Nama : Restu Lestari Mulianingrum

NIM : A11.2022.14668

Kelompok : A11.4415

PRAKTIKUM 5

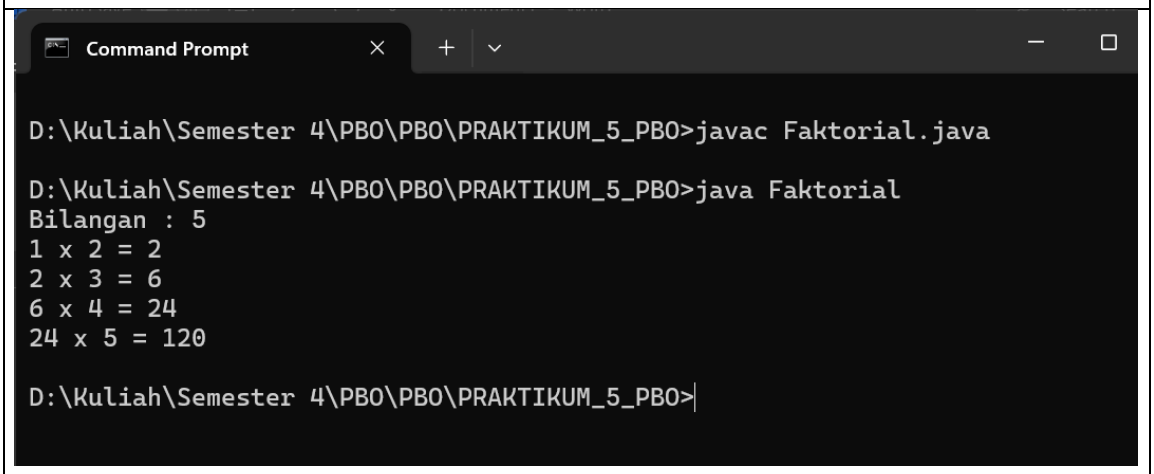
1. Perulangan (LOOP)

Latihan 1 (Program menghitung faktorial)

Code Faktorial.java

```
import java.util.Scanner;

public class Faktorial {
    public static void main(String[] args) {
        long fak = 1;
        int bil;
        Scanner in = new Scanner(System.in);
        System.out.print("Bilangan : ");
        bil = in.nextInt();
        for (int i = 2; i <= bil; i++) {
            System.out.print(fak + " x " + i + " = ");
            fak = fak * i;
            System.out.println(fak);
        }
    }
}
```

Output

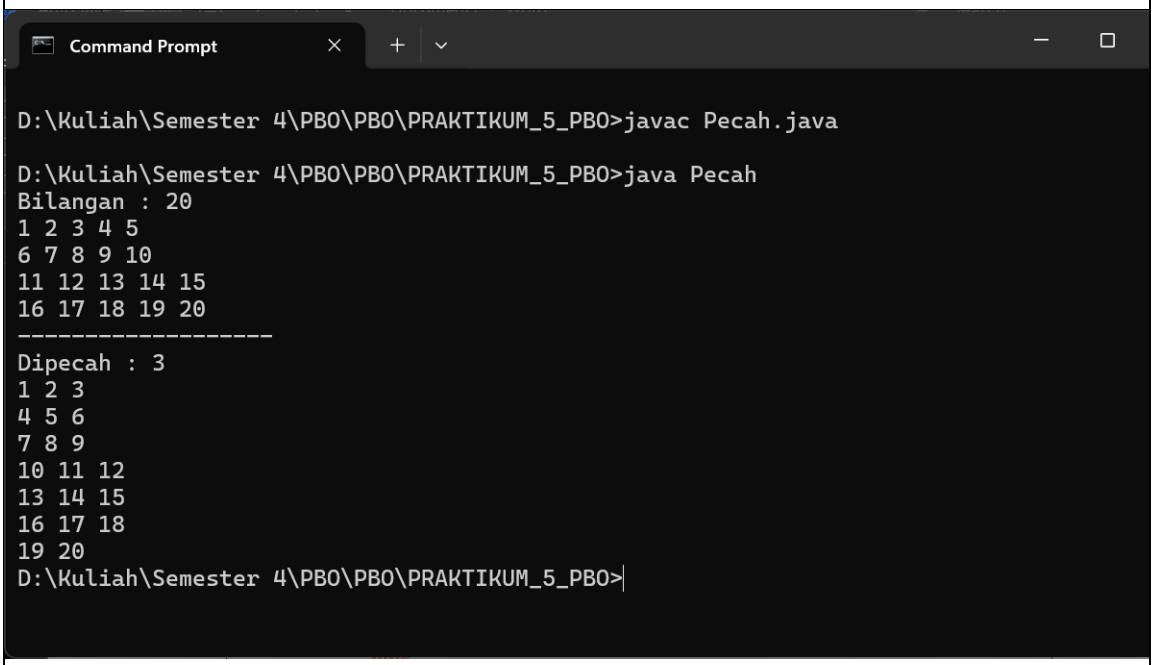


Latihan 2

Code Pecah.java

```java
import java.util.Scanner;

public class Pecah {
    public static void main(String[] args) {
        int bil, p;
        Scanner in = new Scanner(System.in);
        System.out.print("Bilangan : ");
        bil = in.nextInt();
        for (int i = 1; i <= bil; i++) {
            System.out.print(i + " ");
            if (i % 5 == 0)
                System.out.println("");
        }
        System.out.println("--------------------");
        System.out.print("Dipecah : ");
        p = in.nextInt();
        for (int i = 1; i <= bil; i++) {
            System.out.print(i + " ");
            if (i % p == 0)
                System.out.println("");
        }
    }
}
```

