

Seri bahan kuliah Algeo #10 – Update 2025

Pengantar Pemrograman dengan Bahasa Java

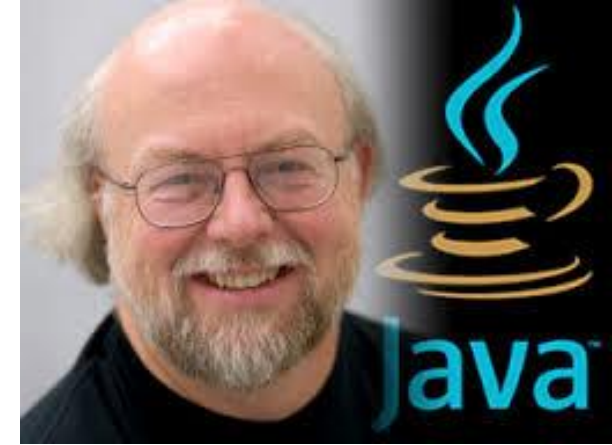
Edisi 2025

IF2123 Aljabar Geometri



Sekolah Teknik Elektro dan Informatika
ITB

Sejarah Bahasa Java



James Gosling

- Bahasa java dibuat oleh James Gosling saat masih bergabung di *Sun Microsystems* dan dirilis tahun 1995.
- Bahasa Java dapat dijalankan pada berbagai komputer dan *platform* sistem operasi.
- Slogan Java: *Write once, run anywhere!* (Tulis sekali, jalankan di manapun)
- Java adalah bahasa pemrograman bersifat umum (*general purpose*)
- Sintaks Bahasa Java diadopsi dari Bahasa C dan C++ tetapi lebih sederhana
- Nama “java” diambil dari jenis kopi yang diminum oleh James Gosling saat itu.

- Java termasuk Bahasa pemrograman yang populer untuk mengembangkan aplikasi, termasuk aplikasi berbasis web.



Gambar 1. Sepuluh (10) bahasa pemrograman top 2018:

IEEE Ranked the Top Programming Languages of 2019.

2019

Rank	Language	Type	Score
1	Python	  	100.0
2	Java	  	96.3
3	C	  	94.4
4	C++	  	87.5
5	R		81.5
6	JavaScript		79.4
7	C#	   	74.5
8	Matlab		70.6
9	Swift	 	69.1
10	Go	 	68.0

Sumber:

<https://learnworthy.net/ieee-ranked-the-top-programming-languages-of-2019/>

2020

IEEE Ranked the Top Programming Languages of 2020

Rank	Language	Type	Score
1	Python ▼	  	100.0
2	Java ▼	  	95.3
3	C ▼	  	94.6
4	C++ ▼	  	87.0
5	JavaScript ▼		79.5
6	R ▼		78.6
7	Arduino ▼		73.2
8	Go ▼	 	73.1
9	Swift ▼	 	70.5
10	Matlab ▼		68.4

2021

IEEE Ranked the Top Programming Languages of 2021

Rank	Language	Type	Score
1	Python✓	  	100.0
2	Java✓	  	95.4
3	C✓	  	94.7
4	C++✓	  	92.4
5	JavaScript✓		88.1
6	C#✓	   	82.4
7	R✓		81.7
8	Go✓	 	77.7
9	HTML✓		75.4
10	Swift✓	 	70.4

Source: <https://spectrum.ieee.org/top-programming-languages-2021>

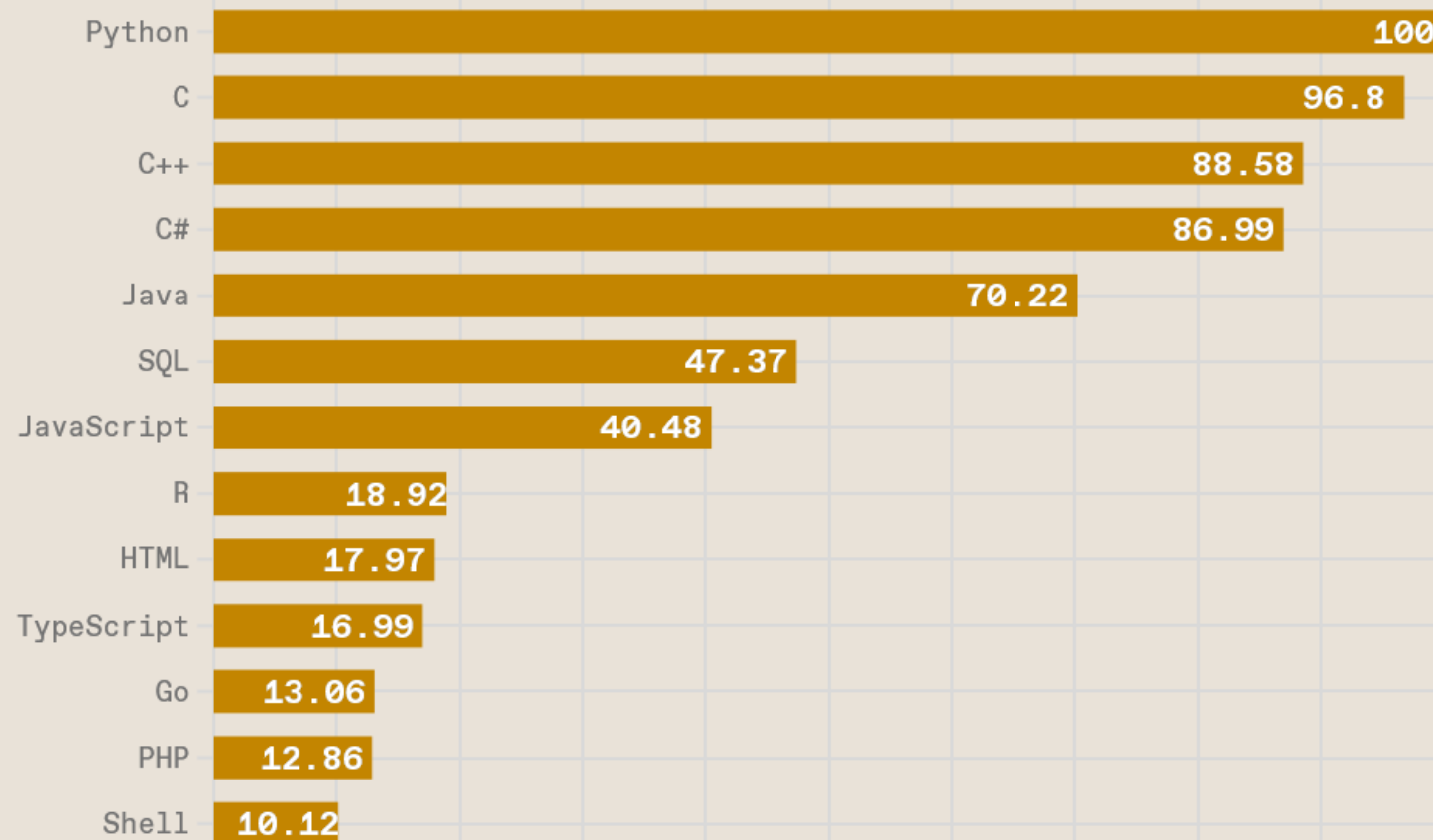
Top Programming Languages 2022

Click a button to see a differently weighted ranking

Spectrum

Jobs

Trending

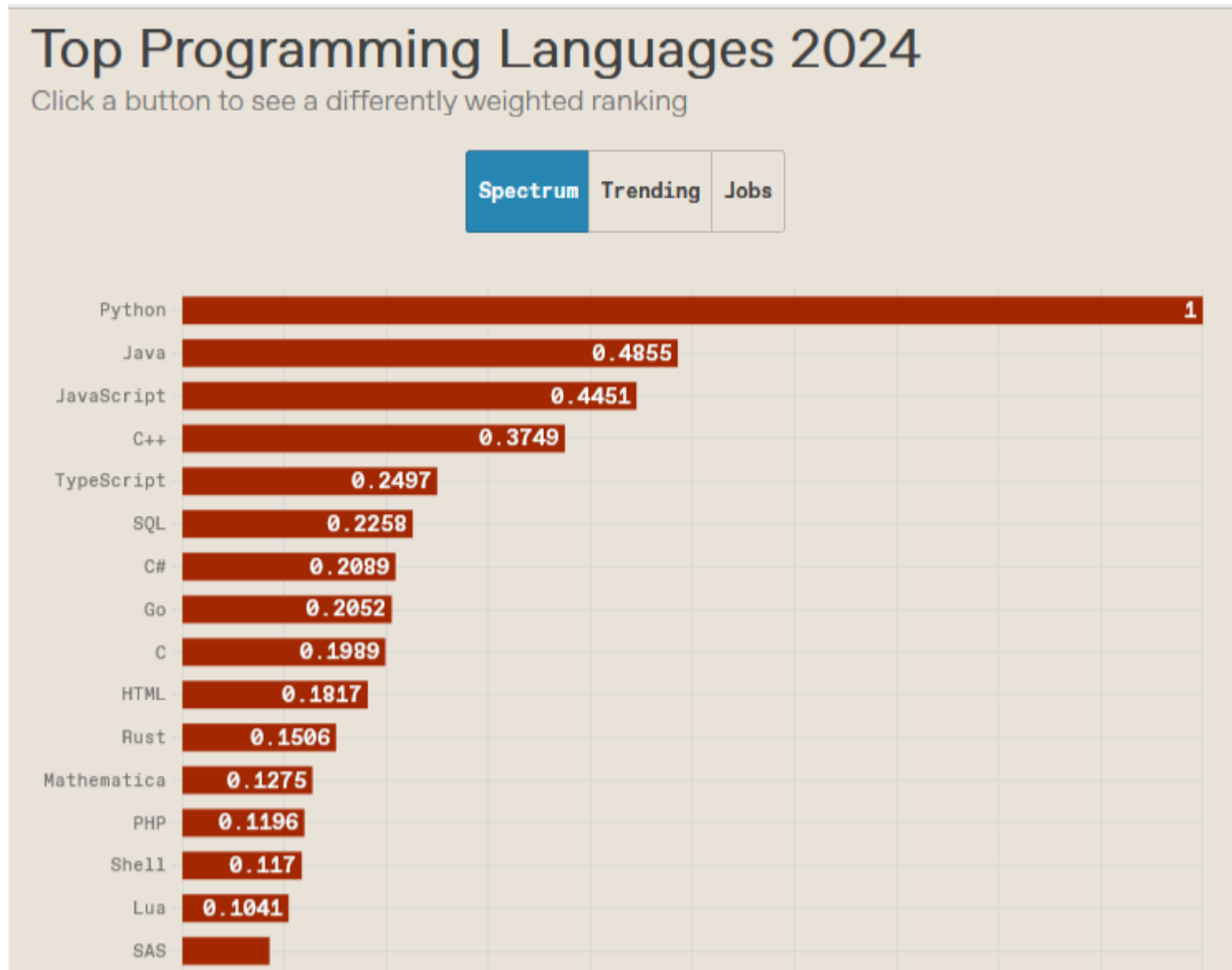


<https://spectrum.ieee.org/top-programming-languages-2022>

IEEE Ranked the Top Programming Languages of 2023.

Language Rank	Types	Spectrum Ranking
1. Python	 	100.0
2. C	  	99.7
3. Java	  	99.5
4. C++	  	97.1
5. C#	  	87.7
6. R		87.7
7. JavaScript	 	85.6
8. PHP		81.2
9. Go	 	75.1
10. Swift	 	73.7

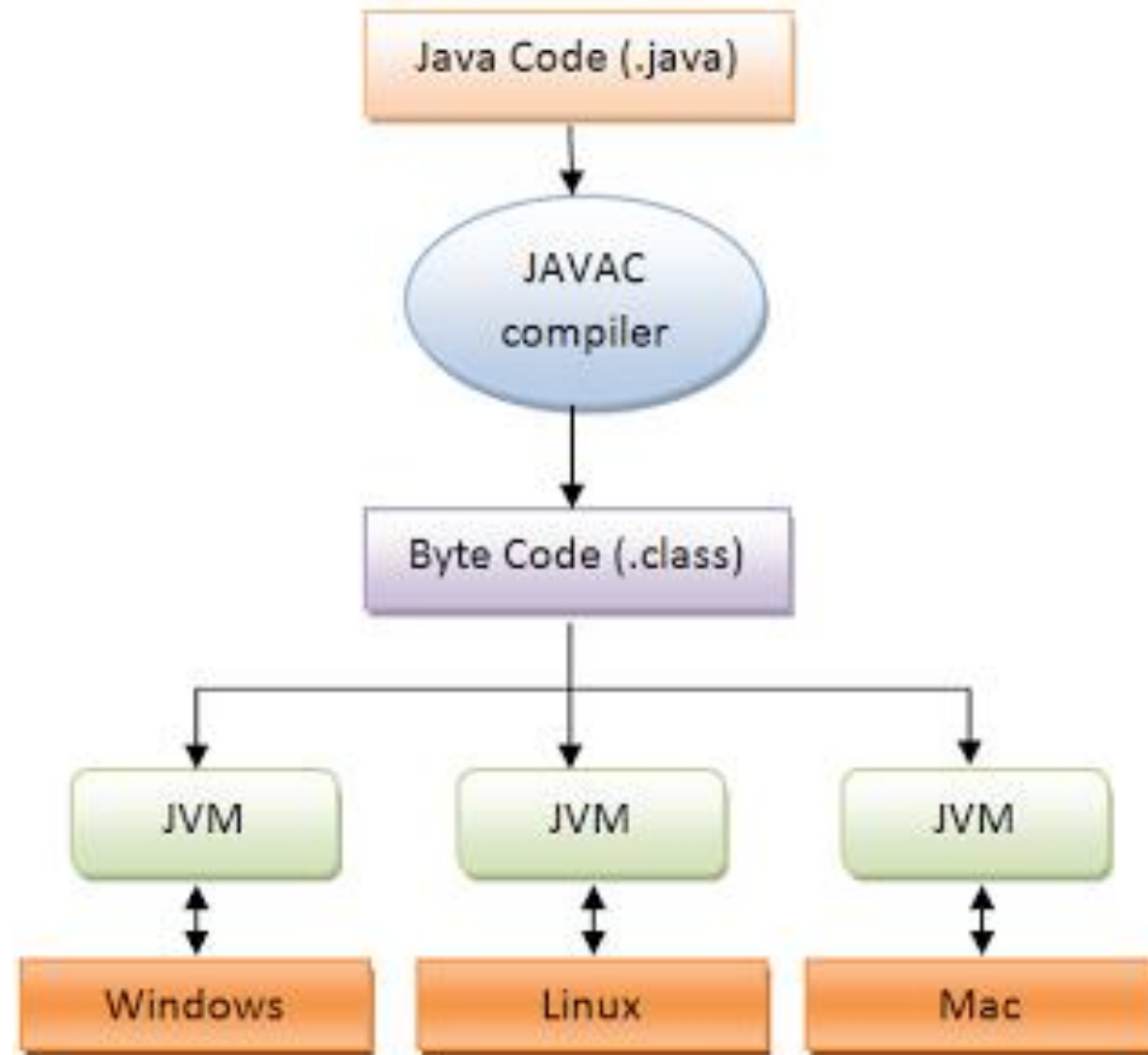
IEEE Ranked the Top Programming Languages of 2024



Teknologi Java = Bahasa pemrograman + platform

Java Sebagai Bahasa Pemrograman

- Bahasa java memiliki karakteristik: *sederhana, berorientasi objek, interpreted, terdistribusi, tangguh, portable, memiliki kinerja tinggi, aman, dinamis*. (Baca di: <http://java.sun.com/docs/white/langenv/>)
- *Compiler* java mengubah kode program menjadi bahasa *intermediate* yang disebut *java bytecode*. Kemudian *interpreter* Java bernama JVM (*Java Virtual Machine*) melakukan interpretasi *bytecode* setiap kali *bytecode* tersebut dijalankan.



Gambar 2. Proses kompilasi dan interpretasi program Java
(Sumber gambar: <http://belajarjava-19.blogspot.co.id>)

Java Sebagai Sebuah *Platform*

- *Platform* adalah lingkungan perangkat keras dan perangkat lunak untuk menjalankan program.
- Java adalah *platform* perangkat lunak untuk menjalankan program java.
- *Platform* java terdiri dari dua komponen:
 1. *Java Virtual Machine* (JVM)
 2. *Java Application Programming Interface* (Java API)

1. JVM

- JVM pada dasarnya adalah aplikasi sederhana yang ditulis dalam bahasa C yang menyediakan lingkungan *runtime* untuk menjalankan kode dalam bahasa Java.

- Cara kerja JVM: Pada saat eksekusi, JVM membaca *bytecode*, lalu mengubahnya ke bahasa mesin yang sesuai dengan komputer yang menjalankannya.
- JVM merupakan bagian integral dari *Java Runtime Environment* (JRE).
- Proses kompilasi bahasa java menghasilkan *bytecode* yang selalu sama untuk setiap sistem operasi atau jenis mesinnya, tetapi JVM akan mengubah *bytecode* menjadi bahasa mesin tujuannya.

2. Java API

- Java API merupakan *library* yang disediakan java untuk mengembangkan program java. Java API berisi sekumpulan komponen perangkat lunak yang memudahkan pemrogram java mengembangkan aplikasi.

Kakas Pemrograman Java

Untuk membuat program java, diperlukan beberapa kakas:

1. *Java Development Kit (JDK)*

Unduh paket JDK (*Java Development Kit*) java terbaru dari laman:

<https://www.oracle.com/id/java/technologies/downloads/>

2. Editor teks

Sembarang editor teks seperti *Notepad*, *Ultraedit*, *Wordpad*, *Vi*, atau *Joe*

←

→

↺

https://www.oracle.com/id/java/technologies/downloads/

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JDK Development Kit 20.0.2 downloads

Java 20 and Java 17 available now

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Learn about Java SE Subscription

JDK 20JDK 17GraalVM for JDK 20GraalVM for JDK 17

JDK Development Kit 20.0.2 downloads

JDK 20 binaries are free to use in production and free to redistribute, at no cost, under the [Oracle No-Fee Terms and Conditions](#).

