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C# Programming

Section 1 – Building block , I/O, Operators & Expressions

- **Dot Net and C# Introduction**
- **Variable**
- **Data Type**
- **Input and Output**
- **Initialization Constant**
- **User Input and Output in C#**
- **Escape Sequence**
- **Arithmetic Operator**
- **Relational & Logical Operator Increment & Decrement Operator**
- **Assignment Operator**
- **Ternary Operator**
- **Type Conversion**

1. Write a program to print given format using Console.WriteLine() function.
   ```
   *
   ***
   *****
   ******
   *******
   ```
2. Write a program to find out simple interest (SI).
3. Write a program to find gross salary (Hint :-GS=BS+DA+TA).
4. Write a program for swapping of two integer variables using third variable.
5. Write a program for swapping of two integer variables Without using third variable.
6. Write a program to print last digit of a given number.
7. Write a program to calculate Compound Interest
8. Write a program to swap two numbers.

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1. Write a program to find out square of given number
2. Write a program to find out area of circle
3. Write a program accept 5 subject marks (**Hint P=67, C=87, M=90, H=98, E=88**) and Calculate total marks and percentage.
4. Write a program accepts three numbers from user and calculate average of given three numbers.
5. Write a program to accepts an amount in rupees (Hint Rs4567) and find out how many currency of Rs 2000 required. Also find remaining amount.
6. Write a program to convert temperature from degree Fahrenheit to Celsius
7. Write a program to convert days into years, weeks and months.
8. Find sum of first , third and fifth digit of 6 digit number.

Section 2 – Flow Control (Conditional Statements)

- **If**
- **If-Else**
- **Else-If**
- **Nested If-Else**
- **Ternary operator**
- **Switch**

1.   Write a program to accepts a number from user and check given number is even or odd.

2.   Write a program to accepts two numbers from user and calculates first no is divisible by second or not.

3.   Write a program to accepts three numbers from user and calculate biggest number out of three numbers.

4.   Write a program to calculate whether character is in lowercase or uppercase.

5.   Write a program to input basic salary of an employee and calculate its Gross salary according to following rules:

   Basic Salary <= 10000 : HRA = 20%, DA = 80%
   Basic Salary <= 20000 : HRA = 25%, DA = 90%
   Basic Salary > 20000 : HRA = 30%, DA = 95%
   Gross Salary = Basic Salary + HRA + DA

6.   Write a program to show day of week according to user input by using switch case.

7.   Write a program to perform all arithmetic operations according to user choice (for ex-for addition press '+'...) by using switch case.

8.   Write a program to find maximum between two numbers.

9.   Write a program to find maximum between three numbers using if-else and ternary operator.

10.   Write a program to calculate sum of digits of a number of three digit number using if-else

11.   Write a "Bonus Distribution Program" using logical operators. Bonus will be given to all those employees who have salary less than 20000 and tenure is more than 3 years.

12   Write a code (using nested switch case) to suggest a diet plan (calories) to a consumer on behalf of inputs(gender and food time).

1. Write a program that accepts the age of person, find out the person is eligible for voting or not.

2. Write a program that accepts a number from user and find whether it is positive or negative or zero.

3. Write a program to calculate whether year is leap year or not.

4. Write a program that accepts five subjects 'marks from user and calculate the total marks then calculate Percentage. Display message according to following condition:

   Percentage >=60 then print message Grade A
   Percentage >=50 then print message Grade B
   Percentage >= 40 then print message Grade C
   Percentage < 40 then print message Grade D

5. Write a program for generating electricity Bill. Accept last month unit and current month unit from user, then calculate and print bill amount according to following condition:

   0-150 charges 4 rs/unit
   151-300 charges 6 rs/unit
   301-500 charges 8rs/unit
   >500 charges 10rs/unit

6. Write a program to show name of month . Ask user to enter between 1 and 12. Use switch case.

7. Write a program that accepts a character and check given character is vowel or not by using switch case.

8. Write a program to check whether a number is even or odd using switch case.

9. Write a program to find the greatest of four numbers entered by the user.

10. Write a program to calculate the income tax of an employee.

    The tax slabs according to annual salary are :
    upto rs.300000 tax is 0%

    from rs.300000 to rs. 500000 tax is 10%

    from rs.500000 to rs. 1000000 tax is 15%

    more than 100000 tax is 20%

    Note: 250000 is exempted from tax criteria

11.
    Write a code for call center (using nested switch case). E,g, 1 for prepaid, 2 for post

Section 3 – Flow Control(Loops)

- **While Loop, Nested WhileLoop**
- **Do-While Loop, Nested Do-WhileLoop**
- **Break & Continue**
- **For Loop, Nested ForLoop**

