[Note: Things Typed in blue should be hand written in assignment sheets.]

Practical No. 1:

Aim: Setup DirectX 11, Window Framework and Initialize Direct3D Device

Step 1:

i) Create new project, and select "Windows Forms Application", select .NET Framework as 2.0 in Visuals C#.
ii) Right Click on properties Click on open click on build Select Platform Target and Select x86.

Step 2: Click on View Code of Form 1.

Step 3:

Go to Solution Explorer, right click on project name, and select Add Reference. Click on Browse and select the given .dll files which are "Microsoft.DirectX", "Microsoft.DirectX.Direct3D", and "Microsoft.DirectX.DirectX3DX".

Step 4:

Go to Properties Section of Form, select Paint in the Event List and enter as Form1_Paint.

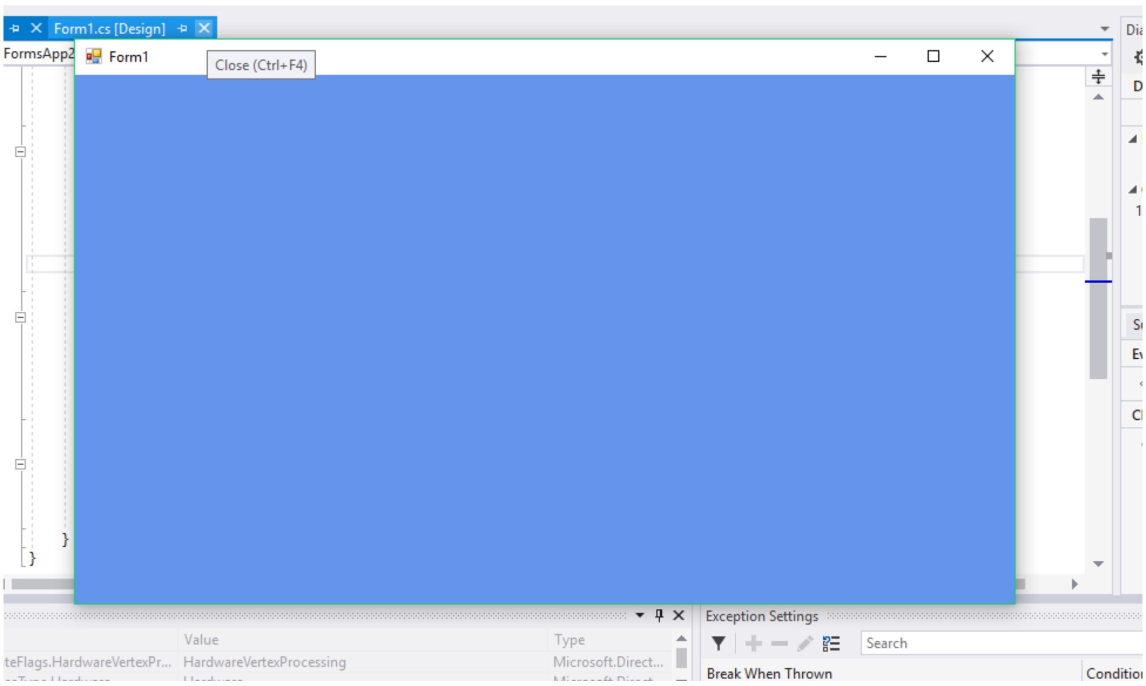
Step 5:

Edit the Form's C# code file. Namespace must be as same as your project name.

```
using System;
using System.Collections.Generic;
using System.ComponentModel;
using System.Data;
using System.Drawing;
using System.Text;
using System.Windows.Forms;
using Microsoft.DirectX;
using Microsoft.DirectX.Direct3D;
namespace GP_P1
{
public partial class Form1 : Form
   {
      Microsoft.DirectX.Direct3D.Device device;
public Form1()
      {
InitializeComponent();
InitDevice();
      }

public void InitDevice()
      {
PresentParameters pp = new PresentParameters();
pp.Windowed = true;
pp.SwapEffect = SwapEffect.Discard;
device = new Device(0, DeviceType.Hardware, this,
                                        CreateFlags.HardwareVertexProcessing, pp);
      }

private void Render()
      {
device.Clear(ClearFlags.Target, Color.Orange, 0, 1);
device.Present();
      }

private void Form1_Paint(object sender, PaintEventArgs e)
      {
Render();
      }
   }
}
```

Step 6: Click on Start. And here is the output. We have initialized 3D Device.

