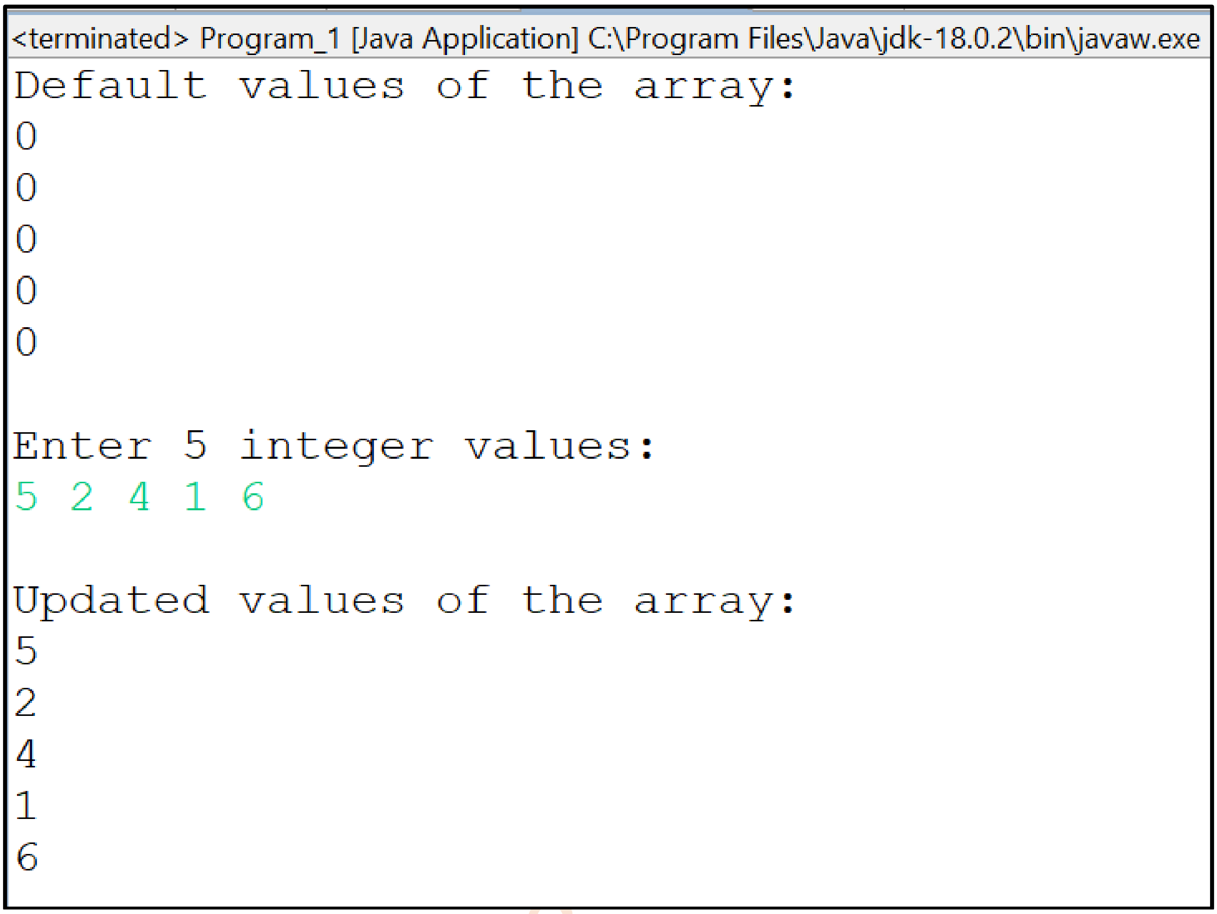
ASSIGNMENT NO.7

1. **Declare a single-dimensional array of 5 integers inside the `main` method. Traverse the array to print the default values. Then accept records from the user and print the updated values of the array.**

```
package in.Cdac.Array;

import java.util.Scanner;
public class Program_1 {
      public static void main(String[] args) {
              int[] arr = new int[5];
              System.out.println("Default values of the array:");
              for (int i = 0; i < arr.length; i++) {
                  System.out.println(arr[i]);
              }
              Scanner sc = new Scanner(System.in);

              System.out.println("\nEnter 5 integer values:");
              for (int i = 0; i < arr.length; i++) {
                  arr[i] = sc.nextInt();
              }

              System.out.println("\nUpdated values of the array:");
              for (int i = 0; i < arr.length; i++) {
                  System.out.println(arr[i]);
              }
              sc.close();
      }
}
```

