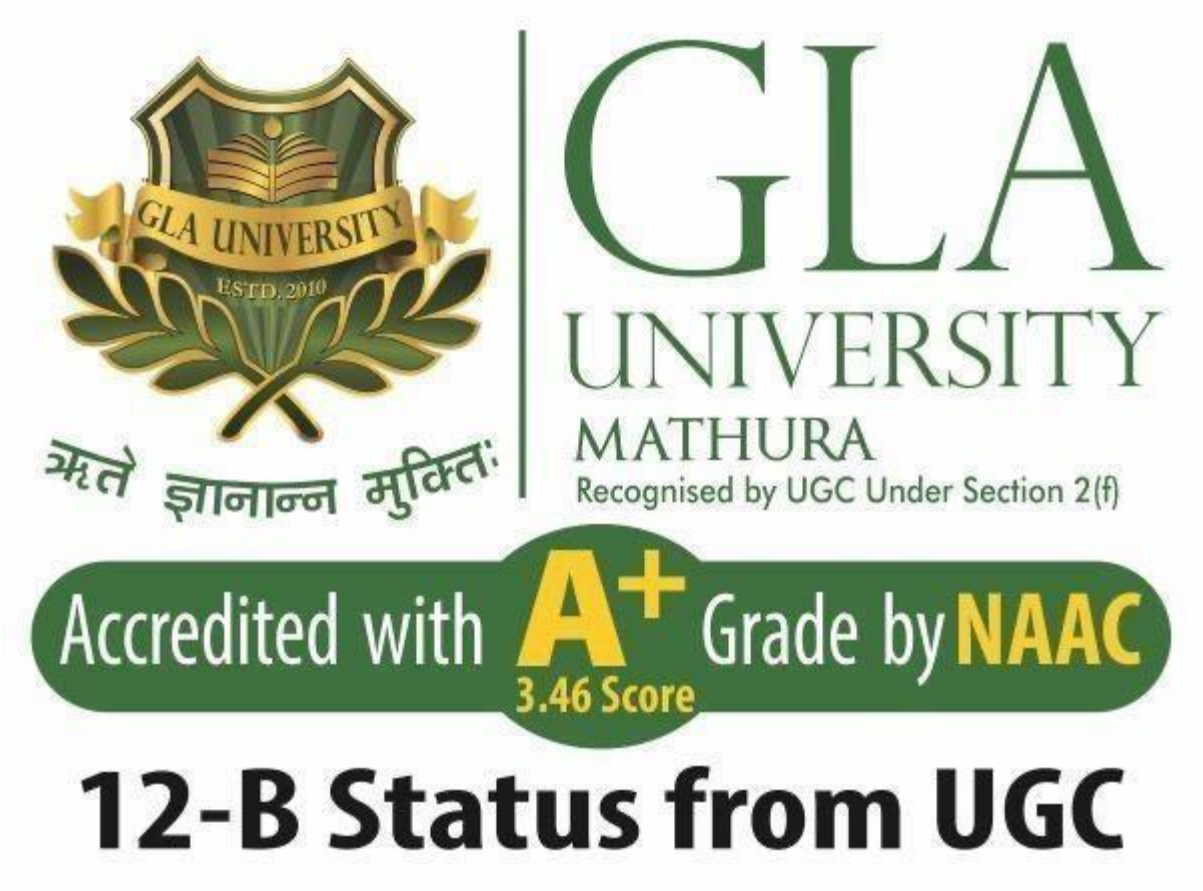

SESSION 2023-2024

MCA –IIIrd Semester

Practical File – .NET FRAMEWORK Using C#

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Que1. Installation of visual studio step by step

1. **Download Visual Studio:**

- Visit https://visualstudio.microsoft.com/.
- Select your preferred edition (e.g., Community).
- Download the installer.

2. **Run Installer:**

- Execute the downloaded installer.

3. **Customize Installation:**

- Choose development workloads (e.g., ".NET desktop," "ASP.NET," etc.).
- Optionally select individual components based on your preferences.

4. **Start Installation:**

- Click "Install" to begin the installation process.
- Wait for the installation to complete.

5. **Launch and Setup:**

- Launch Visual Studio.
- Sign in or create a Microsoft account (optional).
- Choose default development settings.
- Start using Visual Studio for your projects.

These five steps cover the essential stages of downloading, installing, customizing, and setting up Visual Studio for your development needs.

Que2. Creating a simple .net platform program with classes library and functions.

Step 1: Create a Class Library

1. **Open Visual Studio:**
   - Launch Visual Studio.

2. **Create a Class Library Project:**
   - Select "Create a new project."
   - Choose "Class Library" under the "Class Library" category in the language of your choice (e.g., C#).
   - Name the project (e.g., MathLibrary) and click "Create."