Output



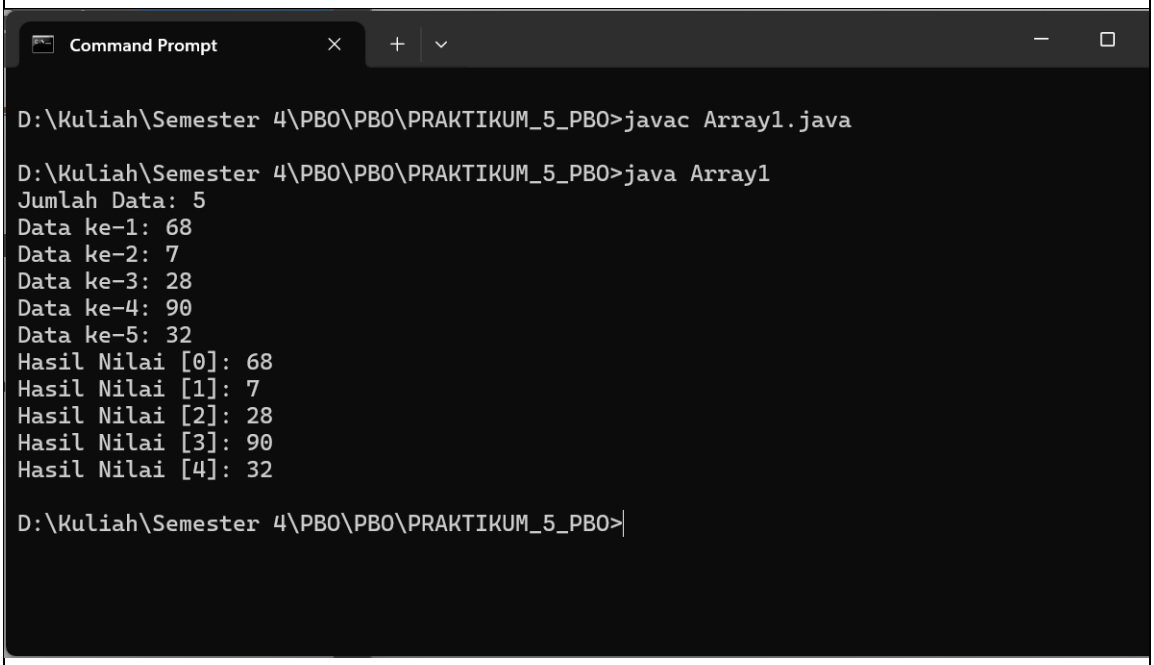
2. Array

Latihan 1

Code Array1.java

```java
import java.util.Scanner;

public class Array1 {
    public static void main(String[] args) {
        int j;
        int[] data;
        Scanner in = new Scanner(System.in);

        System.out.print("Jumlah Data: ");
        j = in.nextInt();
        data = new int[j];

        for (int i = 0; i < j; i++) {
            System.out.print("Data ke-" + (i + 1) + ": ");
            data[i] = in.nextInt();
        }

        for (int i = 0; i < j; i++) {
            System.out.println("Hasil Nilai [" + i + "]: " + data[i]);
        }
    }
}
```

Output



Latihan 2

Code Nilai.java

```
import java.util.Scanner;

public class Nilai {
    String nim;
    String nama;
    float nilaiUts, nilaiTugas, nilaiUas, pNilaiTugas, pNilaiUts,
pNilaiUas, nilaiAkhir;
    String predikat;
    String nHuruf;

    Scanner key = new Scanner(System.in);

    public Nilai() {
    }; // konstruktor

    public Nilai(String nim, String nama, float nilaiUts, float
nilaiTugas, float nilaiUas) {
        this.nim = nim;
        this.nama = nama;
        this.nilaiUts = nilaiUts;
        this.nilaiTugas = nilaiTugas;
        this.nilaiUas = nilaiUas;
    }

    void inputNilai() {
        System.out.print("Nim       : ");
        nim = key.nextLine();
        System.out.print("Nama      : ");
        nama = key.nextLine();
        System.out.print("Nilai Tugas   : ");
        nilaiTugas = key.nextFloat();
        System.out.print("Nilai UTS : ");
        nilaiUts = key.nextFloat();
        System.out.print("Nilai UAS : ");
        nilaiUas = key.nextFloat();
    }

    void hitungNilai() {
        pNilaiTugas = nilaiTugas * 0.20f;
        pNilaiUts = nilaiUts * 0.35f;
        pNilaiUas = nilaiUas * 0.45f;
        nilaiAkhir = pNilaiUts + pNilaiTugas + pNilaiUas;
    }

    String getNilHuruf(float nilai) {
```

```
        if (nilai >= 85)
            nHuruf = "A";
        else if (nilai >= 70 && nilai < 85)
            nHuruf = "B";
        else if (nilai >= 60 && nilai < 70)
            nHuruf = "C";
        else if (nilai >= 40 && nilai < 60)
            nHuruf = "D";
        else
            nHuruf = "E";
        return nHuruf;
    }

    String getPredikat(String huruf) {
        switch (huruf) {
            case "A":
                predikat = "Apik";
                break;
            case "B":
                predikat = "Baik";
                break;
            case "C":
                predikat = "Cukup";
                break;
            case "D":
                predikat = "Dablek";
                break;
            default:
                predikat = "Elek";
        }
        return predikat;
    }

    void cetakNilai() {
        hitungNilai();
        System.out.println("-----------------------------------------
---------------");
        System.out.println("NIM         : " + nim);
        System.out.println("Nama        : " + nama);
        System.out.println("Nilai UTS   : " + nilaiUts + " 20%   : " +
pNilaiUts);
        System.out.println("Nilai Tugas : " + nilaiTugas + " 35%   : " +
pNilaiTugas);
        System.out.println("Nilai UAS   : " + nilaiUas + " 45%   : " +
pNilaiUas);
        System.out.println("Nilai Akhir : " + nilaiAkhir);
        System.out.println("Nilai Huruf : " + getNilHuruf(nilaiAkhir));
        System.out.println("Predikat    : " + getPredikat(nHuruf));
```