<u>Output:</u>



Practical No. 2:

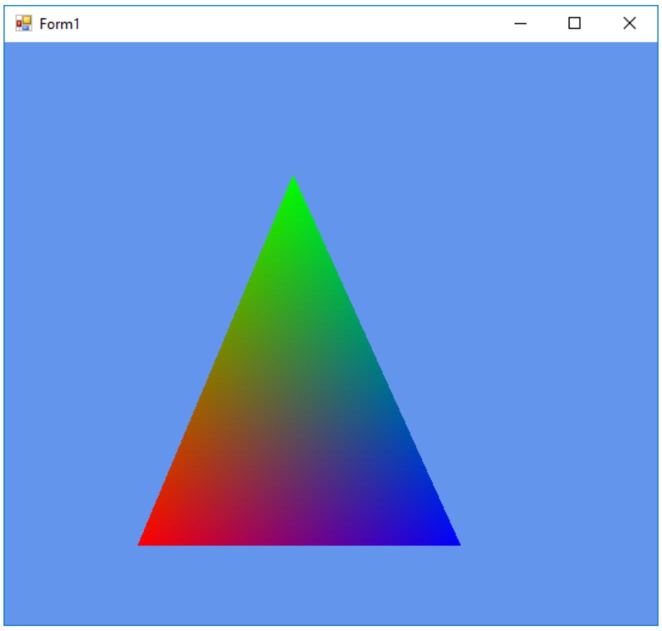
Aim: Draw a triangle using Direct3D 11

Solution:

```
using System;
using System.Collections.Generic;
using System.ComponentModel;
using System.Data;
using System.Drawing;
using System.Text;
using System.Windows.Forms;
using Microsoft.DirectX;
using Microsoft.DirectX.Direct3D;
namespace GP_P2
{
public partial class Form1 : Form
    {
        Microsoft.DirectX.Direct3D.Device device;
public Form1()
        {
InitializeComponent();
InitDevice();
        }
private void InitDevice()
        {
PresentParameters pp = new PresentParameters();
pp.Windowed = true;
pp.SwapEffect = SwapEffect.Discard;
device = new Device(0, DeviceType.Hardware, this,
CreateFlags.HardwareVertexProcessing, pp);
        }
private void Render()
        {
CustomVertex.TransformedColored[] vertexes = new
CustomVertex.TransformedColored[3];

vertexes[0].Position = new Vector4(240, 110, 0, 1.0f);//first point
vertexes[0].Color = System.Drawing.Color.FromArgb(0, 255, 0).ToArgb();

vertexes[1].Position = new Vector4(380, 420, 0, 1.0f);//second point
vertexes[1].Color = System.Drawing.Color.FromArgb(0, 0, 255).ToArgb();

vertexes[2].Position = new Vector4(110, 420, 0, 1.0f);//third point
vertexes[2].Color = System.Drawing.Color.FromArgb(255, 0, 0).ToArgb();

device.Clear(ClearFlags.Target, Color.CornflowerBlue, 1.0f, 0);
device.BeginScene();
device.VertexFormat = CustomVertex.TransformedColored.Format;
device.DrawUserPrimitives(PrimitiveType.TriangleList, 1, vertexes);
device.EndScene();
device.Present();
```

```
        }
private void Form1_Load(object sender, EventArgs e) { }

private void Form1_Paint(object sender, PaintEventArgs e)
        {
Render();
        }
    }
}
```

Output:



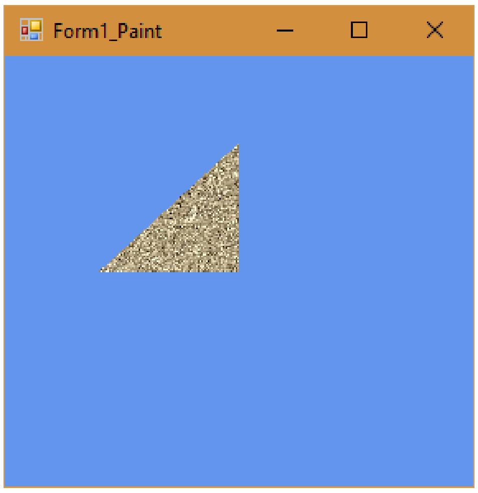
Practical No. 3:

