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C# &.NET Programming
CSE-B

C# and .Net framework

1.Design and implement a Student Registration form using C# and Windows Forms. The form should allow users to input and save student details into a database.

AIM:

To design and implement a Student Registration Form using C# and Windows Forms, allowing users to input student details and save them to a database.

PROCEDURE:

- **Design the Form:** Create a Windows Forms application in Visual Studio and design a form with input fields for Name, Age, Gender, Email, and Contact, along with a Save button.
- **Setup Database:** Create a SQL Server database called `StudentDB` with a table `Students` to store the student details.
- **Implement Database Connection:** Use ADO.NET to connect to the `StudentDB` database.
- **Save Button Functionality:** Add code to the `Save` button's click event to insert student details into the `Students` table in the database.
- **Run the Application:** Test the form by entering details and checking the database to ensure the data is saved correctly.

PROGRAM:

Database Setup:

```
CREATE DATABASE StudentDB;
```

```
USE StudentDB;
```

```
CREATE TABLE Students (  
    StudentID INT PRIMARY KEY IDENTITY,  
    Name NVARCHAR(50),
```

Age INT,
Gender NVARCHAR(10),
Email NVARCHAR(50),
Contact NVARCHAR(15)

);

C# Code:

1. **Form Design** (Add fields for Name, Age, Gender, Email, and Contact in Windows Forms Designer).
2. **Code for Student Registration Form:**

```
using System;
using System.Data.SqlClient;
using System.Windows.Forms;

namespace StudentRegistrationApp
{
    public partial class StudentRegistrationForm : Form
    {
        public StudentRegistrationForm()
        {
            InitializeComponent();

            string connectionString = "Data Source=YourServerName;Initial Catalog=StudentDB;Integrated
Security=True";

            private void btnSave_Click(object sender, EventArgs e)
            {
                string name = txtName.Text;
                int age = int.Parse(txtAge.Text);
                string gender = comboGender.SelectedItem.ToString();
                string email = txtEmail.Text;
                string contact = txtContact.Text;
                using (SqlConnection conn = new SqlConnection(connectionString))
                {
                    string query = "INSERT INTO Students (Name, Age, Gender, Email, Contact) VALUES (@Name,
@Age, @Gender, @Email, @Contact)";
                    SqlCommand cmd = new SqlCommand(query, conn);
                    cmd.Parameters.AddWithValue("@Name", name);
                    cmd.Parameters.AddWithValue("@Age", age);
                    cmd.Parameters.AddWithValue("@Gender", gender);
                    cmd.Parameters.AddWithValue("@Email", email);
                    cmd.Parameters.AddWithValue("@Contact", contact);
                    conn.Open();
                    int result = cmd.ExecuteNonQuery();

                    if (result > 0)
                    {
                        MessageBox.Show("Student registered successfully.");
                    }
                    else
                    {
                        MessageBox.Show("Failed to register student.");
                    }
                }
            }
        }
    }
}
```

INPUT:

- **Name:** Nandhu
- **Age:** 21
- **Gender:** Male
- **Email:** nandhu@example.com
- **Contact:** 1234567890

OUTPUT:

Form Output (on Successful Submission)

1. User Input Form

The form would look like this in Windows Forms:

Student Registration Form
Name : Nandhu Age : 21 Gender : Male Email : nandhu@example.com Contact : 1234567890
Save Button

2. Confirmation Message

After clicking the **Save** button, the form displays this message:

Message Box:

"Student registered successfully."

Database Output:

Query: SELECT * FROM Students;

SQL Table Output:

Student Id	Name	Age	Gender	Email	Contact
1	Nandhu	21	Gender	nandhu@example.com	1234567890

2. Design and implement a Student Fee Payment System using C# and Windows Forms. The application should allow students to enter their details, pay their fees, and generate a bill with a unique bill number.

AIM:

To design and implement a Student Fee Payment System using C# and Windows Forms, allowing students to enter their details, pay their fees, and generate a bill with a unique bill number.

PROCEDURE:

- **Create a Windows Forms Application:** Open Visual Studio, create a new Windows Forms Application project for the Student Fee Payment System.
- **Design the Form:** Add controls for student details (Student ID, Name, Course), fee amount, and payment method. Include buttons for **Pay** and **Generate Bill**.
- **Setup Database:** Create a SQL Server database called `StudentFeesDB` with tables for `Students` and `Payments` to store student details and payment records.
- **Database Connection:** Use ADO.NET to establish a connection to the `StudentFeesDB` database.
- **Test the Application:** Run the application to ensure data is correctly entered, saved, and a bill is generated with a unique bill number.

