

**JURNAL**  
**KONSTRUKSI PERANGKAT LUNAK**  
**PERFORMANCE ANALYSIS, UNIT TESTING,DAN DEBUGGING**



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**PROGRAM STUDI S1 SOFTWARE ENGINEERING**

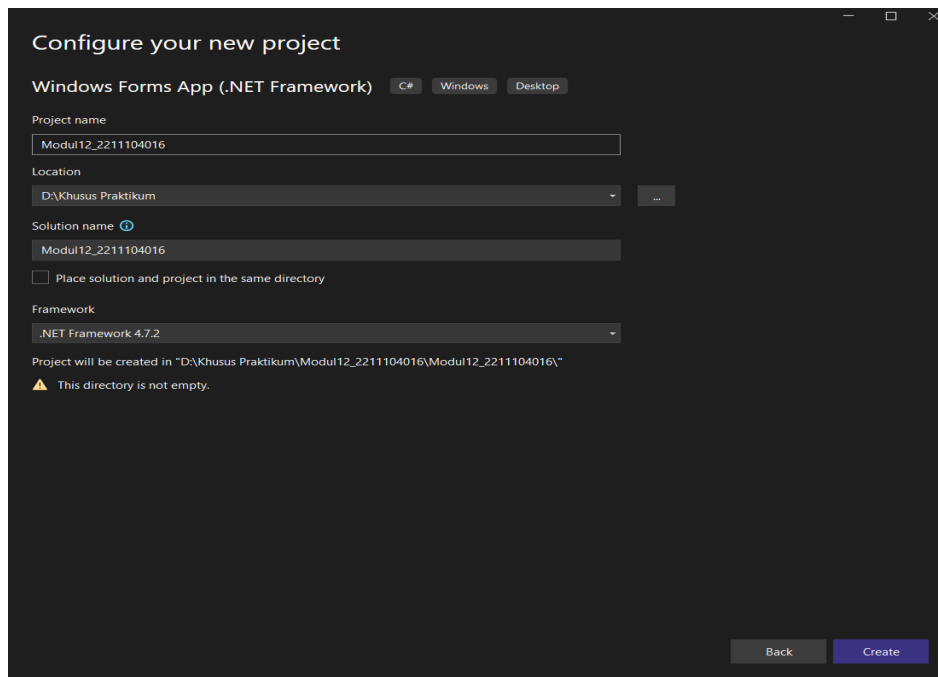
**FAKULTAS INFORMATIKA**

**TELKOM UNIVERSITY PURWOKERTO**

**2025**

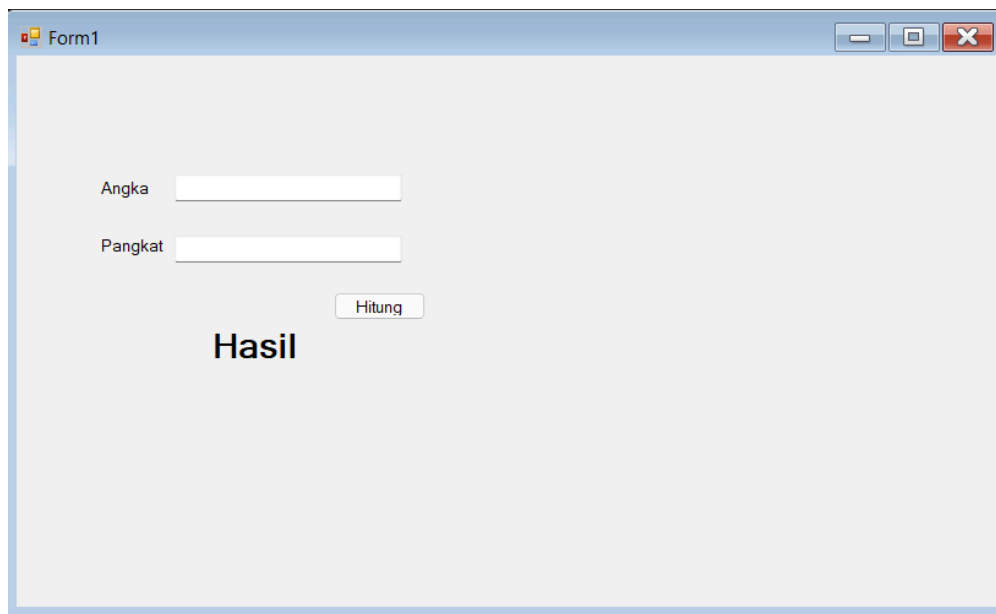
## 1. MEMBUAT PROJECT GUI BARU

- Membuat Project baru dengan nama Modul12\_2211104016



## 2. MEMBUAT GUI SEDERHANA

- Buatlah suatu Form atau tampilan GUI sederhana



- Tambahkan satu method dengan nama “CariNilaiPangkat(int a, int b)

```

28 public static int CariNilaiPangkat(int a, int b)
29 {
30     if (b == 0)
31         return 1;
32     if (b < 0)
33         return -1;
34     if (b > 10 || a > 100)
35         return -2;
36
37     try
38     {
39         checked
40         {
41             int hasil = 1;
42             for (int i = 0; i < b; i++)
43             {
44                 hasil *= a;
45             }
46             return hasil;
47         }
48     }
49     catch (OverflowException)
50     {
51         return -3;
52     }
53 }
54
55 1 reference
56 private void lbl1_Click(object sender, EventArgs e)
57 {
58 }
59
60 }
61

```

- Tambahkan source code pada tombol button

```

1 reference
private void btnHitung_Click(object sender, EventArgs e)
{
    int a = int.Parse(txtA.Text);
    int b = int.Parse(txtB.Text);
    int hasil = CariNilaiPangkat(a, b);
    lblHasil.Text = $"Hasil: {hasil}";
}
1 reference

```

- Output

The screenshot shows a Windows Form titled 'Form1'. It contains two text boxes: 'Angka' with the value '1' and 'Pangkat' with the value '0'. To the right of these text boxes is a button labeled 'Hitung'. Below the text boxes, the text 'Hasil: 1' is displayed in a large, bold font.

### 3. MELAKUKAN SOFTWARE PROFILING

- Pada saat program berjalan, catat dan amati CPU usage dari aplikasi yang sedang berjalan tanpa melakukan input apapun.

| Processes                      |        |            |               |             |                |  |
|--------------------------------|--------|------------|---------------|-------------|----------------|--|
| Name                           | Status | 32%<br>CPU | 92%<br>Memory | 10%<br>Disk | 20%<br>Network |  |
| Apps (5)                       |        |            |               |             |                |  |