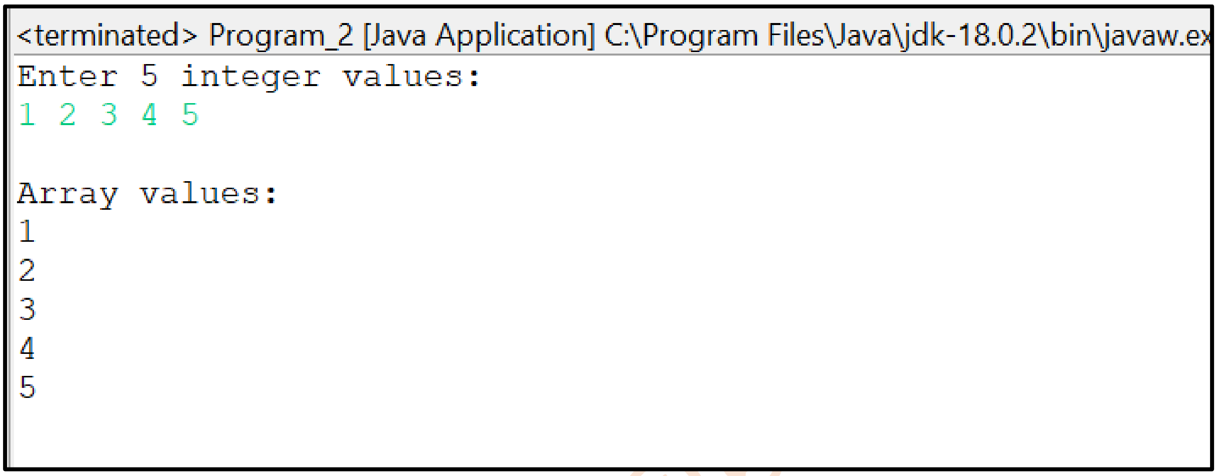


```
<terminated> Program_1 [Java Application] C:\Program Files\Java\jdk-18.0.2\bin\javaw.exe
Default values of the array:
0
0
0
0
0

Enter 5 integer values:
5 2 4 1 6

Updated values of the array:
5
2
4
1
6
```

2. **Declare a single-dimensional array of 5 integers inside the `main` method. Define a method named `acceptRecord` to get input from the terminal into the array and another method named `printRecord` to print the state of the array to the terminal.**

```
package in.Cdac.Array;

import java.util.Scanner;
public class Program_2 {
	public static void acceptRecord(int[] arr) {
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter 5 integer values:");
		for (int i = 0; i < arr.length; i++) {
			arr[i] = sc.nextInt();
		}
		sc.close();
	}

	public static void printRecord(int[] arr) {
		System.out.println("\nArray values:");
		for (int i = 0; i < arr.length; i++) {
			System.out.println(arr[i]);
		}
	}
```

```
    public static void main(String[] args) {
        int[] arr = new int[5];
        acceptRecord(arr);
        printRecord(arr);
    }
}
```

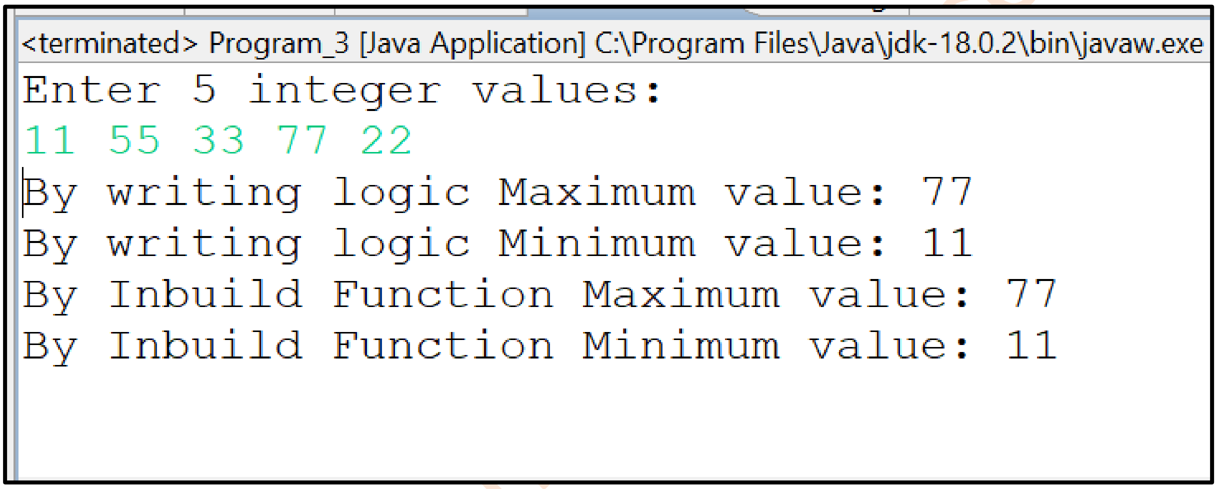


```
<terminated> Program_2 [Java Application] C:\Program Files\Java\jdk-18.0.2\bin\javaw.ex
Enter 5 integer values:
1 2 3 4 5

Array values:
1
2
3
4
5
```