PROGRAM:

-- Create the database

```
CREATE DATABASE StudentFeesDB;
```

```
USE StudentFeesDB;
```

-- Create the Students table

```
CREATE TABLE Students (  
    StudentID INT PRIMARY KEY,  
    Name NVARCHAR(50),  
    Course NVARCHAR(50)  
);
```

-- Create the Payments table

```
CREATE TABLE Payments (  
    PaymentID INT PRIMARY KEY IDENTITY,  
    StudentID INT FOREIGN KEY REFERENCES Students(StudentID),  
    Amount DECIMAL(10, 2),  
    PaymentDate DATETIME,  
    BillNumber UNIQUEIDENTIFIER DEFAULT NEWID()  
);
```

C# Code:

1. **Form Design:** Add TextBoxes for Student ID, Name, and Course, a Fee Amount field, and buttons for **Pay** and **Generate Bill**.
2. **Code for Fee Payment System Form:**

```
using System;

using System.Data.SqlClient;

using System.Windows.Forms;

namespace StudentFeePaymentApp
{
    public partial class FeePaymentForm : Form
    {
        public FeePaymentForm()
        {
            InitializeComponent();

            string connectionString = "Data Source=YourServerName;Initial
Catalog=StudentFeesDB;Integrated Security=True";

            private void btnPay_Click(object sender, EventArgs e){

                int studentID = int.Parse(txtStudentID.Text);

                string name = txtName.Text;

                string course = txtCourse.Text;

                decimal amount = decimal.Parse(txtAmount.Text);

                DateTime paymentDate = DateTime.Now;

                using (SqlConnection conn = new SqlConnection(connectionString)){

                    conn.Open();

                    string insertStudent = "IF NOT EXISTS (SELECT * FROM Students WHERE
StudentID = @StudentID) " +

                        "INSERT INTO Students (StudentID, Name, Course) VALUES
(@StudentID, @Name, @Course)";
```

```

        SqlCommand cmdStudent = new SqlCommand(insertStudent, conn);

        cmdStudent.Parameters.AddWithValue("@StudentID", studentID);

        cmdStudent.Parameters.AddWithValue("@Name", name);

        cmdStudent.Parameters.AddWithValue("@Course", course);

        cmdStudent.ExecuteNonQuery();

        string insertPayment = "INSERT INTO Payments (StudentID, Amount,
PaymentDate) VALUES (@StudentID, @Amount, @PaymentDate); " +

            "SELECT SCOPE_IDENTITY()";

        SqlCommand cmdPayment = new SqlCommand(insertPayment, conn);

        cmdPayment.Parameters.AddWithValue("@StudentID", studentID);

        cmdPayment.Parameters.AddWithValue("@Amount", amount);

        cmdPayment.Parameters.AddWithValue("@PaymentDate", paymentDate);

        int paymentID = Convert.ToInt32(cmdPayment.ExecuteScalar());

        MessageBox.Show("Payment successful. Bill number will be generated.");

        string getBillNumber = "SELECT BillNumber FROM Payments WHERE
PaymentID = @PaymentID";

        SqlCommand cmdBill = new SqlCommand(getBillNumber, conn);

        cmdBill.Parameters.AddWithValue("@PaymentID", paymentID);

        Guid billNumber = (Guid)cmdBill.ExecuteScalar();

        MessageBox.Show($"Bill Generated Successfully!\n\nBill Number:
{billNumber}\nStudent ID: {studentID}\nName: {name}\nCourse: {course}\nAmount Paid:
{amount:C}\nDate: {paymentDate}");
    }

}

}

}

```

INPUT:

- **Student ID:** 1001
- **Name:** John Doe
- **Course:** Computer Science
- **Fee Amount:** 500.00

OUTPUT:

1. Form Layout:

Student Fee Payment Form
Student ID : 1001 Name : John Doe Course : Computer Science Payment : 500.00
Pay Button

2. Confirmation Message:

Message Box:

"Payment successful. Bill number will be generated."

3. Bill Display:

Message Box:

Bill Generated Successfully!
Bill Number : 8a5d9c2e-2c43...
Student ID : 1001
Name : John Doe
Course : Computer Science
Amount Paid : \$500.00
Date : [Payment Date]

3. Design and implement a Web Service using C# and ASP.NET to expose functionality for client applications to consume. The web service should provide a specific set of operations, such as retrieving data or performing a calculation.

AIM:

To design and implement a Web Service using C# and ASP.NET that exposes specific functionality for client applications to consume, such as retrieving data or performing calculations.

PROCEDURE:

- **Create an ASP.NET Web Service Project:** Open Visual Studio, create a new ASP.NET Web Application project, and select the Web API template.
- **Define the Web Service Operations:** Decide on a set of operations. For example, we'll create an operation that retrieves student data and calculates the average grade.
- **Implement Web Service Methods:**
 - Define a method to retrieve a list of students.
 - Define a method to calculate the average grade of a student.
- **Create a Data Model:** Define models for `Student` and `Grade`.
- **Test the Web Service:** Use tools like Postman or Swagger to test the Web API endpoints and verify that data is returned correctly.

