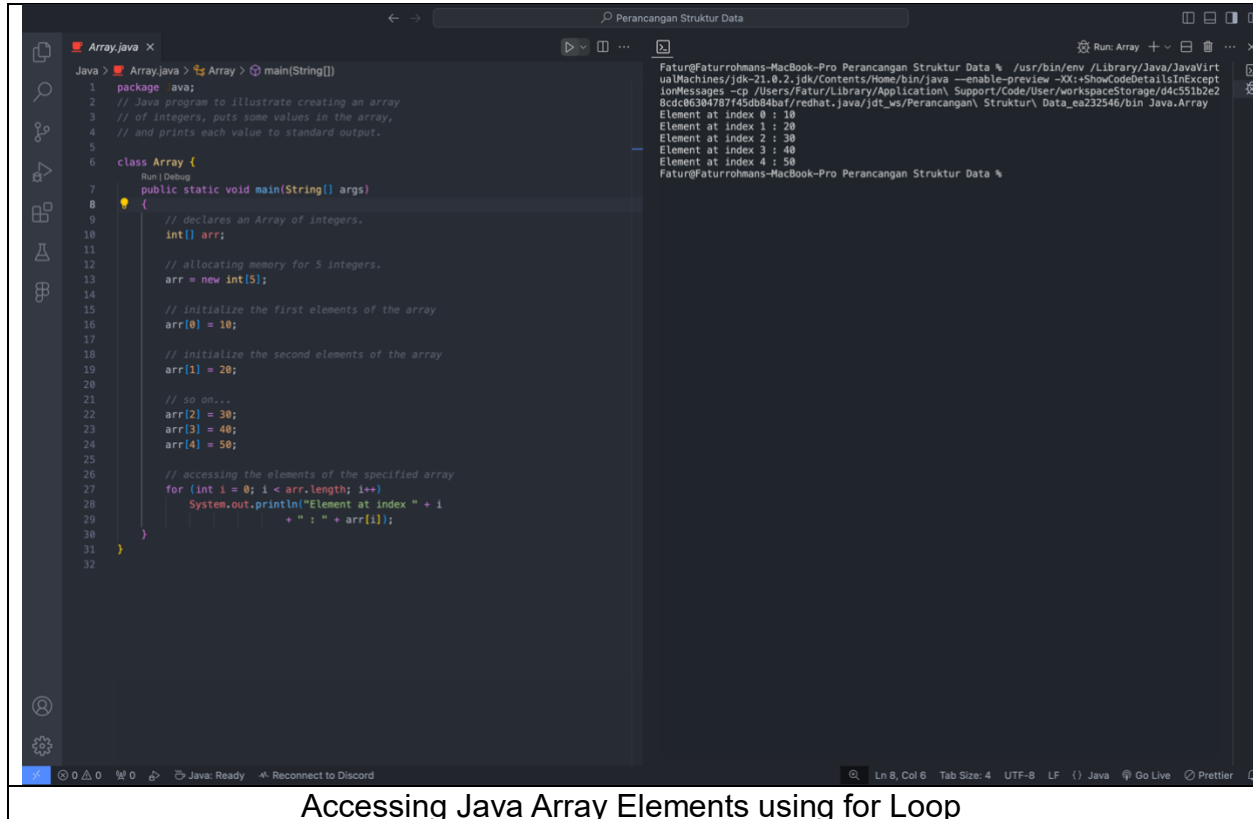


Array dalam Bahasa Pemrograman Java

Perancangan Struktur Data

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Kelas : Informatika C



The screenshot displays an IDE window titled "Perancangan Struktur Data". The editor shows a Java file named "Array.java" with the following code:

```
1 package aya;
2 // Java program to illustrate creating an array
3 // of integers, puts some values in the array,
4 // and prints each value to standard output.
5
6 class Array {
7     public static void main(String[] args)
8     {
9         // declares an Array of integers.
10        int[] arr;
11
12        // allocating memory for 5 integers.
13        arr = new int[5];
14
15        // initialize the first elements of the array
16        arr[0] = 10;
17
18        // initialize the second elements of the array
19        arr[1] = 20;
20
21        // so on....
22        arr[2] = 30;
23        arr[3] = 40;
24        arr[4] = 50;
25
26        // accessing the elements of the specified array
27        for (int i = 0; i < arr.length; i++)
28            System.out.println("Element at index " + i
29                               + " : " + arr[i]);
30    }
31 }
32
```