| > Google Chrome (23)           |        | 0,5%       | 733,8 MB      | 0,3 MB/s    | 0 Mbps         |  |
| ▼ Microsoft Visual Studio 2022 |        | 0%         | 333,9 MB      | 0 MB/s      | 0 Mbps         |  |
| Modul12_2211104016 - M...      |        |            |               |             |                |  |
| > Spotify (7)                  |        | 0,7%       | 433,1 MB      | 0,3 MB/s    | 0 Mbps         |  |
| > Task Manager                 |        | 4,0%       | 83,2 MB       | 0 MB/s      | 0 Mbps         |  |
| > Windows Explorer             |        | 4,7%       | 47,2 MB       | 1,0 MB/s    | 0 Mbps         |  |

- Tambahkan input “3” pada textbox pertama dan “19” pada textbox ketiga, dan tekan tombol button dan catat dan amati memory usage dari aplikasi

| Processes                                 |        |            |               |            |               |  |
|---|--------|------------|---------------|------------|---------------|--|
| Run new task End task Efficiency mode ... |        |            |               |            |               |  |
| Name                                      | Status | 14%<br>CPU | 89%<br>Memory | 1%<br>Disk | 0%<br>Network |  |
| Apps (6)                                  |        |            |               |            |               |  |
| > Google Chrome (19)                      |        | 0,3%       | 697,8 MB      | 0,1 MB/s   | 0 Mbps        |  |
| ▼ Microsoft Visual Studio 2022            |        | 2,3%       | 388,1 MB      | 0,1 MB/s   | 0 Mbps        |  |
| Modul12_2211104016 (Ru...                 |        |            |               |            |               |  |
| > Modul12_2211104016 (32 bit)             |        | 0,3%       | 5,5 MB        | 0 MB/s     | 0 Mbps        |  |
| > Spotify (7)                             |        | 0,2%       | 431,6 MB      | 0,1 MB/s   | 0 Mbps        |  |
| > Task Manager                            |        | 2,6%       | 54,4 MB       | 0 MB/s     | 0 Mbps        |  |
| > Windows Explorer                        |        | 0,2%       | 56,1 MB       | 0 MB/s     | 0 Mbps        |  |

- .Laporkan apakah terdapat perubahan pada CPU usage dan memory  
memory terlihat naik ke 300 mb lebih

- Lakukan lagi eksperimen dengan input pertama yaitu “9” dan angka kedua yaitu “30”, laporkan apakah terdapat perubahan di CPU usage dan memory.

