

### **Source Code:**

- a. Array implementation to find out sum, average , minimum and maximum elements present in the array.

```
import java.util.Scanner;
public class AvgSumMinMax {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        // Get the size of the array from the user
        System.out.print("Enter the size of the array: ");
        int size = scanner.nextInt();

        // Create the array
        int[] numbers = new int[size];

        // Get the values for the array from the user
        System.out.println("Enter " + size + " integers:");
        for (int i = 0; i < size; i++) {
            numbers[i] = scanner.nextInt();
        }

        // Calculate the sum of the elements in the array
        int sum = 0;
        for (int i = 0; i < size; i++) {
            sum += numbers[i];
        }

        // Calculate the average of the elements in the array
        double average = (double) sum / size;

        // Find the minimum element in the array
        int min = numbers[0];
        for (int i = 1; i < size; i++) {
            if (numbers[i] < min) {
                min = numbers[i];
            }
        }

        // Find the maximum element in the array
        int max = numbers[0];
        for (int i = 1; i < size; i++) {
            if (numbers[i] > max) {
                max = numbers[i];
            }
        }

        // Print out the results
        System.out.println("Sum: " + sum);
        System.out.println("Average: " + average);
        System.out.println("Minimum: " + min);
    }
}
```

```

        System.out.println("Maximum: " + max);
    }
}

```

b. Array implementation using bubble sort and searching techniques.

```

import java.util.Scanner;
public class SearchSort {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        // Get the size of the array from the user
        System.out.print("Enter the size of the array: ");
        int size = scanner.nextInt();
        // Create the array
        int[] numbers = new int[size];
        // Get the values for the array from the user
        System.out.println("Enter " + size + " integers:");
        for (int i = 0; i < size; i++) {
            numbers[i] = scanner.nextInt();
        }
        // Print out the unsorted array
        System.out.print("Unsorted array: ");
        for (int i = 0; i < size; i++) {
            System.out.print(numbers[i] + " ");
        }
        System.out.println();

        // Sort the array using bubble sort
        for (int i = 0; i < size - 1; i++) {
            for (int j = 0; j < size - i - 1; j++) {
                if (numbers[j] > numbers[j + 1]) {
                    int temp = numbers[j];
                    numbers[j] = numbers[j + 1];
                    numbers[j + 1] = temp;
                }
            }
        }
        // Print out the sorted array
        System.out.print("Sorted array: ");
        for (int i = 0; i < size; i++) {
            System.out.print(numbers[i] + " ");
        }
        System.out.println();

        // Get a value to search for from the user
        System.out.print("Enter a value to search for: ");
        int searchValue = scanner.nextInt();

        // Perform a linear search to find the value
    }
}

```

```

int index = -1;
for (int i = 0; i < size; i++) {
    if (numbers[i] == searchValue) {
        index = i;
        break;
    }
}

// Print out the search results
if (index != -1) {
    System.out.println("Found " + searchValue + " at index " + index);
} else {
    System.out.println("Did not find " + searchValue);
}
}
}

```

## Outputs:

The screenshot shows the IDE with the file `AvgSumMinMax.java` open. The code is as follows:

```

1 package demo;
2 import java.util.Scanner;
3
4 public class AvgSumMinMax {
5     public static void main(String[] args) {
6         Scanner scanner = new Scanner(System.in);
7
8         // Get the size of the array from the user
9         System.out.print("Enter the size of the array: ");
10        int size = scanner.nextInt();
11
12        // Create the array
13        int[] numbers = new int[size];
14
15        // Get the values for the array from the user
16        System.out.print("Enter " + size + " integers:");
17        for (int i = 0; i < size; i++) {
18            numbers[i] = scanner.nextInt();
19        }
20
21        // Calculate the sum of the elements in the array
22        int sum = 0;
23        for (int i = 0; i < size; i++) {
24            sum += numbers[i];
25        }
26
27        // Calculate the average of the elements in the array
28        double average = (double) sum / size;
29
30        // Find the minimum element in the array
31        int min = numbers[0];
32        for (int i = 1; i < size; i++) {
33            if (numbers[i] < min) {
34                min = numbers[i];
35            }
36        }
37
38        // Find the maximum element in the array
39        int max = numbers[0];
40        for (int i = 1; i < size; i++) {
41            if (numbers[i] > max) {
42                max = numbers[i];
43            }
44        }
45    }
46 }

```

The console output shows the following interaction:

```

<terminated> AvgSumMinMax (Java Application) C:\Us...
Enter the size of the array: 3
Enter 3 integers:
25 -89 78
Sum: 14
Average: 4.666666666666667
Minimum: -89
Maximum: 78

```

The screenshot shows the IDE with the file `AvgSumMinMax.java` open. The code is the same as in the previous screenshot.