Aim: Texture the triangle using Direct3D 11

Solution:

```
using System;
using System.Collections.Generic;
using System.ComponentModel;
using System.Data;
using System.Drawing;
using System.Text;
using System.Windows.Forms;
using Microsoft.DirectX;
using Microsoft.DirectX.Direct3D;

namespace Gp_prac3
{
public partial class Form1 : Form
   {
private Microsoft.DirectX.Direct3D.Device device;
privateCustomVertex.PositionTextured[] vertex = new CustomVertex.PositionTextured[3];
private Texture texture;
public Form1()
       {
InitializeComponent();
InitDevice();
       }
private void InitDevice()
       {
PresentParameters pp = new PresentParameters();
pp.Windowed = true;
pp.SwapEffect = SwapEffect.Discard;
         device = new Device(0,DeviceType .Hardware ,this,
         CreateFlags.HardwareVertexProcessing, pp);

         device.Transform.Projection = Matrix.PerspectiveFovLH(3.14f / 4,
         device.Viewport.Width / device.Viewport.Height, 1f, 1000f);

device.Transform.View = Matrix.LookAtLH(new Vector3(0, 0, 20), new Vector3(),
new Vector3(0, 1, 0));

device.RenderState.Lighting = false;

vertex[0] = new CustomVertex.PositionTextured(new Vector3(0, 0, 0), 0, 0);
vertex[1] = new CustomVertex.PositionTextured(new Vector3(5, 0, 0), 0, 1);
vertex[2] = new CustomVertex.PositionTextured(new Vector3(0, 5, 0),-1, 1);
texture=new Texture (device,new Bitmap ("E:\\TYCS\\images\\img1.jpg"), 0,
Pool.Managed );
       }

private void Form1_Load(Object sender, EventArgs e)
       { }
private void Form1_Paint(Object sender, PaintEventArgs e)
        {
device.Clear(ClearFlags.Target, Color.CornflowerBlue, 1, 0);
device.BeginScene();
device.SetTexture(0,texture);
device.VertexFormat = CustomVertex.PositionTextured.Format;
device.DrawUserPrimitives(PrimitiveType.TriangleList, vertex.Length / 3, vertex);
device.EndScene();
device.Present();
        }
    }
}
```

Output:



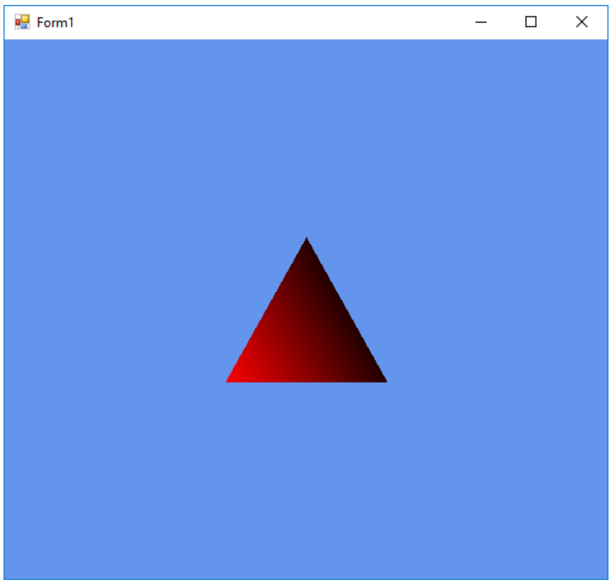
Practical No. 4:

Aim: Programmable Diffuse Lightning using Direct3D 11

Solution:

```
using System;
using System.Collections.Generic;
using System.ComponentModel;
using System.Data;
using System.Drawing;
using System.Text;
using System.Windows.Forms;
using Microsoft.DirectX;
using Microsoft.DirectX.Direct3D;

namespace GP_P2
{
public partial class Form1 : Form
   {

private Microsoft.DirectX.Direct3D.Device device;
privateCustomVertex.PositionNormalColored[] vertex = new
CustomVertex.PositionNormalColored[3];
public Form1()
       {
InitializeComponent();
InitDevice();
       }

public void InitDevice()
       {
PresentParameters pp = new PresentParameters();
pp.Windowed = true;
pp.SwapEffect = SwapEffect.Discard;

device = new Device(0, DeviceType.Hardware, this, CreateFlags.HardwareVertexProcessing,
pp);

device.Transform.Projection = Matrix.PerspectiveFovLH(3.14f / 4, device.Viewport.Width /
device.Viewport.Height, 1f, 1000f);

device.Transform.View = Matrix.LookAtLH(new Vector3(0, 0, 10), new Vector3(), new
Vector3(0, 1, 0));

device.RenderState.Lighting = false;

vertex[0] = new CustomVertex.PositionNormalColored(new Vector3(0, 1, 1), new Vector3(1, 0,
1), Color.Red.ToArgb());

vertex[1] = new CustomVertex.PositionNormalColored(new Vector3(-1, -1, 1), new Vector3(1,
0, 1), Color.Red.ToArgb());
vertex[2] = new CustomVertex.PositionNormalColored(new Vector3(1, -1, 1), new Vector3(-1,
0, 1), Color.Red.ToArgb());

device.RenderState.Lighting = true;
device.Lights[0].Type = LightType.Directional;
device.Lights[0].Diffuse = Color.Plum;
device.Lights[0].Direction = new Vector3(0.8f, 0, -1);
device.Lights[0].Enabled = true;
        }

public void Render()
        {
            device.Clear(ClearFlags.Target, Color.CornflowerBlue, 1, 0);
            device.BeginScene();
            device.VertexFormat = CustomVertex.PositionNormalColored.Format;
            device.DrawUserPrimitives(PrimitiveType.TriangleList, vertex.Length / 3, vertex);
            device.EndScene();
            device.Present();
        }
private void Form1_Load(object sender, EventArgs e)
        {

        }

private void Form1_Paint(object sender, PaintEventArgs e)
        {
Render();
        }


    }
}
```

