Saurabh Shukla Classes

C++ Language

Assignment-1 | Warm-up

1. Write a C++ program to print Hello World on the Screen
2. Write a C++ program to print Hello in first line and World in second line
3. Write a C++ program to add two numbers taken from user.
4. Write a C++ program to calculate area of circle
5. Write a C++ program to calculate area of a rectangle
6. Write a C++ program to calculate volume of a cuboid
7. Write a C++ program to calculate average of three numbers.
8. Write a C++ program to swap values of two int variables.
9. Write a C++ program which takes a character from user and display its ASCII code.
10. Write a C++ program to calculate simple interest.

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Assignment-2 | Decision Control

1. Write a C++ program to check whether a given number is divisible by 7 or not.
2. Write a C++ program to check whether a triangle is right angled triangle or not. Takes lengths of the sides from the user.
3. Write a C++ program to check whether a given number is a valid octal number or not.
4. Write a C++ program to find nature of roots of quadratic equation
5. Write a C++ program to compare two numbers.
6. Write a C++ program to check whether a given number is positive, negative or zero.
7. Write a C++ program to check whether a given number is even or odd
8. Write a C++ program to check whether a given year is a leap year or not.
9. Write a C++ program to find the greater among 3 given numbers.
10. Write a C++ program to check whether a given character is a digit, lowercase alphabet, uppercase alphabet or a special character.

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Assignment-3 | Loops

1. Write a C++ program to print first N natural numbers.
2. Write a C++ program to print first N natural numbers in reverse order
3. Write a C++ program to print first N even natural numbers
4. Write a C++ program to print first N odd natural number in reverse order
5. Write a C++ program to calculate sum of first N natural numbers
6. Write a C++ program to print table of user's choice
7. Write a C++ program to calculate sum of squares of first N natural numbers
8. Write a C++ program to calculate factorial of a number
9. Write a C++ program to count digits in a given number
10. Write a C++ program to calculate the sum of digits in a given number

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Assignment-4 | More on Loops

1. Write a C++ program to check whether a given number is Prime or not.
2. Write a C++ program to print all Prime number between two given numbers
3. Write a C++ program to print first N terms of Fibonacci series.
4. Write a C++ program to calculate LCM of two numbers
5. Write a C++ program to calculate HCF of two numbers
6. Write a C++ program to find the highest value digit in a given number
7. Write a C++ program to print binary of a given decimal number
8. Write a C++ program to print octal of a given decimal number
9. Write a C++ program to reverse a number
10. Write a C++ program to calculate x power y, where values of x and y are given by user.

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Assignment-5 | functions

1. Write a function to calculate area of circle. (TSRS)
2. Write a function to check whether a given number is even or odd. Return 1 if number is even, otherwise return 0. (TSRS)
3. Write a function to check whether a given number is Prime or not. Return 1 if number is Prime, otherwise return 0. (TSRS)
4. Write a function to find next Prime number of a given number. (TSRS)
5. Write a function to print all prime numbers between two given numbers. (TSRS)
6. Write a function to calculate factorial of a number. (TSRS)
7. Write a function to calculate permutation of arranging r items out of n items. (TSRS)
8. Write a function to calculate combinations of selecting r items out of n items. (TSRS)
9. Write a function to print Pascal Triangle. (TSRN)
10. Write a function to calculate LCM of two numbers. (TSRS)
11. Write a function to calculate HCF of two numbers. (TSRS)
12. Write a function to print first N terms of Fibonacci series. (TSRN)

TSRS: Take Something Return Something

TSRN: Take Something Returns Nothing

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Assignment-6 | recursion

1. Write a recursive function to print first N natural numbers
2. Write a recursive function to print first N natural numbers in reverse order
3. Write a recursive function to print first N odd natural numbers
4. Write a recursive function to print first N odd natural numbers in reverse order
5. Write a recursive function to print first N even natural numbers
6. Write a recursive function to print first N even natural numbers in reverse order
7. Write a recursive function to print squares of first N natural numbers.
8. Write a recursive function to calculate sum of first N natural numbers
9. Write a recursive function to calculate sum of squares of first N natural numbers
10. Write a recursive function to calculate sum of first n odd natural numbers
11. Write a recursive function to calculate sum of first N even natural numbers
12. Write a recursive function to calculate factorial of a number
13. Write a recursive function to print binary of a decimal number
14. Write a recursive function to print octal of a decimal number

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Assignment-7 | Classes and Objects

1. Define a class Complex to represent a complex number. Declare instance member variables to store real and imaginary part of a complex number, also define instance member functions to set values of complex number and print values of complex number.

2. Define a class Time to represent Time (like 3 hr 45 min 20 sec). Declare appropriate number of instance member variables and also define instance member functions to set values for time and display values of time.

3. Define a class Box to represent a cuboid. Declare instance member variables to store dimensions of the box and also define instance member functions to set dimensions of the box and display dimensions of the Box. Define one more instance member function which returns the volume of caller object of Box.