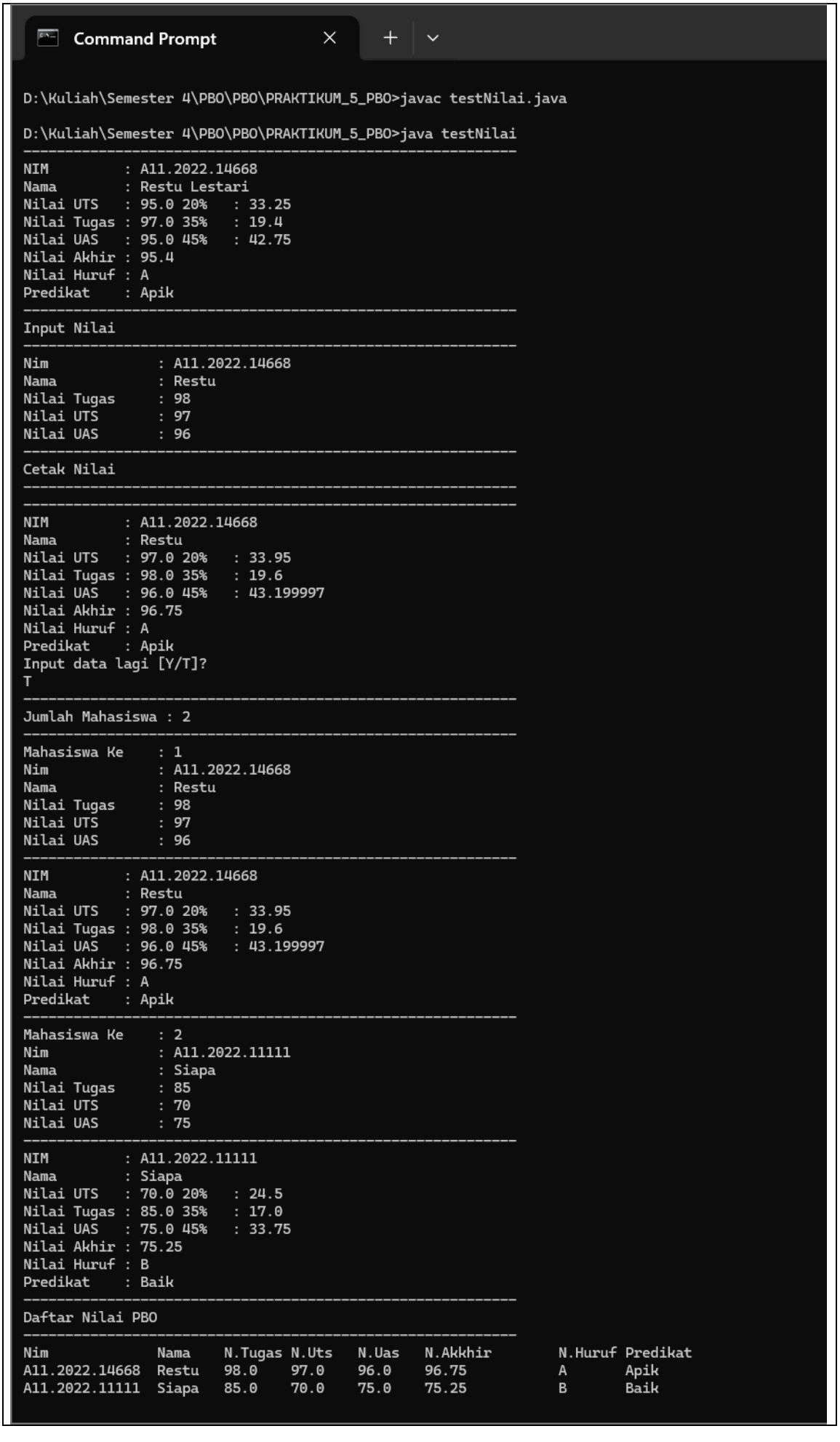
```
    }

    void judul(){
        System.out.println("-----------------------------------------
--------------");
        System.out.println("Daftar Nilai PBO");
        System.out.println("-----------------------------------------
--------------");
        System.out.println("Nim\t\tNama\tN.Tugas\tN.Uts\tN.Uas\tN.Akkhir
"+"\tN.Huruf\tPredikat");
    }

    void daftarNilai(){
        System.out.println(nim+"\t"+nama+"\t"+nilaiTugas+"\t"+nilaiUts+"
\t"+nilaiUas+"\t"+nilaiAkhir+"\t\t"+nHuruf+"\t"+predikat);
    }

}
```

