

**JURNAL
KONSTRUKSI PERANGKAT LUNAK**

**PERTEMUAN 12
PERFORMANCE ANALYSIS,
UNIT TESTING, DAN DEBUGGING**



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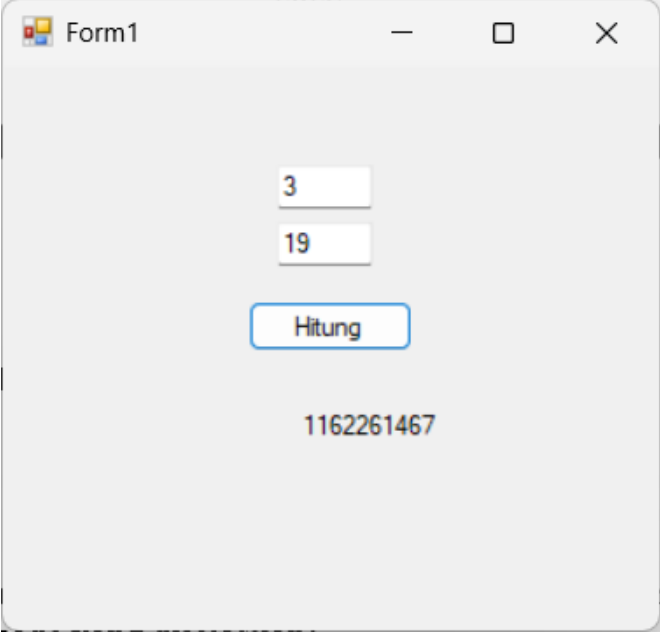
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**PROGRAM STUDI S1 SOFTWARE ENGINEERING
FAKULTAS INFORMATIKA
TELKOM UNIVERSITY PURWOKERTO
2025**

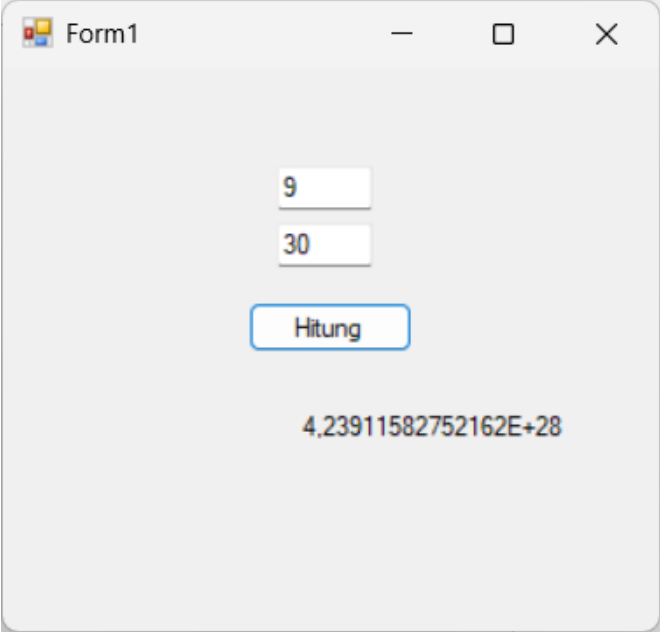
1. Screenshoot Hasil Run

- Input 3, 19



A screenshot of a Windows application window titled "Form1". The window has a standard Windows title bar with minimize, maximize, and close buttons. Inside the window, there are two text input fields stacked vertically. The first field contains the number "3" and the second field contains the number "19". Below these fields is a button labeled "Hitung" (Calculate). At the bottom of the window, the result of the calculation is displayed as the number "1162261467".

- Input 9, 30



A screenshot of a Windows application window titled "Form1". The window has a standard Windows title bar with minimize, maximize, and close buttons. Inside the window, there are two text input fields stacked vertically. The first field contains the number "9" and the second field contains the number "30". Below these fields is a button labeled "Hitung" (Calculate). At the bottom of the window, the result of the calculation is displayed in scientific notation as "4,23911582752162E+28".

2. Penjelasan singkat dari kode implementasi yang dibuat (beserta screenshot dari potongan source code yang dijelaskan).

Source Code :

Program.cs

```
modul12_2211104026 modul12_2211104026.Program
1  using System;
2  using System.Collections.Generic;
3  using System.Linq;
4  using System.Threading.Tasks;
5  using System.Windows.Forms;
6
7  namespace modul12_2211104026
8  {
9      0 references
10     static class Program
11     {
12         /// <summary>
13         /// The main entry point for the application.
14         /// </summary>
15         [STAThread]
16         0 references
17         static void Main()
18         {
19             Application.EnableVisualStyles();
20             Application.SetCompatibleTextRenderingDefault(false);
21             Application.Run(new Form1());
22         }
23     }
24 }
```

Form1.cs

```
modul12_2211104026 modul12_2211104026.Form1
1  using System;
2  using System.Windows.Forms;
3
4  namespace modul12_2211104026
5  {
6      9 references
7      public partial class Form1 : Form
8      {
9          7 references
10         public Form1()
11         {
12             InitializeComponent();
13         }
14
15         // Fungsi CariNilaiPangkat
16         6 references
17         public int CariNilaiPangkat(int a, int b)
18         {
19             if (b == 0) return 1;
20             if (b < 0) return -1;
21             if (b > 10 || a > 100) return -2;
22
23             try
24             {
25                 checked
26                 {
27                     int hasil = 1;
28                     for (int i = 0; i < b; i++)
29                     {
30                         hasil *= a;
31                     }
32                     return hasil;
33                 }
34             }
35             catch { }
36         }
37     }
38 }
```

```

30     }
31     }
32     catch (OverflowException)
33     {
34         return -3;
35     }
36 }
37
38 // Event handler untuk button
39 private void btnHitung_Click_1(object sender, EventArgs e)
40 {
41     try
42     {
43         double a = double.Parse(txtA.Text);
44         double b = double.Parse(txtB.Text);
45         double hasil = Math.Pow(a, b);
46         labelHasil.Text = hasil.ToString();
47     }
48     catch (Exception ex)
49     {
50         MessageBox.Show("Input tidak valid: " + ex.Message);
51     }
52 }
53 }
54 }

