

HATFD1025

Find the Second Largest Element in an Array

Write a program to find the second-largest element in an array of integers without using any sorting algorithms or built-in array functions.

Instructions: Traverse the array manually to find both the largest and second-largest elements

Solution:

```
import java.util.Scanner;
public class SecondLargest
{
    public static void main(String[] args)
    {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter the number of elements in the array: ");
        int n = scanner.nextInt();
        if (n < 2)
        {
            System.out.println("The array should have at least 2 elements.");
            return;
        }
        int[] arr = new int[n];
        System.out.println("Enter the elements of the array:");
        for (int i = 0; i < n; i++) {
            arr[i] = scanner.nextInt();
        }
        int secondLargest = findSecondLargest(arr);
        if (secondLargest != Integer.MIN_VALUE) {
            System.out.println("The second largest element is: " +
secondLargest);
        } else {
            System.out.println("There is no second largest element.");
        }
    }
}
```

```
        scanner.close();
    }

    public static int findSecondLargest(int[] arr)
    {
        int largest = Integer.MIN_VALUE;
        int secondLargest = Integer.MIN_VALUE;
        for (int i = 0; i < arr.length; i++) {
            if (arr[i] > largest) {
                secondLargest = largest;
                largest = arr[i];
            }
            else if (arr[i] > secondLargest && arr[i] != largest)
            {
                secondLargest = arr[i];
            }
        }

        return secondLargest;
    }
}
```

1. Input:

Enter the number of elements in the array:

5

Enter the elements of the array:

100

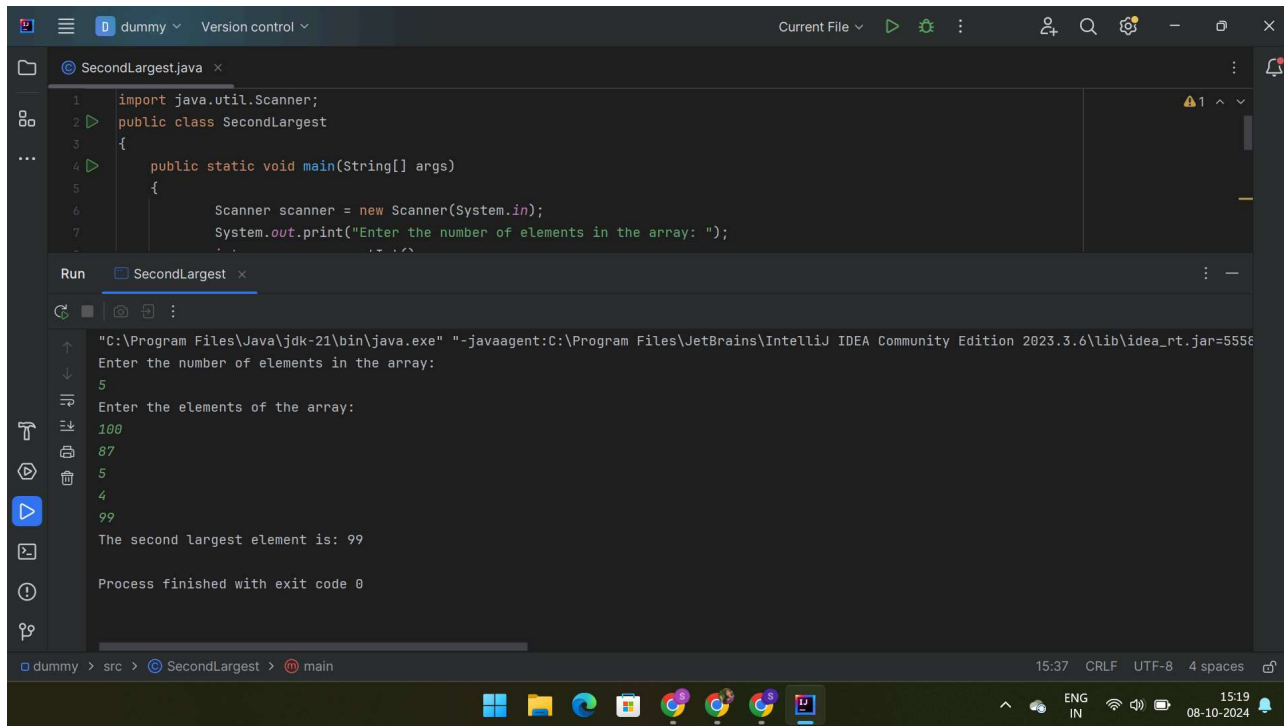
87

5

4

99

1. Output: The second largest element is: 99



2. Input

Enter the number of elements in the array:

4

Enter the elements of the array:

10

01

12

21

2. Output

The second largest element is: 12

The screenshot shows the IntelliJ IDEA IDE with a project named 'dummy'. The file 'SecondLargest.java' is open, containing the following code:

```
1 import java.util.Scanner;
2 public class SecondLargest
3 {
4     public static void main(String[] args)
5     {
6         Scanner scanner = new Scanner(System.in);
7         System.out.print("Enter the number of elements in the array: ");
8         int n = scanner.nextInt();
9         int[] arr = new int[n];
10        for (int i = 0; i < n; i++)
11        {
12            arr[i] = scanner.nextInt();
13        }
14        int first = -1, second = -1;
15        for (int i = 0; i < n; i++)
16        {
17            if (arr[i] > first)
18            {
19                second = first;
20                first = arr[i];
21            }
22            else if (arr[i] > second && arr[i] < first)
23            {
24                second = arr[i];
25            }
26        }
27        System.out.println("The second largest element is: " + second);
28    }
29 }
```

The 'Run' tab is active, showing the execution output:

```
"C:\Program Files\Java\jdk-21\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2023.3.6\lib\idea_rt.jar=5566:C:\Program Files\Java\jdk-21\bin" -Dfile.encoding=UTF-8
Enter the number of elements in the array:
4
Enter the elements of the array:
10
01
12
21
The second largest element is: 12
Process finished with exit code 0
```

The status bar at the bottom indicates the file is 'SecondLargest.java' in the 'src' directory, with the 'main' method selected. The encoding is UTF-8, line endings are CRLF, and there are 4 spaces per tab. The system clock shows 15:37 on 08-10-2024.

3. Input

Enter the number of elements in the array: 6

Enter the elements of the array:

1

2

45

54

32

12

3. Output

The second largest element is: 45