The output window on the right shows the execution results:

```
Fatur@Faturrohman-MacBook-Pro Perancangan Struktur Data % /usr/bin/env /Library/Java/JavaVirtual
ionMachines/jdk-21.0.2.jdk/Contents/Home/bin/java --enable-preview -Xc+ShowCodeDetailsInExcept
ionMessages -cp /Users/Fatur/Library/Application\ Support/Code/User/workspaceStorage/64c551b2e2
8cdc06304787f45db84baf/redhat.java/jdt_ws/Perancangan\ Struktur\ Data_ea232546/bin Java.Array
Element at index 0 : 10
Element at index 1 : 20
Element at index 2 : 30
Element at index 3 : 40
Element at index 4 : 50
Fatur@Faturrohman-MacBook-Pro Perancangan Struktur Data %
```

At the bottom of the IDE window, the status bar indicates "Ln 8, Col 6 Tab Size: 4 UTF-8 LF () Java Go Live Prettier".

Accessing Java Array Elements using for Loop

```
ArrayObject_1.java x
Java > ArrayObject_1.java > ArrayObject_1
1 package ava;
2 class ArrayObject_1 {
3     public static void main (String[] args) {
4         // 4 is the size of arr
5         int [] arr=new int [4];
6         System.out.println("Array Size:"+arr.length);
7     }
8 }
9
10
11

Fatur@Faturrohmans-MacBook-Pro Perancangan Struktur Data % /usr/bin/env /Library/Java/JavaVirtualMachines/jdk-21.0.2.jdk/Contents/Home/bin/java --enable-preview -XX:+ShowCodeDetailsInExceptionMessages -cp /Users/Fatur/Library/Application Support/Code/User/workspaceStorage/d4c551b2e28cdc06384787145db84baf/redhat.java/jdt_ws/Perancangan\ Struktur\ Data_ea232546/bin Java.ArrayObject_1
Array Size:4
Fatur@Faturrohmans-MacBook-Pro Perancangan Struktur Data %
```

Arrays of Objects in Java (example 1)

```
ArrayObject_2.java x
Java > ArrayObject_2.java > Student > Student(int, String)
1 package ava;
2 // Java program to illustrate creating
3 // an array of objects
4
5 class Student {
6     public int roll_no;
7     public String name;
8     Student(int roll_no, String name)
9     {
10         this.roll_no = roll_no;
11         this.name = name;
12     }
13 }
14
15 // Elements of the array are objects of a class Student.
16 public class ArrayObject_2 {
17     public static void main(String[] args)
18     {
19         // declares an Array of Students
20         Student[] arr;
21
22         // allocating memory for 5 objects of type Student.
23         arr = new Student[5];
24
25         // initialize the first elements of the array
26         arr[0] = new Student(roll_no:1, name:"aman");
27
28         // initialize the second elements of the array
29         arr[1] = new Student(roll_no:2, name:"vaibhav");
30
31         // so on...
32         arr[2] = new Student(roll_no:3, name:"shikar");
33         arr[3] = new Student(roll_no:4, name:"dharmesh");
34         arr[4] = new Student(roll_no:5, name:"mohit");
35
36         // accessing the elements of the specified array
37         for (int i = 0; i < arr.length; i++)
38             System.out.println("Element at " + i + " : "
39                               + arr[i].roll_no + " "
40                               + arr[i].name);
41     }
42 }
43

Fatur@Faturrohmans-MacBook-Pro Perancangan Struktur Data % /usr/bin/env /Library/Java/JavaVirtualMachines/jdk-21.0.2.jdk/Contents/Home/bin/java --enable-preview -XX:+ShowCodeDetailsInExceptionMessages -cp /Users/Fatur/Library/Application Support/Code/User/workspaceStorage/d4c551b2e28cdc06384787145db84baf/redhat.java/jdt_ws/Perancangan\ Struktur\ Data_ea232546/bin Java.ArrayObject_2
Element at 0 : 1 aman
Element at 1 : 2 vaibhav
Element at 2 : 3 shikar
Element at 3 : 4 dharmesh
Element at 4 : 5 mohit
Fatur@Faturrohmans-MacBook-Pro Perancangan Struktur Data %
```