1. Write a program to print "Code Better" five times by using loop.

2. Write a program to print n natural number.

3. Take any ten numbers from user and print sum and average of these numbers.

4. Take any ten numbers from user and print sum and average of positive numbers.

5. Take the numbers from user (until ten +ve numbers entered by the user), and print sum and average of these numbers.

6. Write a program to calculate factorial of a given number.

7. Write a program to calculate sum of digits of a number.

8. Write a program to find out reverse of a given number.

9. Write a program that accepts a number from user and check given number is Armstrong number or not.

10. Write a program to find LCM of two numbers.

    .e.g. LCM of 4 and 6 is 12

11. Write a program to find HCF of two numbers.

    .e.g. HCF of 16 and 24 is 8

12. Write a program that accepts a number from user and check given number is prime number or not.

13. Print Fibonacci series unto n terms 0,1,1,2,3,5,8,……

14. Write a program to print given below patterns:

* * * * * * * * * * * * * * *	* * * * * * * * * *	A AB ABC ABCD ABCDE

*
   * *
  * * *
 * * * * *
* * * * * * *
	* * * * *
	 * * * *
	  * * *
	   * *
	    *
		1 2 3 4 5
		1 2 3 4 5
		1 2 3 4 5
		1 2 3 4 5
		1 2 3 4 5

1. Write a program to calculate square of numbers between 1-10
2. Write a program to calculate cubeof numbers betweenm and n. Ask user to enter value of m and n.
3. Write a program to print table of any given numbers. . e.g table of 5 is 5, 10, 15,…,50
4. Write a program that accepts a number from user and check given number is palindrome number or not. e.g palindrome number is 16761.
5. Write a program that accepts a number from user calculate factor of a given number..e.g. factors of 12 are 1,2,3,4,6,12
6. Write a program that accepts a number from user check given number is perfect number or not. A perfect number is whose sum of factors is wise of that numbers. e.g. factor of 6 are 1,2,3,6 then sum os 1+2+3+6=12
7. Write a program to accept N number from user and show how many number are even or odd.
8. Write a program to accept N number from user and check and print only Prime numbers.
9. Write a program to accept N number from user and check and print only Armstrong numbers.
10. Write a program to accept N number from user and check and print only palindrome numbers.
11. Write a program to calculate sum of given series: 1-2+3-4+5-6+7-8……n.
12. Write a program to calculate sum of given series: $x + x^2 + x^3 + …….+x^n$
13. Write a program to print given below patterns:

1 12 123 1234	5 54 543 5432 54321	5 4 3 2 1 5 4 3 2 1 5 4 3 2 1 5 4 3 2 1 5 4 3 2 1	1 1 2 1 2 3 1 2 3 4 1 2 3 4 5
1 1 1 1 2 1 1 3 3 1 1 4 6 4 1	* * * * * * * * * * * * * * * *	* * * * * * * * *	* * * * * * * * * * * * * *

Section 4 - Functions

- **Function Types**
- **Parameters, Declaration**
- **Call by value**
- **Call by reference**
- **Scope, Visibility**
- **Lifetime of Variable**

1. <u>Write a program to find cube of any number using function.</u>
2. Write a program to check whether a number is even or odd using functions.

1. Write a program to check the prime number using function with argument and no return type.

2. Write a program to calculate factorial using function with argument and with return type.

3. Write a program to print all even or odd numbers in given range.

4. Write a program to find LCM of two numbers.

5. Write a program to print all natural numbers between 1 to n.

Section 5 - Array

- **Array, 1D Array, 2D Array, Jagged Array**
- **Object Array**
- **Pass Array to Function, Return Array from function**

   1. Write a program to read and print elements of array.

   2. Write a program to find sum of all array elements

   3. Write a program to find maximum and minimum element in an array

   4. Write a program to insert an element in an array.

   5. Write a program to add two matrices.

   6. Write a program to search an element in an array.

   7. Write a program to sort an array .

   8. Write a program to reverse elements of an array

1. Write a program to count total number of even and odd elements in an array.

2. Write a program to copy all elements from an array to another array.

3. Write a program to count total number of duplicate elements in an array.

4. Write a program to merge two array to third array.

5. Write a program to sort array elements in ascending or descending order.

6. Write a program to multiply two matrices.

7. Write a program to check whether two matrices are equal or not.

8. Remove all duplicate occurring elements from array.

9. Find 2nd highest number from and 2nd minimum from array of n elements.

Section 6 - Object Oriented Programming

- **Introduction to OOP**
- **Object**
- **Class,**
- **Constructor**
- **this**
- **static**

1. Create a **class Rectangle** with three data member **(length, breadth & area).** Now also create method members

   • **inputValue()** – to take input for length and breadth from user.
   • **calculateArea()** – to calculate area of rectangle.
   • **showArea()** – to display the area of rectangle.

