Tugas Aljabar Linear ke 2

Pembuatan Program Penerapan Aljabar Matriks

Berisi Tugas tentang Aljabar Matriks

Tugas Aljabar Linear ke 2

Pembuatan Program Penerapan Aljabar Matriks dengan Bahasa pemrograman bebas

Soal 1 (Penjumlahan Matriks)
Soal 2 (Pengurangan Matriks)
Soal 3 (Perkalian Matriks)
Soal 4 (Transpose Matriks)

OPERASI MATRIKS

Operasi pada Matriks:

1. Penjumlahan Matriks
2. Pengurangan Matriks
3. Perkalian Matriks
4. Transpose Matriks

Ketentuan Tugas:

1. Bahasa Pemrograman Bebas (C++, Java, Phyton, R, Delphi, dll)
2. Jumlah baris dan kolom dalam bentuk variabel bebas
3. Tampilkan atau copy source code di halaman whorksheet
4. Tampilkan atau copy hasil dari program di halaman whorksheet

1.

Source code :

DuaDimensi.java

```
public class DuaDimensi {
    private int[][] matriks1 = new int[2][2];
    private int[][] matriks2 = new int[2][2];
    private int[][] hasil = new int[2][2];

    public void setMatriks1(int baris, int kolom, int value){
        matriks1[baris][kolom] = value;
    }
    public void getMatriks1(){
        System.out.println(Arrays.toString(matriks1[0]));
        System.out.println(Arrays.toString(matriks1[1]));
    }
    public void setMatriks2(int baris, int kolom, int value){
        matriks2[baris][kolom] = value;
    }
    public void getMatriks2(){
        System.out.println(Arrays.toString(matriks2[0]));
        System.out.println(Arrays.toString(matriks2[1]));
    }

    public void jumlah(){
        for(int i = 0; i < 2; i++){
            for(int j = 0; j < 2; j++){
                hasil[i][j] = matriks1[i][j] + matriks2[i][j];
            }
        }
    }

    public void kurang(){
        for(int i = 0; i < 2; i++){
            for(int j = 0; j < 2; j++){
                hasil[i][j] = matriks1[i][j] - matriks2[i][j];
            }
        }
    }

    public void kali(){
        for(int i = 0; i < 2; i++){
            for(int j = 0; j < 2; j++){
                hasil[i][j] = matriks1[i][j] * matriks2[j][i];
            }
        }
    }
```

```
    public void transpose(){
        for(int i = 0; i < 2; i++){
            for(int j = 0; j < 2; j++){
                hasil[i][j] = matriks1[j][i];
            }
        }
    }

    public void getHasil(){
        System.out.println(Arrays.toString(hasil[0]));
        System.out.println(Arrays.toString(hasil[1]));
    }

}
```

TigaDimensi.java

```
public class TigaDimensi {
    private int[][] matriks1 = new int[3][3];
    private int[][] matriks2 = new int[3][3];
    private int[][] hasil = new int[3][3];

    public void setMatriks1(int baris, int kolom, int value){
        matriks1[baris][kolom] = value;
    }
    public void getMatriks1(){
        System.out.println(Arrays.toString(matriks1[0]));
        System.out.println(Arrays.toString(matriks1[1]));
        System.out.println(Arrays.toString(matriks1[2]));
    }
    public void setMatriks2(int baris, int kolom, int value){
        matriks2[baris][kolom] = value;
    }
    public void getMatriks2(){
        System.out.println(Arrays.toString(matriks2[0]));
        System.out.println(Arrays.toString(matriks2[1]));
        System.out.println(Arrays.toString(matriks1[2]));
    }

    public void jumlah(){
        for(int i = 0; i < 3; i++){
            for(int j = 0; j < 3; j++){
                hasil[i][j] = matriks1[i][j] + matriks2[i][j];
            }
        }
    }
```

```
    public void kurang(){
        for(int i = 0; i < 3; i++){
            for(int j = 0; j < 3; j++){
                hasil[i][j] = matriks1[i][j] - matriks2[i][j];
            }
        }
    }

    public void kali(){
        for(int i = 0; i < 3; i++){
            for(int j = 0; j < 3; j++){
                hasil[i][j] = matriks1[i][j] * matriks2[j][i];
            }
        }
    }

    public void transpose(){
        for(int i = 0; i < 3; i++){
            for(int j = 0; j < 3; j++){
                hasil[i][j] = matriks1[j][i];
            }
        }
    }

    public void getHasil(){
        System.out.println(Arrays.toString(hasil[0]));
        System.out.println(Arrays.toString(hasil[1]));
        System.out.println(Arrays.toString(hasil[2]));
    }
}
```