Output:

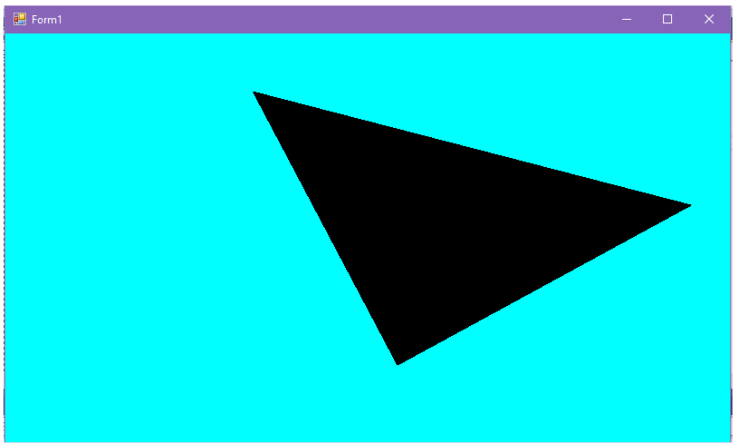


Practical No. 5:

<u>Aim:</u> Programmable Spot Lighting using DirectX

```
using System;
using System.Collections.Generic;
using System.ComponentModel;
using System.Data;
using System.Drawing;
using System.Text;
using System.Windows.Forms;
using Microsoft.DirectX.Direct3D;
using Microsoft.DirectX;
namespace GP_SpotLighting
{
  public partial class Form1 : Form
  {
    private Device device;

    public Form1()
    {
      InitializeComponent();
      InitDevice();
      this.SetStyle(ControlStyles.AllPaintingInWmPaint | ControlStyles.Opaque,
      true);
    }
    private void InitDevice()
    {
      PresentParameters pp = new PresentParameters();
      pp.Windowed = true;
      pp.SwapEffect = SwapEffect.Discard;
      device = new Device(0, DeviceType.Hardware, this,
      CreateFlags.SoftwareVertexProcessing, pp);
      device.RenderState.CullMode = Cull.None;
      device.RenderState.Lighting = true;
      device.Lights[0].Type = LightType.Spot;
      device.Lights[0].Range = 4;
      device.Lights[0].Position = new Vector3(0, -1, 0f);
      device.Lights[0].Enabled = true;
    }
    private void Render()
    {
      device.Transform.Projection = Matrix.PerspectiveFovLH((float)Math.PI / 4,
      this.Width / this.Height, 1f, 50f);
      device.Transform.View = Matrix.LookAtLH(new Vector3(0, 0, 30), new
      Vector3(1, 0, 0), new Vector3(0, 5, 0));
      CustomVertex.PositionNormalColored[] vertices = new
      CustomVertex.PositionNormalColored[6];
      vertices[0].Position = new Vector3(10f, 12f, 0f);
      vertices[0].Normal = new Vector3(0, 2, 0.5f);

      vertices[0].Color = Color.Yellow.ToArgb();
      vertices[1].Position = new Vector3(-5f, 5f, 0f);
```

```
            vertices[1].Normal = new Vector3(0, 2, 0.5f);
            vertices[1].Color = Color.Blue.ToArgb();
            vertices[2].Position = new Vector3(5f, 5f, -1f);
            vertices[2].Normal = new Vector3(0, 0, 0.5f);
            vertices[2].Color = Color.Pink.ToArgb();
            vertices[3].Position = new Vector3(5f, -5f, -1f);
            vertices[3].Normal = new Vector3(0, 0, 0.5f);
            vertices[3].Color = Color.Green.ToArgb();
            vertices[4].Position = new Vector3(10f, 12f, 0f);
            vertices[4].Normal = new Vector3(0, 0, 0.5f);
            vertices[4].Color = Color.Green.ToArgb();
            device.Clear(ClearFlags.Target, Color.Cyan, 1.0f, 0);
            device.BeginScene();

            device.VertexFormat = CustomVertex.PositionNormalColored.Format;
            device.Transform.World = Matrix.Translation(-5, -10 * 1 / 3, 0) *
            Matrix.RotationAxis(new Vector3(), 0);
            Console.WriteLine(device.Transform.World.ToString());
            device.DrawUserPrimitives(PrimitiveType.TriangleStrip, 3, vertices);
            device.EndScene();
            device.Present();
            this.Invalidate();
        }
        private void Form1_Paint(object sender, PaintEventArgs e)
        {
            Render();
        }
    }
}
```