2. Create a **class Demo Arithmetic** with three data member that are **firstNo, secondNo and result**. In this class also create following method:

   a. inputValue() – to take input value from user for firstNo and secondNo
   b. addition() – to perform addition operation and store in result var
   c. subtraction() – to perform subtraction operation and store in result var
   d. multiplication() – to perform multiplication operation and store in result var
   e. divide() – to perform divide operation and store in result var
   f. show() - display value of result variable.

3. Create a **class Student** with data member **(stuName, stuId, stuPercentage)** to store the information of student And also create following method:

   a. inputStuInformation() – to take information about student from user
   b. outputStuInformation() - to display information of student

4.   Create a **class Addition** with member function **addition()** with following given argument

        a. three float
        b array of integer
        c two integer

5.   Create a **class Student** with data member **(stuId , stuName , stuPer)**) by using following properties:

        a. Only parameterized constructor;
        b. Show **StuInformation() method** display the information of student.
        c. Create three student object and call Show **StuInformation** method

6.   Create class **BankAccount** with data members **accountNo, name, balance.**

- Create **display()** method.
- Create another method **deposit(amount:Float)** which add amount value to balance
- Create **withdraw(amount:Float)** method which subtract amount from balance.
- Store 5 BankAccount Information in an Array and display all records. Ask user to

Select choice from below and perform operation

        1. Display account detail by account number
        2. Deposit amount in account by account number
        3. Withdraw amount in account by account number
        4. Delete account by account number.

7.   Create a **class to calculate** Area of circle with one data member to store the radius

        1. init - to input radius from user
        2. calc - to calculate area
        3. display- to display area

8.   Create a **class MathOperation** with two data member X and Y to store the operand and third data member R to store result of operation.
Create method members

        ● init - to input X and Y from user
        ● add - to add X and Y and store in R
        ● multiply - to multiply X and Y and store in R
        ● power - to calculate X Y and store in R
        ● display- to display Result R

9. Create a **class MathOperation** containing method 'multiply' to calculate multiplication of following arguments.

    a. two integers

    b. three float

    c. all elements of array

    d. one double and one integer

10. Create a **class Person** with **properties (name and age)** with following features.

    a. Default age of person should be 18;

    b. A person object can be initialized with name and age;

    c. Method to display name and age of person

11. Create a class Employee with (empNo ,salary and totalSalary) with following features.

    a. Only parameterized constructor;

    b. totalSalary always represent total of all the salaries of all

    employees created.

    c. empNo should be auto incremented.

    d. display total employees and totalSalary using class method.

12. Create **class Product (pid, price, quantity)** with parameterized constructor. Create a main function in different class (say XYZ) and perform following task:

    a. Accept five product information from user and store in an array

    b. Find Pid of product with highest price.

    c. Create method (with array of product's object as argument) in XYZ

    class to calculate and return total amount spent on all products.

    (amount spent on single product=price of product * quantity of

    product)

Section 7 – Inheritance, Interface, Enum, Exception Handling

- **Introduction, Types**
- **Base keyword**
- **Method overriding**
- **Runtime Polymorphism**
- **Interface**
- **Abstract Class**
- **Enum**
- **Properties**

1. Create class Student with variable (name, course, dateOfBirth)
   - create SchoolStudent class with variable (fees) and inherit class Student
   - create CollegeStudent with variable (sem and fees) and inherit class Student
   - create class PGStudent with variable (mainSubject, percent) and inherit CollegeStudent
   - add default and parameterized constructor in all classes

2. Create class Employee (id, name, salary) and add display function

   - create class PartTimeEmployee with variable (hoursWorked , hourlyRate) and inherit class Employee. AddcalculateSalary() function to calculate salary as salary = hourlyRate * hoursWorked

   - create class FullTimeEmployee withvariables(basic,da,pf) and AddcalculateSalary()function to calculate salary assalary = basic + da – pf

   - add default and parameterizedinitializer in all classes

   - Create a global function getTax (emp:Employee) which accept Employee object in Argument and calculate and print income tax on employee salary(12.5% of salary)

   - Also try to pass Objects of PartTime Employee and FullTime Employee togetTax() method

3. Create class BankAccount with variables (accountNo, balance).
   - **Add default and parameterized init.**
   - **Add display method**
   - **Add depositAmount(a:Float) method to increase balance**
   - **Add withdrawAmount(a:FLoat) to subtract from balance**

   Create class SavingAccount with variable (customerName, homeAddress) and Inherit class BankAccount.

   - **Add static variable minimumBalannce.**
   - **Add display method**
   - **override withdrawAmount(a:Float) to check minimumBalance**

Create class CheckingAccount with variable (shopName, shopAddress) and Inherit class BankAccount.