3. **Write a program to find the maximum and minimum values in a single-dimensional array of integers.**

```
package in.Cdac.Array;

import java.util.Arrays;
import java.util.Scanner;

public class Program_3 {
    public static void main(String[] args) {
        int[] arr = new int[5];
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter 5 integer values:");
        for (int i = 0; i < arr.length; i++) {
            arr[i] = sc.nextInt();
        }
        int max = arr[0];
        int min = arr[0];

        for (int i = 1; i < arr.length; i++) {
            if (arr[i] > max) {
                max = arr[i];
            }
            if (arr[i] < min) {
                min = arr[i];
            }
        }
        System.out.println("By writing logic Maximum value: " +
max);
        System.out.println("By writing logic Minimum value: " +
min);
```

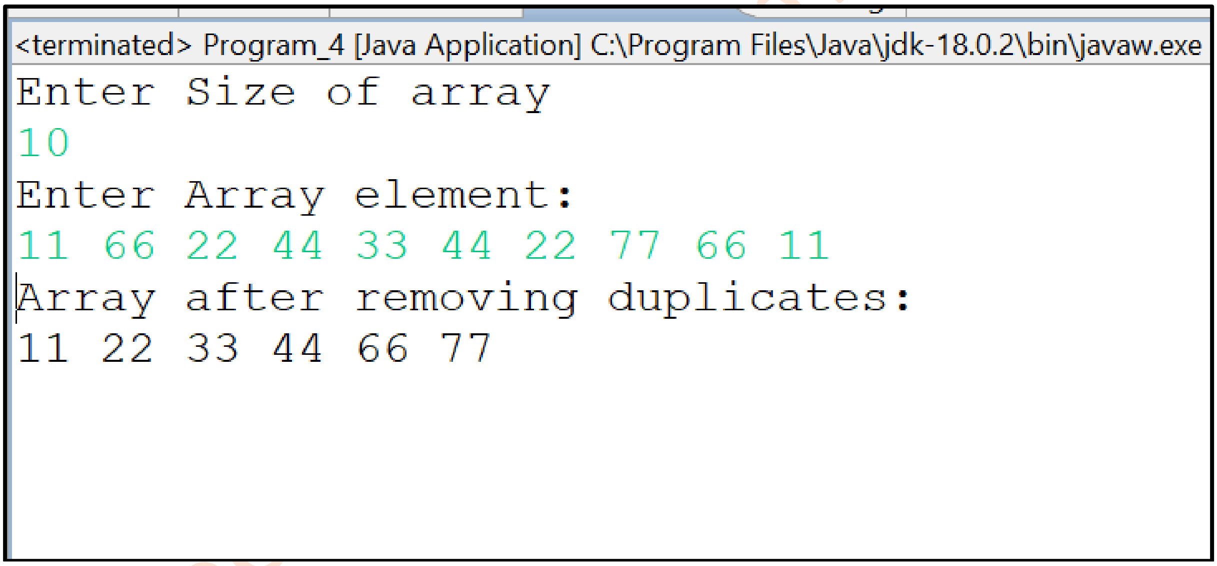
```
            max = Arrays.stream(arr).max().getAsInt();
            min = Arrays.stream(arr).min().getAsInt();

            System.out.println("By Inbuild Function Maximum value: " +
max);
            System.out.println("By Inbuild Function Minimum value: " +
min);

            sc.close();
      }
}
```



```
<terminated> Program_3 [Java Application] C:\Program Files\Java\jdk-18.0.2\bin\javaw.exe
Enter 5 integer values:
11 55 33 77 22
By writing logic Maximum value: 77
By writing logic Minimum value: 11
By Inbuild Function Maximum value: 77
By Inbuild Function Minimum value: 11
```