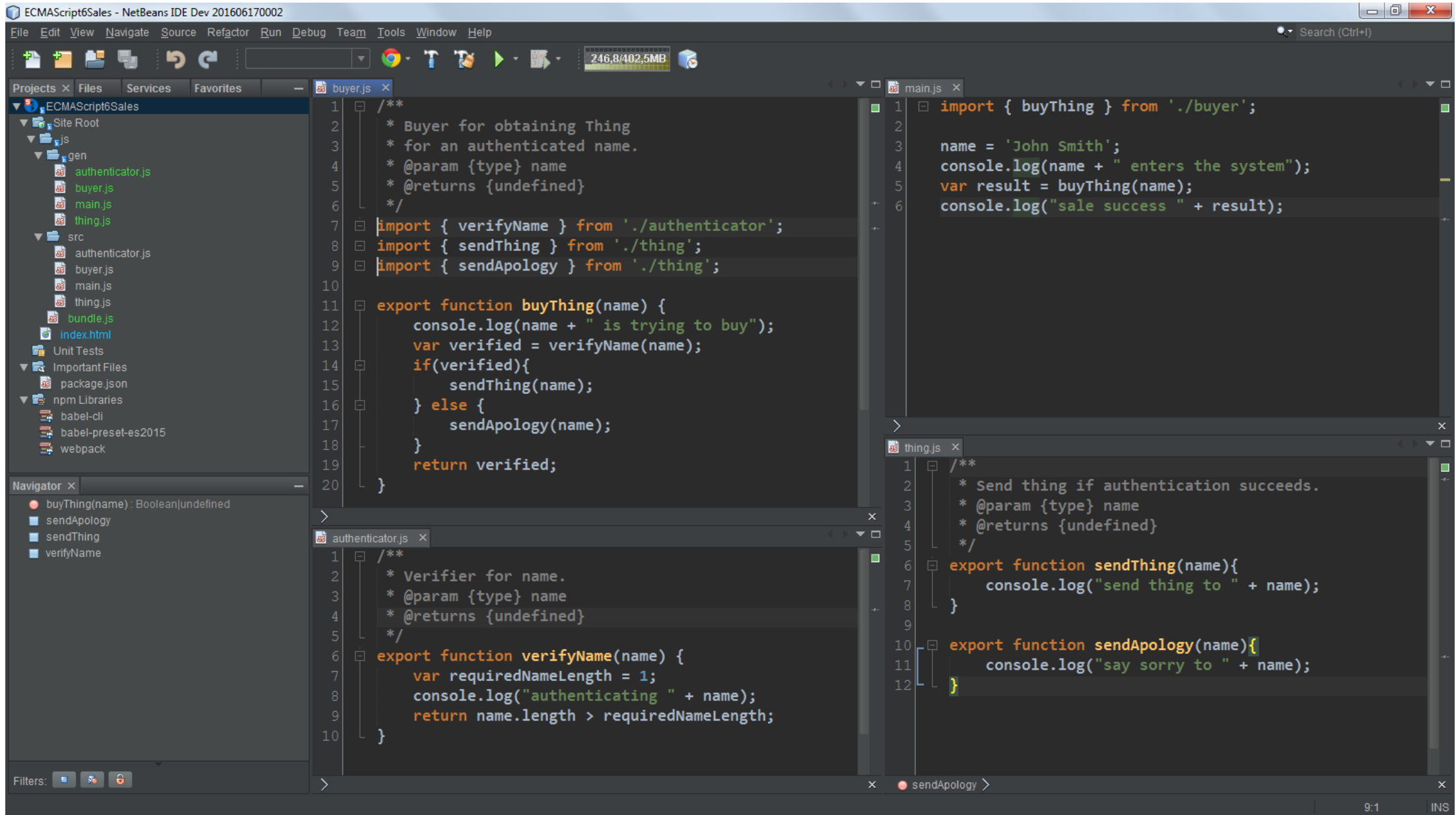
JDK 20 will receive updates under these terms, until September 2023 when it will be superseded by JDK 21.

LinuxmacOSWindows

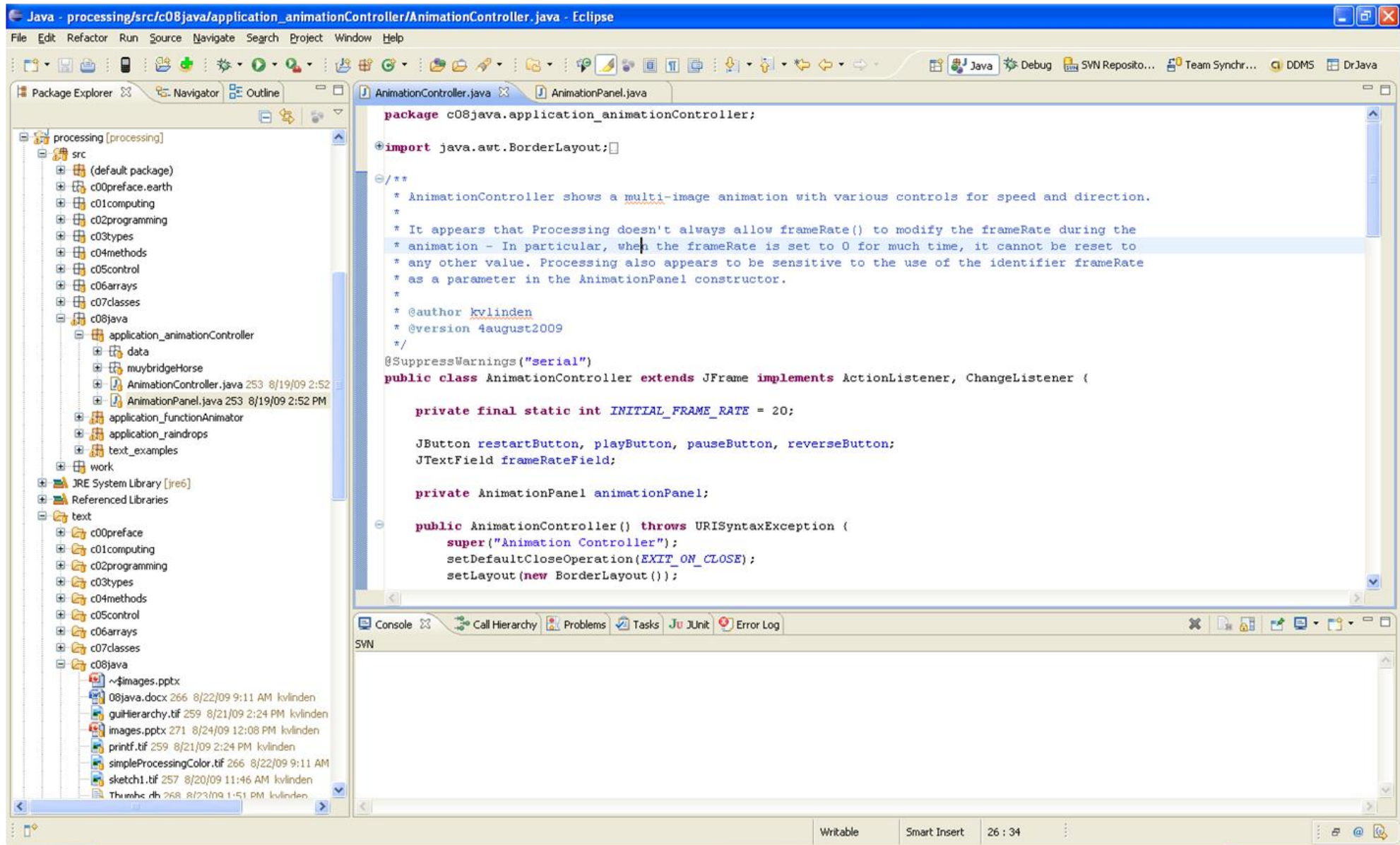
Product/file description	File size	Download
x64 Compressed Archive	180.99 MB	https://download.oracle.com/java/20/latest/jdk-20_windows-x64_bin.zip (sha256)
x64 Installer	160.12 MB	https://download.oracle.com/java/20/latest/jdk-20_windows-x64_bin.exe (sha256)
x64 MSI Installer	158.90 MB	https://download.oracle.com/java/20/latest/jdk-20_windows-x64_bin.msi (sha256)

- Untuk pengembangan aplikasi visual (*visual programming*), anda membutuhkan kakas pengembangan java yang mengintegrasikan:
 - JDK
 - Editor teks
 - Editor antarmuka pengguna (GUI = *Graphical User Interface*)
 - Manajemen aplikasi
 - *Debugger*
- Contoh kakas pengembangan java: *Netbeans* dan *Eclipse*

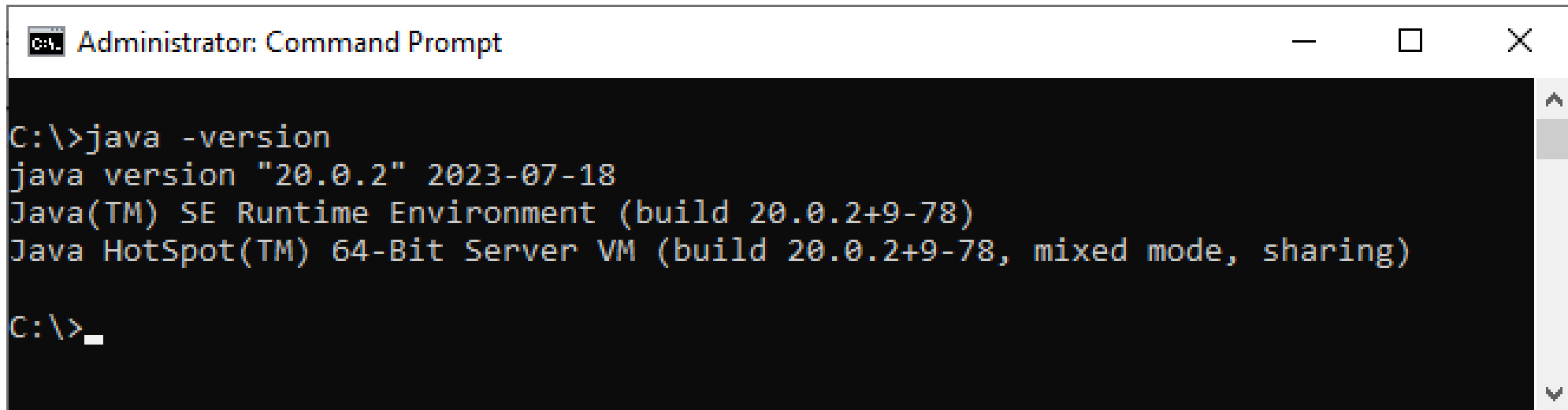
Netbeans



Eclipse



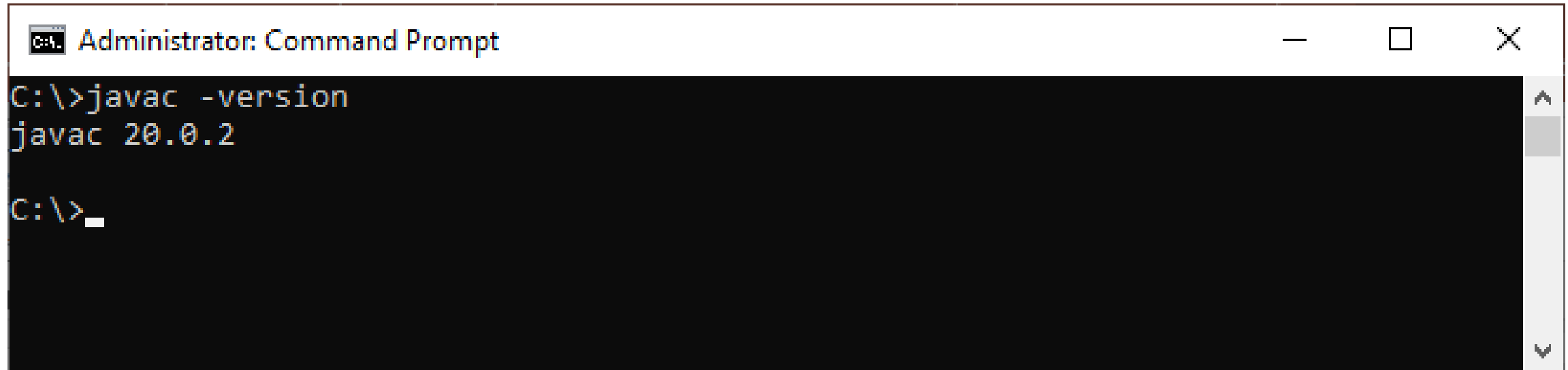
- Instalasilah JDK ke komputer anda dan ikuti semua instruksi untuk menginstalasinya.
- Aturlah nilai *environment variable* PATH melalui Control Panel > System > Advanced > Environement Variables
- Untuk mengetahui versi JRE (*java runtime environment*) yang terinstal:

A screenshot of a Windows Command Prompt window titled "Administrator: Command Prompt". The window has a black background with white text. The command "C:\>java -version" has been entered, and the output is displayed on the next four lines: "java version "20.0.2" 2023-07-18", "Java(TM) SE Runtime Environment (build 20.0.2+9-78)", "Java HotSpot(TM) 64-Bit Server VM (build 20.0.2+9-78, mixed mode, sharing)", and "C:\>_". The cursor is at the end of the last line.

```
Administrator: Command Prompt

C:\>java -version
java version "20.0.2" 2023-07-18
Java(TM) SE Runtime Environment (build 20.0.2+9-78)
Java HotSpot(TM) 64-Bit Server VM (build 20.0.2+9-78, mixed mode, sharing)
C:\>_
```

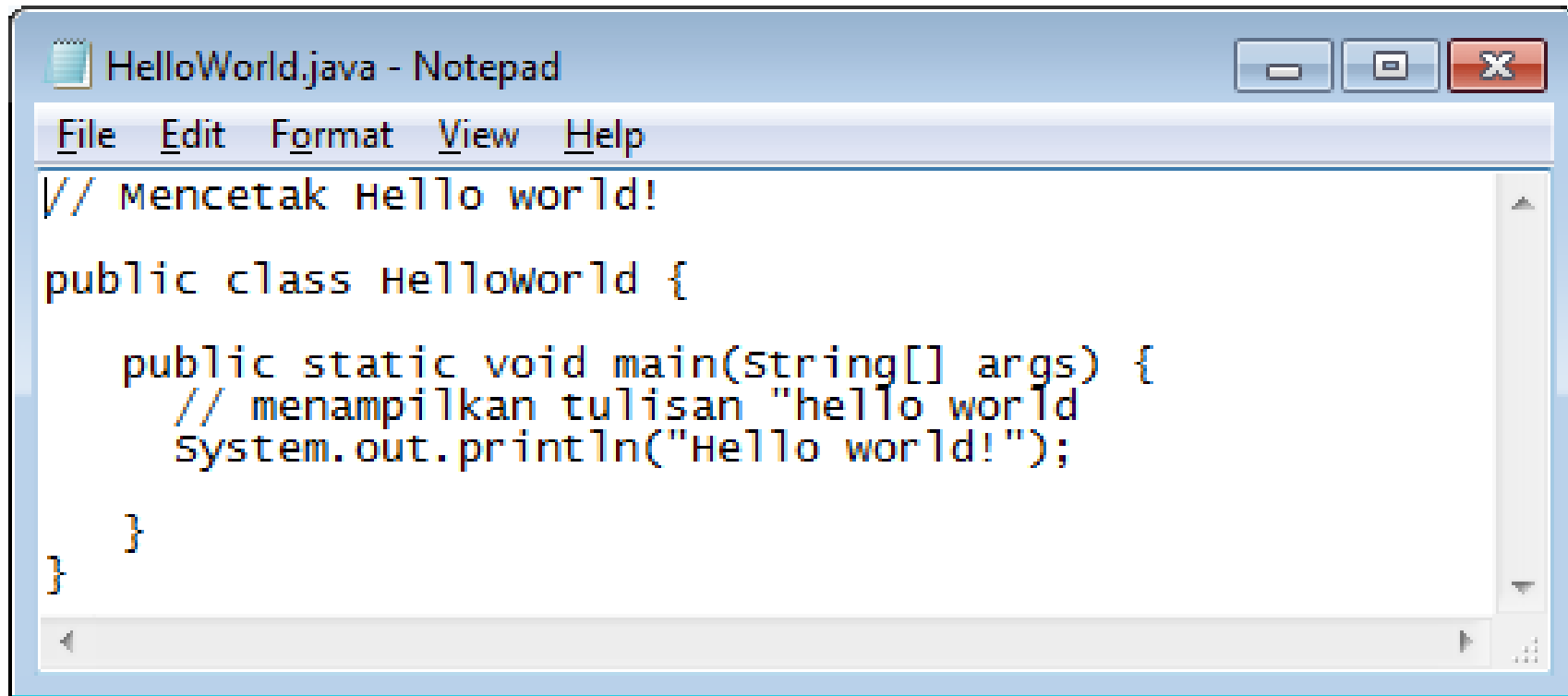
- Untuk mengetahui versi *compiler* java yang terinstal, ketikkan dari *prompt* `javac -version`:



```
Administrator: Command Prompt
C:\>javac -version
javac 20.0.2
C:\>_
```

Program java-ku yang pertama

- Ketik program *HelloWorld* di bawah ini dengan editor teks, simpan dengan nama file `HelloWorld.java` (harus sama persis dengan nama class)