- Add static variable overDraftLimit.
- Add display method
- override withdrawAmount (a:Float) to check over Draft Limit

Create an Array of BankAccount type and append 3 objects of SavingAccount type and 4 objects of CheckingAccount Type with default data. Display all account information onscreen

4. Create **class OneBHK** with instance variable roomArea , hallArea and price

   a. Create default and parameterized constructor;
   b. Method show(): to print OneBHK data member information;

Create another **class TwoBHK** which has all the properties and behaviour of **OneBHK** and a new instance variable room2Area.

   a. Create default and parameterized constructor;
   b. Method show(): to print all data member information;

Write main function in another class(Say XYZ) and store three TwoBHK flat's information and print information using show method. Also print total amount of all flats.

5. Create a class Student with **two members : rollno and percentage**.

Create default and parameterized constructors. Create method show() to display information.

Create another **class CollegeStudent** inherits Student class. Add a new member semester to it. Create default and parameterized constructors. Also override show() method.

Create another **class SchoolStudent** inherits Student class. Add a new member **classname (eg 12th ,10th etc.)** to it. Create default and parameterized constructors. Also override show() method.

Create a class(say XYZ) with main method that carries out the operation of the project :

-- has array to store objects of any class(Student or CollegeStudent, SchoolStudent)

-- create two CollegeStudent and three SchoolStudent record objects and store them inside the array

-- display all record from the array -- search record on the basic of rollno and check given rollno is of SchoolStudent or of CollegeStudent.

-- count how many students are having A grade, if for A grade percentage >75

6. Create an **Abstract class** Processor with int member variable data and method showData to display data value. Create abstract method process() to define processing of member data.

  a.   Create a class Factorial using abstract class Processor to calculate and print factorial of a number by overriding the process method.

  b.   Create a class Circle using abstract class Processor to calculate and print area of a circle by overriding the process method.

  Ask user to enter choice (factorial or circle area). Also ask data to work upon; Use Processor class reference to achieve this mechanism

7. Create **Interface Taxable** with members salesTax=7% and incomeTax=10.5%. create abstract method calcTax().

  a.   Create class Employee(empId,name,salary) and implement Taxable to calculate incomeTax on yearly salary.

  b.   Create class Product(pid,price,quantity) and implement Taxable to calculate salesTax on unit price of product.

  c.   Create class for main method(Say XYZ), accept employee information and a product information from user and print income tax and sales tax respectively.

8.   Store name of weekdays in an array (starting from "Sunday" at 0 index). Ask day position from user and print day name. Handle array index out of bound exception and give proper message if user enter day index outside range (0-6).

9.   Create a class Voter(voterId, name, age) with parameterized constructor. The parameterized constructor should throw a checked exception if age is less than 18. The message of exception is "invalid age for voter "

10.   Create an enumeration named month that hold the values for the months of the year. Starting with January equal to 1.write a program that prompts the user a month's integers convert user's entry to a month's values and display it

Section 8 – List, Dictionary, ArrayList, Delegate, LINQ

- **Generic Collection**
- **Non Generic Collection**
- **Delegate**
- **LINQ**

1. Create a List / generic collection of 5 capital city names in India
2. Create a generic collection that stores even numbers from 2 to 100.
3. Create a delegates that accepts a number from user and displays whether the number is even or odd.
4. Create a delegate that displays a message (" you are underage") if the user's age is less than 18 and (you qualify to be an adult") if the age is greater than 18.
5. Write a program in C# Sharp to find the positive numbers from a list of numbers using two where conditions in LINQ Query.

   Expected Output:

   The numbers within the range of 1 to 11 are : 1 3 6 9 10
6. Write a program in C# to display the name of the days of a week in LINQ Query
7. Write a program in C# to create a list of numbers and display the numbers greater than 20 in LINQ Query
8. Write a program in C# to find the number of an array and the square of each number in LINQ Query
9. Write a program in C# to Remove Items from List using remove function by passing object in LINQ Query
10. Write a program in C# to find the uppercase words in a string in LINQ Query

Section 9 - Strings

- n
- **Strings Input and Output functions**
- **String Comparison**
- **String Functions**

1. Write a program to find length of a string.

2. Write a program to take a two as an input from the user . Confirm that the strings are equal.

3. Write a program to find total number of alphabets, digits or special character in a string.

4. Write a program to convert lowercase string to uppercase.

5. Write a program to find reverse of a string.

6. Write a program to accept a string and check if it is palindrome or not?

7. Write a program to count total number of vowels and consonants in a string.

8. Write a program to find first occurrence of a character in a given string.

9. Write a program to toggle case of each character of a string.