Arrays of Objects in Java (example 2)



```
Java > ArrayObject_3.java > ArrayObject_3 > main(String[])
1 package ava;
2 // Java program to illustrate creating
3 // an array of objects
4
5 class Student2
6 {
7
8     public String name;
9     Student2(String name)
10    {
11        this.name = name;
12    }
13    @Override
14    public String toString(){
15        return name;
16    }
17 }
18
19 // Elements of the array are objects of a class Student.
20 public class ArrayObject_3
21 {
22     Run | Debug
23     public static void main (String[] args)
24     {
25         // declares an Array and initializing the elements of the array
26         Student2[] myStudents = new Student2[]{new Student2(name:"Dharma"),new Student2(name:"sanvi"),new Student2(name:"Rupa"),new Student2(name:"Ajay")};
27
28         // accessing the elements of the specified array
29         for(Student2 m:myStudents){
30             System.out.println(m);
31         }
32     }
33 }
```

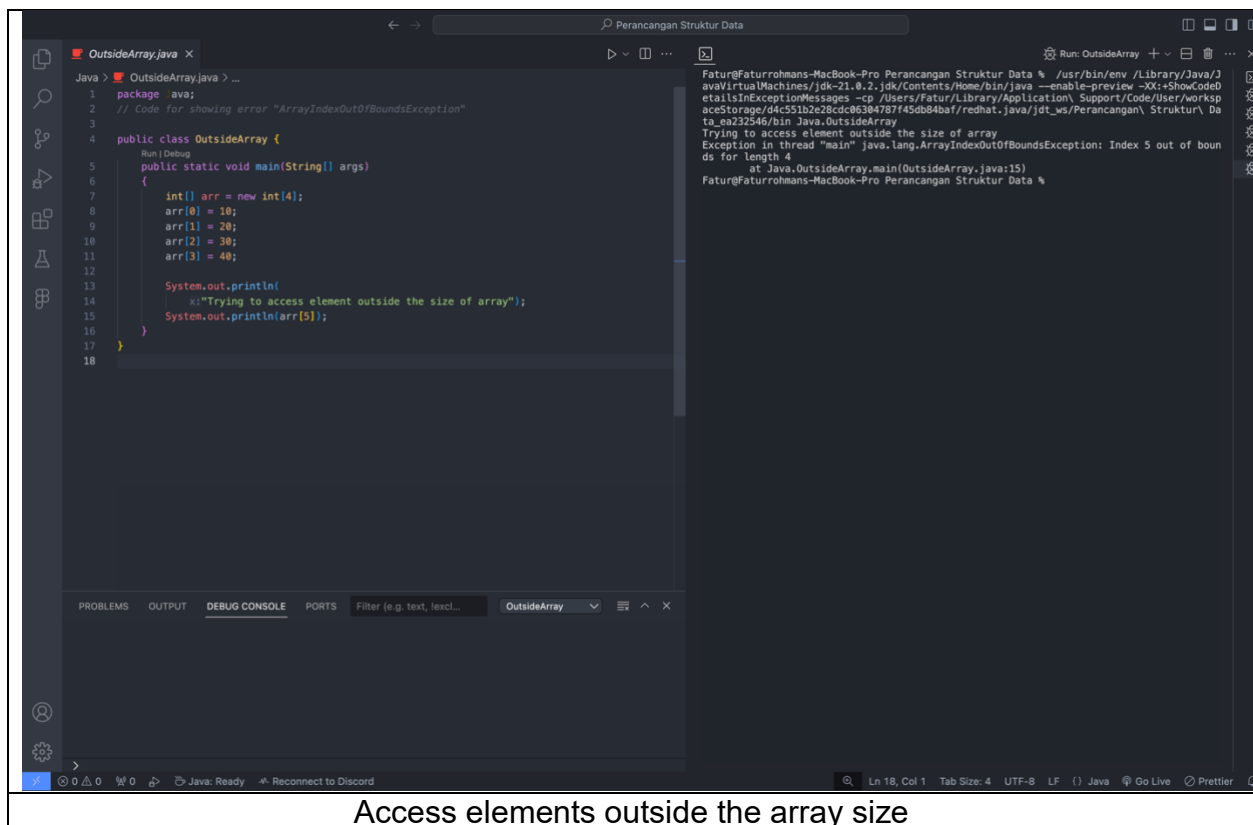
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