Code testNilai.java

```
import java.util.Scanner;
import java.io.*;

public class testNilai {
    public static void main(String[] args) throws IOException {
        Scanner input = new Scanner(System.in);
        BufferedReader br = new BufferedReader(
                new InputStreamReader(System.in));
        String inputLagi = "";

        Nilai nilaiku = new Nilai();
        nilaiku.nim = "A11.2022.14668";
        nilaiku.nama = "Restu Lestari";
        nilaiku.nilaiTugas = 97;
        nilaiku.nilaiUts = 95;
        nilaiku.nilaiUas = 95;
        nilaiku.hitungNilai();
        nilaiku.cetakNilai();

        do {
            Nilai mahasiswa1 = new Nilai();
            System.out.println("-----------------------------------------
-------------------");
            System.out.println("Input Nilai ");
            System.out.println("-----------------------------------------
-------------------");
            mahasiswa1.inputNilai();
```

```
            mahasiswa1.hitungNilai();
            System.out.println("----------------------------------------
-------------------");
            System.out.println("Cetak Nilai ");
            System.out.println("----------------------------------------
-------------------");
            mahasiswa1.cetakNilai();

            System.out.println("Input data lagi [Y/T]? ");
            inputLagi = input.nextLine();
        } while (inputLagi.equalsIgnoreCase("Y"));

        System.out.println("----------------------------------------
---------------");
        System.out.print("Jumlah Mahasiswa : ");
        int n = input.nextInt();
        Nilai[] nilaibyk = new Nilai[n];
        for (int i = 0; i < n; i++) {
            System.out.println("----------------------------------------
-------------------");
            System.out.println("Mahasiswa Ke    : " + (i + 1));
            nilaibyk[i] = new Nilai();
            nilaibyk[i].inputNilai();
            nilaibyk[i].hitungNilai();
            nilaibyk[i].cetakNilai();
        }
        nilaibyk[0].judul();
        for (int i = 0; i < n; i++) {
            nilaibyk[i].daftarNilai();
        }
    }

}
```

Output


Command Prompt
D:\Kuliah\Semester 4\PBO\PBO\PRAKTIKUM_5_PBO>javac testNilai.java
D:\Kuliah\Semester 4\PBO\PBO\PRAKTIKUM_5_PBO>java testNilai
NIM : A11.2022.14668
Nama : Restu Lestari
Nilai UTS : 95.0 20% : 33.25
Nilai Tugas : 97.0 35% : 19.4
Nilai UAS : 95.0 45% : 42.75
Nilai Akhir : 95.4
Nilai Huruf : A
Predikat : Apik
Input Nilai
Nim : A11.2022.14668
Nama : Restu
Nilai Tugas : 98
Nilai UTS : 97
Nilai UAS : 96
Cetak Nilai
NIM : A11.2022.14668
Nama : Restu
Nilai UTS : 97.0 20% : 33.95
Nilai Tugas : 98.0 35% : 19.6
Nilai UAS : 96.0 45% : 43.199997
Nilai Akhir : 96.75
Nilai Huruf : A
Predikat : Apik
Input data lagi [Y/T]?
T
Jumlah Mahasiswa : 2
Mahasiswa Ke : 1
Nim : A11.2022.14668
Nama : Restu
Nilai Tugas : 98
Nilai UTS : 97
Nilai UAS : 96
NIM : A11.2022.14668
Nama : Restu
Nilai UTS : 97.0 20% : 33.95
Nilai Tugas : 98.0 35% : 19.6
Nilai UAS : 96.0 45% : 43.199997
Nilai Akhir : 96.75
Nilai Huruf : A
Predikat : Apik
Mahasiswa Ke : 2
Nim : A11.2022.11111
Nama : Siapa
Nilai Tugas : 85
Nilai UTS : 70
Nilai UAS : 75
NIM : A11.2022.11111
Nama : Siapa
Nilai UTS : 70.0 20% : 24.5
Nilai Tugas : 85.0 35% : 17.0
Nilai UAS : 75.0 45% : 33.75
Nilai Akhir : 75.25
Nilai Huruf : B
Predikat : Baik
Daftar Nilai PBO
Nim Nama N.Tugas N.Uts N.Uas N.Akkhir N.Huruf Predikat
A11.2022.14668 Restu 98.0 97.0 96.0 96.75 A Apik
A11.2022.11111 Siapa 85.0 70.0 75.0 75.25 B Baik