4. Write a program to remove duplicate elements from a single-dimensional array of integers.

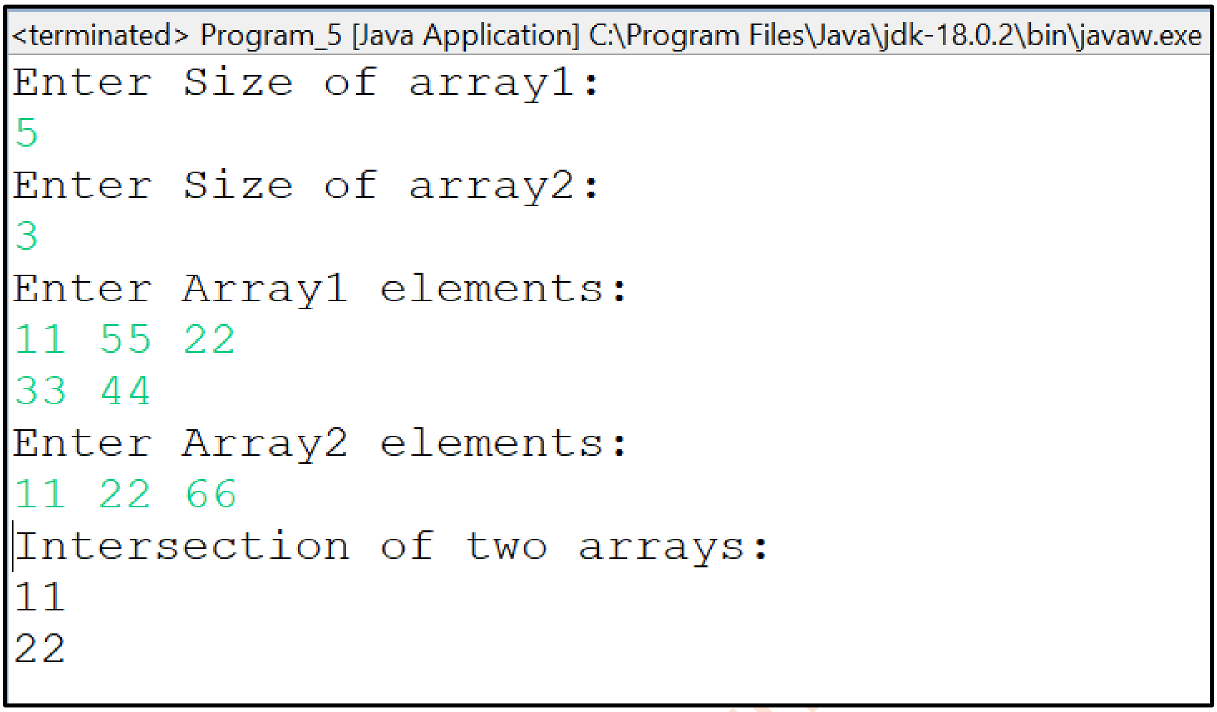
```
package in.Cdac.Array;

import java.util.Scanner;
import java.util.Arrays;

public class Program_4 {
    static int removeDuplicates(int arr[], int n) {
        if (n == 0 || n == 1)
            return n;
        Arrays.sort(arr);

        int j = 0;
        for (int i = 0; i < n - 1; i++) {
            if (arr[i] != arr[i + 1])
                arr[j++] = arr[i];
        }
        arr[j++] = arr[n - 1];

        return j;
    }
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter Size of array");
        int n = sc.nextInt();
        int arr[] = new int[n];

        System.out.println("Enter Array element: ");
        for(int i = 0; i < arr.length; i++)
            arr[i] = sc.nextInt();

        n = removeDuplicates(arr, n);

        System.out.println("Array after removing duplicates: ");
        for (int i = 0; i < n; i++)
            System.out.print(arr[i] + " ");
        sc.close();
    }
}
```



```
<terminated> Program_4 [Java Application] C:\Program Files\Java\jdk-18.0.2\bin\javaw.exe
Enter Size of array
10
Enter Array element:
11 66 22 44 33 44 22 77 66 11
Array after removing duplicates:
11 22 33 44 66 77
```