Main.java

```
public class Main {

    /**
     * @param args the command line arguments
     */
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        System.out.println("Program operasi matriks");
        System.out.println("Pilih jenis matriks : ");
        System.out.println("1. 2x2");
        System.out.println("2. 3x3");
        int pilihan1 = input.nextInt();
        System.out.println("============================");
```

```
        if(pilihan1 == 1){
            DuaDimensi dd = new DuaDimensi();
            System.out.println("masukkan matriks pertama : (urutan : baris1kolom1 ->
baris2kolom2)");
            for(int i = 0; i < 2; i++){
                for(int j = 0; j < 2; j++){
                    int nilai = input.nextInt();
                    dd.setMatriks1(i, j, nilai);
                }
            }
            System.out.println("============================");
            System.out.println("pilih operasi : ");
            System.out.println("1. penjumlahan \n2. pengurangan \n3. perkalian \n4. transpose ");
            int pilihan2 = input.nextInt();
            System.out.println("============================");
            switch (pilihan2) {
                case 1:
                    System.out.println("masukkan matriks kedua : (urutan : baris1kolom1 ->
baris2kolom2)");
                    for(int i = 0; i < 2; i++){
                        for(int j = 0; j < 2; j++){
                            int nilai = input.nextInt();
                            dd.setMatriks2(i, j, nilai);
                        }
                    }
                    System.out.println("============================");
                    dd.jumlah();
                    dd.getMatriks1();
                    System.out.println(" + ");
                    dd.getMatriks2();
                    System.out.println(" = ");
                    dd.getHasil();
                    System.out.println("============================");
                    break;
                case 2:
                    System.out.println("masukkan matriks kedua : (urutan : baris1kolom1 ->
baris2kolom2)");
                    for(int i = 0; i < 2; i++){
                        for(int j = 0; j < 2; j++){
                            int nilai = input.nextInt();
                            dd.setMatriks2(i, j, nilai);
                        }
                    }
                    System.out.println("============================");
                    dd.kurang();
                    dd.getMatriks1();
                    System.out.println(" - ");
                    dd.getMatriks2();
```

```
                System.out.println(" = ");
                dd.getHasil();
                System.out.println("==============================");
                break;
            case 3:
                System.out.println("masukkan matriks kedua : (urutan : baris1kolom1 ->
baris2kolom2)");
                for(int i = 0; i < 2; i++){
                    for(int j = 0; j < 2; j++){
                        int nilai = input.nextInt();
                        dd.setMatriks2(i, j, nilai);
                    }
                }
                System.out.println("==============================");
                dd.kali();
                dd.getMatriks1();
                System.out.println(" x ");
                dd.getMatriks2();
                System.out.println(" = ");
                dd.getHasil();
                System.out.println("==============================");
                break;
            case 4:
                dd.transpose();
                dd.getMatriks1();
                System.out.println("Hasil transpose : ");
                dd.getHasil();
                System.out.println("==============================");
                break;
            default:
                throw new AssertionError();
        }
    }
    else{
        TigaDimensi td = new TigaDimensi();
        System.out.println("masukkan matriks pertama : (urutan : baris1kolom1 ->
baris2kolom2)");
        for(int i = 0; i < 3; i++){
            for(int j = 0; j < 3; j++){
                int nilai = input.nextInt();
                td.setMatriks1(i, j, nilai);
            }
        }
        System.out.println("==============================");
        System.out.println("pilih operasi : ");
        System.out.println("1. penjumlahan \n2. pengurangan \n3. perkalian \n4. transpose ");
        int pilihan2 = input.nextInt();
        System.out.println("==============================");
```

```
        switch (pilihan2) {
            case 1:
                System.out.println("masukkan matriks kedua : (urutan : baris1kolom1 ->
baris2kolom2)");
                for(int i = 0; i < 3; i++){
                    for(int j = 0; j < 3; j++){
                        int nilai = input.nextInt();
                        td.setMatriks2(i, j, nilai);
                    }
                }
                System.out.println("==============================");
                td.jumlah();
                td.getMatriks1();
                System.out.println(" + ");
                td.getMatriks2();
                System.out.println(" = ");
                td.getHasil();
                System.out.println("==============================");
                break;
            case 2:
                System.out.println("masukkan matriks kedua : (urutan : baris1kolom1 ->
baris2kolom2)");
                for(int i = 0; i < 3; i++){
                    for(int j = 0; j < 3; j++){
                        int nilai = input.nextInt();
                        td.setMatriks2(i, j, nilai);
                    }
                }
                System.out.println("==============================");
                td.kurang();
                td.getMatriks1();
                System.out.println(" - ");
                td.getMatriks2();
                System.out.println(" = ");
                td.getHasil();
                System.out.println("==============================");
                break;
            case 3:
                System.out.println("masukkan matriks kedua : (urutan : baris1kolom1 ->
baris2kolom2)");
                for(int i = 0; i < 3; i++){
                    for(int j = 0; j < 3; j++){
                        int nilai = input.nextInt();
                        td.setMatriks2(i, j, nilai);
                    }
                }
                System.out.println("==============================");
                td.kali();
```

```
                td.getMatriks1();
                System.out.println(" x ");
                td.getMatriks2();
                System.out.println(" = ");
                td.getHasil();
                System.out.println("==============================");
                break;
            case 4:
                td.transpose();
                td.getMatriks1();
                System.out.println("Hasil transpose : ");
                td.getHasil();
                System.out.println("==============================");
                break;
            default:
                throw new AssertionError();
        }
    }

  }

}
```