Latihan 3

Code Sorting.java

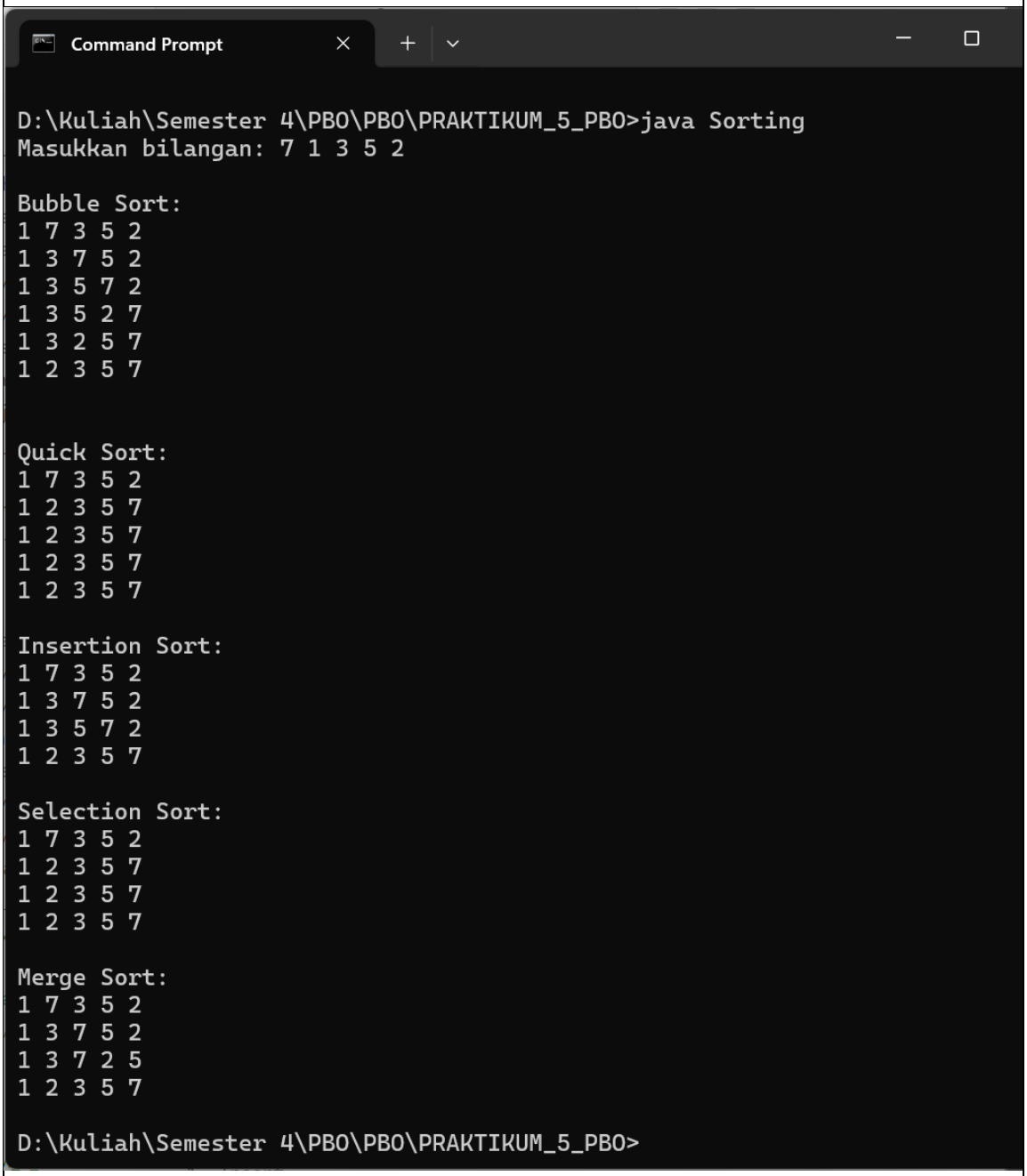
```
import java.util.Scanner;

public class Sorting{
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Masukkan bilangan: ");
        String input = scanner.nextLine();
        String[] inputArr = input.split(" ");
        int[] arr = new int[inputArr.length];
        for (int i = 0; i < inputArr.length; i++) {
            arr[i] = Integer.parseInt(inputArr[i]);
        }

        System.out.println("\nBubble Sort:");
        Sorting.bubbleSort(arr.clone());

        System.out.println("\nQuick Sort:");
        Sorting.quickSort(arr.clone(), 0, arr.length - 1);

        System.out.println("\nInsertion Sort:");
        Sorting.insertionSort(arr.clone());

        System.out.println("\nSelection Sort:");
        Sorting.selectionSort(arr.clone());

        System.out.println("\nMerge Sort:");
        Sorting.mergeSort(arr.clone(), 0, arr.length - 1);
    }

    static void bubbleSort(int arr[]){
        int n = arr.length;
        for (int i = 0; i < n - 1; i++) {
            for (int j = 0; j < n - i - 1; j++) {
                if (arr[j] > arr[j + 1]) {
                    int temp = arr[j];
                    arr[j] = arr[j + 1];
                    arr[j + 1] = temp;
                    printArray(arr);
                }
            }
        }
        System.out.println();
    }
    static void swap(int[] arr, int i, int j){
```

```
        int temp = arr[i];
        arr[i] = arr[j];
        arr[j] = temp;
    }
    static void quickSort(int[] arr, int low, int high){
        if (low < high) {
            int pivot = arr[high];
            int i = (low - 1);
            for(int j = low; j <= high - 1; j++) {
                if (arr[j] < pivot) {
                    i++;
                    swap(arr, i, j);
                    printArray(arr);
                }
            }
            swap(arr, i + 1, high);
            quickSort(arr, low, i - 1);
            quickSort(arr, i + 1, high);
        }
    }

    public static void insertionSort(int arr[]){
        int n = arr.length;
        for (int i = 1; i < n; ++i) {
            int key = arr[i];
            int j = i - 1;
            while (j >= 0 && arr[j] > key) {
                arr[j + 1] = arr[j];
                j = j - 1;
            }
            arr[j + 1] = key;
            printArray(arr);
        }
    }

    public static void selectionSort(int arr[]){
        int n = arr.length;
        for (int i = 0; i < n-1; i++){
            int min_idx = i;
            for (int j = i+1; j < n; j++)
            if (arr[j] < arr[min_idx])
            min_idx = j;
            int temp = arr[min_idx];
            arr[min_idx] = arr[i];
            arr[i] = temp;
            printArray(arr);
        }
    }
```

```java
    public static void merge(int arr[], int l, int m, int r){
        int n1 = m - l + 1;
        int n2 = r - m;
        int L[] = new int[n1];
        int R[] = new int[n2];
        for (int i = 0; i < n1; ++i)
        L[i] = arr[l + i];
        for (int j = 0; j < n2; ++j)
        R[j] = arr[m + 1 + j];
        int i = 0, j = 0;
        int k = l;
        while (i < n1 && j < n2) {
            if (L[i] <= R[j]) {
                arr[k] = L[i];
                i++;
            }
            else {
                arr[k] = R[j];
                j++;
            }
            k++;
        }

        while (i < n1) {
            arr[k] = L[i];
            i++;
            k++;
            printArray(arr);
        }

        while (j < n2) {
            arr[k] = R[j];
            j++;
            k++;
            printArray(arr);
        }
    }

    public static void mergeSort(int arr[], int l, int r){
        if (l < r) {
            int m = l + (r - l) / 2;
            mergeSort(arr, l, m);
            mergeSort(arr, m + 1, r);
            merge(arr, l, m, r);
        }
    }
    static void printArray(int arr[]){
        int n = arr.length;
```

```
        for (int i = 0; i < n; ++i) {
            System.out.print(arr[i] + " ");
        }
        System.out.println();
    }
}
```