Fatur@Faturrohman-MacBook-Pro Perancangan Struktur Data % /usr/bin/env /Library/Java/JavaVirtualMachines/jdk-21.0.2.jdk/Contents/Home/bin/java --enable-preview -XX:+ShowCodeDetailsInExceptionMessages -cp /Users/Fatur/Library/Application\ Support/Code/User/workspaceStorage/d4c551b2e28cdc06304787f45db84baf/redhat.java/jdt_ws/Perancangan\ Struktur\ Data_ea232546/bin Java.ArrayObject_3

Dharma
sanvi
Rupa
Ajay
Fatur@Faturrohman-MacBook-Pro Perancangan Struktur Data %

Ln 31, Col 6 Tab Size: 4 UTF-8 LF () Java Go Live Prettier

Arrays of Objects in Java (example 3)



```
Java > OutsideArray.java > ...
1 package ava;
2 // Code for showing error "ArrayIndexOutOfBoundsException"
3
4 public class OutsideArray {
5     Run | Debug
6     public static void main(String[] args)
7     {
8         int[] arr = new int[4];
9         arr[0] = 10;
10        arr[1] = 20;
11        arr[2] = 30;
12        arr[3] = 40;
13
14        System.out.println
15        x:"Trying to access element outside the size of array";
16        System.out.println(arr[5]);
17    }
18 }
```

PROBLEMS OUTPUT DEBUG CONSOLE PORTS Filter (e.g. text, text...) OutsideArray

Fatur@Faturrohman-MacBook-Pro Perancangan Struktur Data % /usr/bin/env /Library/Java/JavaVirtualMachines/jdk-21.0.2.jdk/Contents/Home/bin/java --enable-preview -XX:+ShowCodeDetailsInExceptionMessages -cp /Users/Fatur/Library/Application\ Support/Code/User/workspaceStorage/d4c551b2e28cdc06304787f45db84baf/redhat.java/jdt_ws/Perancangan\ Struktur\ Data_ea232546/bin Java.OutsideArray

Trying to access element outside the size of array
Exception in thread "main" java.lang.ArrayIndexOutOfBoundsException: Index 5 out of bounds for length 4
at Java.OutsideArray.main(OutsideArray.java:15)
Fatur@Faturrohman-MacBook-Pro Perancangan Struktur Data %

Ln 18, Col 1 Tab Size: 4 UTF-8 LF () Java Go Live Prettier

Access elements outside the array size

```
1 package ava;
2 public class IteratingArray {
3     public static void main(String[] args)
4     {
5         int[] arr = new int[2];
6         arr[0] = 10;
7         arr[1] = 20;
8
9         for (int i = 0; i < arr.length; i++)
10             System.out.println(arr[i]);
11     }
12 }
13
```

Run | Debug

PROBLEMS DEBUG CONSOLE ... Filter (e.g. text, text...) IteratingArray

Ln 1, Col 14 Tab Size: 4 UTF-8 LF () Java Go Live Prettier

Iterating the array

```
1 package ava;
2 // Driver class
3 class MultidimensionalArray_1 {
4     public static void main(String[] args)
5     {
6         // Syntax
7         int[][] arr = new int[3][3];
8         // 3 row and 3 column
9
10        // Number of Rows
11        System.out.println("Number of Rows:"+
12                           arr.length);
13
14        // Number of Columns
15        System.out.println("Number of Columns:"+
16                           arr[0].length);
17    }
18 }
19
```

