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Course : C# and .Net

1) Develop the C# program to initialize two dimensional array and print all the elements of the array on the same line separated with space

Aim:

To develop the C# program to initialize the 2D array and print all the elements .

Program:

```
using System;

class Program
{
    static void Main()
    {
        int[,] array = { { 10,20,30 }, { 40,50,60 }, { 70,80,90 } };
        for (int i = 0; i < array.GetLength(0); i++)
        {
            for (int j = 0; j < array.GetLength(1); j++)
            {
                Console.Write(array[i, j] + " ");
            }
        }
    }
}
```

Output:

10 20 30 40 50 60 70 80 90

2) Aravind wants to apply for competitive exam. He needs to know whether he is eligible to apply. The eligibility criteria is given below:

- Age should be greater than 18 years, but not more than 30.
- The candidate should have passed 10 std with a minimum pass percentage of 65.

Design the C# program to help him to know his eligibility. If the criteria gets satisfied, print he is eligible else print he is not eligible.

Aim:

To develop the C# program to check the eligibility of the person to apply for the competitive exams .

Program:

```
using System;

class EligibilityCheck
{
    static void Main()
    {
        Console.Write("Enter your age: ");

        int age = int.Parse(Console.ReadLine());

        Console.Write("Enter your 10th std percentage: ");

        double passPercentage = double.Parse(Console.ReadLine());

        if (age > 18 && age <= 30 && passPercentage >= 65)
        {
            Console.WriteLine("He is eligible");
        }
        else
        {
            Console.WriteLine("He is not eligible");
        }
    }
}
```

Output:

Enter your age: 25

Enter your 10th std percentage: 75

He is eligible

3) Design the C# console application named validation to get mobile number as input from the user. Validate the mobile number with the following cases:

- The first four number must be followed by then followed by next six numbers(eg:9894-256874)
- Should contains only numbers
- Should be of length 10.
- The first number should start only with 9 Or 8.

Aim:

To develop the C# program to design the console for mobile number validation .

Program:

```
using System;

using System.Text.RegularExpressions;

class Validation
{
    static void Main()
    {
        Console.Write("Enter the mobile number: ");
        string mobileNumber = Console.ReadLine();

        if (Regex.IsMatch(mobileNumber, @"^[98]\d{3}-\d{6}$"))
        {
            Console.WriteLine("Valid mobile number");
        }
        else
        {
            Console.WriteLine("Invalid mobile number");
        }
    }
}
```

```
}
```

Output:

Enter the mobile number: 9842-673142

Valid mobile number

4)Write the missing code snippets and the statements in the C# program given below.

```
Class person {  
    _____name;  
    _____age;  
    _____weight;  
  
    Void printperson() {  
        // write the code to print name, age and weight of a person  
    }  
}  
  
Class persondata {  
    Static void Main(string[] args) {  
        person_____ = _____;  
        _____.name = "Kannan";  
        _____.age = 19;  
        _____.weight = 58;  
        // write the statement to access printperson() function  
    }  
}
```

Aim:

To develop the C# program to print the personal details(name,age,weight) of the person .

Program:

```
using System;  
  
class Person  
{  
    public string Name { get; set; }  
    public int Age { get; set; }  
}
```

```

        public double Weight { get; set; }

        public void PrintPerson()
        {
            Console.WriteLine($"Name: {Name}, Age: {Age}, Weight: {Weight}");
        }
    }

    class PersonData
    {
        static void Main(string[] args)
        {
            Person person = new Person();

            Console.Write("Enter Name: ");
            person.Name = Console.ReadLine();

            Console.Write("Enter Age: ");
            person.Age = int.Parse(Console.ReadLine());

            Console.Write("Enter Weight: ");
            person.Weight = double.Parse(Console.ReadLine());

            person.PrintPerson();
        }
    }

```

Output:

Enter Name: Nithish

Enter Age: 19

Enter Weight: 61

Name: Nithish, Age: 19, Weight: 61

5)A hospital wants to create a console application to maintain its impatient details. The information to store includes:

- **Name of the patient**
- **Date of admission**
- **Age of patient**
- **Disease**
- **Date of discharge**
- **Total bills paid**

Design the C# program with the class name patient with necessary data members to store the above information. The class should have two member functions, one to get the patients information and other to display the

information. Create a main class called hospital to create necessary instances, methods calling statements and display all the details about the patient.

Aim:

To develop the C# program to get details about patients and generate the receipt .

