



TUGAS PENDAHULUAN
KONSTRUKSI PERANGKAT LUNAK
MODUL 10

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OLEH :
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S1-SE07-02

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1. MEMBUAT LIBRARY MATEMATIKA

Code :

```
using System;

namespace AljabarLibraries
{
    public class Aljabar
    {
        public static double[] AkarPersamaanKuadrat(double[] persamaan)
        {
            double a = persamaan[0];
            double b = persamaan[1];
            double c = persamaan[2];

            double diskriminan = b * b - 4 * a * c;
            if (diskriminan < 0) return new double[0];

            double akar1 = (-b + Math.Sqrt(diskriminan)) / (2 * a);
            double akar2 = (-b - Math.Sqrt(diskriminan)) / (2 * a);

            return new double[] { akar1, akar2 };
        }

        public static double[] HasilKuadrat(double[] persamaan)
        {
            double a = persamaan[0];
            double b = persamaan[1];

            double hasilA = a * a;
            double hasilB = 2 * a * b;
            double hasilC = b * b;

            return new double[] { hasilA, hasilB, hasilC };
        }
    }
}
```

```

using System;
using AljabarLibraries;

namespace ConsoleAppAljabar
{
    class Program
    {
        static void Main(string[] args)
        {
            Console.WriteLine("Mencari Akar Persamaan Kuadrat dari  $x^2 - 3x - 10$ ");
            double[] akar = Aljabar.AkarPersamaanKuadrat(new double[] { 1, -3, -10 });
            Console.WriteLine($"Akar: {akar[0]} dan {akar[1]}");

            Console.WriteLine("\nMenghitung Hasil Kuadrat dari  $2x - 3$ ");
            double[] hasil = Aljabar.HasilKuadrat(new double[] { 2, -3 });
            Console.WriteLine($"Hasil Kuadrat: {hasil[0]} $x^2$  + ({hasil[1]}) $x$  + {hasil[2]}");
        }
    }

    public static string Turunan(int[] koef)
    {
        string hasil = "";
        for (int i = 1; i < koef.Length; i++)
        {
            int k = koef[i] * i;
            string term = $"{(k >= 0 && hasil != "" ? "+" : "")}{k} $x^{i - 1}$ ";
            hasil += term;
        }
        return hasil;
    }

    public static string Integral(int[] koef)
    {
        string hasil = "";
        for (int i = 0; i < koef.Length; i++)
        {
            double k = (double)koef[i] / (i + 1);
            string term = $"{(k >= 0 && hasil != "" ? "+" : "")}{k} $x^{i + 1}$ ";
            hasil += term;
        }
        return hasil + "+C";
    }
}

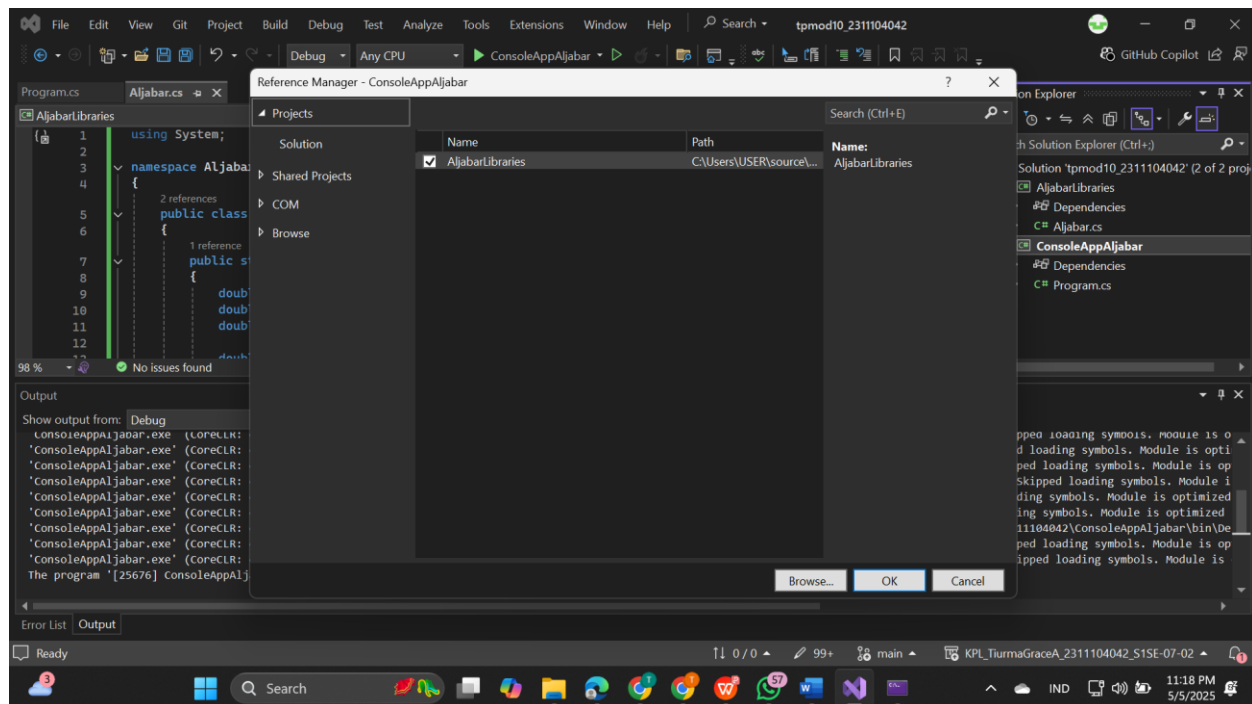
```

```
}
```

```
Microsoft Visual Studio Debug Console
Mencari Akar Persamaan Kuadrat dari  $x^2 - 3x - 10$ 
Akar: 5 dan -2

Menghitung Hasil Kuadrat dari  $2x - 3$ 
Hasil Kuadrat:  $4x^2 + (-12)x + 9$ 

C:\Users\USER\source\repos\KPL_TiurmaGraceA_2311104042_S1SE-07-02\10_Library_Construction\tpmod10_2311104042\ConsoleAppAljabar\bin\Debug\net8.0\ConsoleAppAljabar.exe (process 25676) exited with code 0 (0x0).
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the console when debugging stops.
Press any key to close this window . . .
```