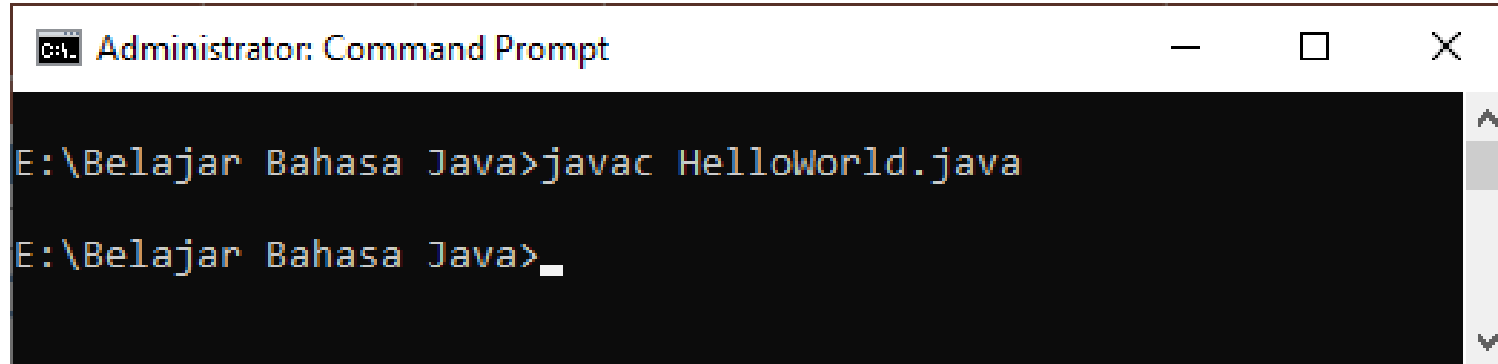


```
// Mencetak Hello world!

public class HelloWorld {

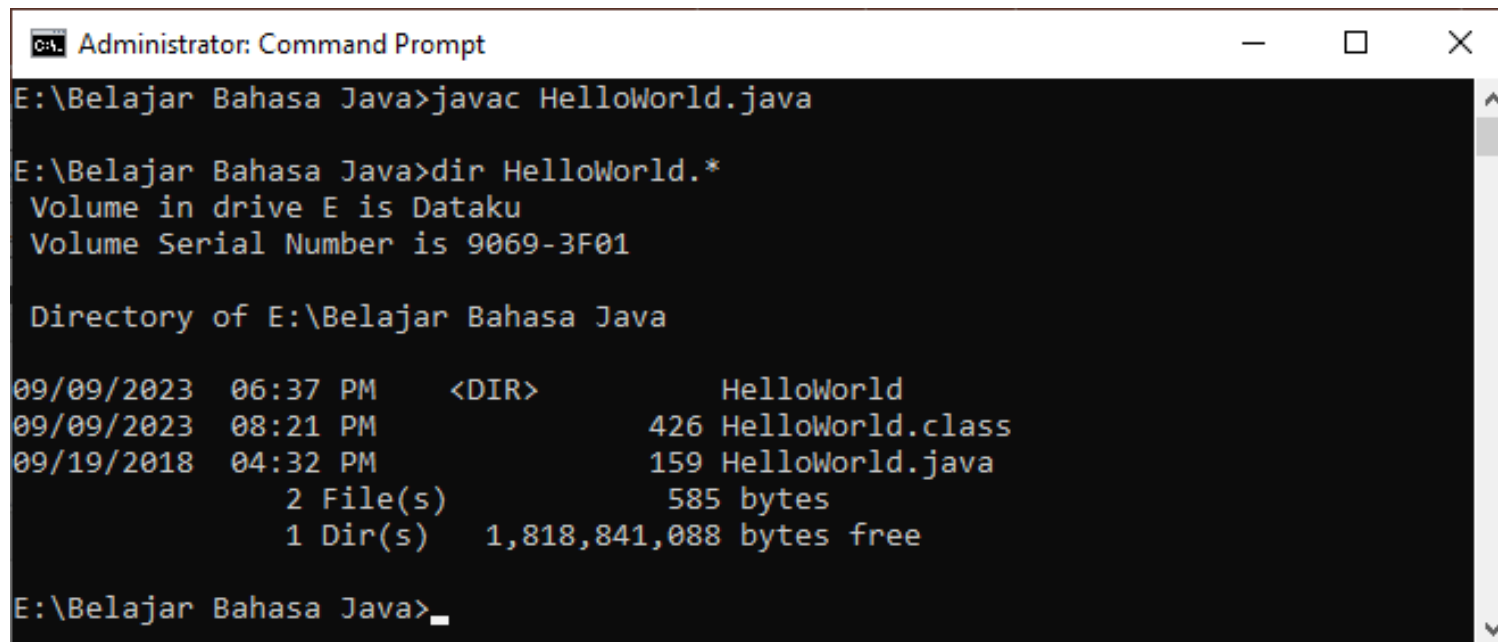
    public static void main(String[] args) {
        // menampilkan tulisan "hello world"
        System.out.println("Hello world!");
    }
}
```

- Kompilasi program *HelloWorld* dari *command prompt*:



```
Administrator: Command Prompt
E:\Belajar Bahasa Java>javac HelloWorld.java
E:\Belajar Bahasa Java>_
```

Hasilnya sebuah file bernama `HelloWord.class` → file *bytecode*



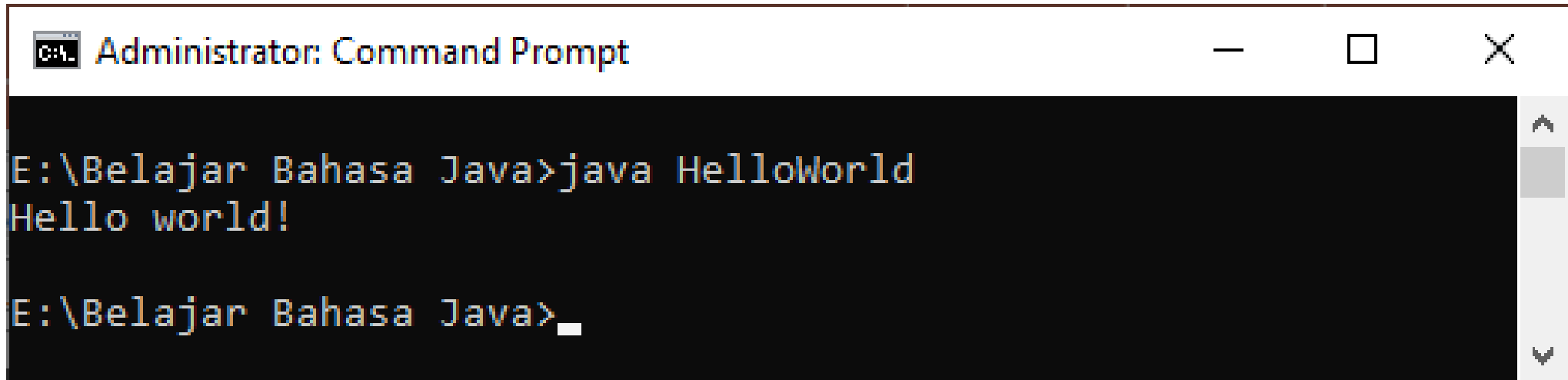
```
Administrator: Command Prompt
E:\Belajar Bahasa Java>javac HelloWorld.java
E:\Belajar Bahasa Java>dir HelloWorld.*
Volume in drive E is Dataku
Volume Serial Number is 9069-3F01

Directory of E:\Belajar Bahasa Java

09/09/2023  06:37 PM    <DIR>          HelloWorld
09/09/2023  08:21 PM              426 HelloWorld.class
09/19/2018  04:32 PM              159 HelloWorld.java
                2 File(s)              585 bytes
                1 Dir(s)  1,818,841,088 bytes free

E:\Belajar Bahasa Java>_
```

- Jalankan arsip `HelloWorld.class` melalui *command prompt*:

A screenshot of a Windows Command Prompt window titled "Administrator: Command Prompt". The window has a black background and white text. The command prompt shows the directory "E:\Belajar Bahasa Java" and the command "java HelloWorld" being entered. The output "Hello world!" is displayed on the next line. The prompt "E:\Belajar Bahasa Java>" is followed by a cursor.

```
Administrator: Command Prompt
E:\Belajar Bahasa Java>java HelloWorld
Hello world!
E:\Belajar Bahasa Java>_
```

- Horeeee..., saya sudah bisa membuat program java!



Yang gue rasakan saat berhasil menulis program "Hello World" tanpa ada bug atau error



Class dan Object

- Bahasa java adalah berorientasi objek. Struktur bahasa java terdiri dari kelas-kelas objek.
- **Kelas** (*class*) adalah *blue-print* dari objek, sedangkan **objek** adalah instansiasi dari kelas pada saat *runtime* (*running* program Java)
- Setiap kelas di dalam java memiliki *template*:

```
class NamaKelas {  
    // body kelas ditulis di sini  
}
```

- Satu kelas disimpan ke dalam satu file, nama file harus sama dengan nama kelas

- Di dalam kelas terdapat *atribut (data)* dan *method (function)*.
- Salah satu atau keduanya mungkin tidak terdapat di dalam kelas.
- Jadi, sebuah kelas membungkus data dan *method* dalam satu struktur.
Konsep ini dinamakan *encapsulation*.

Classname
(Identifier)

Data Member
(Static attributes)

Member Functions
(Dynamic Operations)

Student	Circle
name grade	radius color
getName() printGrade()	getRadius() getArea()

SoccerPlayer	Car
name number xLocation yLocation	plateNumber xLocation yLocation speed
run() jump() kickBall()	move() park() accelerate()

Examples of classes

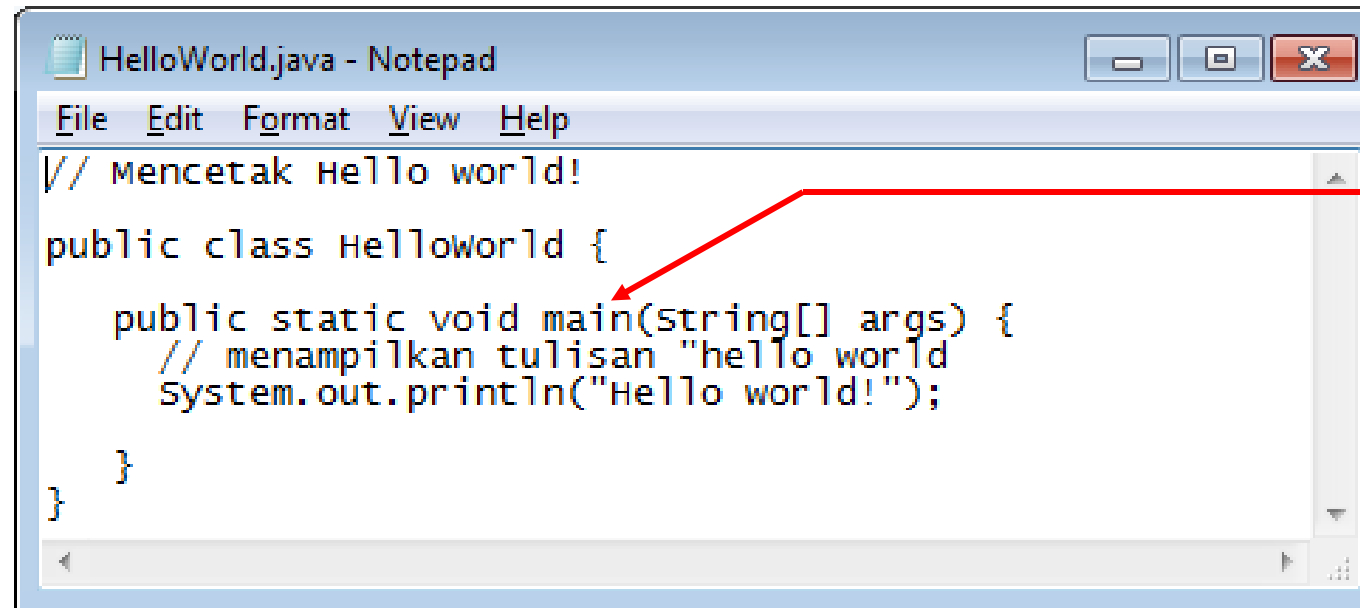
Button
- xsize - ysize - label_text - interested_listeners - xposition - yposition
+ draw() + press() + register_callback() + unregister_callback()

Author
-name:String -email:String -gender:char •
+Author(name:String,email:String,gender:char) +getName():String +getEmail():String +setEmail(email:String):void +getGender():char +toString():String •

'm' or 'f'

"name (gender) at email"

- Atribut di dalam kelas dinyatakan dengan variabel atau objek kelas lain.
- *Method* adalah operasi (prosedur, fungsi, atau konstruktor) yang dimiliki oleh sebuah kelas.
- Kelas HelloWorld tidak mempunyai atribut tetapi hanya mempunyai satu *method*, yaitu `main`:



```
File Edit Format View Help
// Mencetak Hello world!
public class HelloWorld {
    public static void main(String[] args) {
        // menampilkan tulisan "hello world"
        System.out.println("Hello world!");
    }
}
```

Method/function

- Lebih lanjut mengenai kelas dan objek akan dipelajari di dalam kuliah *Pemrograman Berorientasi Objek* (di semester 4)

Menggunakan *Package* di dalam Bahasa Java

- *Package* adalah pustaka (*library*) yang berisi sekumpulan *class*. *Package* dibuat untuk memudahkan manajemen kode program, khususnya pada program yang besar. Setiap *package* disimpan di dalam *folder* dengan nama yang sama.
- Ada dua macam *package* di dalam Java:
 1. *Built-in package*: *package* bawaan yang sudah disediakan oleh Java
 2. *User-defined package*: *package* yang dibuat sendiri oleh pemrogram
- Untuk menggunakan *package*, tambahkan perintah `import` di depan nama *package*
- Contoh mengimpor *built-in package* Java:

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

`Scanner` adalah paket yang berisi *class* untuk proses input data teks

- Daftar lengkap package di dalam Java dapat dibaca dan dipelajari di dalam laman ini: <https://docs.oracle.com/javase/8/docs/api/java/util/package-summary.html>

← → ↺ <https://docs.oracle.com/javase/8/docs/api/java/util/package-summary.html> ☆ 📄 ⬇️ 📌

OVERVIEW **PACKAGE** CLASS USE TREE DEPRECATED INDEX HELP Java™ Platform Standard Ed. 8

PREV PACKAGE NEXT PACKAGE FRAMES NO FRAMES ALL CLASSES

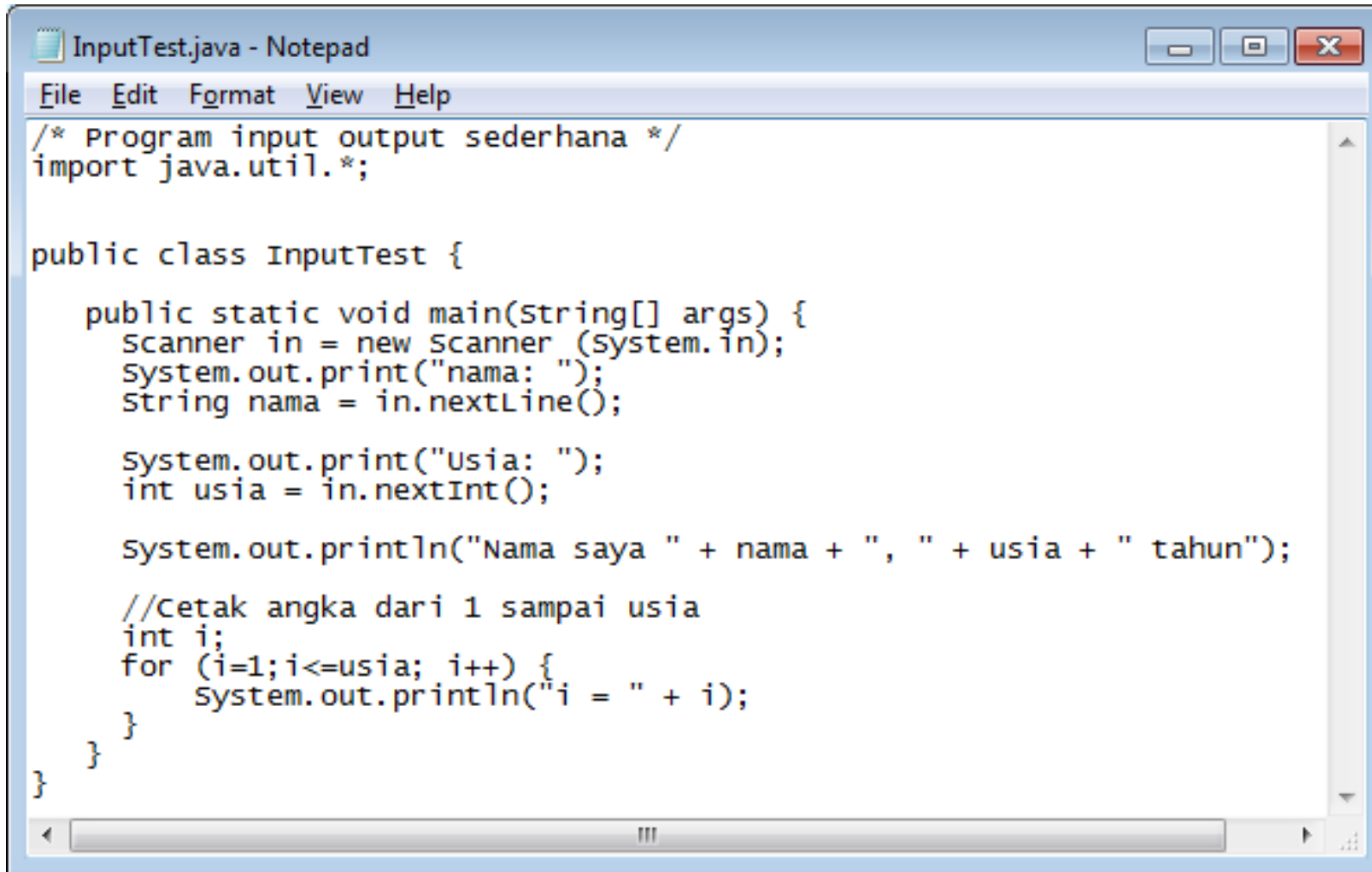
Package java.util

Contains the collections framework, legacy collection classes, event model, date and time facilities, internationalization, and miscellaneous utility classes (a string tokenizer, a random-number generator, and a bit array).