|                                |        | 11%  | 85%      | 1%       | 0%       |
|--------------------------------|--------|------|----------|----------|----------|
|                                |        | CPU  | Memory   | Disk     | Network  |
| Name                           | Status |      |          |          |          |
| Apps (6)                       |        |      |          |          |          |
| > Google Chrome (22)           |        | 0,4% | 857,7 MB | 0,1 MB/s | 0,1 Mbps |
| ▼ Microsoft Visual Studio 2022 |        | 1,8% | 304,8 MB | 0,1 MB/s | 0 Mbps   |
| Modul12_2211104016 (Ru...      |        |      |          |          |          |
| > Modul12_2211104016 (32 bit)  |        | 0,2% | 3,9 MB   | 0,1 MB/s | 0 Mbps   |
| > Spotify (7)                  |        | 0,1% | 429,0 MB | 0 MB/s   | 0 Mbps   |
| > Task Manager                 |        | 2,8% | 54,2 MB  | 0 MB/s   | 0 Mbps   |
| > Windows Explorer             |        | 0,3% | 79,9 MB  | 0,1 MB/s | 0 Mbps   |

Tidak ada perubahan yang signifikan

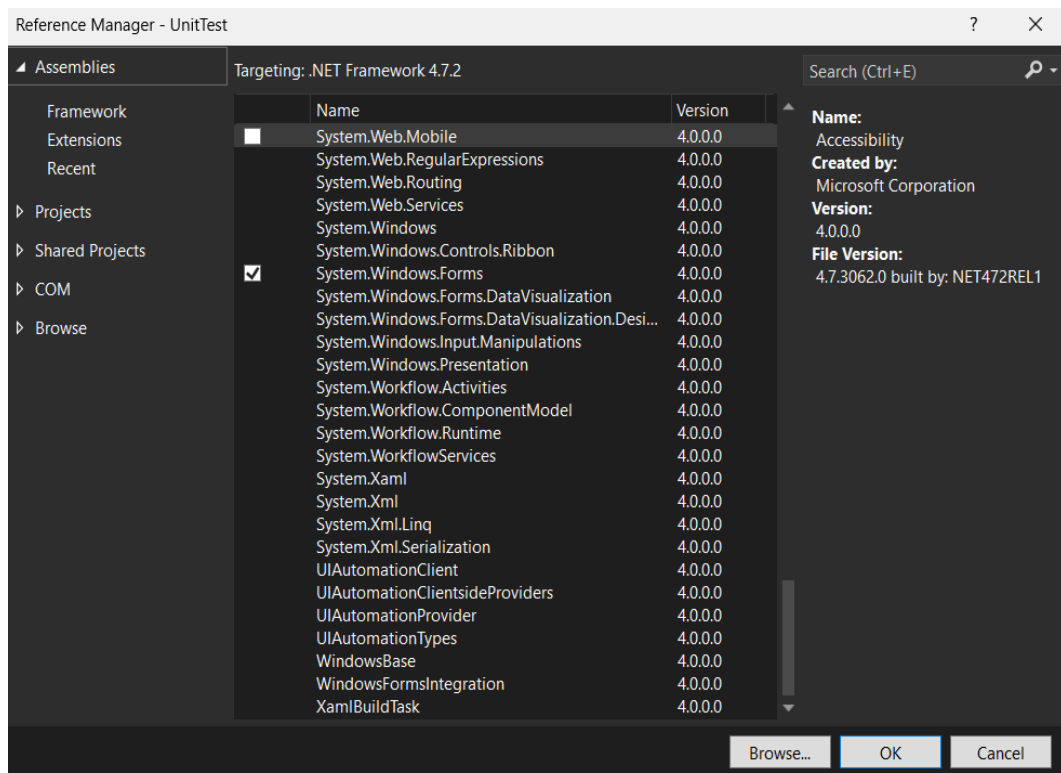
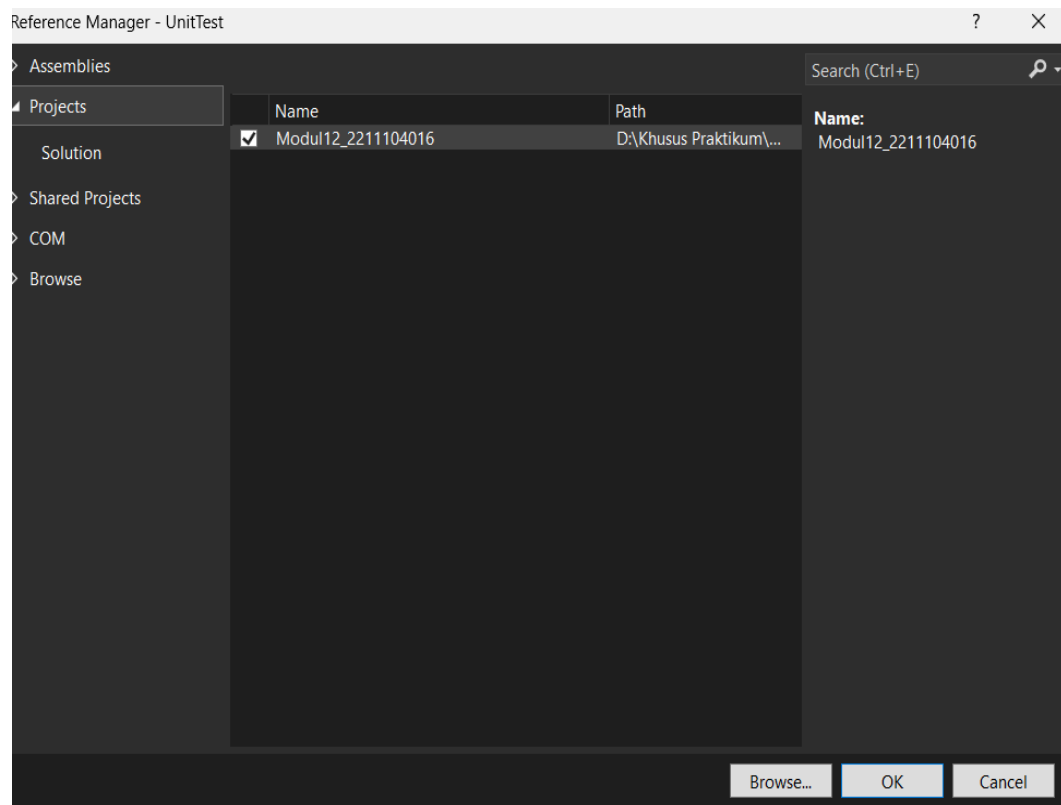
#### 4. MENAMBAHKAN UNIT TESTING