PROGRAM:

1. **Project Structure:** Create an ASP.NET Web API project with controllers and models.
2. **Models:** Define `Student` and `Grade` models.

```
namespace StudentWebService.Models
{
    public class Student
    {
        public int StudentID { get; set; }
        public string Name { get; set; }
        public List<int> Grades { get; set; }
    }
}
```

3. **Controller:** Create a `StudentController` to define the Web API endpoints.

```
using Microsoft.AspNetCore.Mvc;
using StudentWebService.Models;
using System.Collections.Generic;
using System.Linq;
namespace StudentWebService.Controllers
{
```

```

[ApiController]
[Route("api/[controller]")]
public class StudentController : ControllerBase
{

    private static readonly List<Student> students = new List<Student>
    {
        new Student { StudentID = 1, Name = "John Doe", Grades = new List<int> { 85, 90, 78 } },
        new Student { StudentID = 2, Name = "Jane Smith", Grades = new List<int> { 92, 88, 94 } }
    };

    [HttpGet]
    public ActionResult<IEnumerable<Student>> GetStudents()
    {
        return Ok(students);
    }

    [HttpGet("{id}/average")]
    public ActionResult<double> GetAverageGrade(int id)
    {
        var student = students.FirstOrDefault(s => s.StudentID == id);
        if (student == null)
        {
            return NotFound("Student not found");
        }
        double averageGrade = student.Grades.Average();
        return Ok(averageGrade);
    }
}

```

4.Startup Configuration: Configure the API services in `Startup.cs`.

```

using Microsoft.AspNetCore.Builder;
using Microsoft.AspNetCore.Hosting;
using Microsoft.Extensions.DependencyInjection;
using Microsoft.Extensions.Hosting;

namespace StudentWebService
{
    public class Startup
    {
        public void ConfigureServices(IServiceCollection services)
        {
            services.AddControllers();
        }
    }
}

```

```
public void Configure(IApplicationBuilder app, IWebHostEnvironment env)
{
    if (env.IsDevelopment())
    {
        app.UseDeveloperExceptionPage();
    }

    app.UseRouting();

    app.UseEndpoints(endpoints =>
    {
        endpoints.MapControllers();
    });
}
```

INPUT:

1. Get All Students:

- URL: `http://localhost:5000/api/student`
- Method: GET

2. Get Average Grade for a Student:

- URL: `http://localhost:5000/api/student/1/average`
- Method: GET

OUTPUT:

Get All Students:

- **Request:** GET `http://localhost:5000/api/student`
- **Response (JSON):**

```
[
  {
    "StudentID": 1,
    "Name": "John Doe",
    "Grades": [85, 90, 78]
  },
  {
    "StudentID": 2,
    "Name": "Jane Smith",
    "Grades": [92, 88, 94]
  }
]
```

Get Average Grade for a Student:

- **Request:** GET `http://localhost:5000/api/student/1/average`
- **Response (JSON):**

```
{
  "averageGrade":
```

4. Our college is organizing an Alumni Meet on May 5, 2024. The alumni cell is in the process of creating a database to store a list of registered alumni who will attend the event. You are tasked with designing a registration form and implementing it using ADO.NET.

Requirements:

1. **Design the Registration Form:**

- Create a Windows Forms application that includes the following controls:
 - **TextBox** for entering the **Alumni Name**
 - **TextBox** for entering the **Email**
 - **TextBox** for entering the **Phone Number**
 - **ComboBox** for selecting the **Department** (e.g., Computer Science, Business, Arts)
 - **Button** to **Register** alumni
 - **Button** to **Display** registered alumni
 - **DataGridView** control to display the list of registered alumni from the selected department

2. **Implement Functionality Using ADO.NET:**

- **Register Button:**
 - When the **Register** button is clicked, validate the input fields.
 - If the inputs are valid, insert the entered details into the database using ADO.NET. Handle any database exceptions that may occur.
- **Display Button:**
 - When the **Display** button is clicked, retrieve all registered alumni for the selected department from the ComboBox.
 - Display the results in the **DataGridView** control.

AIM:

To design a Windows Forms application for alumni registration for the Alumni Meet and implement functionality to store and display registered alumni details using ADO.NET.

PROCEDURE:

1. **Create the Database:** Set up an SQL Server database named AlumniDB with an Alumni table containing columns for AlumniID, Name, Email, PhoneNumber, and Department.
2. **Design the Windows Form:**
 - Add text boxes for Alumni Name, Email, and Phone Number.
 - Add a ComboBox for selecting Department.
 - Add a **Register** button to save data, a **Display** button to show data, and a DataGridView to display registered alumni.
3. **Implement Register and Display Functionality Using ADO.NET:**
 - **Register Button:** Validate input fields and insert data into the Alumni table using an ADO.NET SqlCommand.
 - **Display Button:** Retrieve and display alumni data for the selected department in the DataGridView using an ADO.NET SqlDataAdapter.
4. **Test the Application:** Run the form to ensure alumni data is saved correctly in the database and displays in the DataGridView.

