

Basis of Computer Programming (java A)

LAB 5

(The source code and document description are designed by ZHU Yueming, SHEN Yun)

[Experimental Objective]

- Learn array initializer (Declare, create, and initialize).
- Learn how to copy and print array by for loop
- Learn how to using array to realize some simple algorithms

[Before Exercises]

(1) Type following code, try to create two arrays and use two different ways to print them.

```
int[] array1 = {1,2,3,4,5};
int[] array2 = new int[5];
array2[0] = 6;
array2[1] = 7;
array2[2] = 8;
array2[3] = 9;
array2[4] = 10;

for(int i = 0; i<array1.length; i++){
    System.out.print(array1[i] + "\t");
}
System.out.println();
for(int e:array2){
    System.out.print(e + "\t");
}
System.out.println();
```

(2) Continue typing, create another array without giving it an address, and then finding what is the difference between two arrays.

```
int[] array3 = null;
System.out.println(array3);

array3=array2;
System.out.println(array3);
```

(3) Why the first loop cannot change the value of array3? The second loop can change the value.

```
for(int e:array3){
    e=1;
}
System.out.println("array3: " + Arrays.toString(array3));
for(int i = 0; i<array3.length; i++){
    array3[i] = 1;
}
System.out.println("array3: "+Arrays.toString(array3));
```

(4) We change the value of elements in array3, why are the elements in array2 changed accordingly?

```
System.out.println("array2: " + Arrays.toString(array2));
```

[Advanced]Try following code:

```
char[] Array4 = {'a', 'b', 'c'};
System.out.println(Array4);
```

(5) Type following code, try to create two 2D arrays and initialize them.

```
int[][] array0 = new int[2][4];
int[][] array1 = {{1,2,3,4},{0,1,2,3}};
int[][] array2 = new int[2][];
array2[0] = new int[3];
array2[1] = new int[4];

for(int i = 0; i<array1.length; i++){
    for(int j = 0; j<array1[0].length; j++){
        System.out.print(array1[i][j] + "\t");
    }
    System.out.println("");
}
System.out.println("-----");

for(int i = 0; i<array2.length; i++){
    for(int j = 0; j<array2[i].length; j++){
        array2[i][j]=1;
    }
}

for(int i = 0; i<array2.length; i++){
    for(int j = 0; j<array2[i].length; j++){
        System.out.print(array2[i][j] + "\t");
    }
    System.out.println();
}
```

[Exercises]

1. Suppose there are 10 students in a class, and we want the average score of these 10 students. Input 10 scores ([0, 100]) from the keyboard. Then after removing the highest score and the smallest score, please find the average score of the other 8 scores.

Please input 10 scores of these students:88.3 99 45 78 67.5 98.4 23.5 65.5
82 85.4
Average score is 76.26

2. Write a program to compare two arrays.
 - (1) Let user input the array size,
 - (2) Let user input the two arrays,
 - (3) Output the result.

For example, the result may be

```
C:\untitled2\src>java Lab5P3
Enter the length of array:4
Enter the 1st integer array of size 4:1 2 3 4
Enter the 2nd integer array of size 4:1 2 3 4
The two arrays have the same value.

C:\untitled2\src>java Lab5P3
Enter the length of array:3
Enter the 1st integer array of size 3:1 2 3
Enter the 2nd integer array of size 3:3 2 1
The two arrays have different values.
```

- [illegible]

11
1 3 2 1 4 3 4 0 2 1 0
6

- ```
Enter the integers between 1 and 100: 22 33 35 34 99 87 45 34 23 78 45 33
11 23 87 34 76 0
11 occurs 1 time
22 occurs 1 time
23 occurs 2 times
33 occurs 2 times
34 occurs 3 times
35 occurs 1 time
45 occurs 2 times
76 occurs 1 time
78 occurs 1 time
87 occurs 2 times
99 occurs 1 time
```

- Sample:

|                                        |         |         |         |         |
|----------------------------------------|---------|---------|---------|---------|
| Please enter the number of subjects: 3 |         |         |         |         |
| Please enter the number of students: 4 |         |         |         |         |
| 32 44 52 32                            |         |         |         |         |
| 89 92 80 94                            |         |         |         |         |
| 11 22 32 23                            |         |         |         |         |
|                                        | Course1 | Course2 | Course3 | Average |
| Student1                               | 32      | 89      | 11      | 44.00   |
| Student2                               | 44      | 92      | 22      | 52.67   |
| Student3                               | 52      | 80      | 32      | 54.67   |
| Student4                               | 32      | 94      | 23      | 49.67   |
| Average                                | 40.00   | 88.75   | 22.00   |         |