5. Write a program to find the intersection of two single-dimensional arrays.

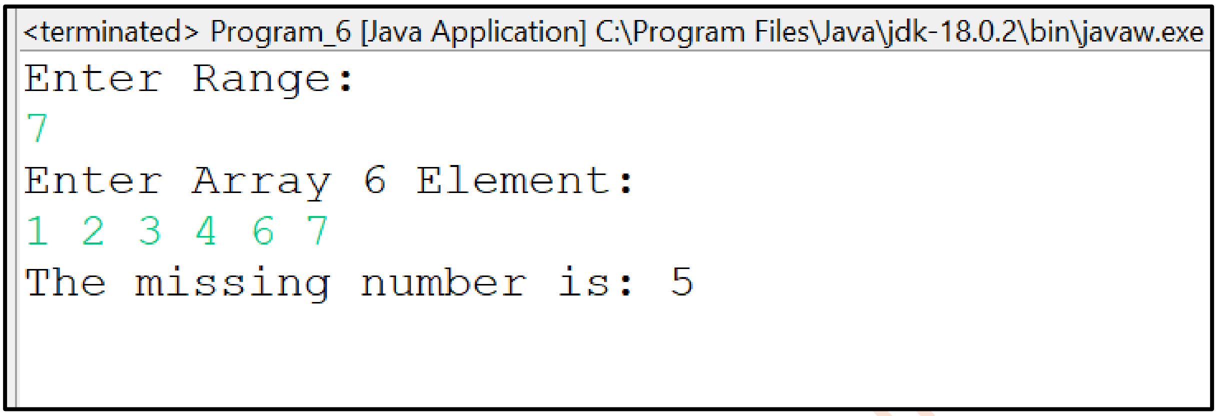
```
package in.Cdac.Array;

import java.util.Scanner;
import java.util.Arrays;

public class Program_5 {
    public static void intersection(int arr1[], int arr2[], int n1, int
n2) {
        Arrays.sort(arr1);
        Arrays.sort(arr2);

        int i = 0, j = 0;
        while (i < n1 && j < n2)
        {
            if (arr1[i] < arr2[j])
            {
                i++;
            }
            else if (arr1[i] > arr2[j])
            {
                j++;
            }
            else
            {
                System.out.println(arr1[i] + " ");
                i++;
                j++;
            }
        }
    }

    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter Size of array1: ");
        int n1 = sc.nextInt();
        System.out.println("Enter Size of array2: ");
        int n2 = sc.nextInt();
        int arr1[] = new int[n1];
        int arr2[] = new int[n2];

        System.out.println("Enter Array1 elements: ");
        for (int i = 0; i < arr1.length; i++) {
            arr1[i] = sc.nextInt();
        }
        System.out.println("Enter Array2 elements: ");
        for (int i = 0; i < arr2.length; i++) {
            arr2[i] = sc.nextInt();
        }

        System.out.println("Intersection of two arrays:");
        intersection(arr1, arr2, n1, n2);
    }
}
```



```
<terminated> Program_5 [Java Application] C:\Program Files\Java\jdk-18.0.2\bin\javaw.exe
Enter Size of array1:
5
Enter Size of array2:
3
Enter Array1 elements:
11 55 22
33 44
Enter Array2 elements:
11 22 66
Intersection of two arrays:
11
22
```