PROGRAM:

Database Setup:

```
-- Create the AlumniDB database
CREATE DATABASE AlumniDB;

USE AlumniDB;

-- Create the Alumni table
CREATE TABLE Alumni (
    AlumniID INT PRIMARY KEY IDENTITY,
    Name NVARCHAR(50),
    Email NVARCHAR(50),
    PhoneNumber NVARCHAR(15),
    Department NVARCHAR(50)
);
```

C# Code for Alumni Registration Form:

1. Designing the Form:

- Add controls for **Alumni Name**, **Email**, **Phone Number**, **Department** (ComboBox), **Register** and **Display** buttons, and a DataGridView.

2. C# Code for Form:

```
using System;
using System.Data;
using System.Data.SqlClient;
using System.Windows.Forms;
namespace AlumniRegistrationApp
{
    public partial class AlumniForm : Form
    {
        private string connectionString = "Data Source=YourServerName;Initial
Catalog=AlumniDB;Integrated Security=True";

        public AlumniForm()
        {
            InitializeComponent();
            LoadDepartments();
        }
        private void LoadDepartments()
        {
            comboBoxDepartment.Items.AddRange(new string[] { "Computer Science", "Business",
"Arts" });
        }
    }
}
```

```

private void btnRegister_Click(object sender, EventArgs e)
{
    string name = txtName.Text;
    string email = txtEmail.Text;
    string phoneNumber = txtPhoneNumber.Text;
    string department = comboBoxDepartment.SelectedItem?.ToString();

    if (string.IsNullOrEmpty(name) || string.IsNullOrEmpty(email) ||
        string.IsNullOrEmpty(phoneNumber) || string.IsNullOrEmpty(department))
    {
        MessageBox.Show("All fields are required.");
        return;
    }

    using (SqlConnection conn = new SqlConnection(connectionString))
    {
        try
        {
            conn.Open();
            string query = "INSERT INTO Alumni (Name, Email, PhoneNumber, Department)
VALUES (@Name, @Email, @PhoneNumber, @Department)";
            using (SqlCommand cmd = new SqlCommand(query, conn))
            {
                cmd.Parameters.AddWithValue("@Name", name);
                cmd.Parameters.AddWithValue("@Email", email);
                cmd.Parameters.AddWithValue("@PhoneNumber", phoneNumber);
                cmd.Parameters.AddWithValue("@Department", department);
                cmd.ExecuteNonQuery();
            }
            MessageBox.Show("Alumni registered successfully.");
        }
        catch (Exception ex)
        {
            MessageBox.Show($"Error: {ex.Message}");
        }
    }
}

private void btnDisplay_Click(object sender, EventArgs e)
{
    string department = comboBoxDepartment.SelectedItem?.ToString();
    if (string.IsNullOrEmpty(department))
    {
        MessageBox.Show("Please select a department.");
        return;
    }
    using (SqlConnection conn = new SqlConnection(connectionString))
    {
        try
        {
            conn.Open();

```

```

        string query = "SELECT AlumniID, Name, Email, PhoneNumber, Department FROM
Alumni WHERE Department = @Department";
        using (SqlCommand cmd = new SqlCommand(query, conn))
        {
            cmd.Parameters.AddWithValue("@Department", department);
            using (SqlDataAdapter adapter = new SqlDataAdapter(cmd))
            {
                DataTable dt = new DataTable();
                adapter.Fill(dt);
                dataGridViewAlumni.DataSource = dt;
            }
        }
    }
    catch (Exception ex)
    {
        MessageBox.Show($"Error: {ex.Message}");
    }
}
}
}

```

INPUT:

- **Alumni Name:** John Doe
- **Email:** johndoe@example.com
- **Phone Number:** 1234567890
- **Department:** Computer Science

DISPLAY:

Form Layout:

Alumini Registration Form
Name : John Doe Email: johndoe@example.com Phone: 1234567890 Department: Computer Science (ComboBox)
[Register Button] [Display Button]
DataGridView (Alumni List)

OUTPUT:

After Registering Alumni:

- Message Box:

"Alumni registered successfully."

Displaying Registered Alumni for Selected Department:

- On clicking **Display** with "Computer Science" selected, the `DataGridView` displays all registered alumni in the Computer Science department:

`DataGridView` (Alumni List):

Alumini Id	Name	Email	Phone	Dept
1	John Doe	johndoe@example.com	1234567890	CS