- Membuat Project Unit Testing

```

UnitTest
└─ UnitTest\UnitTest1
   └─ TestMethod1()
      2  using Microsoft.VisualStudio.TestTools.UnitTesting;
      3
      4  namespace UnitTest
      5  {
      6      [TestClass]
      7      0 references
      8      public class UnitTest1
      9      {
          [TestMethod]
          10  0 references
          11  public void TestMethod1()
          12  {
          13  }
          14  }
  
```

- Menambahkan reference ke project utama



- membuat code unit testing untuk method cari nilai perangkat

```

1  using Microsoft.VisualStudio.TestTools.UnitTesting;
2  using Modul12_2211104016;
3
4  namespace UnitTest
5  {
6      [TestClass]
7      public class PangkatTests
8      {
9          [TestMethod]
10         public void TestPangkatNormal()
11         {
12             Assert.AreEqual(8, Form1.CariNilaiPangkat(2, 3));
13         }
14
15         [TestMethod]
16         public void TestPangkatB0()
17         {
18             Assert.AreEqual(1, Form1.CariNilaiPangkat(0, 0));
19         }
20
21         [TestMethod]
22         public void TestPangkatBNegatif()
23         {
24             Assert.AreEqual(-1, Form1.CariNilaiPangkat(2, -2));
25         }
26
27         [TestMethod]
28         public void TestPangkatOverLimit()
29         {
30             Assert.AreEqual(-2, Form1.CariNilaiPangkat(101, 2));
31         }
32
33         [TestMethod]
34         public void TestPangkatOverflow()
35         {
36             Assert.AreEqual(-3, Form1.CariNilaiPangkat(100, 10));
37         }
38     }
39 }

```

- menjalankan code test

Test Explorer

Test discovery skipped: All test containers are up to date

| Test                 | Duration | Traits | Error Message |
|----------------------|----------|--------|---------------|
| UnitTest (5)         | 177 ms   |        |               |
| UnitTest (5)         | 177 ms   |        |               |
| PangkatTests (5)     | 177 ms   |        |               |
| TestPangkatB0        | 177 ms   |        |               |
| TestPangkatBNegatif  | < 1 ms   |        |               |
| TestPangkatNormal    | < 1 ms   |        |               |
| TestPangkatOverflow  | < 1 ms   |        |               |
| TestPangkatOverLimit | < 1 ms   |        |               |

1 Warning 0 Errors

Run Debug

Group Summary

UnitTest

Tests in group: 5

Total Duration: 177 ms

Outcomes

5 Passed