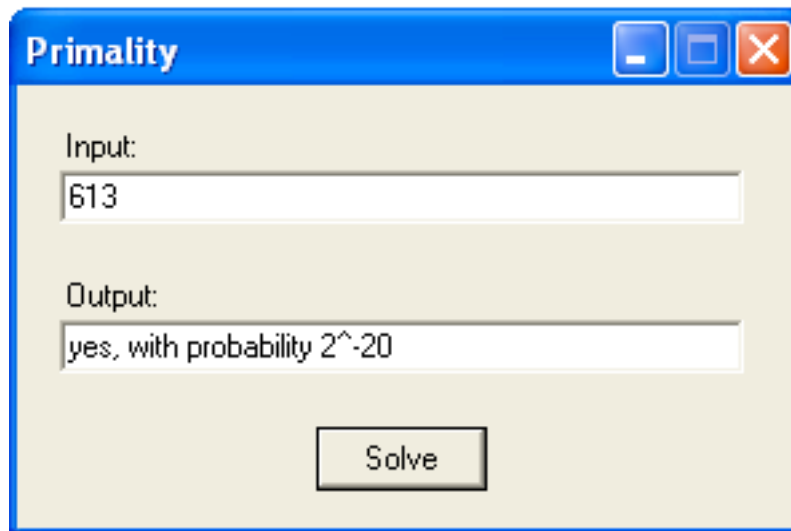


Screenshot of Primality Test



Code Listing of Form1.cs

```
using System;
using System.Drawing;
using System.Collections;
using System.ComponentModel;
using System.Windows.Forms;
using System.Data;

namespace Primality
{
    /// <summary>
    /// Summary description for Form1.
    /// </summary>
    public class PrimalityForm : System.Windows.Forms.Form
    {
        private System.Windows.Forms.TextBox input;
        private System.Windows.Forms.Label label1;
        private System.Windows.Forms.TextBox output;
        private System.Windows.Forms.Label label2;
        private System.Windows.Forms.Button solve;
        /// <summary>
        /// Required designer variable.
        /// </summary>
        private System.ComponentModel.Container components = null;
```

```

public PrimalityForm()
{
    //
    // Required for Windows Form Designer support
    //
    InitializeComponent();

    //
    // TODO: Add any constructor code after InitializeComponent call
    //
}

/// <summary>
/// Clean up any resources being used.
/// </summary>
protected override void Dispose( bool disposing )
{
    if( disposing )
    {
        if (components != null)
        {
            components.Dispose();
        }
    }
    base.Dispose( disposing );
}

#region Windows Form Designer generated code
/// <summary>
/// Required method for Designer support - do not modify
/// the contents of this method with the code editor.
/// </summary>
private void InitializeComponent()
{
    this.input = new System.Windows.Forms.TextBox();
    this.output = new System.Windows.Forms.TextBox();
    this.solve = new System.Windows.Forms.Button();
    this.label1 = new System.Windows.Forms.Label();
    this.label2 = new System.Windows.Forms.Label();
    this.SuspendLayout();
    //
    // input
    //
    this.input.Location = new System.Drawing.Point(16, 32);
    this.input.Name = "input";
    this.input.Size = new System.Drawing.Size(256, 20);
    this.input.TabIndex = 0;

```

```

this.input.Text = "";
//
// output
//
this.output.Location = new System.Drawing.Point(16, 88);
this.output.Name = "output";
this.output.Size = new System.Drawing.Size(256, 20);
this.output.TabIndex = 1;
this.output.Text = "";
//
// solve
//
this.solve.Location = new System.Drawing.Point(112, 128);
this.solve.Name = "solve";
this.solve.Size = new System.Drawing.Size(64, 24);
this.solve.TabIndex = 2;
this.solve.Text = "Solve ";
this.solve.Click += new System.EventHandler(this.button1_Click);
//
// label1
//
this.label1.Location = new System.Drawing.Point(16, 16);
this.label1.Name = "label1";
this.label1.Size = new System.Drawing.Size(96, 16);
this.label1.TabIndex = 3;
this.label1.Text = "Input:";
//
// label2
//
this.label2.Location = new System.Drawing.Point(16, 72);
this.label2.Name = "label2";
this.label2.Size = new System.Drawing.Size(72, 16);
this.label2.TabIndex = 4;
this.label2.Text = "Output:";
//
// PrimalityForm
//
this.AutoScaleBaseSize = new System.Drawing.Size(5, 13);
this.ClientSize = new System.Drawing.Size(292, 166);
this.Controls.Add(this.label2);
this.Controls.Add(this.label1);
this.Controls.Add(this.solve);
this.Controls.Add(this.output);
this.Controls.Add(this.input);
this.FormBorderStyle =
System.Windows.Forms.FormBorderStyle.FixedDialog;
this.MaximizeBox = false;
this.Name = "PrimalityForm";

```

```

        this.Text = "Primality";
        this.Load += new System.EventHandler(this.PrimalityForm_Load);
        this.ResumeLayout(false);
    }
#endregion

/// <summary>
/// The main entry point for the application.
/// </summary>
[STAThread]
static void Main()
{
    Application.Run(new PrimalityForm());
}

private int modExp(int x, int y, int N)
{
    if (y == 0) return 1;
    int z = modExp(x, y/2, N);
    if (y % 2 == 0)
        return z*z % N;
    else
        return x*z*z % N;
}

private bool isPrime(int N, int k)
{
    Random rnd = new Random();
    for (int i = 0; i < k; i++)
    {
        int a = rnd.Next(N - 1) + 1;
        int p = modExp(a, N-1, N); //a ^ (N - 1); //Power(a, N - 1);
        if (p % N != 1) return false;
    }
    return true;
}

private void button1_Click(object sender, System.EventArgs e)
{
    int k = 20;
    if (isPrime(Convert.ToInt32(input.Text), k))
        output.Text = String.Format("yes, with probability 2^{-{0}}",k);
    else
        output.Text = "no";
}

private void PrimalityForm_Load(object sender, System.EventArgs e)

```