Output



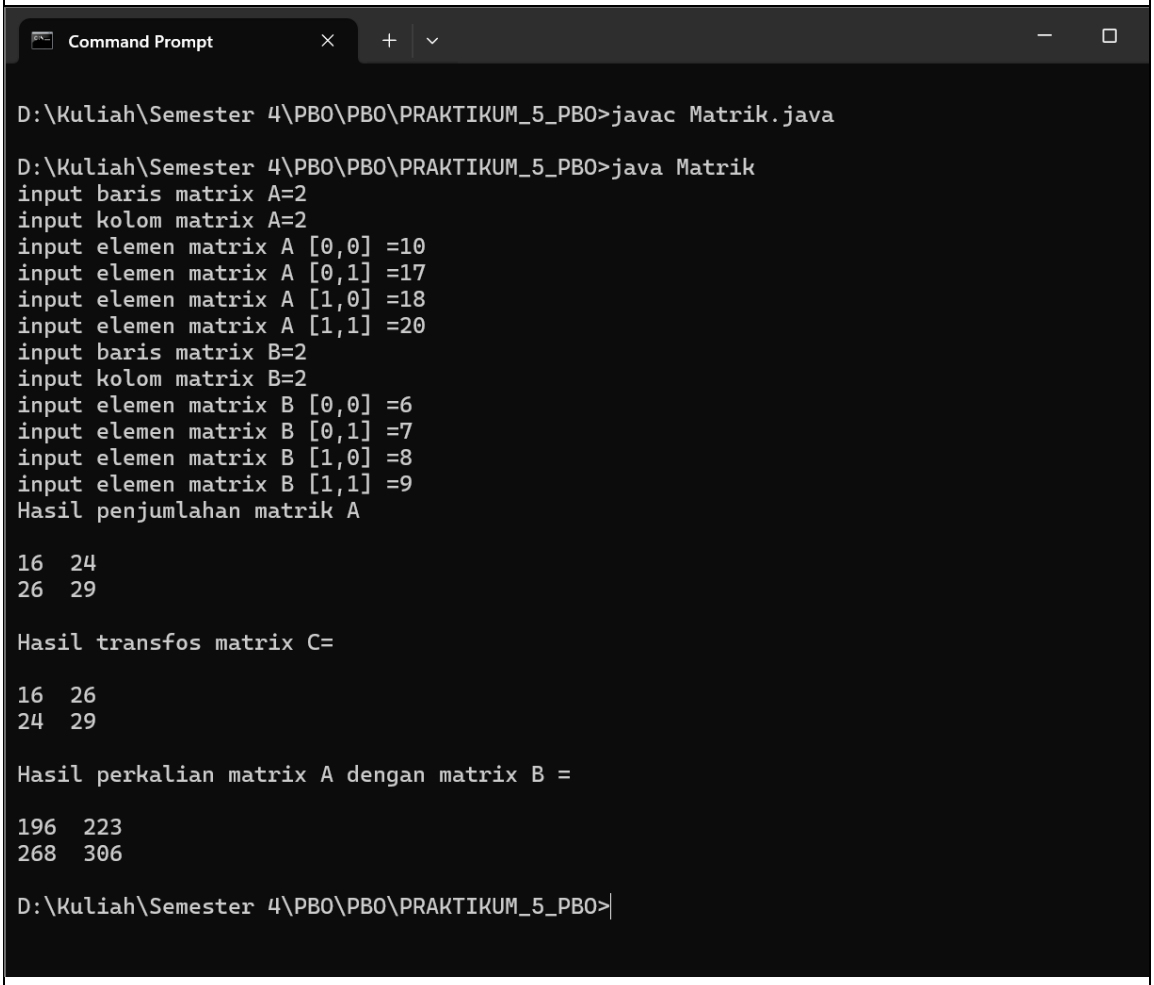
Latihan 4

Code Matrik.java

```
import java.util.Scanner;

public class Matrik {
   public static void main(String[] args) {
      Scanner in = new Scanner(System.in);
      int[][] A = new int[10][10];
      int[][] B = new int[10][10];
      int[][] C = new int[10][10];
      int[][] D = new int[10][10];
      int[][] E = new int[10][10];

      int jlh = 0, hsl = 1, i, j, n, m, a, b, k;

      System.out.print("input baris matrix A=");
      n = in.nextInt();
      System.out.print("input kolom matrix A=");
      m = in.nextInt();
      for (i = 0; i < n; i++) {
         for (j = 0; j < m; j++) {
            System.out.print("input elemen matrix A [" + i + "," + j +
"] =");
            A[i][j] = in.nextInt();
         }
      }
      System.out.print("input baris matrix B=");
      a = in.nextInt();
      System.out.print("input kolom matrix B=");
      b = in.nextInt();
      for (i = 0; i < n; i++) {
         for (j = 0; j < m; j++) {
            System.out.print("input elemen matrix B [" + i + "," + j +
"] =");
            B[i][j] = in.nextInt();
         }
      }
      if (n == a && m == b) {
         System.out.println("Hasil penjumlahan matrik A\n");
         for (i = 0; i < n; i++) {
            for (j = 0; j < m; j++) {
               C[i][j] = A[i][j] + B[i][j];
               System.out.print(C[i][j] + "  ");
            }
            System.out.println();
         }
         System.out.println("\nHasil transfos matrix C=\n");
```

```
            for (i = 0; i < n; i++) {
               for (j = 0; j < m; j++) {
                  D[i][j] = C[j][i];
                  System.out.print(D[i][j] + "  ");
               }
               System.out.println();
            }
         } else
            System.out.println("data tidak dapat diproses");
         if (m == a) {
            for (i = 0; i < n; i++) {
               for (j = 0; j < b; j++) {
                  E[i][j] = 0;
                  for (k = 0; k < a; k++) {
                     E[i][j] = E[i][j] + (A[i][k] * B[k][j]);
                  }
               }
            }
            System.out.println("\nHasil perkalian matrix A dengan matrix B
=\n");
            for (i = 0; i < n; i++) {
               for (j = 0; j < b; j++) {
                  System.out.print(E[i][j] + "  ");
               }
               System.out.println();
            }
         } else
            System.out.println("data tidak bisa di proses");
      }
}
```

Output



ArrayList

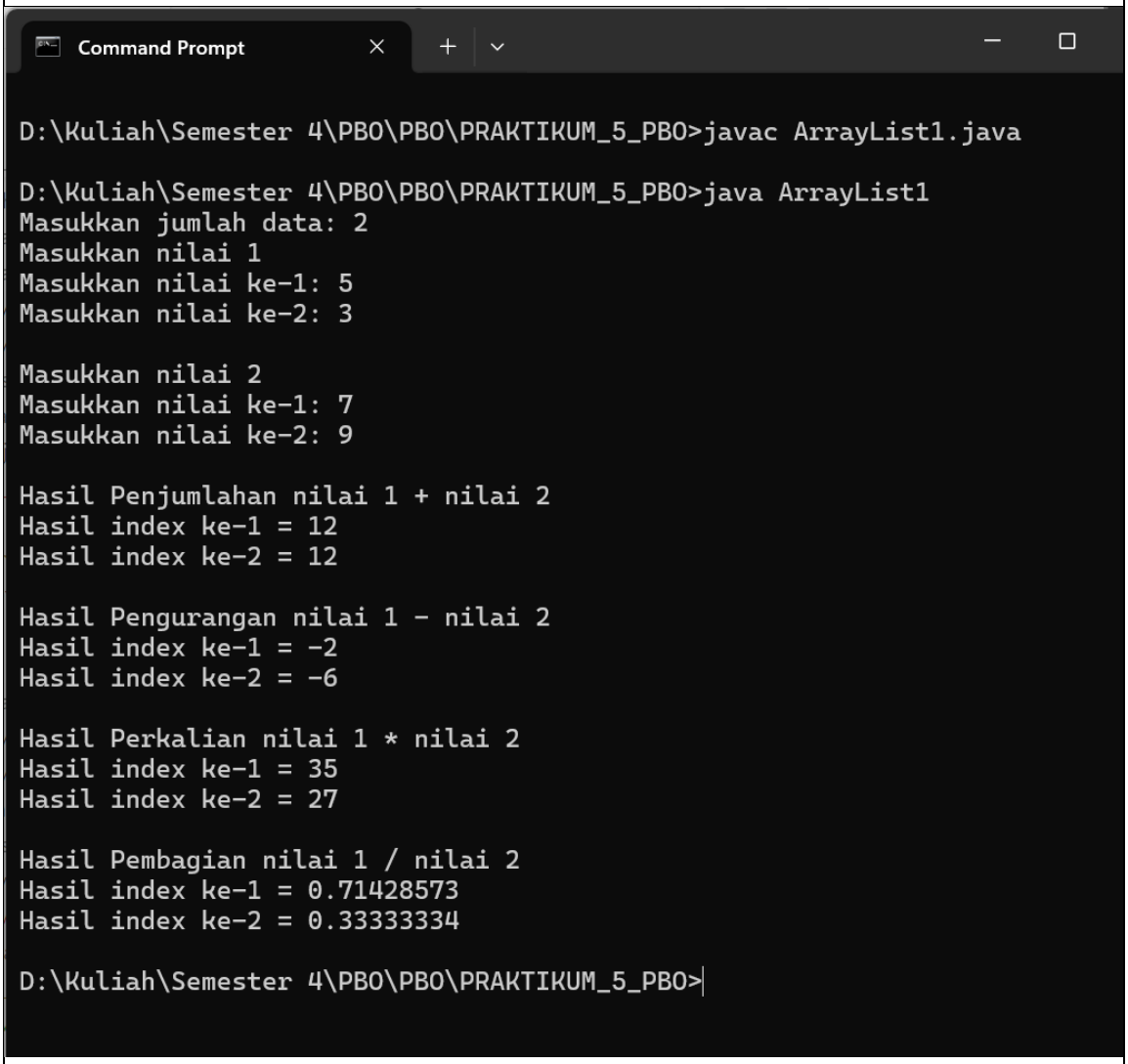
Code ArrayList1.java