See: [Description](#)

Interface Summary	
Interface	Description
Collection<E>	The root interface in the <i>collection hierarchy</i> .
Comparator<T>	A comparison function, which imposes a <i>total ordering</i> on some collection of objects.
Deque<E>	A linear collection that supports element insertion and removal at both ends.
Enumeration<E>	An object that implements the Enumeration interface generates a series of elements, one at a time.
EventListener	A tagging interface that all event listener interfaces must extend.
Formattable	The Formattable interface must be implemented by any class that needs to perform custom formatting using the 's' conversion specifier of Formatter .
Iterator<E>	An iterator over a collection.

Program Input/Output Sederhana

A screenshot of a Notepad window titled "InputTest.java - Notepad". The window has a menu bar with "File", "Edit", "Format", "View", and "Help". The text area contains the following Java code:

```
/* Program input output sederhana */
import java.util.*;

public class InputTest {
    public static void main(String[] args) {
        Scanner in = new Scanner (System.in);
        System.out.print("nama: ");
        String nama = in.nextLine();

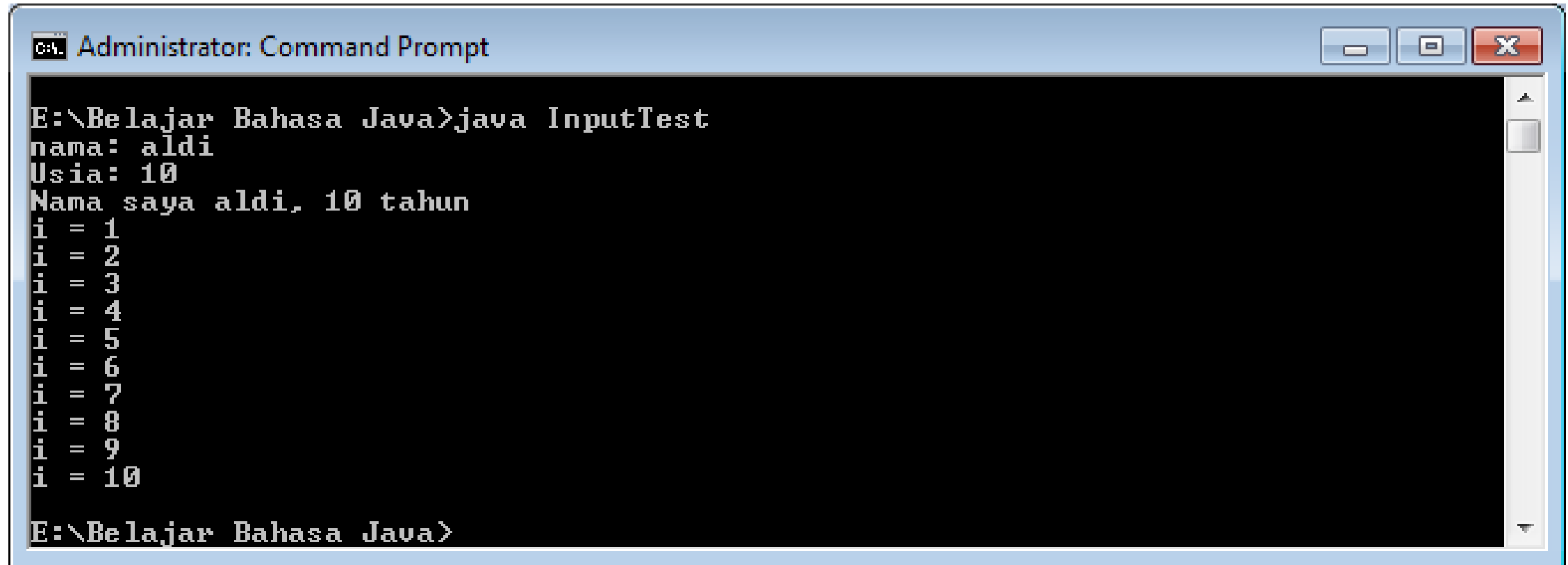
        System.out.print("Usia: ");
        int usia = in.nextInt();

        System.out.println("Nama saya " + nama + ", " + usia + " tahun");

        //Cetak angka dari 1 sampai usia
        int i;
        for (i=1;i<=usia; i++) {
            System.out.println("i = " + i);
        }
    }
}
```

The code is a simple Java program that prompts the user for their name and age, then prints the name and age, and finally prints numbers from 1 to the user's age. The window has standard Windows window controls (minimize, maximize, close) in the top right corner and a scrollbar on the right side.

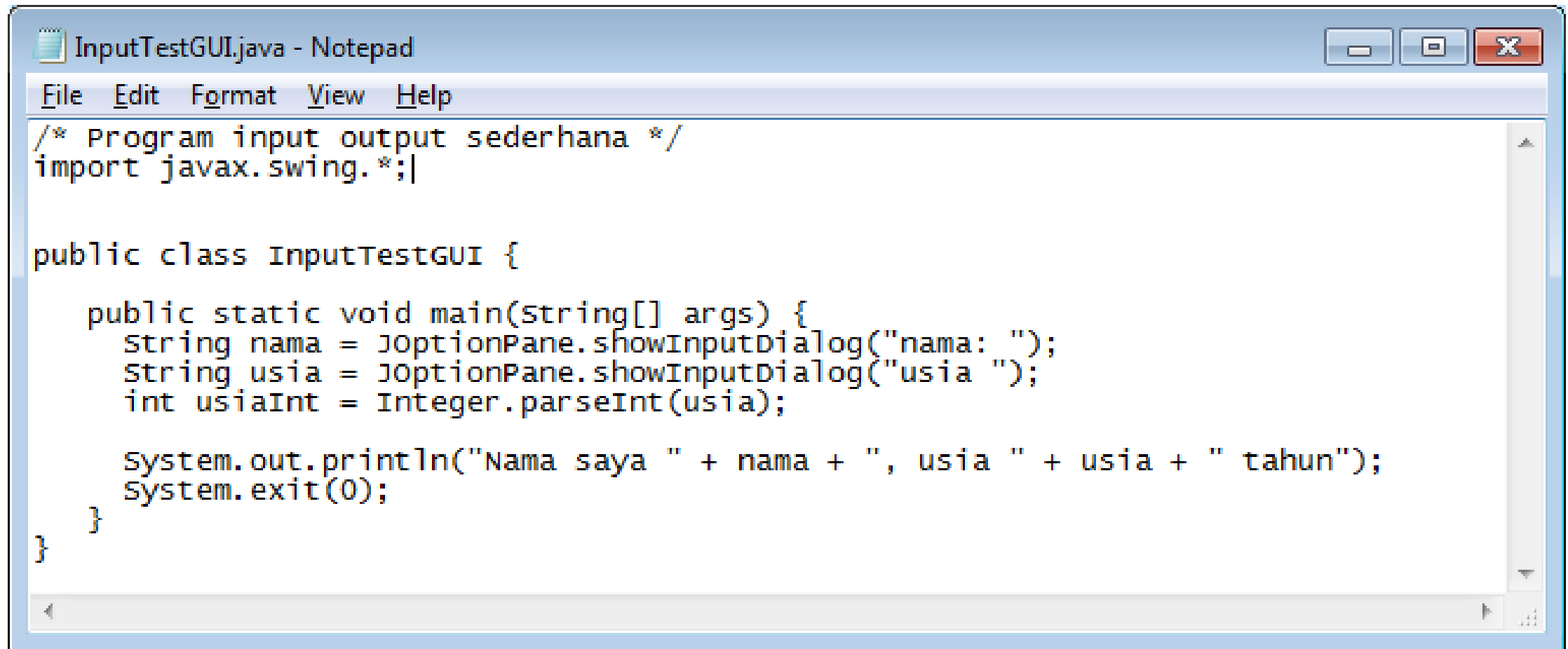
- Kompilasi `InputTest.java` dan jika sudah benar jalankan programnya:



```
Administrator: Command Prompt

E:\Belajar Bahasa Java>java InputTest
nama: aldi
Usia: 10
Nama saya aldi, 10 tahun
i = 1
i = 2
i = 3
i = 4
i = 5
i = 6
i = 7
i = 8
i = 9
i = 10
E:\Belajar Bahasa Java>
```

Program Input dengan GUI

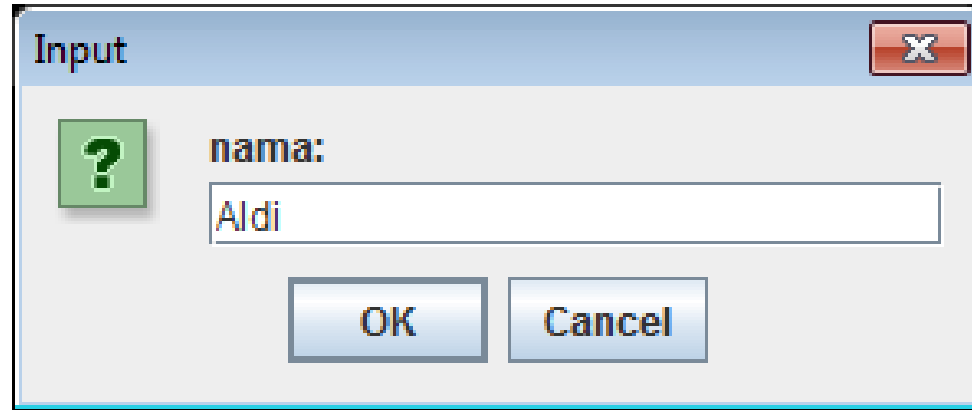


```
InputTestGUI.java - Notepad
File Edit Format View Help
/* Program input output sederhana */
import javax.swing.*;

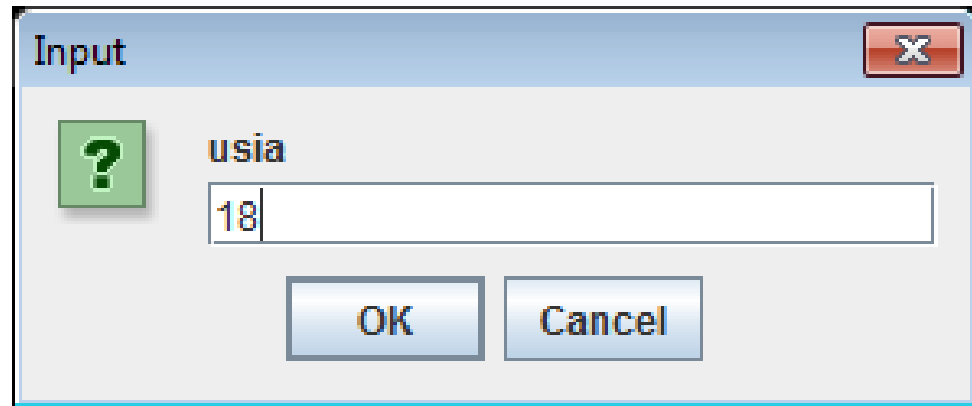
public class InputTestGUI {
    public static void main(String[] args) {
        String nama = JOptionPane.showInputDialog("nama: ");
        String usia = JOptionPane.showInputDialog("usia ");
        int usiaInt = Integer.parseInt(usia);

        System.out.println("Nama saya " + nama + ", usia " + usia + " tahun");
        System.exit(0);
    }
}
```

- Kompilasi `InputTestGUI.java` dan jika sudah benar jalankan programnya:

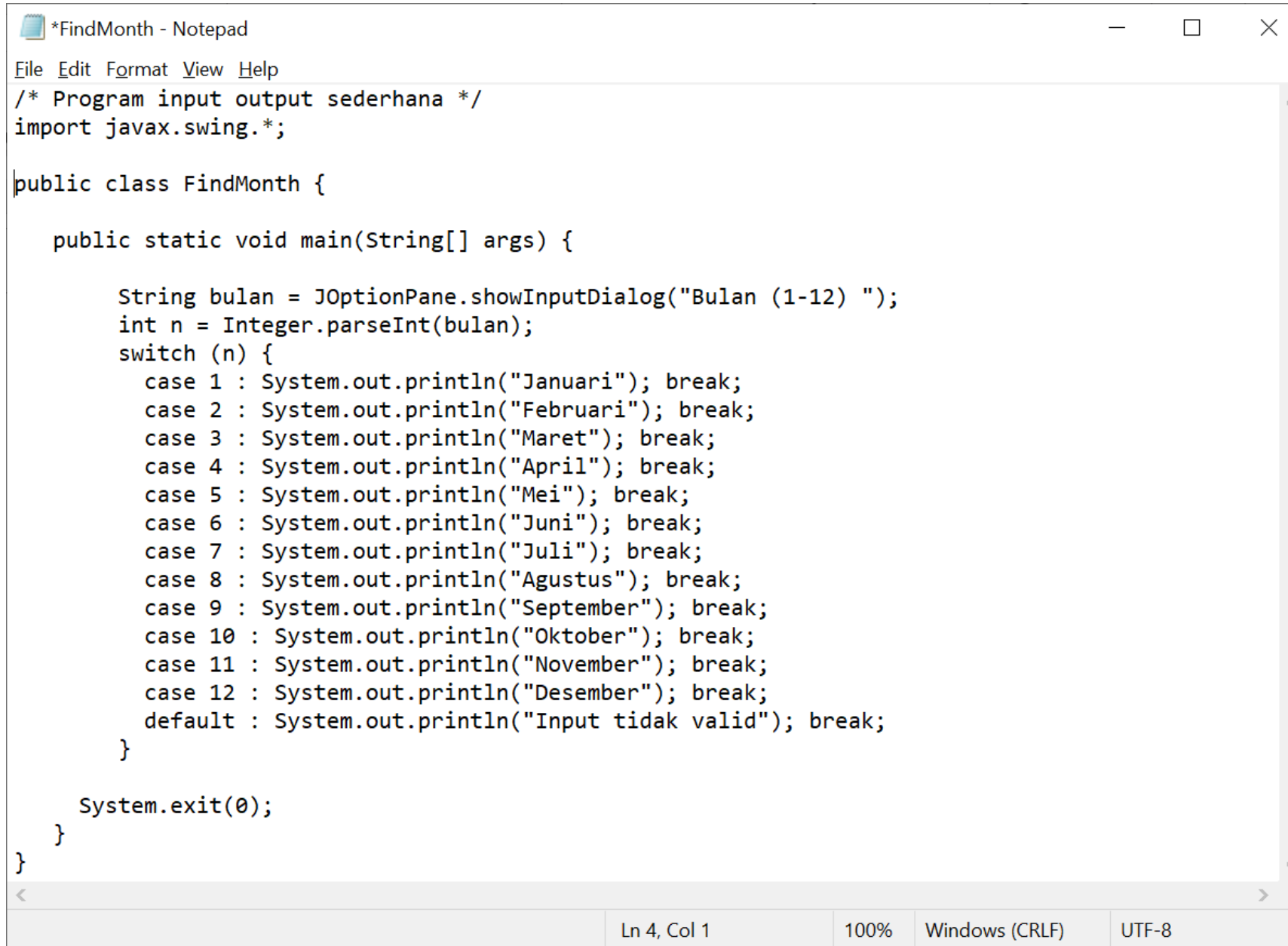


A screenshot of a Java Swing dialog box titled "Input". It features a standard window header with a close button (X). On the left, there is a green square icon with a white question mark. To its right, the label "nama:" is displayed. Below the label is a text input field containing the text "Aldi". At the bottom of the dialog, there are two buttons: "OK" and "Cancel".



A screenshot of a Java Swing dialog box titled "Input". It features a standard window header with a close button (X). On the left, there is a green square icon with a white question mark. To its right, the label "usia" is displayed. Below the label is a text input field containing the text "18". At the bottom of the dialog, there are two buttons: "OK" and "Cancel".

Program FindMonth



```
*FindMonth - Notepad
File Edit Format View Help
/* Program input output sederhana */
import javax.swing.*;

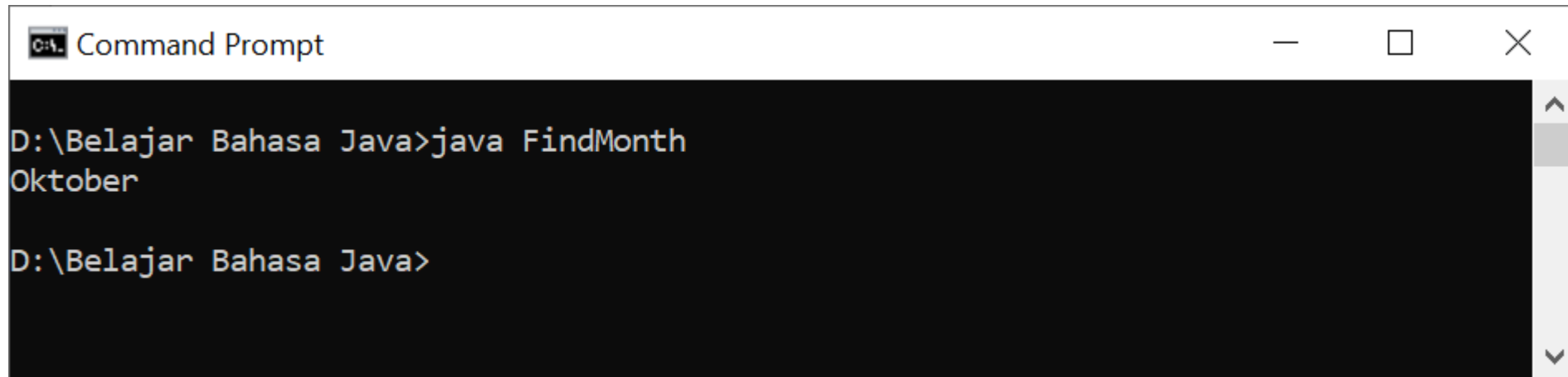
public class FindMonth {

    public static void main(String[] args) {

        String bulan = JOptionPane.showInputDialog("Bulan (1-12) ");
        int n = Integer.parseInt(bulan);
        switch (n) {
            case 1 : System.out.println("Januari"); break;
            case 2 : System.out.println("Februari"); break;
            case 3 : System.out.println("Maret"); break;
            case 4 : System.out.println("April"); break;
            case 5 : System.out.println("Mei"); break;
            case 6 : System.out.println("Juni"); break;
            case 7 : System.out.println("Juli"); break;
            case 8 : System.out.println("Agustus"); break;
            case 9 : System.out.println("September"); break;
            case 10 : System.out.println("Oktober"); break;
            case 11 : System.out.println("November"); break;
            case 12 : System.out.println("Desember"); break;
            default : System.out.println("Input tidak valid"); break;
        }

        System.exit(0);
    }
}
```

Ln 4, Col 1 100% Windows (CRLF) UTF-8



Command Prompt

```
D:\Belajar Bahasa Java>java FindMonth  
Oktober  
  
D:\Belajar Bahasa Java>
```

The image shows a Windows Command Prompt window with a black background and white text. The title bar reads "Command Prompt". The command prompt shows the user has navigated to the directory "D:\Belajar Bahasa Java" and executed the command "java FindMonth". The output of the program is "Oktober". The prompt is now waiting for the next command.