3. **Define a Class and Function:**
   - Open the default class file (e.g., Class1.cs).
   - Replace the content with a simple math function:

4. **Build the Class Library:**
   - Build the solution to ensure there are no errors.

Step 2: Create a Console Application

1. **Add a Console Application to the Solution:**
   - Right-click on the solution in Solution Explorer.
   - Choose "Add" -> "New Project."
   - Select "Console App" under the language of your choice (e.g., C#).
   - Name the project (e.g., ConsoleApp) and click "Create."

2. **Reference the Class Library:**
   - Right-click on the console application project.
   - Choose "Add" -> "Reference."
   - Select the class library project (MathLibrary) and click "OK."

3. **Use the Class Library in the Console Application:**
   - Open the Program.cs file in the console application.

Build and Run:

- Build the solution.
- Run the console application.

Que3. Conditional statement in c#

In C#, conditional statements are used to control the flow of execution based on certain conditions. The primary conditional statements in C# are if, else if, else, and the switch statement. Here are examples of each:

1. if Statement:

The if statement allows you to execute a block of code if a specified condition is true.

```
Int number = 10;


if (number > 0)

{

Console.WriteLine("The number is positive.");

}
```

2. if-else Statement:

The if-else statement allows you to execute one block of code if the condition is true and another block if the condition is false.

```
int number = -5;


if (number > 0)

{

Console.WriteLine("The number is positive.");

}

else

{

Console.WriteLine("The number is non-positive.");

}
```

3. else if Statement:

The else if statement is used to test multiple conditions. It is executed if the preceding if or else if conditions are false and its own condition is true.

```
int number = 0;


if (number > 0)

{

Console.WriteLine("The number is positive.");

}

else if (number < 0)

{

Console.WriteLine("The number is negative.");

}

else

{

Console.WriteLine("The number is zero.");

}


{

Console.WriteLine("The number is positive.");

}
```

4. switch Statement:

The switch statement is used when you have multiple possible conditions to test. It provides a concise way to compare a variable against multiple values.

```
int dayOfWeek = 3;


switch (dayOfWeek)

{
```

```
    case 1:
Console.WriteLine("Monday");
        break;
    case 2:
Console.WriteLine("Tuesday");
        break;
    case 3:
Console.WriteLine("Wednesday");
        break;
    // ... other cases ...
    default:
Console.WriteLine("Invalid day");
        break;
}
```

Que4. Loops statements in C#

1. for Loop:

The for loop is used when you know in advance how many times you want to execute a block of code.

```
for (int i = 0; i< 5; i++)
{
Console.WriteLine($"Iteration {i + 1}");
}
```

2. while Loop:

The while loop is used when you want to repeat a block of code as long as a specified condition is true.

```
int count = 0;
```

```
while (count < 5)

{

Console.WriteLine($"Iteration {count + 1}");

   count++;

}
```

3. do-while Loop:

The do-while loop is similar to the while loop, but it ensures that the block of code is executed at least once before checking the condition

```
int count = 0;


do

{

Console.WriteLine($"Iteration {count + 1}");

   count++;

} while (count < 5);
```

4. foreach Loop:

The foreach loop is used to iterate over elements in an array or a collection.

```
int[] numbers = { 1, 2, 3, 4, 5 };


foreach (int number in numbers)

{

Console.WriteLine($"Number: {number}");

}
```

Que5. Classes in C#

1. Declaring a Class:

You declare a class using the class keyword, followed by the class name. The body of the class contains fields, properties, methods, and other members.

```
public class MyClass
{
   // Fields
   private int myField;

   // Properties
   public int MyProperty
   {
      get { returnmyField; }
      set { myField = value; }
   }

   // Methods
   public void MyMethod()
   {
Console.WriteLine("Executing MyMethod");
   }
}
```

2. Creating Objects (Instances):

Once a class is defined, you can create objects (instances) of that class. Objects represent real entities based on the class blueprint.

```
MyClassmyObject = new MyClass();
```

3. Accessing Members:

You can access the members (fields, properties, methods) of a class using the dot notation.

```
myObject.MyProperty = 42;
int value = myObject.MyProperty;
```

```
myObject.MyMethod();
```

4. Constructors:

A constructor is a special method used to initialize the object when it is created. It has the same name as the class.

```
public class MyClass

{

   private int myField;


   // Constructor

   public MyClass(int initialValue)

   {

myField = initialValue;

   }

}
```

5. Inheritance:

C# supports inheritance, allowing one class to inherit the members of another. The : base keyword is used to specify the base class.

```
public class DerivedClass :MyBaseClass

{

   // Additional members for the derived class

}
```

6. Encapsulation:

Classes provide encapsulation, which means bundling the data (fields) and methods that operate on the data within a single unit. Access modifiers like public, private, and protected control the visibility of class members.