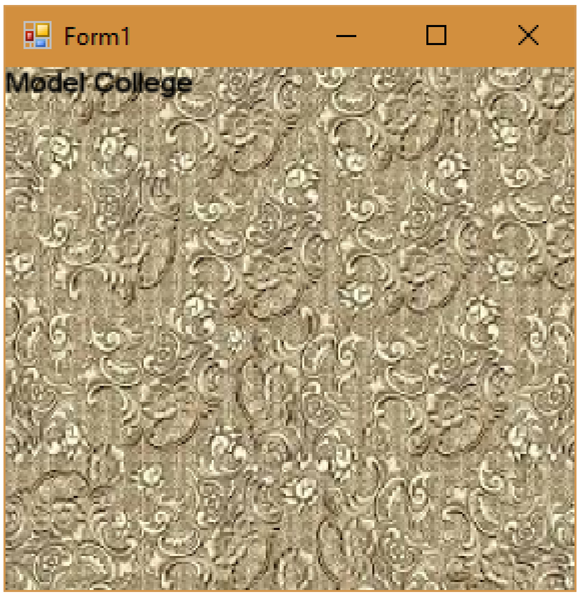


Practical No. 6:

<u>Aim:</u> Loading models into DirectX 11 and rendering

```
using System;
using System.Collections.Generic;
using System.ComponentModel;
using System.Data;
using System.Drawing;
using System.Text;
using System.Windows.Forms;
using Microsoft.DirectX;
using Microsoft.DirectX.Direct3D;

namespace GP_P5_Loading_Model
{
public partial class Form1 : Form
 {
 Microsoft.DirectX.Direct3D.Device device;
 Microsoft.DirectX.Direct3D.Texture texture;
 Microsoft.DirectX.Direct3D.Font font;

public Form1()
 {
        InitializeComponent();
        InitDevice();
        InitFont();
        LoadTexture();
 }

private void InitFont()
 {
        System.Drawing.Font f = new System.Drawing.Font("Arial", 16f,
        FontStyle.Regular);
        font = new Microsoft.DirectX.Direct3D.Font(device, f);
 }

private void LoadTexture()
 {
        texture = TextureLoader.FromFile(device,"E:\\TYCS\\images\\img1.jpg",400, 400, 1, 0,
        Format.A8B8G8R8, Pool.Managed, Filter.Point, Filter.Point,
        Color.Transparent.ToArgb());
 }

private void InitDevice()
 {
        PresentParameters pp = new PresentParameters();
        pp.Windowed = true;
        pp.SwapEffect = SwapEffect.Discard;
        device = new Device(0, DeviceType.Hardware, this,
        CreateFlags.HardwareVertexProcessing, pp);
 }
private void Render()
 {
        device.Clear(ClearFlags.Target, Color.CornflowerBlue, 0, 1);
        device.BeginScene();
        using (Sprite s = new Sprite(device))
 {
        s.Begin(SpriteFlags.AlphaBlend);
        s.Draw2D(texture, new Rectangle(0, 0, 0, 0), new Rectangle(0, 0,
        device.Viewport.Width, device.Viewport.Height), new Point(0, 0), 0f, new
        Point(0, 0), Color.White);
        font.DrawText(s, "Model College", new Point(0, 0), Color.Black);
        s.End();
 }
device.EndScene();
device.Present();
 }
private void Form1_Paint(object sender, PaintEventArgs e)
 {
Render();
 }
 }
}
```

Output:



Model College