Input

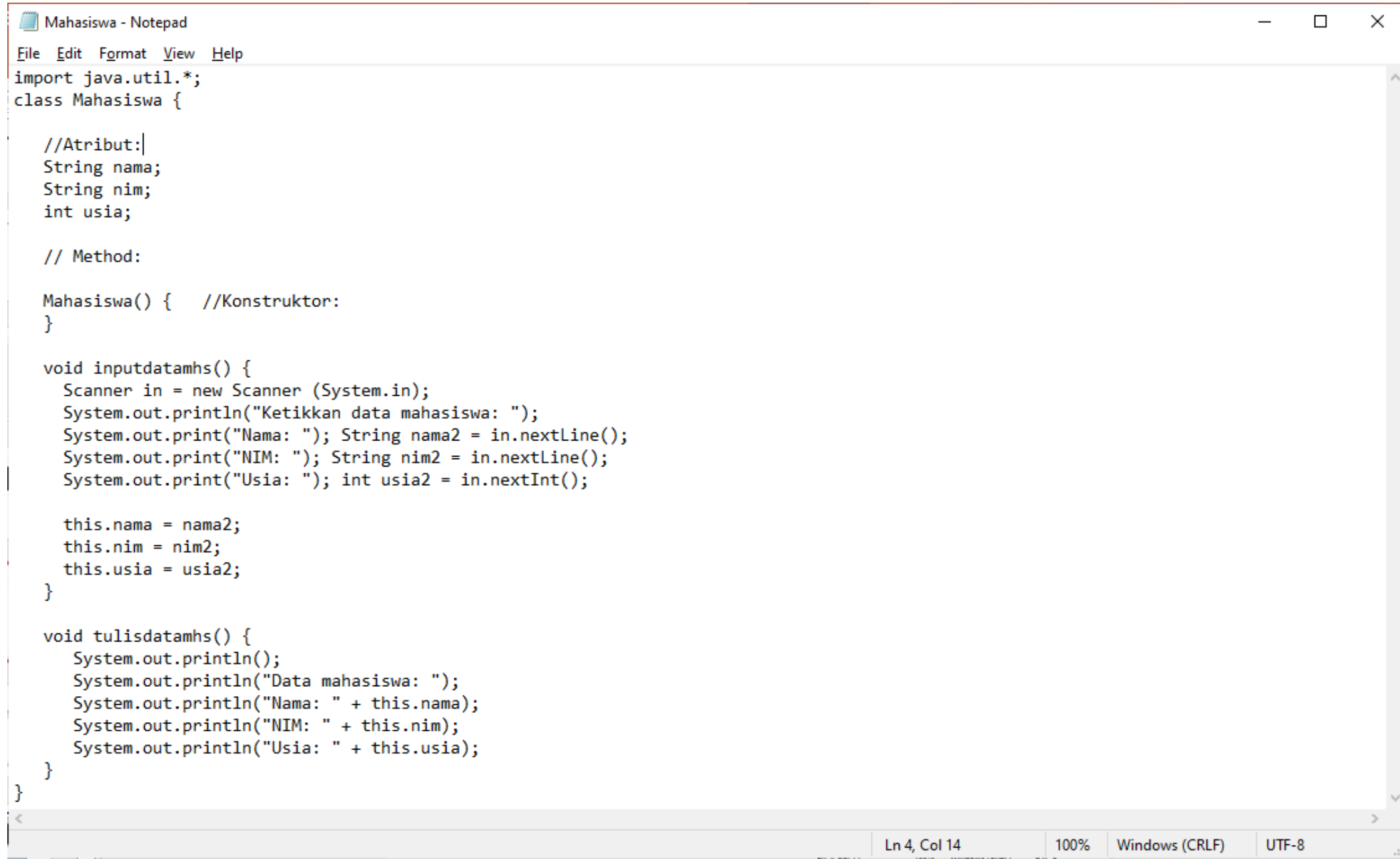
 Bulan (1-12)

10

OK Cancel

The image shows a standard Windows "Input" dialog box. It has a title bar with the text "Input" and a close button. Inside the dialog, there is a green square icon with a white question mark. To the right of the icon is the text "Bulan (1-12)". Below this text is a text input field containing the number "10". At the bottom of the dialog are two buttons: "OK" and "Cancel".

Kelas Mahasiswa



```
Mahasiswa - Notepad
File Edit Format View Help
import java.util.*;
class Mahasiswa {

    //Atribut:|
    String nama;
    String nim;
    int usia;

    // Method:

    Mahasiswa() {    //Konstruktor:
    }

    void inputdatamhs() {
        Scanner in = new Scanner (System.in);
        System.out.println("Ketikkan data mahasiswa: ");
        System.out.print("Nama: "); String nama2 = in.nextLine();
        System.out.print("NIM: "); String nim2 = in.nextLine();
        System.out.print("Usia: "); int usia2 = in.nextInt();

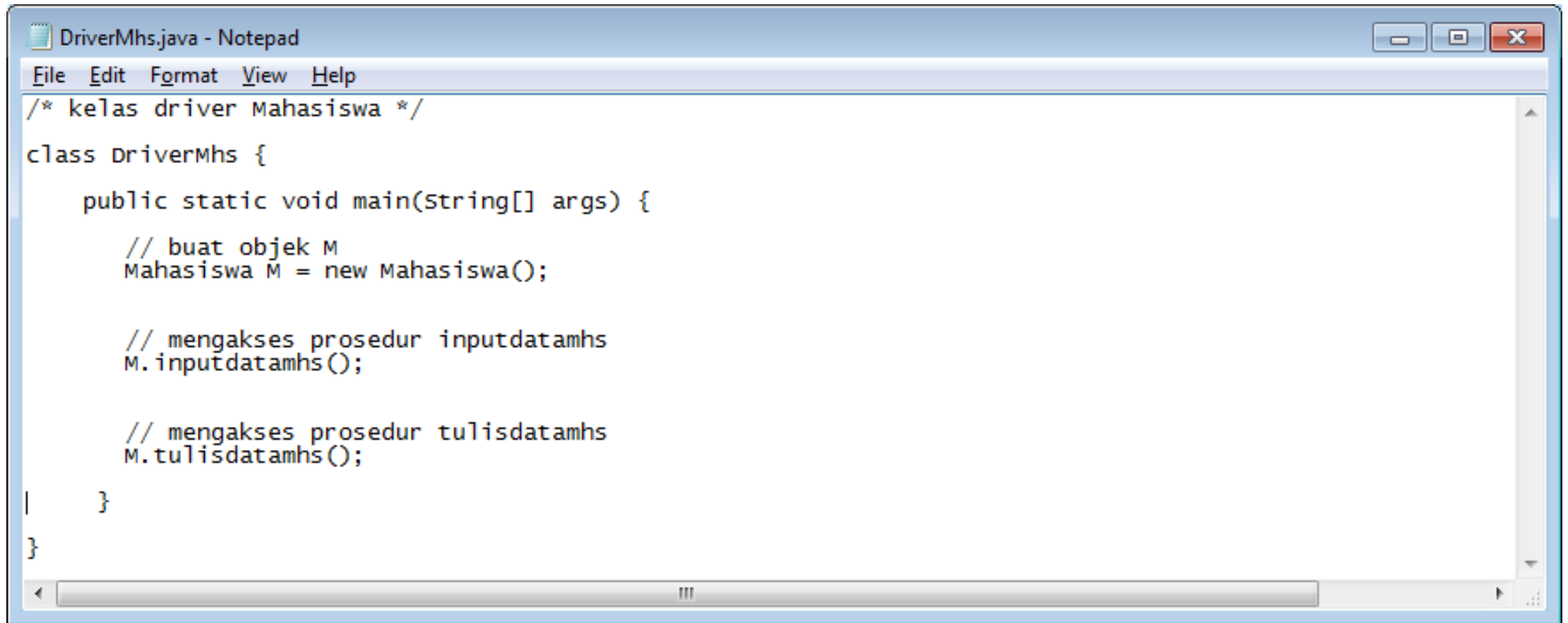
        this.nama = nama2;
        this.nim = nim2;
        this.usia = usia2;
    }

    void tulisdatamhs() {
        System.out.println();
        System.out.println("Data mahasiswa: ");
        System.out.println("Nama: " + this.nama);
        System.out.println("NIM: " + this.nim);
        System.out.println("Usia: " + this.usia);
    }
}
```

Ln 4, Col 14 100% Windows (CRLF) UTF-8

Kelas DriverMhs

(yang menggunakan kelas Mahasiswa)

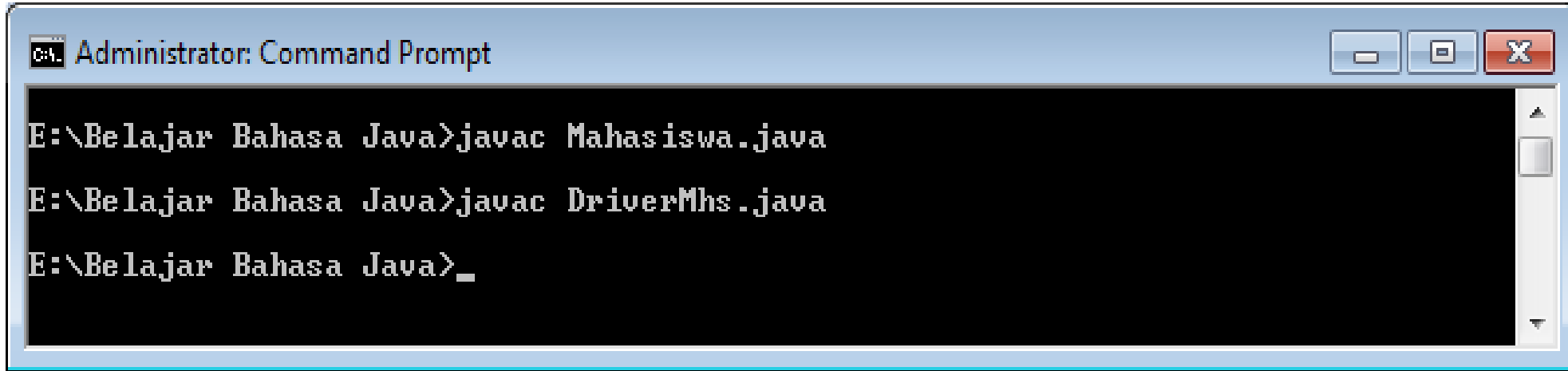


```
DriverMhs.java - Notepad
File Edit Format View Help
/* kelas driver mahasiswa */
class DriverMhs {
    public static void main(String[] args) {
        // buat objek M
        Mahasiswa M = new Mahasiswa();

        // mengakses prosedur inputdatamhs
        M.inputdatamhs();

        // mengakses prosedur tulisdatamhs
        M.tulisdatamhs();
    }
}
```

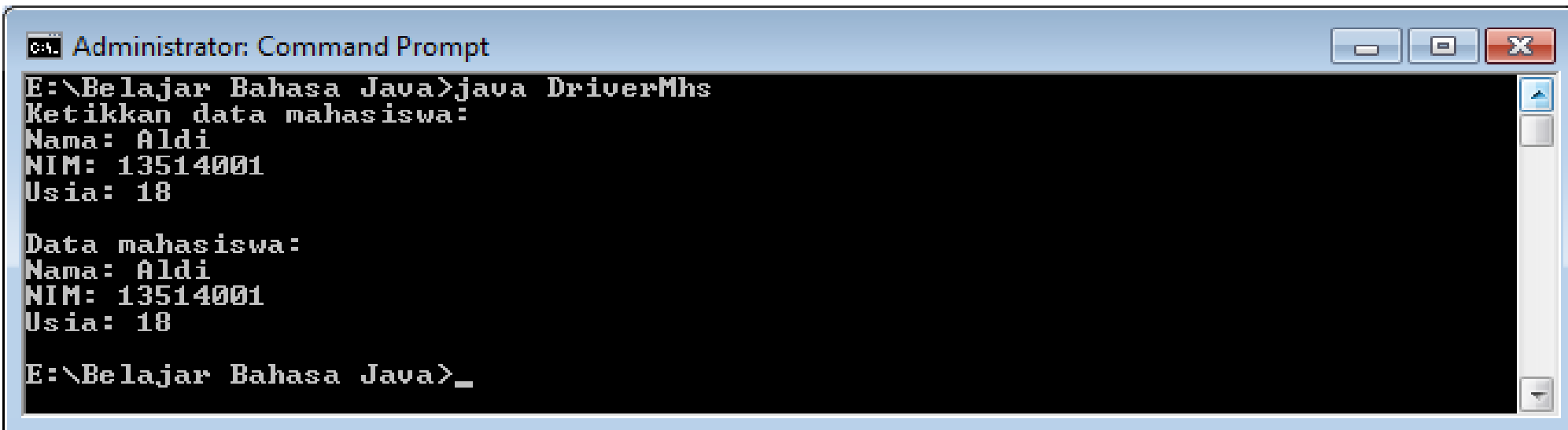
- Kompilasi masing-masing Mahasiswa.java dan DriverMhs.java



```
Administrator: Command Prompt

E:\Belajar Bahasa Java>javac Mahasiswa.java
E:\Belajar Bahasa Java>javac DriverMhs.java
E:\Belajar Bahasa Java>_
```

- Jalankan kelas DriverMhs.class



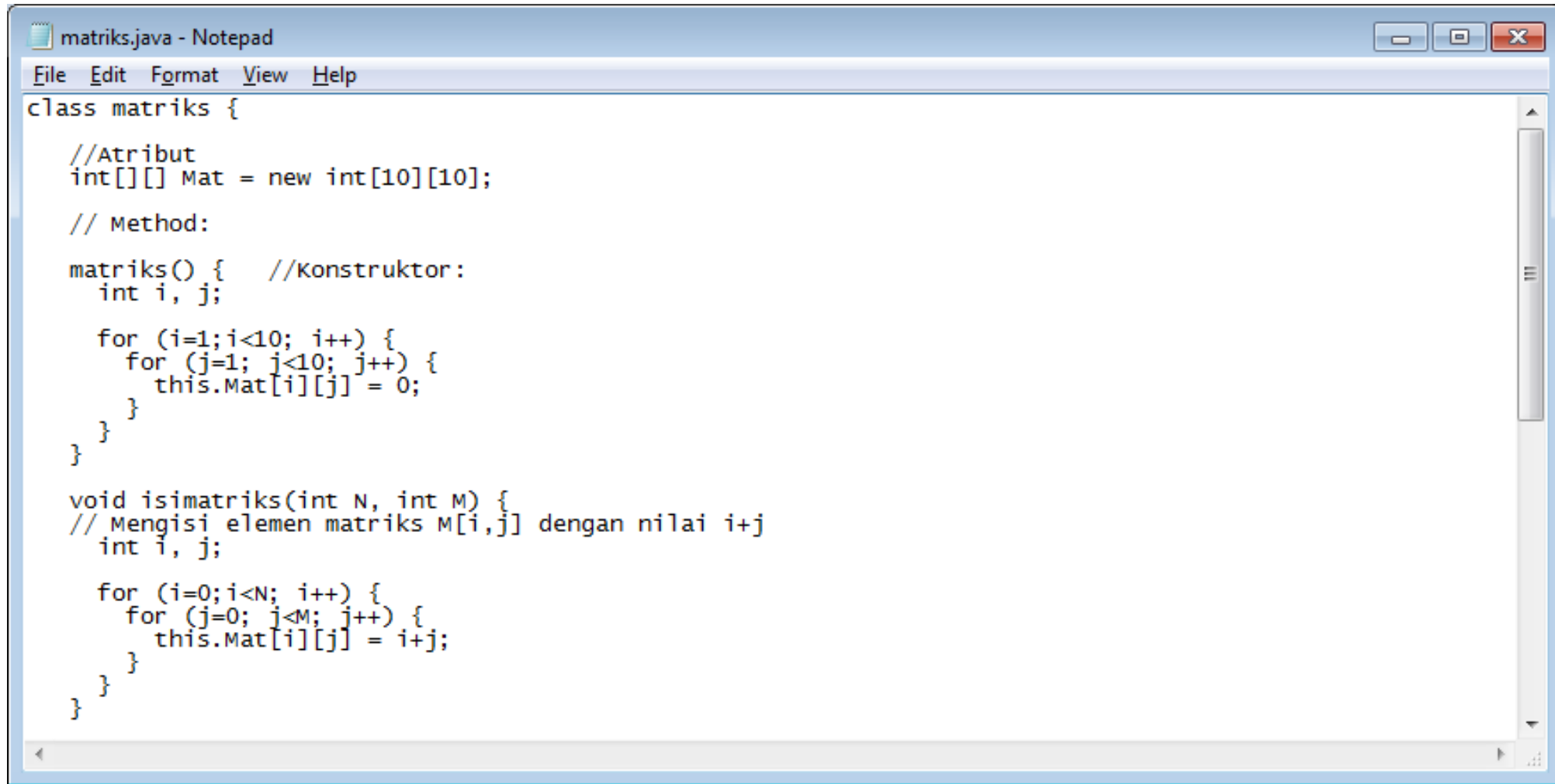
```
Administrator: Command Prompt

E:\Belajar Bahasa Java>java DriverMhs
Ketikkan data mahasiswa:
Nama: Aldi
NIM: 13514001
Usia: 18

Data mahasiswa:
Nama: Aldi
NIM: 13514001
Usia: 18

E:\Belajar Bahasa Java>_
```