Program:

```
using System;

class Patient
{
    public string Name { get; set; }
    public DateTime DateOfAdmission { get; set; }
    public int Age { get; set; }
    public string Disease { get; set; }
    public DateTime DateOfDischarge { get; set; }
    public double TotalBillsPaid { get; set; }

    public void GetPatientInfo()
    {
        Console.WriteLine($"Name: {Name}, Age: {Age}, Disease: {Disease}, Total Bills Paid: {TotalBillsPaid}");
    }

    public void DisplayInfo()
    {
        Console.WriteLine($"Patient: {Name}, Admission: {DateOfAdmission.ToShortDateString()}, Discharge: {DateOfDischarge.ToShortDateString()}");
    }
}

class Hospital
{
    static void Main(string[] args)
    {
        Patient patient = new Patient();

        Console.Write("Enter Patient Name: ");
        patient.Name = Console.ReadLine();
```

```
Console.Write("Enter Age: ");
patient.Age = int.Parse(Console.ReadLine());

Console.Write("Enter Disease: ");
patient.Disease = Console.ReadLine();

Console.Write("Enter Date of Admission (yyyy-mm-dd): ");
patient.DateOfAdmission = DateTime.Parse(Console.ReadLine());

Console.Write("Enter Date of Discharge (yyyy-mm-dd): ");
patient.DateOfDischarge = DateTime.Parse(Console.ReadLine());

Console.Write("Enter Total Bills Paid: ");
patient.TotalBillsPaid = double.Parse(Console.ReadLine());

patient.GetPatientInfo();
patient.DisplayInfo();
}
}
```

Output:

Enter Patient Name: Nithish

Enter Age: 19

Enter Disease: Dengue

Enter Date of Admission (yyyy-mm-dd): 2024-08-21

Enter Date of Discharge (yyyy-mm-dd): 2024-08-27

Enter Total Bills Paid: 10000

Name: Nithish, Age: 19, Disease: Dengue, Total Bills Paid: 10000

Patient: Nithish, Admission: 08/21/2024, Discharge: 08/27/2024

6) Implement the C# code to get two vector number as input, add them and print the sum as another vector. Make use of operator overloading to perform addition of vector numbers.

Aim:

To develop the C# program to get two vector numbers from user and print the sum of vector numbers as output in the form of vector number .

Program:

```
using System;

class Vector
{
    public int X { get; set; }
    public int Y { get; set; }
    public Vector(int x, int y)
    {
        X = x;
        Y = y;
    }
    public static Vector operator +(Vector a, Vector b)
    {
        return new Vector(a.X + b.X, a.Y + b.Y);
    }
    public void Display()
    {
        Console.WriteLine($"Vector: ({X}, {Y})");
    }
}

class Program
{
    static void Main(string[] args)
    {
        Console.Write("Enter X coordinate for first vector: ");
        int x1 = int.Parse(Console.ReadLine());

        Console.Write("Enter Y coordinate for first vector: ");
```



```
int y1 = int.Parse(Console.ReadLine());

Vector v1 = new Vector(x1, y1);

Console.Write("Enter X coordinate for second vector: ");
int x2 = int.Parse(Console.ReadLine());

Console.Write("Enter Y coordinate for second vector: ");
int y2 = int.Parse(Console.ReadLine());

Vector v2 = new Vector(x2, y2);
Vector v3 = v1 + v2;
v3.Display();
}
}
```

Output:

```
Enter X coordinate for first vector: 10
Enter Y coordinate for first vector: 20
Enter X coordinate for second vector: 30
Enter Y coordinate for second vector: 40
Vector: (40, 60)
```

7) Create the class student with necessary members to maintain the basic details of a student such as name, age, address and mobile number. Add method getDate() to read the basic details and printData() to print the details of the student. Inherit the student class into the sub class called studentmark with necessary members to maintain student mark details. Override the getDate() and printData() in student mark class to read mark details and print the marks, respectively. Also, define a method to find the grade of the student based on his/her marks. Design the student main class to access the member of both the classes in C#.

Aim:

To develop the C# program to maintain the basic details of students as main class and to maintain the student mark details as sub class and inherit the main class into sub class and print the student details .