Run | Debug

PROBLEMS DEBUG CONSOLE ... Filter (e.g. text, text...) MultidimensionalArray_1

Ln 1, Col 1 Tab Size: 4 UTF-8 LF () Java Go Live Prettier

Multidimensional Arrays in Java

The screenshot shows an IDE with a Java file named `MultidimensionalArray_2.java`. The code defines a class `MultidimensionalArray_2` with a `main` method. It declares and initializes a 2D array `arr` with the following values: `{{ 2, 7, 9}, {3, 6, 1}, {7, 4, 2}}`. The `main` method then prints the array using nested loops.

```
1 package avai;
2 // Java Program to Multidimensional Array
3
4 // Driver Class
5 public class MultidimensionalArray_2 {
6     // main function
7     public static void main(String args[])
8     {
9         // declaring and initializing 2D array
10        int arr[][]
11        = { { 2, 7, 9 }, { 3, 6, 1 }, { 7, 4, 2 } };
12
13        // printing 2D array
14        for (int i = 0; i < 3; i++) {
15            for (int j = 0; j < 3; j++)
16                System.out.print(arr[i][j] + " ");
17
18            System.out.println();
19        }
20    }
21 }
22
```

The output window shows the following result:

```
Fatur@Faturrohman-MacBook-Pro Perancangan Struktur Data % /usr/bin/env ./Library/Java/J
avaVirtualMachines/jdk-21.0.2.jdk/Contents/Home/bin/java --enable-preview -XX:+ShowCodeB
etailsInExceptionMessages -cp /Users/Fatur/Library/Application\ Support/Code/User/worksp
aceStorage/d4c551b2e28cdc86384787f45db84baf/redhat.java/jdt_ws/Perancangan\ Struktur\ Da
ta_ea232546/bin Java.MultidimensionalArray_2
2 7 9
3 6 1
7 4 2
Fatur@Faturrohman-MacBook-Pro Perancangan Struktur Data %
```

Example of Multidimensional Array in Java

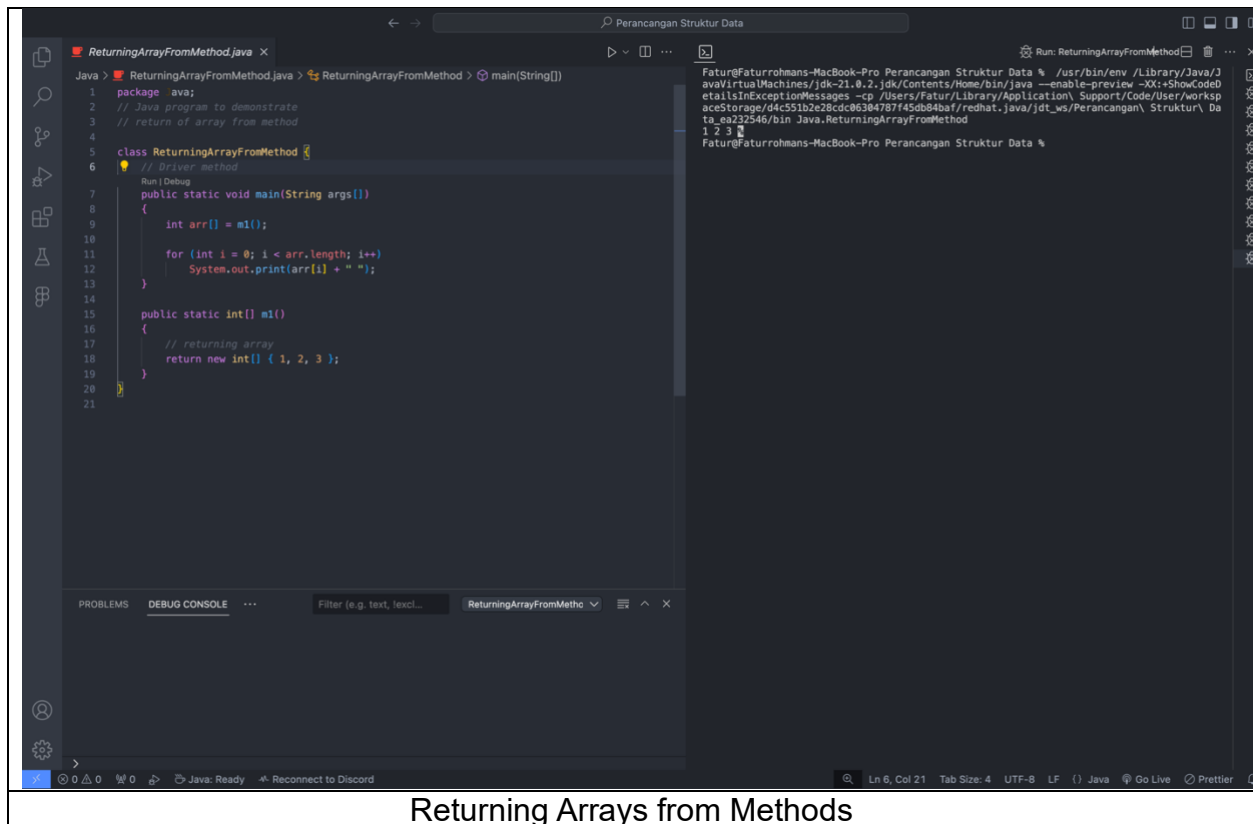
The screenshot shows an IDE with a Java file named `PassingArrayToMethod.java`. The code defines a class `PassingArrayToMethod` with a `main` method and a `sum` method. The `main` method declares an array `arr` with values `{ 3, 1, 2, 5, 4 }` and calls the `sum` method. The `sum` method calculates the sum of the array elements and prints the result.

```
1 package avai;
2 // Java program to demonstrate
3 // passing of array to method
4
5 public class PassingArrayToMethod {
6     // Driver method
7     public static void main(String args[])
8     {
9         int arr[] = { 3, 1, 2, 5, 4 };
10
11        // passing array to method m1
12        sum(arr);
13
14        public static void sum(int[] arr)
15        {
16            // getting sum of array values
17            int sum = 0;
18
19            for (int i = 0; i < arr.length; i++)
20                sum += arr[i];
21
22            System.out.println("sum of array values : " + sum);
23        }
24    }
25 }
26
```