Kelas Matriks

A screenshot of a Notepad window titled 'matriks.java - Notepad'. The window contains Java code for a class named 'matriks'. The code includes a 2D array 'Mat' of size 10x10, a constructor that initializes the array to zero, and a method 'isimatriks' that fills the array with the sum of its indices (i+j).

```
matriks.java - Notepad
File Edit Format View Help
class matriks {
    //Atribut
    int[][] Mat = new int[10][10];

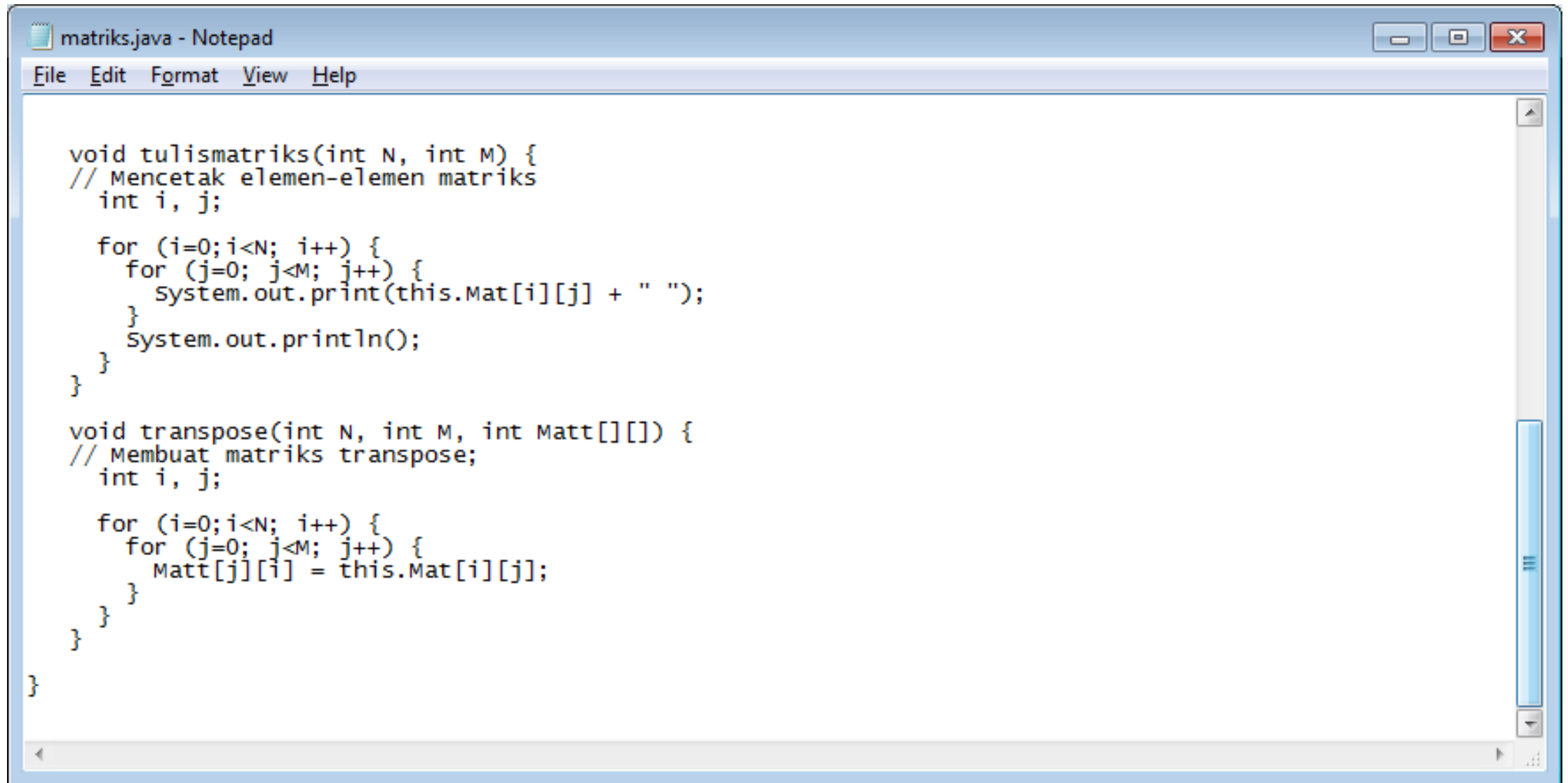
    // Method:

    matriks() {    //Konstruktor:
        int i, j;

        for (i=1; i<10; i++) {
            for (j=1; j<10; j++) {
                this.Mat[i][j] = 0;
            }
        }
    }

    void isimatriks(int N, int M) {
        // Mengisi elemen matriks M[i,j] dengan nilai i+j
        int i, j;

        for (i=0; i<N; i++) {
            for (j=0; j<M; j++) {
                this.Mat[i][j] = i+j;
            }
        }
    }
}
```

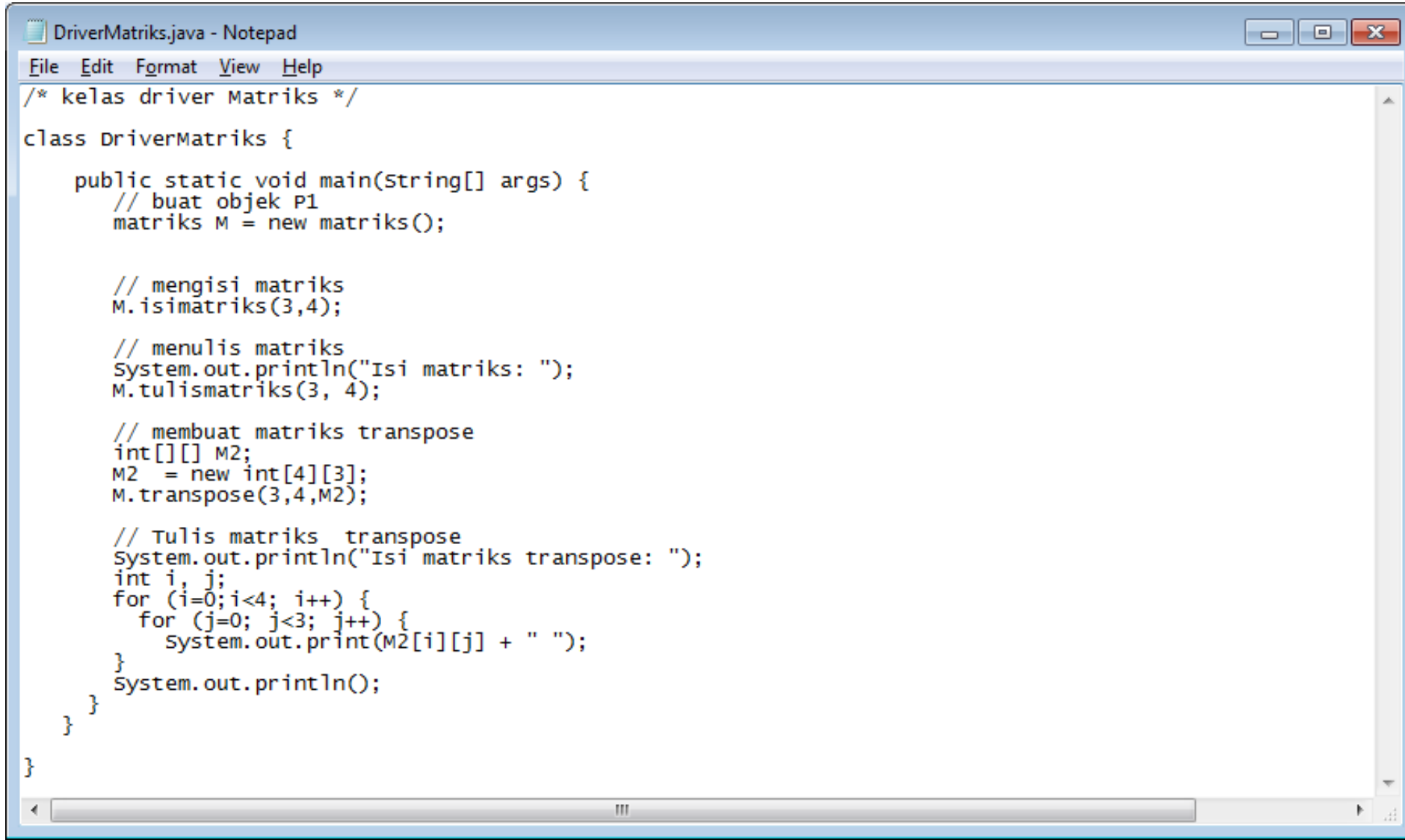


The image shows a Notepad window with the title "matriks.java - Notepad". The menu bar includes "File", "Edit", "Format", "View", and "Help". The code is written in Java and defines two methods: `tulismatriks` and `transpose`. The `tulismatriks` method iterates through a matrix `Mat` of size `N` by `M` and prints its elements. The `transpose` method iterates through the same matrix and creates a transpose matrix `Matt` where `Matt[j][i] = Mat[i][j]`.

```
void tulismatriks(int N, int M) {  
    // Mencetak elemen-elemen matriks  
    int i, j;  
  
    for (i=0; i<N; i++) {  
        for (j=0; j<M; j++) {  
            System.out.print(this.Mat[i][j] + " ");  
        }  
        System.out.println();  
    }  
}  
  
void transpose(int N, int M, int Matt[][]) {  
    // Membuat matriks transpose;  
    int i, j;  
  
    for (i=0; i<N; i++) {  
        for (j=0; j<M; j++) {  
            Matt[j][i] = this.Mat[i][j];  
        }  
    }  
}
```

Kelas DriverMatriks

(yang menggunakan kelas Mahasiswa)



```
DriverMatriks.java - Notepad
File Edit Format View Help
/* kelas driver Matriks */
class DriverMatriks {
    public static void main(String[] args) {
        // buat objek P1
        matriks M = new matriks();

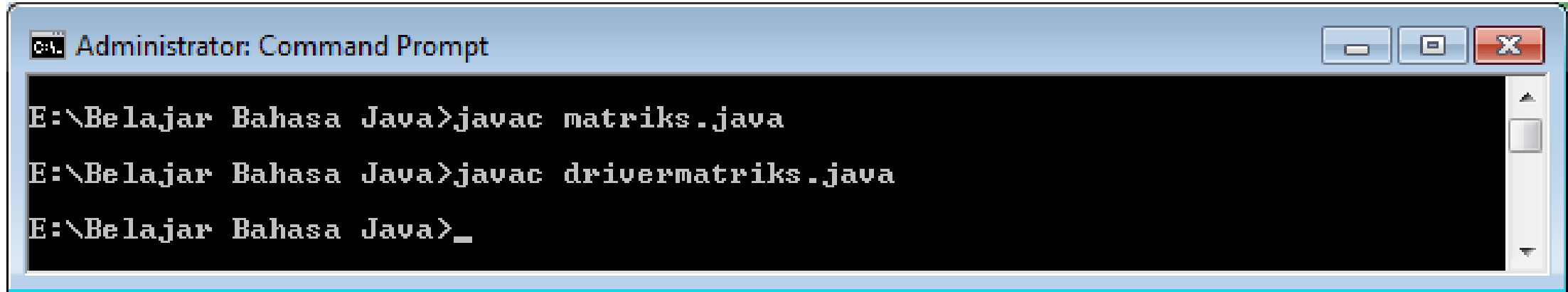
        // mengisi matriks
        M.isimatriks(3,4);

        // menulis matriks
        System.out.println("Isi matriks: ");
        M.tulismatriks(3, 4);

        // membuat matriks transpose
        int[][] M2;
        M2 = new int[4][3];
        M.transpose(3,4,M2);

        // Tulis matriks transpose
        System.out.println("Isi matriks transpose: ");
        int i, j;
        for (i=0; i<4; i++) {
            for (j=0; j<3; j++) {
                System.out.print(M2[i][j] + " ");
            }
            System.out.println();
        }
    }
}
```

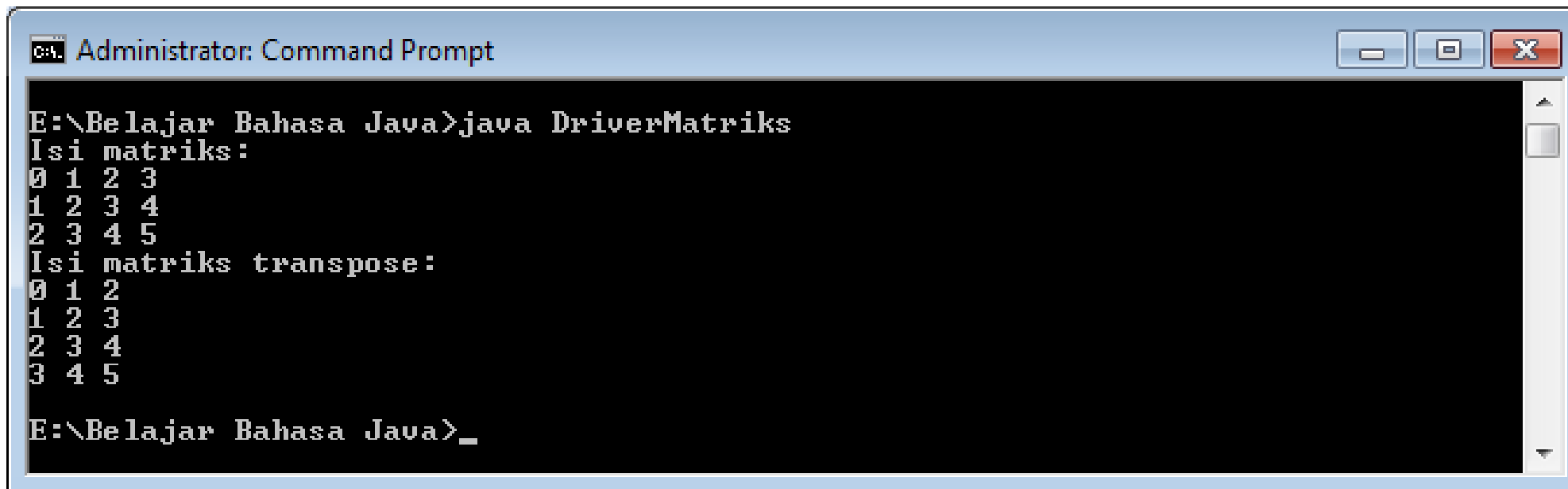
- Kompilasi masing-masing `matriks.java` dan `DriverMatriks.java`



```
Administrator: Command Prompt

E:\Belajar Bahasa Java>javac matriks.java
E:\Belajar Bahasa Java>javac drivermatriks.java
E:\Belajar Bahasa Java>_
```

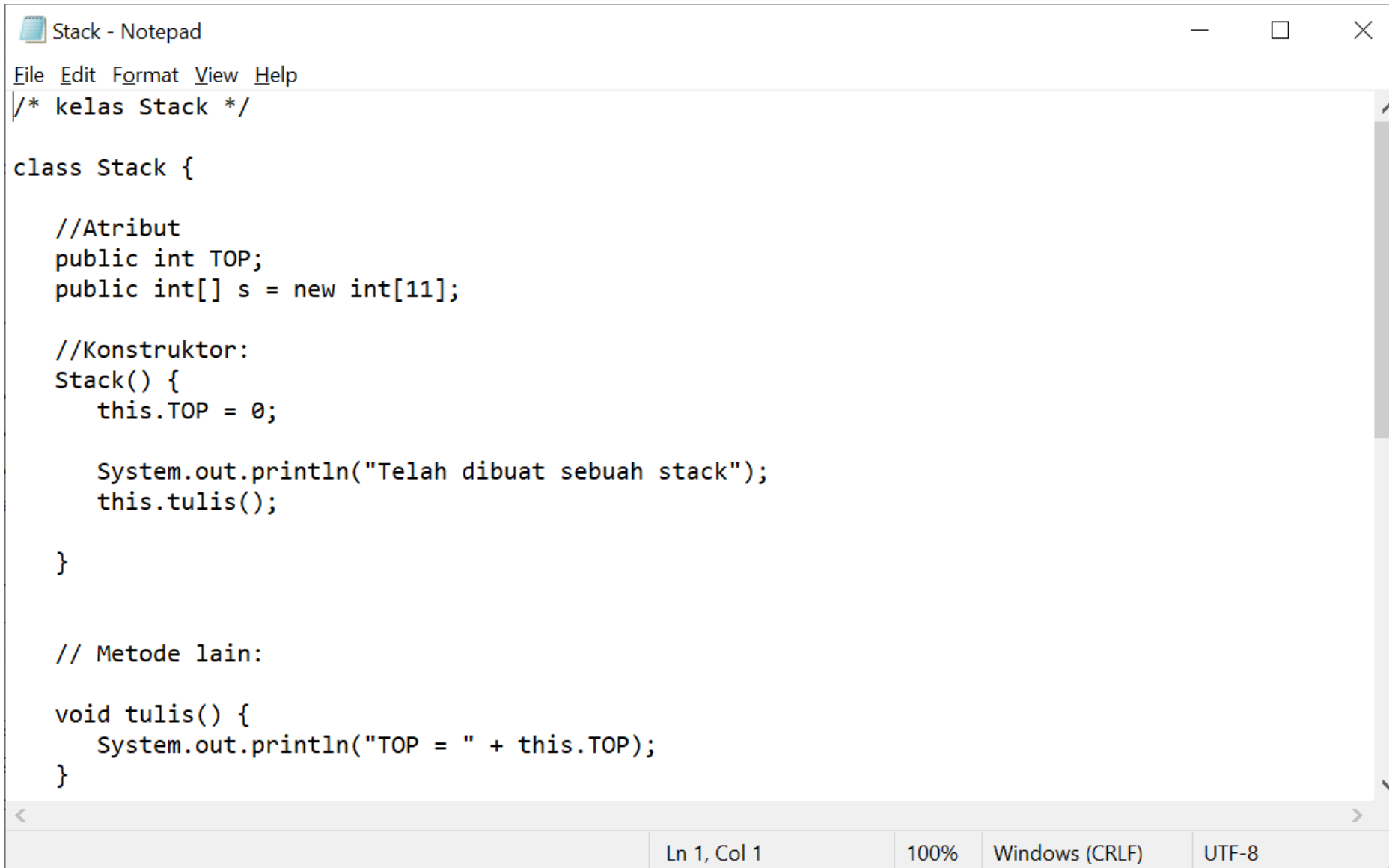
- Jalankan kelas `DriverMatriks.class`



```
Administrator: Command Prompt

E:\Belajar Bahasa Java>java DriverMatriks
Isi matriks:
0 1 2 3
1 2 3 4
2 3 4 5
Isi matriks transpose:
0 1 2
1 2 3
2 3 4
3 4 5
E:\Belajar Bahasa Java>_
```