Program:

```
using System;

class Student
{
    public string Name { get; set; }
    public int Age { get; set; }
    public string Address { get; set; }
    public string MobileNumber { get; set; }

    public virtual void GetData()
    {
        Console.WriteLine($"Name: {Name}, Age: {Age}, Address: {Address}, Mobile Number: {MobileNumber}");
    }

    public virtual void PrintData()
    {
        Console.WriteLine($"Student Information:\nName: {Name}, Age: {Age}, Address: {Address}, Mobile Number: {MobileNumber}");
    }
}

class StudentMark : Student
{
    public int Marks { get; set; }

    public override void GetData()
    {
        base.GetData();
    }
}
```

```
        Console.WriteLine($"Marks: {Marks}");
    }

    public override void PrintData()
    {
        base.PrintData();

        Console.WriteLine($"Marks: {Marks}");
    }

    public char CalculateGrade()
    {
        if (Marks >= 90) return 'O';
        else if (Marks >= 80) return 'A';
        else if (Marks >= 70) return 'B';
        else if (Marks >= 60) return 'C';
        else if (Marks >= 50) return 'D';
        else return 'F';
    }
}

class Program
{
    static void Main(string[] args)
    {
        StudentMark student = new StudentMark();

        Console.Write("Enter the student's name: ");
        student.Name = Console.ReadLine();

        Console.Write("Enter the student's age: ");
        student.Age = int.Parse(Console.ReadLine());

        Console.Write("Enter the student's address: ");
        student.Address = Console.ReadLine();

        Console.Write("Enter the student's mobile number: ");
        student.MobileNumber = Console.ReadLine();
    }
}
```

```
        Console.WriteLine("Enter the student's marks: ");  
        student.Marks = int.Parse(Console.ReadLine());  
  
        student.GetData();  
        student.PrintData();  
        Console.WriteLine($"Grade: {student.CalculateGrade()}");  
    }  
}
```

Output:

Enter the student's name: Nithish

Enter the student's age: 19

Enter the student's address: 123 Echangadu Ariyalur

Enter the student's mobile number: 9472346751

Enter the student's marks: 97

Name: Nithish, Age: 19, Address: 123 Echangadu Ariyalur, Mobile Number: 9472346751

Marks: 97

Student Information:

Name: Nithish, Age: 19, Address: 123 Echangadu Ariyalur, Mobile Number: 9472346751

Marks: 97

Grade: O

8)Design sample C# program with class name employee to compute netsalary of the employee using the basic salary, if for the job_catg is 1 use table-I else use table-II. Use constructor to initialize basic salary,hra,da,pf and loan. The employee class should contain input() method to get input for job_catg, empno, empname, calculateSalary() method to compute salary and display() method to print the details.

Table-I

BASIC=Rs. 8,000

HRA=10% of basic

DA=20% of basic

LOAN=Rs. 300

PF=Rs. 500

Table-II

BASIC=Rs. 15,000

HRA=20% of basic

DA=30% of basic

LOAN=Rs. 600

PF=1000

Aim:

To develop the C# program to calculate the netsalary of the employee by using the basic salary and print the details as output .

Program:

```
using System;

class Employee
{
    public int JobCategory { get; set; }
    public int EmpNo { get; set; }
    public string EmpName { get; set; }
    public double BasicSalary { get; set; }
    public double HRA { get; set; }
    public double DA { get; set; }
    public double Loan { get; set; }
    public double PF { get; set; }

    public Employee(int jobCategory)
    {
        JobCategory = jobCategory;
        if (JobCategory == 1)
        {
            BasicSalary = 8000;
            HRA = 0.1 * BasicSalary;
```

```

        DA = 0.2 * BasicSalary;

        Loan = 300;

        PF = 500;
    }
    else if (JobCategory == 2)
    {
        BasicSalary = 15000;

        HRA = 0.2 * BasicSalary;

        DA = 0.3 * BasicSalary;

        Loan = 600;

        PF = 1000;
    }
}

public void InputDetails(int empNo, string empName)
{
    EmpNo = empNo;

    EmpName = empName;
}

public double CalculateSalary()
{
    return BasicSalary + HRA + DA - (Loan + PF);
}

public void Display()
{
    Console.WriteLine($"Employee No: {EmpNo}");

    Console.WriteLine($"Employee Name: {EmpName}");

    Console.WriteLine($"Job Category: {JobCategory}");

    Console.WriteLine($"Basic Salary: {BasicSalary}");

    Console.WriteLine($"HRA: {HRA}");

    Console.WriteLine($"DA: {DA}");

    Console.WriteLine($"Loan Deduction: {Loan}");

    Console.WriteLine($"PF Deduction: {PF}");

    Console.WriteLine($"Net Salary: {CalculateSalary()}");
}

```

```
}  
  
class Program  
{  
    static void Main(string[] args)  
    {  
        Console.Write("Enter Job Category (1 or 2): ");  
        int jobCategory = int.Parse(Console.ReadLine());  
  
        Employee emp = new Employee(jobCategory);  
  
        Console.Write("Enter Employee Number: ");  
        int empNo = int.Parse(Console.ReadLine());  
  
        Console.Write("Enter Employee Name: ");  
        string empName = Console.ReadLine();  
  
        emp.InputDetails(empNo, empName);  
  
        emp.Display();  
    }  
}
```

Output:

Enter Job Category (1 or 2): 2
Enter Employee Number: 100
Enter Employee Name: Nithish

Employee No: 100
Employee Name: Nithish
Job Category: 2
Basic Salary: 15000
HRA: 3000
DA: 4500
Loan Deduction: 600

PF Deduction: 1000

Net Salary: 20900