

OOP LAB QUESTION BANK

April 5, 2018

QUESTION BANK

1. Write a C++ program to create a class to represent entities of type Circle, specified by its attributes radius and coordinates of its center. Include appropriate Constructors and display methods. Also write a friend function that determines whether two circles intersect one another or they touch each other or they are disjoint.
2. Write a C++ program that stores the time duration in hh:mm:ss format in a class called Duration having the members hh, mm and ss.
Include the following constructors
zero parameter constructor that sets all data members to zero
three parameter constructor that sets values of hh, mm and ss respectively if the values are valid
Implement the following methods
getDuration method that reads and validates a time duration
showDuration method that displays the time duration
addDuration method that adds two durations
Illustrate the addition of two time durations
3. Create a **RainGauge** class that store rainfall in cm information and city name. Include a zero parameter constructor. Implement the following methods
fnReadMeasurement that generates a random decimal value in the range 0-20cms and reads the name of the city
fnDisplayReading that display city name and rainfall received
Write a friend function that takes an array of RainGauge objects and the number of cities as parameters and calculates the average rainfall received
Create an array of **RainGauge** objects in main and display the results
4. Write a class to represent entities of type **Fraction** with appropriate data members. Include a method simplify that simplifies a given fraction (for eg: 6/8 to 3/4).
Overload the following operators
» to read a fraction object
« to display a fraction object
== to check if two fractions are the same
+ to add two fractions
Illustrate these operations in main function.
5. Write a C++ program to create a class called **EXPRESSION** which can store an arithmetic expression in both infix and postfix representations. Implement the following methods in the class.
 - i. Read and store an infix expression (input expression assumed to be valid)
 - ii. convert to postfix representation
 - iii. display the expressions in both infix and postfix representationsThe expression is supposed to contain the operators + - * / only, along with the open and close parentheses.
6. Create two classes DB & DM which store the value of distances. DM stores distances in metres & centimeters and DB in feet & inches. Write a program that can read values for the class objects and add one object of DM with another object of DB. Use friend function to carry out the addition. The object that stores the result should be a DB object.
7. Write a C++ program to create class called bank account. Include the following data member and member functions.
Data Members
 - i. Name of depositor
 - ii. Account holder
 - iii. Type of account
 - iv. Balance amount in the account**Member functions**
 - i. Parametrized Constructor
 - ii. To deposit an amount
 - iii. To withdraw amount
 - iv. To display bank account details with balance.

8. Write a C++ program that reads contents from two text files that are specified as command line arguments and create a file by name “merge.txt”. Read one line at a time from each input file in an alternate manner and write to the output file till you have reached the end.
A Sample output is shown here:

Input File1	Input File1	merge.txt
abcdeabc	12345678	abcdeabc
fghijfgh	67890123	fghijfgh
		12345678
		67890123

9. Write a C++ program to create class called MATRIX using a two dimensional array of integers. Implement the following operations by overloading the operator == which checks the compatibility of two matrices m1 and m2 to be added and subtracted. Perform the addition and subtraction by overloading the operator + and – respectively. Display the results (sum matrix m3 and difference matrix m4) by overloading the operator <<.
10. Write a C++ program to create class called MATRIX. Overload the operator ‘==’ which checks the compatibility of two matrices m1 and m2 to be multiplied. Perform the multiplication of matrices by overloading the operator *. Display the results (product matrix m3) by overloading the operator <<.
11. Create a POLYGON class that has the following members
Data members : name, number of sides and area
Methods :
constructors and destructors
display method to display details of the POLYGON object
pure virtual function calcArea
Next Derive the following classes from POLYGON namely TRIANGLE and SQUARE with appropriate data members and methods. Both these derived classes have to define the calcArea method to suit its purpose.
12. Write a class called ResistancePair that represents a pair of resistance connected either in series or parallel. Implement a method too read the resistance values of the resistance pair. Provide a pure virtual function that calculates the combined resistance of the resistance pair which will be implemented in its child classes namely SeriesResistancePair and ParallelResistancePair. Now calculate the combined resistance of 4 ResistancePair objects connected in parallel.
Note :
the combined resistance for two resistors connected in series is the sum of its individual resistances.
the combined resistance for two resistors connected in parallel is the reciprocal of the sum of the individual reciprocal of the resistances.
13. Design and develop a ITEM class with itemName, itemCode, itemPrize, numberOfItems (itemCount) as data members. Implement suitable methods
Working with Files: demonstrate the following file operations;
a. Writing an object at the end of file
b. Reading all objects from a file and display on console
c. Update a given object information on the file
14. Write a C++ program to perform the following string operations by using the C++ string library
i. Parameterized and copy constructor
ii. Compare two string objects
iii. Find substring in a main string
iv. Return the position of the first occurrence a given substring in the string.
v. Return the position of the last occurrence a given substring in the string
vi. Insert a given substring at the end of main string
vii. Swap content of two given strings
15. Write a C++ program to create a template functions for Insertion sort and Selection Sort. Demonstrate sorting of integers and double data types for both sorting algorithms.
16. Write a C++ program to create a template class STACK, with push and pop and display member functions. Write a menu based program to illustrate the working for stack of doubles and stack of integers. Use exception handling to handle the special conditions underflow and overflow of the stack.