6. Write a program to find the missing number in an array of integers ranging from 1 to N.

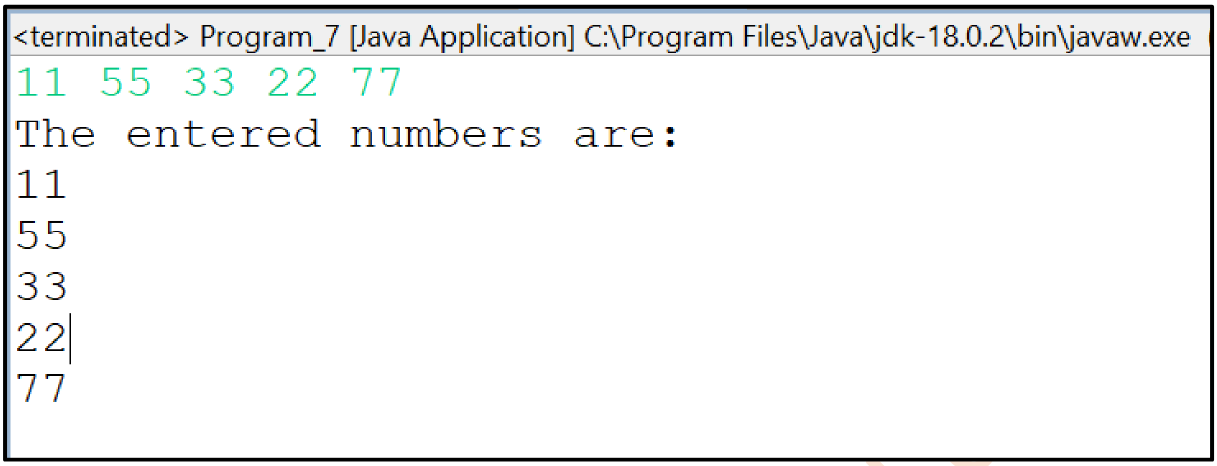
```
package in.Cdac.Array;

import java.util.Scanner;

public class Program_6 {
	public static int totalSum(int range) {
		return range * (range + 1) / 2;
	}
	public static int missingNumber(int arr[],int range ) {
		int arraySum = 0;
		for (int i = 0; i < arr.length; i++) {
			arraySum += arr[i];
		}
		return totalSum(range) - arraySum;
	}
	public static void main(String[] args) {
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter Range: ");
		int range = sc.nextInt();
		int[] arr = new int[range-1];
		System.out.println("Enter Array "+(range-1)+" Element: ");
		for(int i=0;i<arr.length;i++) {
			arr[i]=sc.nextInt();
		}

		int number = missingNumber(arr,range);
		System.out.println("The missing number is: " + number);
		sc.close();
	}
}
```



```
<terminated> Program_6 [Java Application] C:\Program Files\Java\jdk-18.0.2\bin\javaw.exe
Enter Range:
7
Enter Array 6 Element:
1 2 3 4 6 7
The missing number is: 5
```

7. **Declare a single-dimensional array as a field inside a class and instantiate it inside the class constructor. Define methods named `acceptRecord` and `printRecord` within the class and test their functionality.**

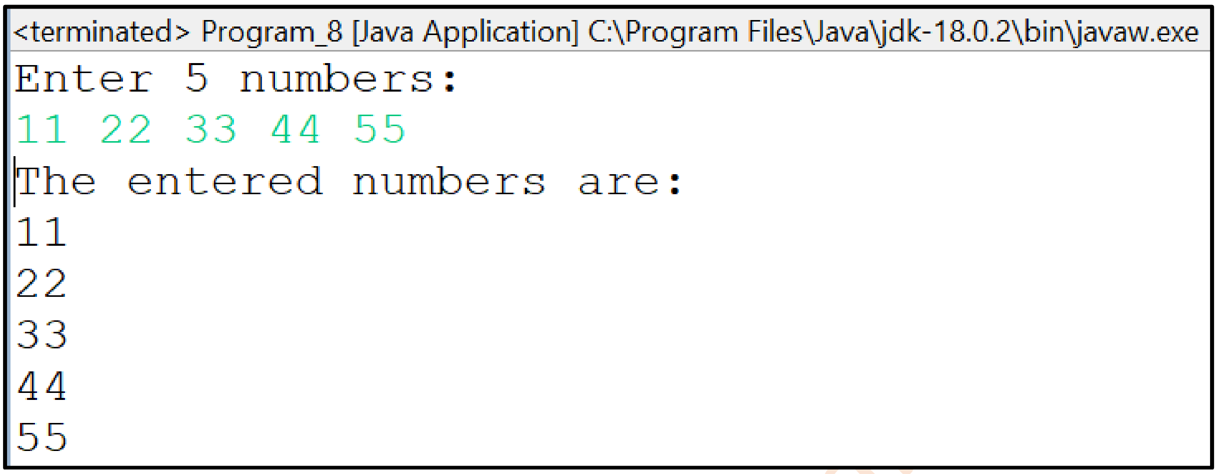
```
package in.Cdac.Array;

import java.util.Scanner;

class Record {
    private int[] numbers;
    public Record(int size) {
        numbers = new int[size];
    }
    public void acceptRecord() {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter " + numbers.length + " numbers:");
        for (int i = 0; i < numbers.length; i++) {
            numbers[i] = sc.nextInt();
        }
        sc.close();
    }
    public void printRecord() {
        System.out.println("The entered numbers are:");
        for (int number : numbers) {
            System.out.println(number);
        }
    }
}
public class Program_7 {
      public static void main(String[] args) {
            Record record = new Record(5);
        record.acceptRecord();
        record.printRecord();
      }
}
```



```
<terminated> Program_7 [Java Application] C:\Program Files\Java\jdk-18.0.2\bin\javaw.exe
11 55 33 22 77
The entered numbers are:
11
55
33
22
77
```