```java
import java.util.ArrayList;
import java.util.Scanner;

public class ArrayList1 {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Masukkan jumlah data: ");
        int jumlahData = scanner.nextInt();

        ArrayList<Integer> nilai1 = new ArrayList<Integer>();
        ArrayList<Integer> nilai2 = new ArrayList<Integer>();
        ArrayList<Integer> jumlah = new ArrayList<Integer>();
        ArrayList<Integer> kurang = new ArrayList<Integer>();
        ArrayList<Integer> kali = new ArrayList<Integer>();
        ArrayList<Float> bagi = new ArrayList<Float>();
```

```
        System.out.println("Masukkan nilai 1");
        for (int i = 0; i < jumlahData; i++) {
            System.out.print("Masukkan nilai ke-" + (i+1) + ": ");
            nilai1.add(scanner.nextInt());
        }
        System.out.println();

        System.out.println("Masukkan nilai 2");
        for (int i = 0; i < jumlahData; i++) {
            System.out.print("Masukkan nilai ke-" + (i+1) + ": ");
            nilai2.add(scanner.nextInt());
        }
        System.out.println();

        // Penjumlahan
        for (int i = 0; i < jumlahData; i++) {
            jumlah.add(nilai1.get(i) + nilai2.get(i));
        }
        System.out.println("Hasil Penjumlahan nilai 1 + nilai 2");
        for (int i = 0; i < jumlahData; i++) {
            System.out.println("Hasil index ke-" + (i+1) + " = " +
jumlah.get(i));
        }
        System.out.println();

        // Pengurangan
        for (int i = 0; i < jumlahData; i++) {
            kurang.add(nilai1.get(i) - nilai2.get(i));
        }
        System.out.println("Hasil Pengurangan nilai 1 - nilai 2");
        for (int i = 0; i < jumlahData; i++) {
            System.out.println("Hasil index ke-" + (i+1) + " = " +
kurang.get(i));
        }
        System.out.println();

        // Perkalian
        for (int i = 0; i < jumlahData; i++) {
            kali.add(nilai1.get(i) * nilai2.get(i));
        }
        System.out.println("Hasil Perkalian nilai 1 * nilai 2");
        for (int i = 0; i < jumlahData; i++) {
            System.out.println("Hasil index ke-" + (i+1) + " = " +
kali.get(i));
        }
        System.out.println();
```

```
        // Pembagian
        for (int i = 0; i < jumlahData; i++) {
            bagi.add((float) nilai1.get(i) / nilai2.get(i));
        }
        System.out.println("Hasil Pembagian nilai 1 / nilai 2");
        for (int i = 0; i < jumlahData; i++) {
            System.out.println("Hasil index ke-" + (i+1) + " = " +
bagi.get(i));
        }

        scanner.close();
    }
}
```