The console output shows the following interaction:

```

<terminated> AvgSumMinMax (Java Application) C:\Us...
Enter the size of the array: 6
Enter 6 integers:
45 -869 287 653 -245 369
Sum: 240
Average: 40.0
Minimum: -869
Maximum: 653

```

```
SearchSort.java X
1 package demo;
2 import java.util.Scanner;
3 public class SearchSort {
4     public static void main(String[] args) {
5         Scanner scanner = new Scanner(System.in);
6         // Get the size of the array from the user
7         System.out.print("Enter the size of the array: ");
8         int size = scanner.nextInt();
9         // Create the array
10        int[] numbers = new int[size];
11        // Get the values for the array from the user
12        System.out.println("Enter " + size + " integers:");
13        for (int i = 0; i < size; i++) {
14            numbers[i] = scanner.nextInt();
15        }
16        // Print out the unsorted array
17        System.out.print("Unsorted array: ");
18        for (int i = 0; i < size; i++) {
19            System.out.print(numbers[i] + " ");
20        }
21        System.out.println();
22
23        // Sort the array using bubble sort
24        for (int i = 0; i < size - 1; i++) {
25            for (int j = 0; j < size - i - 1; j++) {
26                if (numbers[j] > numbers[j + 1]) {
27                    int temp = numbers[j];
28                    numbers[j] = numbers[j + 1];
29                    numbers[j + 1] = temp;
30                }
31            }
32        }
33        // Print out the sorted array
34        System.out.print("Sorted array: ");
35        for (int i = 0; i < size; i++) {
36            System.out.print(numbers[i] + " ");
37        }
38        System.out.println();
39
40        // Get a value to search for from the user
41        System.out.print("Enter a value to search for: ");
42        int searchValue = scanner.nextInt();
43    }
}
```

```
Console X
<terminated> SearchSort [Java Application] C:\Users\Administrator\p2\
Enter the size of the array: 5
Enter 5 integers:
78 795 8645 25469 7
Unsorted array: 78 795 8645 25469 7
Sorted array: 7 78 795 8645 25469
Enter a value to search for: 8645
Found 8645 at index 3
```

```
SearchSort.java X
1 package demo;
2 import java.util.Scanner;
3 public class SearchSort {
4     public static void main(String[] args) {
5         Scanner scanner = new Scanner(System.in);
6         // Get the size of the array from the user
7         System.out.print("Enter the size of the array: ");
8         int size = scanner.nextInt();
9         // Create the array
10        int[] numbers = new int[size];
11        // Get the values for the array from the user
12        System.out.println("Enter " + size + " integers:");
13        for (int i = 0; i < size; i++) {
14            numbers[i] = scanner.nextInt();
15        }
16        // Print out the unsorted array
17        System.out.print("Unsorted array: ");
18        for (int i = 0; i < size; i++) {
19            System.out.print(numbers[i] + " ");
20        }
21        System.out.println();
22
23        // Sort the array using bubble sort
24        for (int i = 0; i < size - 1; i++) {
25            for (int j = 0; j < size - i - 1; j++) {
26                if (numbers[j] > numbers[j + 1]) {
27                    int temp = numbers[j];
28                    numbers[j] = numbers[j + 1];
29                    numbers[j + 1] = temp;
30                }
31            }
32        }
33        // Print out the sorted array
34        System.out.print("Sorted array: ");
35        for (int i = 0; i < size; i++) {
36            System.out.print(numbers[i] + " ");
37        }
38        System.out.println();
39
40        // Get a value to search for from the user
41        System.out.print("Enter a value to search for: ");
42        int searchValue = scanner.nextInt();
43    }
}
```

```
Console X
<terminated> SearchSort [Java Application] C:\Users\Administrator\
Enter the size of the array: 6
Enter 6 integers:
145 48 2698 258 359 -758
Unsorted array: 145 48 2698 258 359 -758
Sorted array: -758 48 145 258 359 2698
Enter a value to search for: 486
Did not find 486
```