```

Form1.Designer.cs

```

ul12_2211104026 modul12_2211104026.Form1
1 namespace modul12_2211104026
2 {
3     partial class Form1
4     {
5         private System.ComponentModel.IContainer components = null;
6
7         protected override void Dispose(bool disposing)
8         {
9             if (disposing && (components != null))
10            {
11                components.Dispose();
12            }
13            base.Dispose(disposing);
14        }
15
16        > Windows Form Designer generated code
17
18        private System.Windows.Forms.Button btnHitung;
19        private System.Windows.Forms.TextBox txtA;
20        private System.Windows.Forms.TextBox txtB;
21        private System.Windows.Forms.Label lblHasil;
22        private System.Windows.Forms.Label labelHasil;
23    }
24 }

```

UnitTest.cs

```

1  using Microsoft.VisualStudio.TestTools.UnitTesting;
2  using modul12_2211104026;
3
4  namespace modul12_2211104026.Tests
5  {
6      [TestClass]
7      0 references
8      public class Form1Tests
9      {
10         private Form1 form;
11
12         [TestInitialize]
13         0 references
14         public void Setup()
15         {
16             form = new Form1();
17         }
18
19         [TestMethod]
20         0 references
21         public void Pangkat_B_Positive_ValidRange_ReturnsCorrectResult()
22         {
23             int result = form.CariNilaiPangkat(2, 3);
24             Assert.AreEqual(8, result);
25         }
26
27         [TestMethod]
28         0 references
29         public void Pangkat_B_EqualsZero_ReturnsOne()
30         {
31             int result = form.CariNilaiPangkat(5, 0);
32             Assert.AreEqual(1, result);
33         }
34
35         [TestMethod]
36         0 references
37         public void Pangkat_B_Negative_ReturnsMinusOne()
38         {
39             int result = form.CariNilaiPangkat(3, -2);
40             Assert.AreEqual(-1, result);
41         }
42
43         [TestMethod]
44         0 references
45         public void Pangkat_B_GreaterThan10_ReturnsMinusTwo()
46         {
47             int result = form.CariNilaiPangkat(2, 11);
48             Assert.AreEqual(-2, result);
49         }
50
51         [TestMethod]
52         0 references
53         public void Pangkat_A_GreaterThan100_ReturnsMinusTwo()
54         {
55             int result = form.CariNilaiPangkat(101, 2);
56             Assert.AreEqual(-2, result);
57         }
58
59         [TestMethod]
60         0 references
61         public void Pangkat_Overflow_ReturnsMinusThree()
62         {
63             int result = form.CariNilaiPangkat(100, 10); // 100*10 = big number, likely overflow
64             Assert.AreEqual(-3, result);
65         }
66     }
67 }

```

Hasil Unit Tesing (Berhasil Semua)

Test Explorer

Test discovery finished: 0 Tests found in 1,5 sec

15 Warnings 0 Errors

Test	Durati...	Traits	Error Message
modul12_2211104026.Tests (6)	480 ms		
modul12_2211104026.Tests (6)	480 ms		
Form1Tests (6)	480 ms		
Pangkat_B_EqualsZero_Returns...	< 1 ms		
Pangkat_B_GreaterThan10_Retu...	< 1 ms		
Pangkat_B_Negative_ReturnsMi...	< 1 ms		
Pangkat_B_Positive_ValidRange...	< 1 ms		
Pangkat_Overflow_ReturnsMinu...	2 ms		
Pangkat_A_GreaterThan100_Ret...	478 ms		

Run Debug

Group Summary

modul12_2211104026.Tes

Tests in group: 6

Total Duration: 486

Outcomes

6 Passed

Penjelasan


Aplikasi ini merupakan program Windows Forms yang menghitung nilai pemangkatan dari dua bilangan dengan validasi input dan pengujian unit. Fungsi utama `CariNilaiPangkat(int a, int b)` akan mengembalikan hasil pangkat jika nilai `b` berada dalam rentang 1–10 dan `a` tidak melebihi 100. Fungsi ini juga menangani kondisi khusus, seperti nilai `b` nol (hasil 1), `b` negatif (hasil -1), batasan nilai berlebih (hasil -2), dan overflow perhitungan (hasil -3). Untuk memastikan keandalan fungsi, telah dilakukan 6 pengujian unit menggunakan MSTest yang mencakup semua cabang logika. Seluruh tes berhasil dijalankan dan menghasilkan output yang sesuai dengan ekspektasi, menunjukkan bahwa fungsi `CariNilaiPangkat` telah bekerja dengan benar dan stabil.

3. CPU & Memory Usage


- Tanpa input apapun

	1	40.03s	2.348 (n/a)	189,32 KB (n/a)	
---	---	--------	-------------	-----------------	--

- Input 3, 19

	2	76.98s	2.386 (+38 ↑)	190,41 KB (+1,09 KB ↑)	
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- Input 9, 30

	3	91.47s	2.386 (+0)	190,43 KB (+0,02 KB ↑)	
---	---	--------	------------	------------------------	--