Hasil :

1. Penjumlahan :

   2x2

```
==============================
[1, 2]
[3, 4]
 +
[1, 2]
[3, 4]
 =
[2, 4]
[6, 8]
==============================
BUILD SUCCESSFUL (total time: 13 seconds)
```

   3x3

```
==============================
[1, 2, 3]
[4, 5, 6]
[7, 8, 9]
 +
[1, 2, 3]
[4, 5, 6]
[7, 8, 9]
 =
[2, 4, 6]
[8, 10, 12]
[14, 16, 18]
==============================
BUILD SUCCESSFUL (total time: 26 seconds)
```

2. Pengurangan :

   2x2

```
==============================
[1, 2]
[3, 4]
 -
[1, 2]
[3, 4]
 =
[0, 0]
[0, 0]
==============================
BUILD SUCCESSFUL (total time: 24 seconds)
```

   3x3

```
==============================
[1, 2, 3]
[4, 5, 6]
[7, 8, 9]
 -
[1, 2, 3]
[4, 5, 6]
[7, 8, 9]
 =
[0, 0, 0]
[0, 0, 0]
[0, 0, 0]
==============================
BUILD SUCCESSFUL (total time: 21 seconds)
```

3. Perkalian :

   2x2

```
Pilih jenis matriks :
1. 2x2
2. 3x3
1
==============================
masukkan matriks pertama : (urutan : baris1kolom1 -> baris2kolom2)
1 2 3 4
==============================
pilih operasi :
1. penjumlahan
2. pengurangan
3. perkalian
4. transpose
3
==============================
masukkan matriks kedua : (urutan : baris1kolom1 -> baris2kolom2)
1 2 3 4
==============================
[1, 2]
[3, 4]
 x
[1, 2]
[3, 4]
 =
[1, 6]
[6, 16]
==============================
BUILD SUCCESSFUL (total time: 25 seconds)
```

3x3

```
run:
Program operasi matriks
Pilih jenis matriks :
1. 2x2
2. 3x3
2
==============================
masukkan matriks pertama : (urutan : baris1kolom1 -> baris2kolom2)
1 2 3 4 5 6 7 8 9
==============================
pilih operasi :
1. penjumlahan
2. pengurangan
3. perkalian
4. transpose
3
==============================
masukkan matriks kedua : (urutan : baris1kolom1 -> baris2kolom2)
1 2 3 4 5 6 7 8 9
==============================
[1, 2, 3]
[4, 5, 6]
[7, 8, 9]
 x
[1, 2, 3]
[4, 5, 6]
[7, 8, 9]
 =
[1, 8, 21]
[8, 25, 48]
[21, 48, 81]
==============================
BUILD SUCCESSFUL (total time: 23 seconds)
```

4. Transpose :

   2x2

```
run:
Program operasi matriks
Pilih jenis matriks :
1. 2x2
2. 3x3
1
==============================
masukkan matriks pertama : (urutan : baris1kolom1 -> baris2kolom2)
1 2 3 4
==============================
pilih operasi :
1. penjumlahan
2. pengurangan
3. perkalian
4. transpose
4
==============================
[1, 2]
[3, 4]
Hasil transpose :
[1, 3]
[2, 4]
==============================
BUILD SUCCESSFUL (total time: 8 seconds)
```

3x3

```
run:
Program operasi matriks
Pilih jenis matriks :
1. 2x2
2. 3x3
2
==============================
masukkan matriks pertama : (urutan : baris1kolom1 -> baris2kolom2)
1 2 3 4 5 6 7 8 9
==============================
pilih operasi :
1. penjumlahan
2. pengurangan
3. perkalian
4. transpose
4
==============================
[1, 2, 3]
[4, 5, 6]
[7, 8, 9]
Hasil transpose :
[1, 4, 7]
[2, 5, 8]
[3, 6, 9]
==============================
BUILD SUCCESSFUL (total time: 10 seconds)
```