8. Modify the previous assignment to use getter and setter methods instead of `acceptRecord` and `printRecord`.

```
package in.Cdac.Array;

import java.util.Scanner;

class ModifyArray {
    private int[] numbers;

    public ModifyArray(int size) {
        numbers = new int[size];
    }

    public void setNumbers() {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter " + numbers.length + " numbers:");
        for (int i = 0; i < numbers.length; i++) {
            numbers[i] = sc.nextInt();
        }
        sc.close();
    }

    public int[] getNumbers() {
        return numbers;
    }
}

public class Program_8 {
    public static void main(String[] args) {
        ModifyArray r = new ModifyArray(5);
        r.setNumbers();
        System.out.println("The entered numbers are:");
        int[] nums = r.getNumbers();
        for (int num : nums) {
            System.out.println(num);
        }
    }
}
```

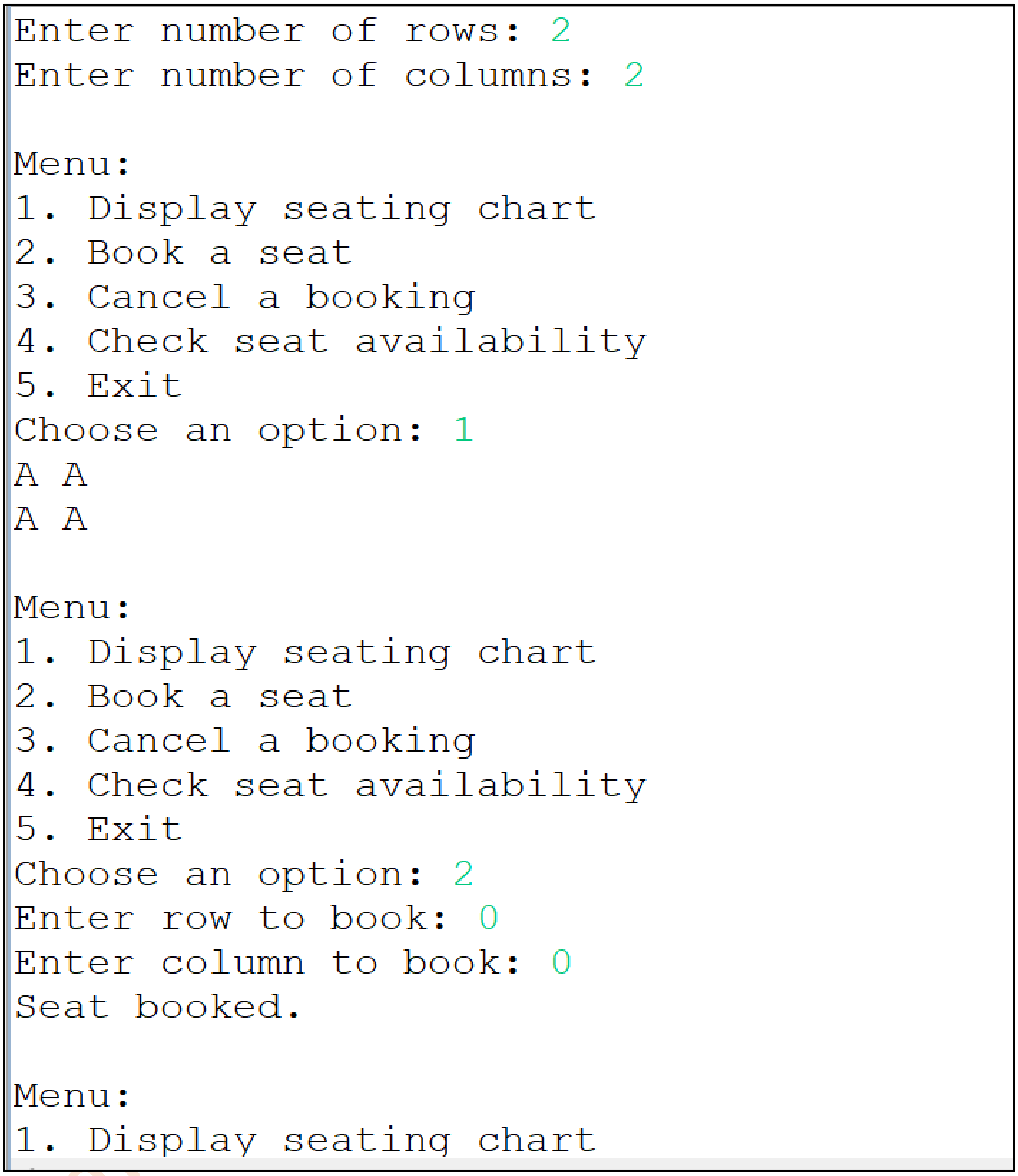


```
<terminated> Program_8 [Java Application] C:\Program Files\Java\jdk-18.0.2\bin\javaw.exe
Enter 5 numbers:
11 22 33 44 55
The entered numbers are:
11
22
33
44
55
```