Penjelasan :

1. Library AljabarLibraries

Namespace AljabarLibraries berisi class Aljabar dengan dua fungsi statis:

a. AkarPersamaanKuadrat(double[] persamaan)

- Fungsi ini digunakan untuk menghitung akar-akar dari persamaan kuadrat $ax^2 + bx + c = 0$.
- Parameter berupa array double[] dengan isi [a, b, c].
- Menghitung diskriminan ($b^2 - 4ac$):
 - Jika diskriminan $< 0 \rightarrow$ tidak ada akar real (return array kosong).
 - Jika diskriminan $\geq 0 \rightarrow$ hitung dua akar menggunakan rumus kuadrat:
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$
- Output berupa array double[2] berisi dua akar tersebut.

b. HasilKuadrat(double[] persamaan)

- Fungsi ini menghitung hasil kuadrat dari bentuk $(ax + b)^2$.
- Parameter berupa array double[] dengan isi [a, b].
- Rumus ekspansi:
$$(ax+b)^2 = a^2x^2 + 2abx + b^2$$
- Mengembalikan array double[3] yang merepresentasikan koefisien dari:
 - $x^2 \rightarrow a^2$
 - $x \rightarrow 2ab$
 - konstanta $\rightarrow b^2$

2. Console Application (ConsoleAppAljabar)

- Program utama yang memanggil fungsi dari library AljabarLibraries.
- Menampilkan dua proses:
 - a. Menghitung akar dari $x^2 - 3x - 10$
`double[] akar = Aljabar.AkarPersamaanKuadrat(new double[] { 1, -3, -10 });`
Output: Menampilkan dua akar dari persamaan tersebut.
 - b. Menghitung hasil kuadrat dari $(2x - 3)^2$
`double[] hasil = Aljabar.HasilKuadrat(new double[] { 2, -3 });`
Output: Menampilkan koefisien dari hasil ekspansi $(2x - 3)^2$.