Kelas Stack



```
Stack - Notepad
File Edit Format View Help
/* kelas Stack */

class Stack {

    //Atribut
    public int TOP;
    public int[] s = new int[11];

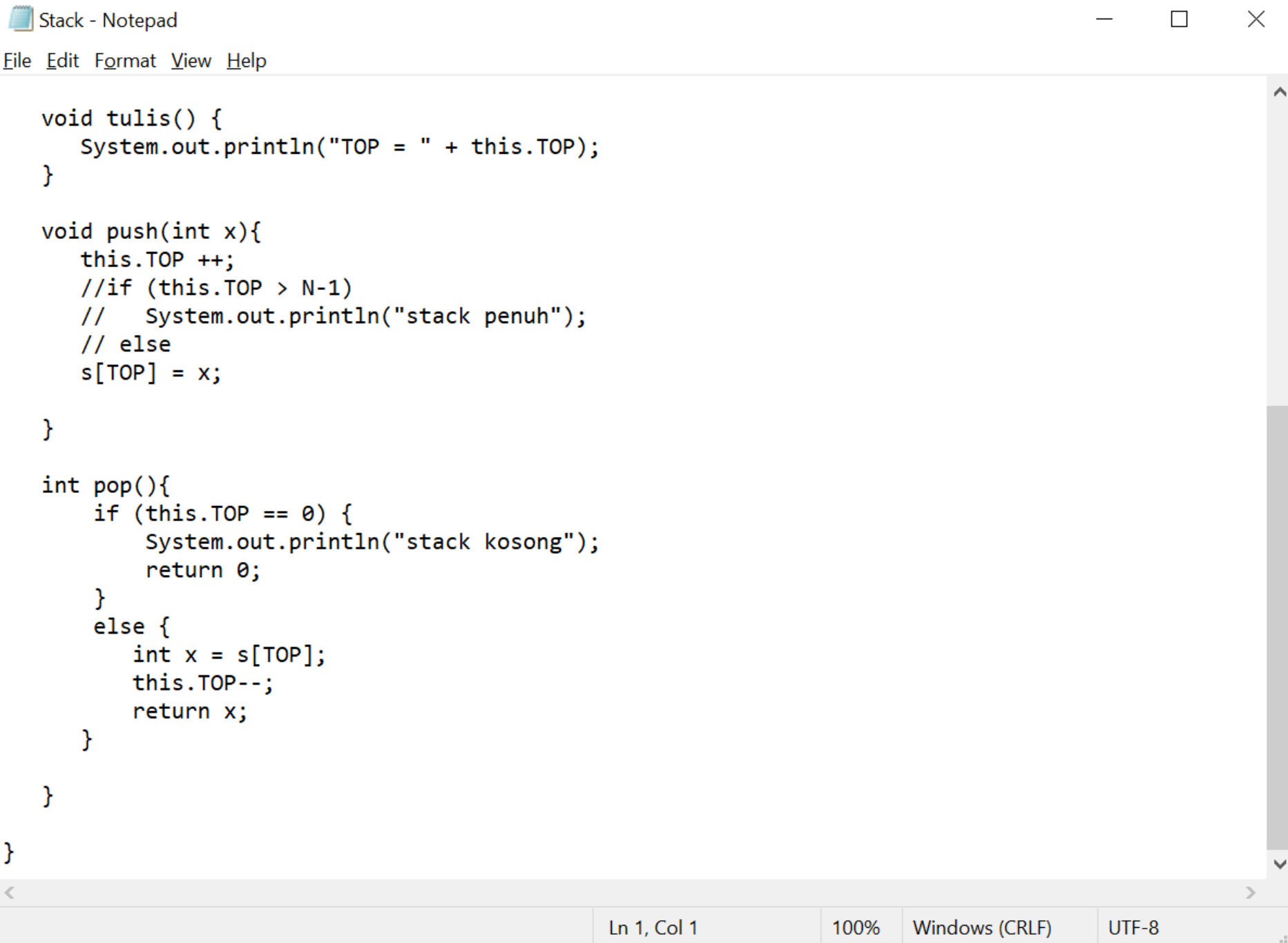
    //Konstruktor:
    Stack() {
        this.TOP = 0;

        System.out.println("Telah dibuat sebuah stack");
        this.tulis();
    }

    // Metode lain:

    void tulis() {
        System.out.println("TOP = " + this.TOP);
    }
}
```

Ln 1, Col 1 100% Windows (CRLF) UTF-8

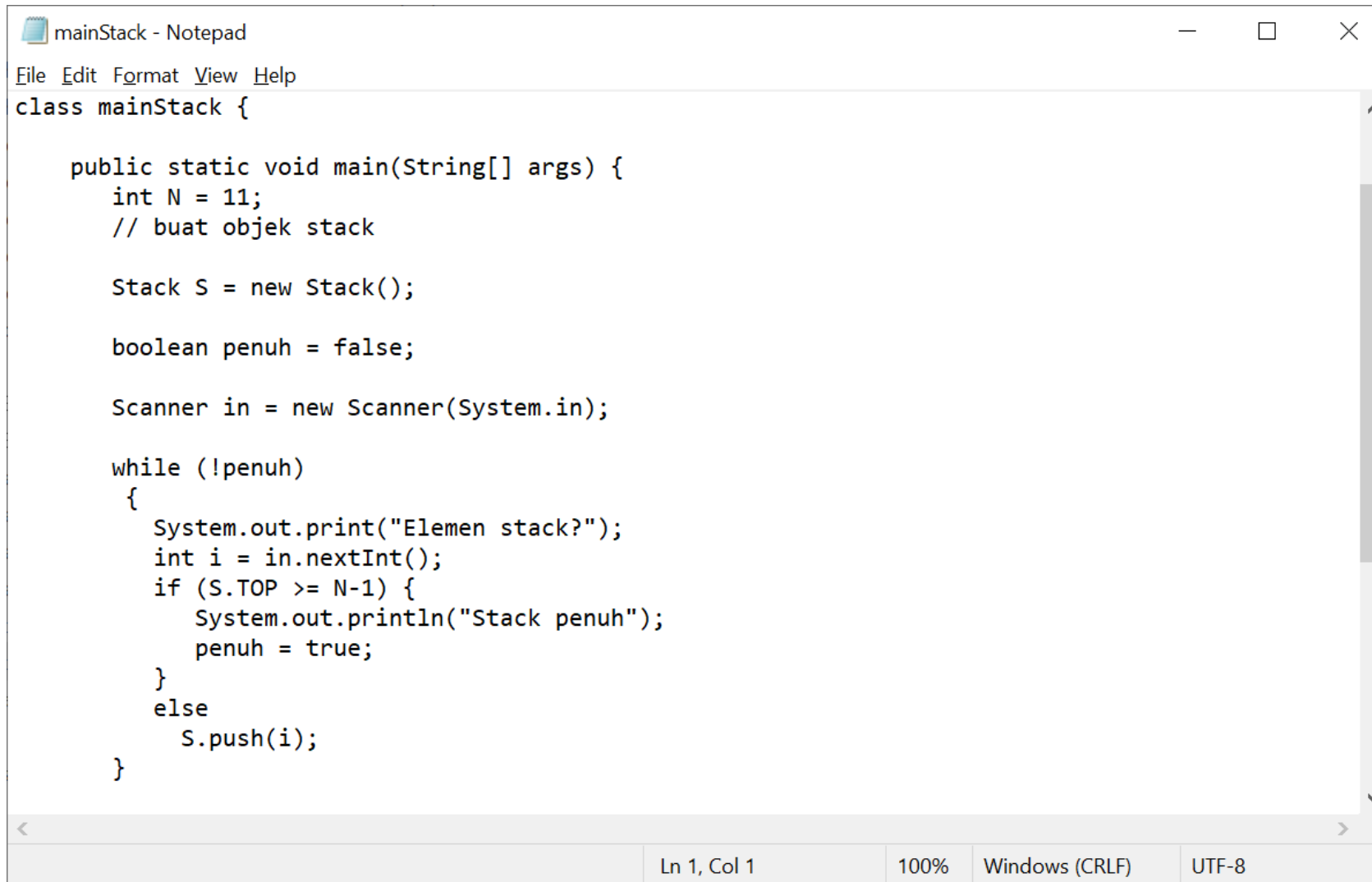


```
void tulis() {  
    System.out.println("TOP = " + this.TOP);  
}  
  
void push(int x){  
    this.TOP++;  
    //if (this.TOP > N-1)  
    //    System.out.println("stack penuh");  
    // else  
    s[TOP] = x;  
}  
  
int pop(){  
    if (this.TOP == 0) {  
        System.out.println("stack kosong");  
        return 0;  
    }  
    else {  
        int x = s[TOP];  
        this.TOP--;  
        return x;  
    }  
}  
}
```

Ln 1, Col 1 100% Windows (CRLF) UTF-8

Kelas mainStack

(yang menggunakan kelas Stack)



```
mainStack - Notepad
File Edit Format View Help
class mainStack {

    public static void main(String[] args) {
        int N = 11;
        // buat objek stack

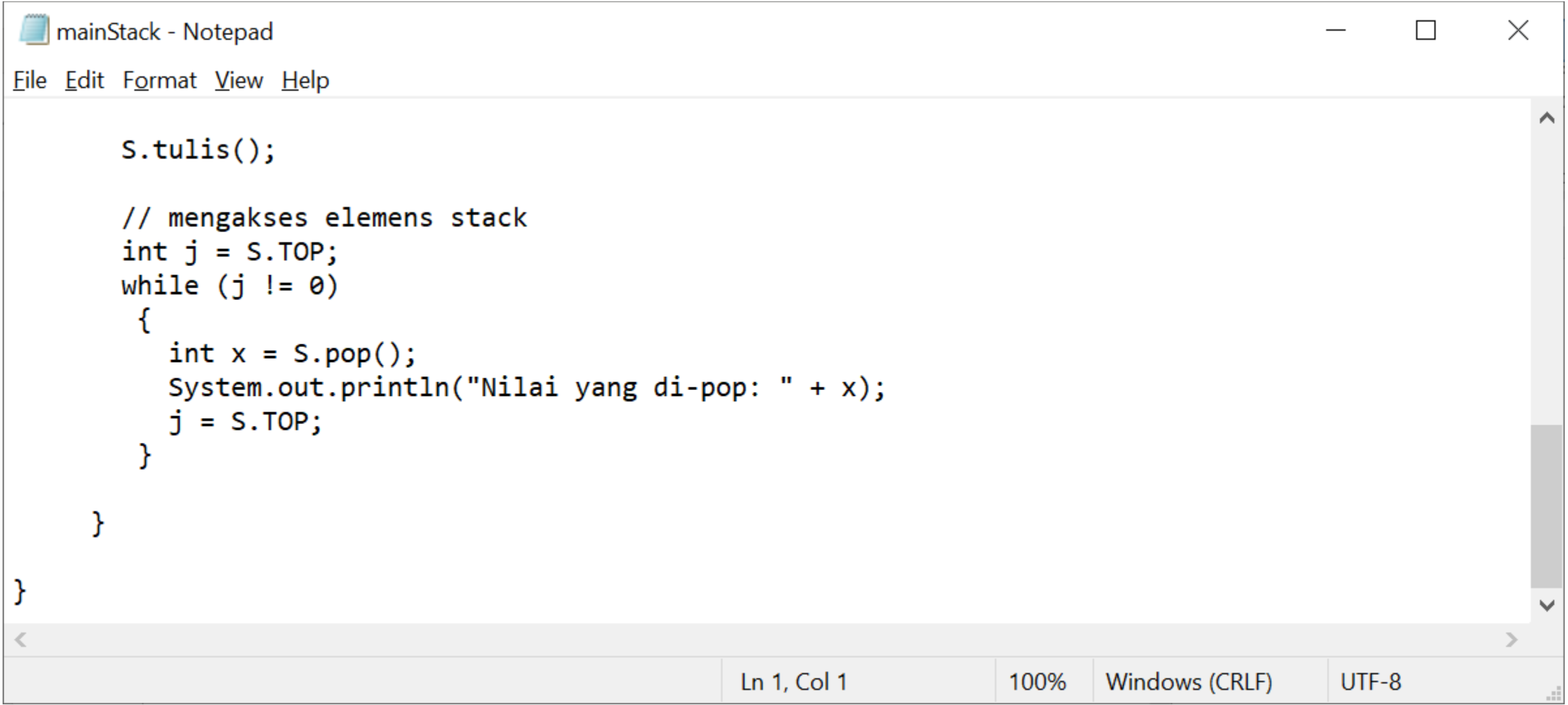
        Stack S = new Stack();

        boolean penuh = false;

        Scanner in = new Scanner(System.in);

        while (!penuh)
        {
            System.out.print("Elemen stack?");
            int i = in.nextInt();
            if (S.TOP >= N-1) {
                System.out.println("Stack penuh");
                penuh = true;
            }
            else
                S.push(i);
        }
    }
}
```

Ln 1, Col 1 100% Windows (CRLF) UTF-8



The image shows a Notepad window titled "mainStack - Notepad". The window contains the following Java code:

```
S.tulis();

// mengakses elemens stack
int j = S.TOP;
while (j != 0)
{
    int x = S.pop();
    System.out.println("Nilai yang di-pop: " + x);
    j = S.TOP;
}

}
```

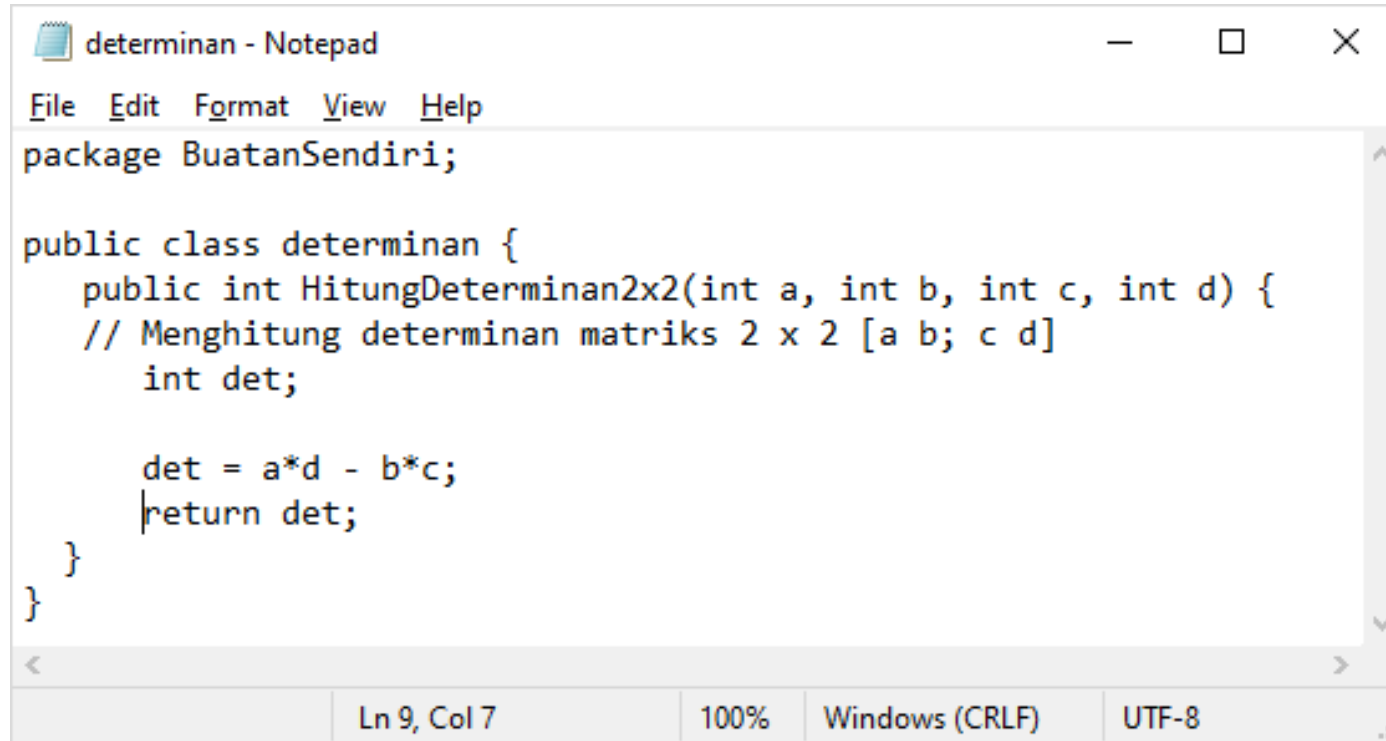
The status bar at the bottom indicates the current position is "Ln 1, Col 1", the zoom is "100%", the line endings are "Windows (CRLF)", and the encoding is "UTF-8".

```
Command Prompt

D:\Belajar Bahasa Java>java mainStack
Telah dibuat sebuah stack
TOP = 0
Elemen stack?5
Elemen stack?7
Elemen stack?29
Elemen stack?12
Elemen stack?7
Elemen stack?18
Elemen stack?90
Elemen stack?23
Elemen stack?45
Elemen stack?44
Elemen stack?10
Stack penuh
TOP = 10
Nilai yang di-pop: 44
Nilai yang di-pop: 45
Nilai yang di-pop: 23
Nilai yang di-pop: 90
Nilai yang di-pop: 18
Nilai yang di-pop: 7
Nilai yang di-pop: 12
Nilai yang di-pop: 29
Nilai yang di-pop: 7
Nilai yang di-pop: 5

D:\Belajar Bahasa Java>
```

Membuat *package* buatan sendiri



```
determinan - Notepad
File Edit Format View Help
package Buatansendiri;

public class determinan {
    public int HitungDeterminan2x2(int a, int b, int c, int d) {
        // Menghitung determinan matriks 2 x 2 [a b; c d]
        int det;

        det = a*d - b*c;
        return det;
    }
}
```

Ln 9, Col 7 100% Windows (CRLF) UTF-8

- Paket bernama `Buatansendiri`, berisi satu kelas bernama `determinan`
- Buat *sub-folder* bernama `Buatansendiri` di dalam folder proyek Java yang sedang kita kembangkan (folder Belajar Bahasa Java)
- Simpan *package* di atas ke dalam sub-folder `Buatansendiri` dengan nama `determinan.java`

Belajar Bahasa Java

Home Share View

This PC > Dataku (E:) > Belajar Bahasa Java

Search Belajar Bah...