9. **You need to implement a system to manage airplane seat assignments. The airplane has seats arranged in rows and columns. Implement functionalities to:**

- **Initialize the seating arrangement with a given number of rows and columns.**
- **Book a seat to mark it as occupied.**
- **Cancel a booking to mark a seat as available.**
- **Check seat availability to determine if a specific seat is available.**
- **Display the current seating chart.**

```
package in.Cdac.Array;

import java.util.Scanner;

class Airplane {
    private char[][] seats;

    public Airplane(int rows, int columns) {
        seats = new char[rows][columns];
        for (int i = 0; i < rows; i++) {
            for (int j = 0; j < columns; j++) {
                seats[i][j] = 'A';
            }
        }
    }

    public void bookSeat(int row, int column) {
        if (seats[row][column] == 'A') {
            seats[row][column] = 'O';
            System.out.println("Seat booked.");
        } else {
            System.out.println("Seat already booked.");
        }
    }

    public void cancelBooking(int row, int column) {
        if (seats[row][column] == 'O') {
            seats[row][column] = 'A';
            System.out.println("Booking cancelled.");
        } else {
            System.out.println("Seat is not booked.");
        }
    }

    public void checkSeat(int row, int column) {
        if (seats[row][column] == 'A') {
            System.out.println("Seat is available.");
        } else {
            System.out.println("Seat is occupied.");
        }
    }

    public void showSeats() {
        for (int i = 0; i < seats.length; i++) {
            for (int j = 0; j < seats[i].length; j++) {
                System.out.print(seats[i][j] + " ");
            }
            System.out.println();
        }
    }
    public boolean processChoice(int choice, Scanner scanner) {
        switch (choice) {
            case 1:
                showSeats();
                break;
            case 2:
                System.out.print("Enter row to book: ");
                int bookRow = scanner.nextInt();
                System.out.print("Enter column to book: ");
                int bookColumn = scanner.nextInt();
                bookSeat(bookRow, bookColumn);
                break;
            case 3:
                System.out.print("Enter row to cancel booking: ");
                int cancelRow = scanner.nextInt();
                System.out.print("Enter column to cancel booking: ");
                int cancelColumn = scanner.nextInt();
                cancelBooking(cancelRow, cancelColumn);
                break;
            case 4:
                System.out.print("Enter row to check availability: ");
                int checkRow = scanner.nextInt();
                System.out.print("Enter column to check availability:
");

                int checkColumn = scanner.nextInt();
                checkSeat(checkRow, checkColumn);
                break;
            case 5:
                return false;
            default:
                System.out.println("Invalid option. Please try
again.");
                break;
        }
        return true;
    }
}

public class Program_9 {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter number of rows: ");
        int rows = scanner.nextInt();
        System.out.print("Enter number of columns: ");
        int columns = scanner.nextInt();

        Airplane airplane = new Airplane(rows, columns);

        int choice;
        boolean continueRunning = true;
        while (continueRunning) {
            System.out.println("\nMenu:");
            System.out.println("1. Display seating chart");
            System.out.println("2. Book a seat");
            System.out.println("3. Cancel a booking");
            System.out.println("4. Check seat availability");
            System.out.println("5. Exit");
            System.out.print("Choose an option: ");
            choice = scanner.nextInt();
            continueRunning = airplane.processChoice(choice, scanner);
        }

        System.out.println("Exiting...");
        scanner.close();
    }
}
```



```
Enter number of rows: 2
Enter number of columns: 2

Menu:
1. Display seating chart
2. Book a seat
3. Cancel a booking
4. Check seat availability
5. Exit
Choose an option: 1
A A
A A

Menu:
1. Display seating chart
2. Book a seat
3. Cancel a booking
4. Check seat availability
5. Exit
Choose an option: 2
Enter row to book: 0
Enter column to book: 0
Seat booked.

Menu:
1. Display seating chart
```