COMMIT :

```
C:\WINDOWS\system32\cmd.exe
*****
** Visual Studio 2022 Developer Command Prompt v17.13.0
** Copyright (c) 2022 Microsoft Corporation
*****

C:\Users\USER\source\repos\KPL_TiurmaGraceA_2311104042_S1SE-07-02\10_Library_Construction\tpmod10_2311104042>git add .gitignore

C:\Users\USER\source\repos\KPL_TiurmaGraceA_2311104042_S1SE-07-02\10_Library_Construction\tpmod10_2311104042>git commit -m "up .gitignore"
[main 666ce06] up .gitignore
1 file changed, 400 insertions(+)
create mode 100644 10_Library_Construction/tpmod10_2311104042/.gitignore

C:\WINDOWS\system32\cmd.exe
no changes added to commit (use "git add" and/or "git commit -a")
Dropped refs/stash@{0} (8a457ead26324ccb97df4a9e919a7bcdedb9fc68)

C:\Users\USER\source\repos\KPL_TiurmaGraceA_2311104042_S1SE-07-02\10_Library_Construction\tpmod10_2311104042>git push origin main
Enumerating objects: 7, done.
Counting objects: 100% (7/7), done.
Delta compression using up to 12 threads
Compressing objects: 100% (4/4), done.
Writing objects: 100% (5/5), 3.33 KiB | 1.66 MiB/s, done.
Total 5 (delta 2), reused 0 (delta 0), pack-reused 0 (from 0)
remote: Resolving deltas: 100% (2/2), completed with 2 local objects.
To https://github.com/tiurmagrace/KPL_TiurmaGraceA_2311104042_S1SE-07-02.git
 2089cb6..b0ffdd8  main -> main

C:\Users\USER\source\repos\KPL_TiurmaGraceA_2311104042_S1SE-07-02\10_Library_Construction\tpmod10_2311104042>cd ..

C:\Users\USER\source\repos\KPL_TiurmaGraceA_2311104042_S1SE-07-02\10_Library_Construction>git add tpmod10_2311104042

C:\Users\USER\source\repos\KPL_TiurmaGraceA_2311104042_S1SE-07-02\10_Library_Construction>git commit -m "up menambahkan library AljabarLibraries"
[main 43ace4e] up menambahkan library AljabarLibraries
5 files changed, 107 insertions(+)
create mode 100644 10_Library_Construction/tpmod10_2311104042/AljabarLibraries/Aljabar.cs
create mode 100644 10_Library_Construction/tpmod10_2311104042/AljabarLibraries/AljabarLibraries.csproj
create mode 100644 10_Library_Construction/tpmod10_2311104042/ConsoleAppAljabar/ConsoleAppAljabar.csproj
create mode 100644 10_Library_Construction/tpmod10_2311104042/ConsoleAppAljabar/Program.cs
create mode 100644 10_Library_Construction/tpmod10_2311104042/tpmod10_2311104042.sln

C:\Users\USER\source\repos\KPL_TiurmaGraceA_2311104042_S1SE-07-02\10_Library_Construction>git push origin main
Enumerating objects: 14, done.
Counting objects: 100% (14/14), done.
Delta compression using up to 12 threads
Compressing objects: 100% (11/11), done.
Writing objects: 100% (11/11), 2.15 KiB | 732.00 KiB/s, done.
Total 11 (delta 2), reused 0 (delta 0), pack-reused 0 (from 0)
remote: Resolving deltas: 100% (2/2), completed with 2 local objects.
To https://github.com/tiurmagrace/KPL_TiurmaGraceA_2311104042_S1SE-07-02.git
 b0ffdd8..43ace4e  main -> main

C:\Users\USER\source\repos\KPL_TiurmaGraceA_2311104042_S1SE-07-02\10_Library_Construction>
```