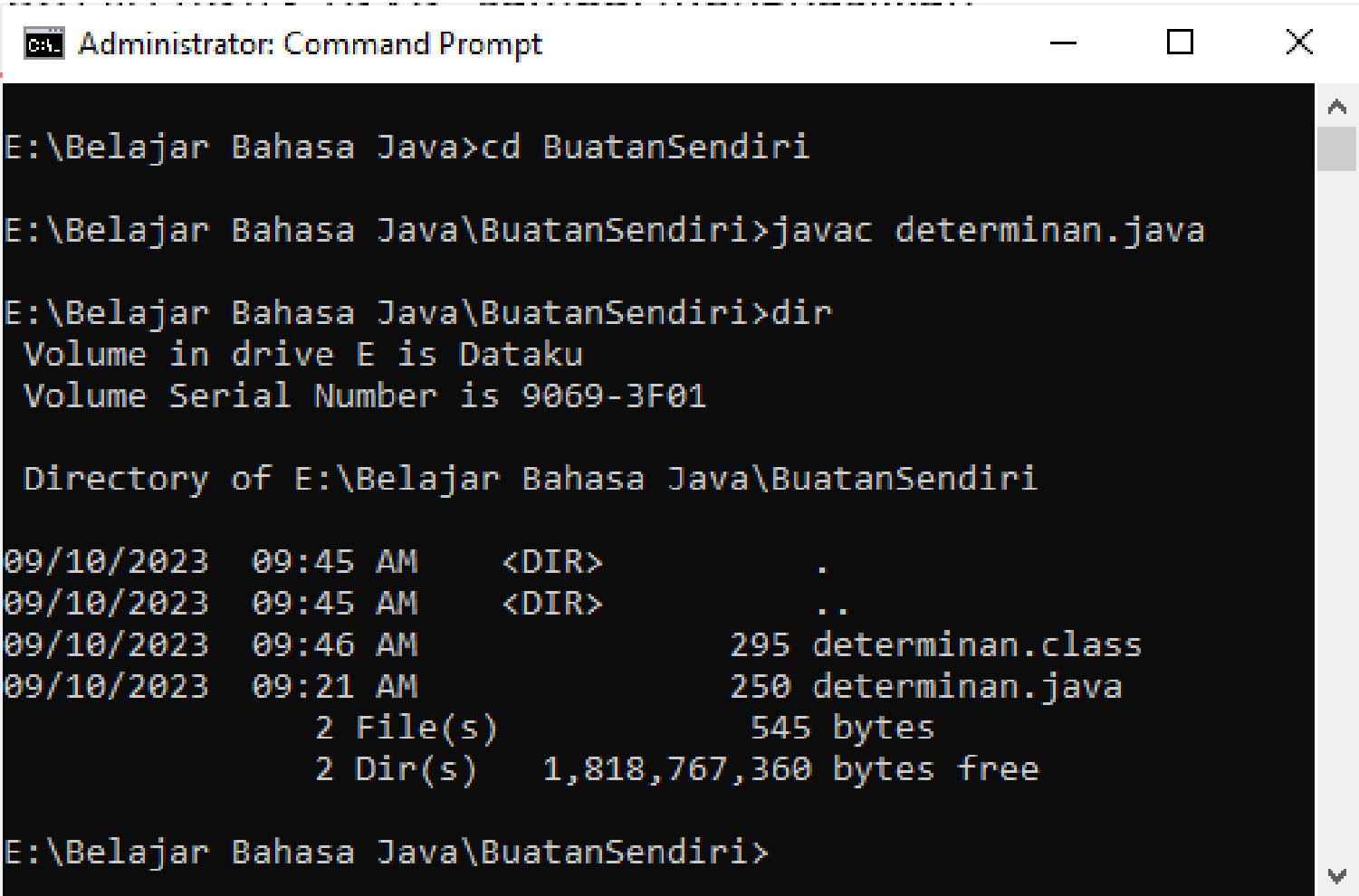
Quick access

- Desktop
- Downloads
- Documents
- Pictures
- 2023-2024
- 2023-2024
- 2023-2024
- Tahun 2023
- OneDrive
- OneDrive - Personal

35 items | 1 item selected

Name	Date modified	Type	Size
browseFile	9/9/2023 6:37 PM	File folder	
BuatanSendiri	9/10/2023 6:03 AM	File folder	
HelloWorld	9/9/2023 6:37 PM	File folder	
Lingkaran	9/9/2023 6:37 PM	File folder	
myApplet	9/9/2023 6:37 PM	File folder	
Test	9/9/2023 6:37 PM	File folder	
DriverMatriks.class	9/15/2021 2:57 PM	CLASS File	2 KB
DriverMatriks.java	9/5/2015 5:37 PM	JAVA File	1 KB
DriverMhs.class	9/19/2018 4:49 PM	CLASS File	1 KB
DriverMhs.java	9/5/2015 4:21 PM	JAVA File	1 KB
DriverTitik.class	1/26/2017 12:36 PM	CLASS File	1 KB
DriverTitik.java	1/26/2017 12:36 PM	JAVA File	1 KB
FindMonth.class	3/18/2011 1:56 PM	CLASS File	2 KB

- Kompilasi program `determinan.java` sampai menghasilkan `determinan.class`



```
Administrator: Command Prompt

E:\Belajar Bahasa Java>cd BuatanSendiri

E:\Belajar Bahasa Java\BuatanSendiri>javac determinan.java

E:\Belajar Bahasa Java\BuatanSendiri>dir
Volume in drive E is Dataku
Volume Serial Number is 9069-3F01

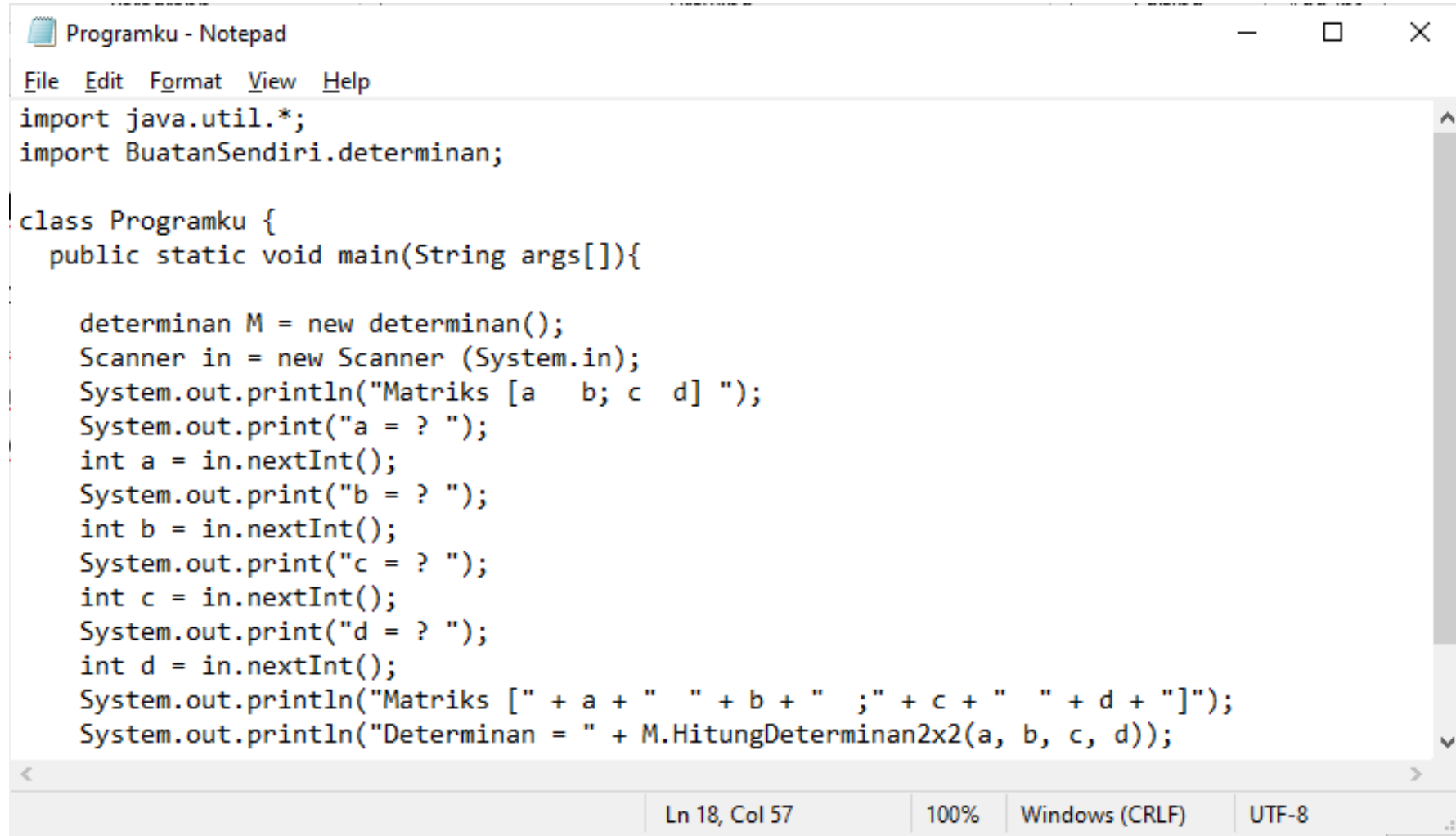
Directory of E:\Belajar Bahasa Java\BuatanSendiri

09/10/2023  09:45 AM    <DIR>          .
09/10/2023  09:45 AM    <DIR>          ..
09/10/2023  09:46 AM                295 determinan.class
09/10/2023  09:21 AM                250 determinan.java
                2 File(s)                545 bytes
                2 Dir(s)  1,818,767,360 bytes free

E:\Belajar Bahasa Java\BuatanSendiri>
```

Cara menggunakan *package* buatan sendiri

- Tulis Programku.java yang memanggil *method* di dalam *package* BuatanSendiri, impor *package* BuatanSendiri.determinan
- Simpan Programku.java di dalam folder proyek Java yang sedang kita dikembangkan



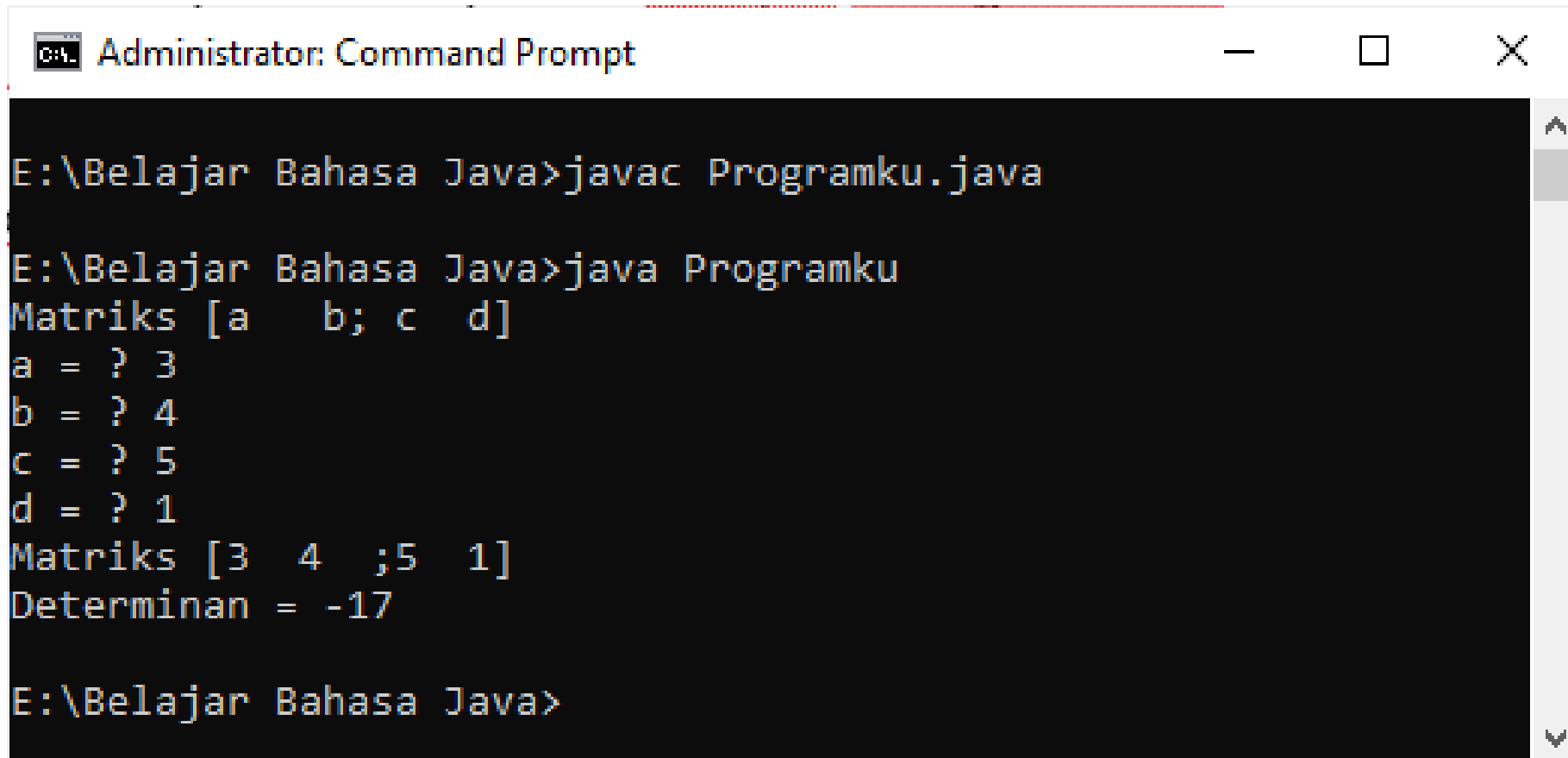
```
Programku - Notepad
File Edit Format View Help
import java.util.*;
import BuatanSendiri.determinan;

class Programku {
    public static void main(String args[]){

        determinan M = new determinan();
        Scanner in = new Scanner (System.in);
        System.out.println("Matriks [a  b; c  d] ");
        System.out.print("a = ? ");
        int a = in.nextInt();
        System.out.print("b = ? ");
        int b = in.nextInt();
        System.out.print("c = ? ");
        int c = in.nextInt();
        System.out.print("d = ? ");
        int d = in.nextInt();
        System.out.println("Matriks [" + a + "  " + b + "  ;" + c + "  " + d + "]");
        System.out.println("Determinan = " + M.HitungDeterminan2x2(a, b, c, d));
    }
}
```

Ln 18, Col 57 100% Windows (CRLF) UTF-8

- Kompilasi program `Programku.java` sampai menghasilkan `Programku.class`
- *Run* program `Programku`



```
Administrator: Command Prompt
E:\Belajar Bahasa Java>javac Programku.java
E:\Belajar Bahasa Java>java Programku
Matriks [a  b; c  d]
a = ? 3
b = ? 4
c = ? 5
d = ? 1
Matriks [3  4  ;5  1]
Determinan = -17
E:\Belajar Bahasa Java>
```

Referensi

Materi “Pengantar Pemrograman Bahasa Java” diambil dari berbagai sumber, antara lain:

1. Arief Bahtiar S.T, M.T, Ivan Kurniawan, *Fundamental Java 2 Platform Application Developer*, ComLabs IT Course ITB.
2. Adi Nuralim, *Java Virtual Machine*, <http://belajarjava-19.blogspot.co.id/2011/05/java-virtual-machine-jvm.html>, tanggal akses 3 September 2015
3. Dunia Ilkom, <https://www.duniailkom.com/tutorial-oop-java-cara-membuat-package-dan-proses-import/>
4. Wikipedia