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Assignment-8 | Arrays

1. Define a class Array, which contains an int array of size 10 as instance member variable.Now define the following member functions to access this array:
   a. inputArrayElements()
   b. findMaxElement()
   c. findMinElement()
   d. sort()
   e. editElement(int index, int newData)
   f. sumOfelement()
   g. averageOfElements()

2. Define a class Employee with empid, name and salary as instance member variable. Define following instance member functions in it:
   a. setEmployeeId(int id)
   b. setEmployeeName(char n[])
   c. setEmployeeSalary(float s)
   d. showEmployee()
   e. getSalary()
   f. getEmpId()
   g. getName()

3. Create an array of 10 Employees (use Employee class of que 2). Define following functions:
   a. displayEmployees(Employee [])
   b. sortEmployeesBySalary(Employee [])
   c. sortEmployeeByName(Employee [])
   d. sortEmployeeByEmpId(Employee [])

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Assignment-9 | static

1. Define a class Account, which contains following instance member variables
   a. account_no
   b. balance

   Also declare static member variable for rate of interest. Now define following member functions. (Analyze and decide which function has to be static and which has to be instance member)
   c. setBalance()
   d. setAccountNo()
   e. getBalance()
   f. getAccountNo()
   g. setRateOfInterest()
   h. getRateOfInterest()

Assignment-10 | Member Functions

1. Define a class Complex with instance member variables to store real and imaginary part. Define member functions to set data and show data. Also define functions to perform various mathematical operations between two objects of Complex. Following is the list of operations:
   a. addition
   b. subtraction
   c. multiplication

2. Define a class Time with instance member variables of hour min and second. Define setTime and showTime functions. Also define normalize function to make object data in standard format (min and sec should be less than 60). Also define functions for the following operations:
   a. Addition
   b. Subtraction

3. Define a class Result with instance member variables resulted, total_attempt, net_right, net_wrong, marks_for_right, marks_for_wrong. Define the following member functions:
   a. setResult() - it take 5 arguments for all instance variables. Set default arguments for marks_for_right and marks_for_wrong.
   b. showResult()

4. Define a class Operations, with static member pi with value 3.14. Define following functions
   a. Overloaded versions of area to calculate area of circle and area of rectangle
   b. Overloaded versions of add to calculate sum of two int values, sum of two float values, concatenate two strings

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Assignment-11 | Constructor

1. Define a class Complex with instance member variables to store real and imaginary part. Define member functions to set data and show data. Also define two constructors, one takes two arguments to set values of real and imaginary part, second takes no argument.
2. Define a class Box with instance member variables length, breadth and height. Define instance member functions setDimensions() and showDimensions(). Also define three constructors:
   a. Non-parameterized constructor.
   b. Takes three arguments for three dimensions
   c. Take one argument which is for all three dimensions

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Assignment-12 | Operator Overloading

1. Define a class Complex with instance member variables to store real and imaginary part. Define member functions to set data and show data. Overload following operators in the class
   a. + (binary + to add two complex objects)
   b. - (binary – to subtract complex objects)
   c. * (binary * to multiply complex objects)
   d. == (relational operator to compare two complex objects)
2. Define a class Time with hour, min and sec as instance member variables. Define instance member functions setTime() and showTime(). Also overload following operators:
   a. + (binary + to add two Time objects)
   b. – (binary – to find difference between two Time objects)
   c. > (relational operator to compare two Time Objects)

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Assignment-13 | Operator Overloading of unary operators

1. Define a class Complex with instance member variables to store real and imaginary part. Define member functions to set data and show data. Overload following operators in the class
   a. - (unary - to negate the value of complex object)
   b. ++ (Pre-increment operator ++)
   c. ++ (Post-increment operator ++)
2. Define a class Time with hour, min and sec as instance member variables. Define instance member functions setTime() and showTime(). Also overload following operators:
   a. ! (unary ! to set Time 0:0:0 if non zero time or set Time 1:0:0 if already zero)
   b. ++ (Pre-increment operator ++, increases 1 sec)
   c. ++(Post-increment operator ++, increases 1 sec)

Assignment-14 | Pointers

1. Define a class LinkedList to implement linked list data structure. Create appropriate member variables and following member functions:
    a. addItemAtStart()
    b. addItemAtLast()
    c. deleteFirstItem()
    d. deleteLastItem()
    e. viewListItems()
    f. Constructor and destructor

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Assignment-15 | Inheritance

1. Define a class Person with name and age as private instance member variables. Define public member functions setName() getName(), setAge(), getAge(). Now define derived class of Person, with the name Employee. Class Employee will have empid and salary as private instance member variables. Now define a mechanism to automatically generate empid for every new employee (define this function as protected member). Also define following public member functions in Employee class
    a. setEmployeeData()
    b. showEmployeeData()
    c. countEmployee()

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Assignment-16 | File Handling

1. Write a program to copy one file data and write into another file.
2. Write a program to count words in a file
3. Write a program to search a word in a file.
4. Write a program to count lines in a CPP file.
5. Write a program of book record management. Define a class Book with bookid, title and price as instance member variables. Also define following functions:
   a. inputBook()
   b. showBook()
   c. storeBook()
   d. viewAllBooks()
   e. searchBook()
   f. deleteBook()
   g. editBook()