define destructor to de-allocate memory.
- A3.** Create a class called TRIANGLE that stores the length of base and height of a right triangle in two private instance variables. Include a constructor that sets these values. Define two functions. The 1st is **hypo ()**, which returns the length of hypotenuse. The 2nd is **area ()**, which returns the area of the triangle.

Operator overloading:

- P6.** Implement the Stack operation with overload unary+ for push operation & unary- for pop operation. Your queue implementation must be menu based.
- P7.** Write a C++ program to overload cout and cin to perform multiplication of two complex number (Here * operator is also overloaded).
- A4.** Create a class called HEIGHT that stores the height of a student in feet and inches in two private instance variables. Include a constructor that sets these values. Define a function **into_cm()**, which returns the height in cm. overload the operator “-” to perform the difference of two student's heights.

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Function overloading:

P8. Write a program in C++ to implement class ADD that will have 3 overloaded functions.

1st one will add two integer numbers.

2nd one will add two floating and one integer number.

3rd one will take two complex objects as parameter and will add two complex numbers.

A5. Assume that object represents an employee report that contains the information about employee id, total bonus, and total overtime in a particular year. Use four objects to represent four employees' reports. Write a program that display report information. Use setpara() overloaded member functions to set report attributes by passing/without passing the arguments and member function displayreport() to show the reports according to parameter passed.

Virtual Functions:

P9. Write a program to create a class shape with functions to find area of the shapes and display the name of the shape and other essential component of the class. Create derived classes circle, rectangle and trapezoid each having overridden functions area and display. Write a suitable program to illustrate virtual functions and virtual destructor.

A6. Create a class Person and two derived classes Employee, and Student, inherited from class Person. Now create a class Manager which is derived from two base classes Employee and Student. Show the use of the virtual base class.

Friend class & function:

A7. Create a class complex that contains two double data members. Overload +, -, and * arithmetic operators using friend function, so that they can operate on the object of complex. Then find the expression $a - b * c + d$ (where a, b, c, and d are complex objects).

A8. Create two class DM & DB which store the value of distances. DM stores it in meter & centimeters. DB stores it in feet & inches. Write a program that can read values for the class objects & add one object of DM with another object of DB. Use a friend function to carry out the addition operation. The objects that store the result may be of either type depending on the units in which the results are required. The display function should act accordingly.

Inheritance:

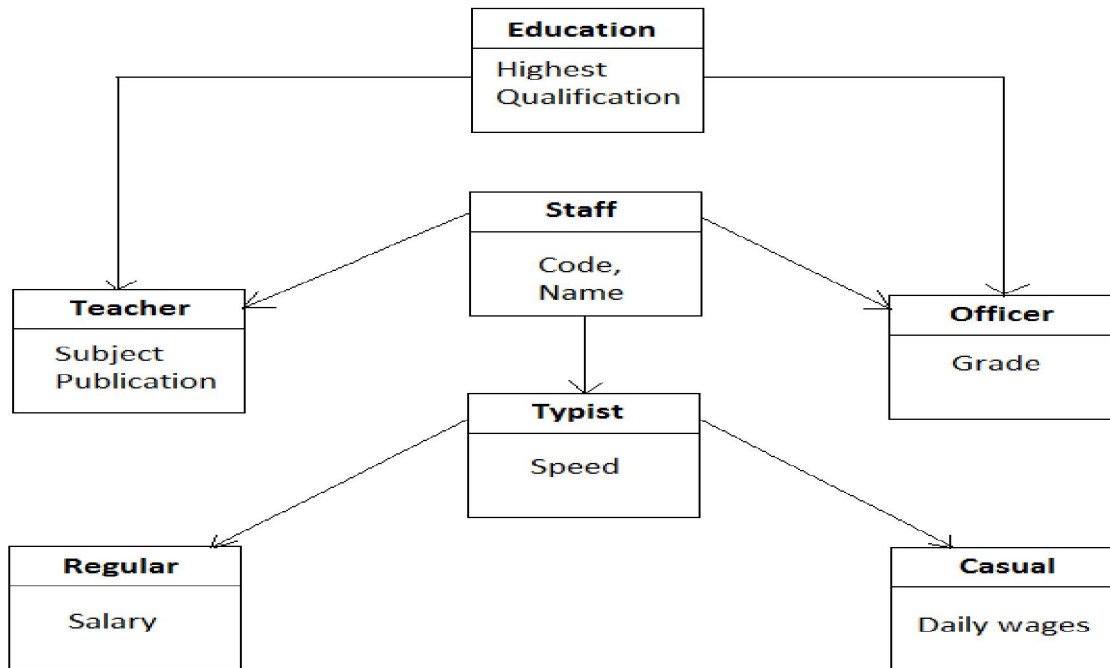
P10. Write three derived classes inheriting functionality of base class person (should have member function. That ask to enter name and age) and with added unique features of student, employee, and functionality to assign, change and delete records of student and employee. And make one member function for printing address of the objects of classes (base and derived) using this pointer. Create two objects of base class and derived classes each and print the addresses of individual objects. Using calculator, calculate the address space occupied by each object and verify this with address spaces printed by the program.

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P11. Write base class that ask the user to enter a complex number and derived class adds the complex number of its own with the base. Finally make third class that is friend of derived and calculate the difference of base complex number and its own complex number.

A9.



This is the database of the employees of an Educational Institute. Specify all the classes & define functions to create database & retrieve individual information when required.

Template:

P12. Write a program in C++ to implement STACK class that will have push, pop and display operations using template. Use a constructor to initialize top value.

A10. Implement QUEUE class, which will perform all operations of a linear queue using template.

Others:

A12. Write a program to pass n numbers through **command line**. Then find out largest among them.

A13. Write an interactive program which divides two numbers. Here inputs are actually passed by command line arguments. Enhance your design by using exception handling (possible cause of exception-number of arguments must be 2, divide by 0, both arguments must be a number).