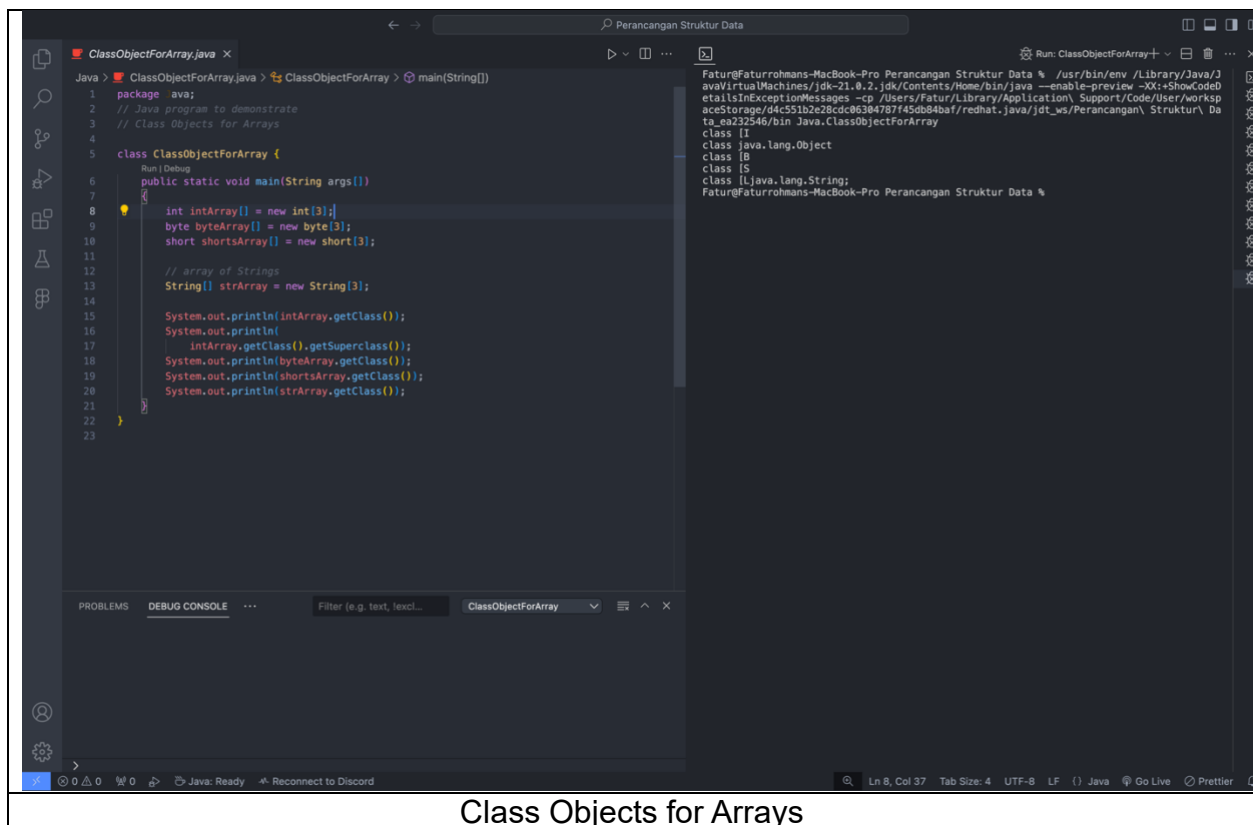
The output window shows the following result:

```
Fatur@Faturrohman-MacBook-Pro Perancangan Struktur Data % /usr/bin/env ./Library/Java/J
avaVirtualMachines/jdk-21.0.2.jdk/Contents/Home/bin/java --enable-preview -XX:+ShowCodeB
etailsInExceptionMessages -cp /Users/Fatur/Library/Application\ Support/Code/User/worksp
aceStorage/d4c551b2e28cdc86384787f45db84baf/redhat.java/jdt_ws/Perancangan\ Struktur\ Da
ta_ea232546/bin Java.PassingArrayToMethod
sum of array values : 15
Fatur@Faturrohman-MacBook-Pro Perancangan Struktur Data %
```