7. Example Usage:

```
class Program

{
```

```
    static void Main()
    {
        // Create an instance of MyClass
MyClassmyObject = new MyClass(10);


        // Access members
myObject.MyMethod();
Console.WriteLine($"Value: {myObject.MyProperty}");
    }
}
```

Que6. Delegates in C#

1. Delegate Declaration:

To declare a delegate, you specify the method signature it can reference. The delegate keyword is used for this purpose.

```
public delegate void MyDelegate(string message);
```

In the above example, MyDelegate is a delegate that can reference methods taking a string parameter and returning void.

2. Using Delegates:

Once a delegate is declared, you can create an instance of it and associate it with methods that match its signature.

```
public class MyClass
{
    public void Method1(string message)
    {
Console.WriteLine($"Method1: {message}");
    }
```

```
    public void Method2(string message)
    {
Console.WriteLine($"Method2: {message}");
    }
}

class Program
{
    static void Main()
    {
MyClassmyObject = new MyClass();

        // Create delegate instances and associate with methods
MyDelegate delegate1 = myObject.Method1;
MyDelegate delegate2 = myObject.Method2;

        //  Invoke  delegates
        delegate1("Hello");
        delegate2("World");
    }
}
```

3. Multicast Delegates:

Delegates can be combined to create a multicast delegate, which can invoke multiple methods.

```
MyDelegatemultiDelegate = delegate1 + delegate2;
multiDelegate("Combined invocation");
```

4. Built-in Delegates:

C# provides several built-in generic delegate types in the System namespace, such as Action and Func. These are widely used and eliminate the need to define custom delegates for many scenarios.

```
Action<string>actionDelegate = myObject.Method1;

actionDelegate("Using Action");


Func<int, int, int>addDelegate = (a, b) => a + b;

int result = addDelegate(3, 5);

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

5. Events:

Delegates are commonly used to implement events, which provide a mechanism for one object to notify other objects when a specific event occurs.

```
public class Publisher

{

   public event MyDelegateMyEvent;


   public void RaiseEvent(string message)

   {

MyEvent?.Invoke(message);

   }

}


class Program

{

   static void Main()

   {

      Publisher publisher = new Publisher();
```

```
MyClass subscriber = new MyClass();


      // Subscribe to the event
publisher.MyEvent += subscriber.Method1;


      // Raise the event
publisher.RaiseEvent("Event triggered");
   }
}
```

Que7. File Handling in C#

1.Reading from a File:

```
string filePath = "example.txt";
if (File.Exists(filePath))
{
string[] lines = File.ReadAllLines(filePath);
   // Process lines
}
```

2.Writing to a File:

```
string filePath = "example.txt";
string[] lines = { "Line 1", "Line 2", "Line 3" };
File.WriteAllLines(filePath, lines);
```

3.Appending to a File:

```
string filePath = "example.txt";
string[] newLines = { "New Line 1", "New Line 2" };
File.AppendAllLines(filePath, newLines);
```

4.Reading and Writing Binary Files:

```
string filePath = "binaryfile.bin";


// Writing binary data

byte[] data = { 0x48, 0x65, 0x6C, 0x6C, 0x6F };

File.WriteAllBytes(filePath, data);


// Reading binary data

byte[] buffer = File.ReadAllBytes(filePath);

// Process binary data
```

Que8. Create a windows form app individual studio with C#

Steps to Create a Windows Forms Application:

1. **Open Visual Studio:**
   - Launch Visual Studio.
2. **Create a New Project:**
   - Go to "File" -> "New" -> "Project..."
   - In the "Create a new project" dialog, select "Windows Forms App (.NET Core)" or "Windows Forms App (.NET Framework)" based on your preference and system setup.
   - Click "Next."
3. **Configure Project:**
   - Enter a name for your project.
   - Choose the location where you want to save the project.
   - Set the solution name (optional).
   - Choose the framework version (e.g., .NET Core 3.1 or .NET Framework 4.8).
   - Click "Create."
4. **Design the Form:**
   - Once the project is created, you'll see the default form (Form1.cs) in the designer.
   - You can design your form by dragging and dropping controls from the Toolbox (View -> Toolbox) onto the form.
   - Customize the properties of the controls using the Properties window.
5. **Add Code to the Form:**

- Double-click on a control to create an event handler.
- Add your C# code to handle events and perform actions.
- For example, you can add code to the button click event:

```
private void button1_Click(object sender, EventArgs e)