Output



Impementasi Queue/Antrian

Code QueueImplement.java

```
import java.util.LinkedList;
import java.util.Queue;
import java.util.Scanner;

public class QueueImplement {
    public static void main(String[] args) {
        QueueImplement mine = new QueueImplement();
        mine.menu();
    }

    Queue<Integer> antrian = new LinkedList<>();
    Scanner input = new Scanner(System.in);
    int max = 5, top = 0;

    public void insert() {
        System.out.print("\nInput number : ");
        antrian.add(input.nextInt());
        this.top++;
    }

    public void pop() {
        System.out.print("Select the data you want to delete  : ");
        antrian.remove(input.nextInt());
        this.top--;
    }

    public void menu() {
        String choose;
        do {
            System.out.println("\nQUEUE OPERATIONS");
            System.out.println("1. Insert");
            System.out.println("2. Remove");
            System.out.println("3. Peek");
            System.out.println("4. Check Empty");
            System.out.println("5. Check Full");
            System.out.println("6. Size");
            System.out.println("7. Exit");
            System.out.print("\nYour Choice ? : ");
            int pilih = input.nextInt();
            switch (pilih) {
                case 1:
                    if (top < max) {
                        insert();
                        System.out.println("Queue = " + antrian);
                    } else {
```

```
                        System.out.println("Queue full!\n");
                    }
                    break;
                case 2:
                    if (top != 0) {
                        System.out.println("Queue = " + antrian);
                        pop();
                        System.out.println("New Queue = " + antrian);
                    } else {
                        System.out.println("Queue empty!\n");
                    }
                    break;
                case 3:
                    if (top != 0) {
                        System.out.println("First Data in the Queue = "
+ antrian.peek());
                    } else {
                        System.out.println("Queue empty!\n");
                    }
                    break;
                case 4:
                    if (top == 0) {
                        System.out.println("Queue is empty");
                    } else {
                        System.out.println("Queue is not empty");
                    }
                    break;
                case 5:
                    if (top == max) {
                        System.out.println("Queue full!\n");
                    } else {
                        System.out.println((max - top) + " more slot(s)
available");
                    }
                    break;
                case 6:
                    System.out.println("Size = " + antrian.size());
                    System.out.println("Queue = " + antrian);
                    break;
                case 7:
                    input.close();
                    System.exit(0);
                default:
                    System.out.println("Invalid input!\n");
                    break;
            }
            System.out.print("Do you want to continue? <Y or N> : ");
            choose = input.next();
```

```
        } while (choose.equalsIgnoreCase("Y"));
        input.close();
    }
}
```

Output