Passing Arrays to Methods



Returning Arrays from Methods



Class Objects for Arrays

```
1 package avai;
2 // Java program to demonstrate
3 // cloning of one-dimensional arrays
4
5 class CloningSingleDimensionalArray {
6     public static void main(String args[])
7     {
8         int intArray[] = { 1, 2, 3 };
9
10        int cloneArray[] = intArray.clone();
11
12        // will print false as deep copy is created
13        // for one-dimensional array
14        System.out.println(intArray == cloneArray);
15
16        for (int i = 0; i < cloneArray.length; i++) {
17            System.out.print(cloneArray[i] + " ");
18        }
19    }
20 }
21
```

Run | Debug

1 2 3

Fatur@Faturrohman-MacBook-Pro Perancangan Struktur Data %

PROBLEMS DEBUG CONSOLE ... Filter (e.g. text, text...) CloningSingleDimensional...

Ln 6, Col 43 Tab Size: 4 UTF-8 LF () Java Go Live Prettier

Cloning of Single-Dimensional Array in Java

```
1 package avai;
2 // Java program to demonstrate
3 // cloning of multi-dimensional arrays
4
5 class CloningMultidimensionalArray {
6     public static void main(String args[])
7     {
8         int intArray[][] = { { 1, 2, 3 }, { 4, 5 } };
9
10        int cloneArray[][] = intArray.clone();
11
12        // will print false
13        System.out.println(intArray == cloneArray);
14
15        // will print true as shallow copy is created
16        // i.e. sub-arrays are shared
17        System.out.println(intArray[0] == cloneArray[0]);
18        System.out.println(intArray[1] == cloneArray[1]);
19    }
20 }
21
```

Run | Debug

true

Fatur@Faturrohman-MacBook-Pro Perancangan Struktur Data %

PROBLEMS DEBUG CONSOLE ... Filter (e.g. text, text...) CloningMultidimensionalAi...

Ln 8, Col 1 Tab Size: 4 UTF-8 LF () Java Go Live Prettier

Cloning Multidimensional Array in Java