{

MessageBox.Show("Hello, Windows Forms!");

}
```

6. Build and Run:

- Build your project by clicking on "Build" -> "Build Solution."
- Run your application by pressing F5 or clicking on the "Start Debugging" button.

That's it! You've created a simple Windows Forms application. You can further enhance your application by adding more controls, implementing additional functionality, and exploring features provided by the Windows Forms framework.

Que9. Assembly in .net

1.Types of Assemblies:

Single-File Assemblies (EXE): Contains all the necessary information in a single executable file with the .exe extension.

Multi-File Assemblies: Comprises multiple files, including one main .exe file and accompanying .dll files containing additional code.

2. Components of an Assembly:

Manifest: Contains metadata about the assembly, such as version information, culture, public key token for strong naming, and a list of files that make up the assembly.

MSIL (Microsoft Intermediate Language) Code: The compiled code that is platform-independent and needs further compilation by the Just-In-Time (JIT) compiler at runtime.

3. Strong Naming:

Assemblies can be strongly named, which involves signing the assembly with a cryptographic key pair. Strong naming ensures uniqueness and integrity of the assembly.

4. Private and Shared Assemblies:

Private Assemblies: Used by a single application and stored in the application's directory.

Shared Assemblies (Global Assembly Cache - GAC): Accessible by multiple applications, allowing for code reuse. Shared assemblies are stored in the GAC.

5. **Versioning:**

Assemblies support versioning, allowing multiple versions of the same assembly to coexist. This helps in managing updates and ensuring backward compatibility.

6. **Deployment:**

Assemblies can be deployed along with the application or shared among multiple applications. Deployment options include XCOPY deployment, ClickOnce deployment, and deployment through installers.

7. **References:**

Assemblies can reference other assemblies, and this reference information is stored in the manifest. References help in resolving dependencies between different components.

8. **Reflection:**

.NET provides reflection, which allows runtime inspection of the metadata and types within an assembly. This enables dynamic loading and invocation of types.

Global Assembly Cache (GAC):

The GAC is a machine-wide repository for shared assemblies. Shared assemblies in the GAC are accessible to multiple applications.

Que10. Window based calculator in C#

1.Create a new Windows Forms Application:

- Open Visual Studio.
- Create a new project: "File" -> "New" -> "Project..."
- Choose "Windows Forms App (.NET Core)" or "Windows Forms App (.NET Framework)" based on your preference.
- Name your project and click "Create."

2. **Design the Calculator Form:**

- In the Solution Explorer, double-click on "Form1.cs" to open the designer.
- Drag and drop buttons for digits (0-9), operators (+, -, *, /), equals (=), clear (C), and a TextBox for display.

3. **Add Code to Handle Button Clicks:**

Double-click on each button to create event handlers. Add the following code to handle button clicks and perform calculations:

```
using System;

using System.Windows.Forms;
```

```
namespace CalculatorApp
{
    public partial class Form1 : Form
    {
        private string currentInput = "";
        private double currentValue = 0;
        private char currentOperator;

        public Form1()
        {
InitializeComponent();
        }

        private void DigitButton_Click(object sender, EventArgs e)
        {
            Button button = (Button)sender;
currentInput += button.Text;
DisplayText(currentInput);
        }

        private void OperatorButton_Click(object sender, EventArgs e)
        {
            Button button = (Button)sender;
            if (!string.IsNullOrEmpty(currentInput))
            {
```

```
currentValue = double.Parse(currentInput);
currentInput = "";
currentOperator = button.Text[0];
        }
    }

    private void EqualsButton_Click(object sender, EventArgs e)
    {
        if (!string.IsNullOrEmpty(currentInput))
        {
            double secondValue = double.Parse(currentInput);
            double result = PerformCalculation(currentValue, secondValue, currentOperator);
DisplayText(result.ToString());
currentInput = result.ToString();
        }
    }

    private void ClearButton_Click(object sender, EventArgs e)
    {
currentInput = "";
currentValue = 0;
currentOperator = '\0';
DisplayText("");
    }

    private double PerformCalculation(double firstValue, double secondValue, char op)
```

```
        {
            switch (op)
            {
                case '+':
                    return firstValue + secondValue;
                case '-':
                    return firstValue - secondValue;
                case '*':
                    return firstValue * secondValue;
                case '/':
                    return secondValue != 0 ? firstValue / secondValue : double.NaN;
                default:
                    return double.NaN;
            }
        }

        private void DisplayText(string text)
        {
            textBox1.Text = text;
        }
    }
}
```

4. Build and Run:

- Build your project by clicking on "Build" -> "Build Solution."
- Run your application by pressing F5 or clicking on the "Start Debugging" button.