一、 实验名称

Arrays

二、 实验目的

- Be able to declare and instantiate arrays
- Be able to fill an array using a for loop
- Be able to access and process data in an array
- Be able to write a sorting method
- Be able to use an array of objects

三、 实验内容

Task #1 Create a class called Average according to the UML diagram.
Task #2 Create an AverageDriver class.
Task #3 Arrays of Objects

四、 实验方法(原理、流程图)

1. Written by Intellij IDEA Community edition 2020.3

2.

Task 1:

（1）Creat data[]— the array which will contain the scores.
（2）Creat mean — the arithmetic average of the scores.
（3）Creat Average –the constructor. It will allocate memory for the array. Use a for loop to repeatedly display a prompt for the user which should indicate that user should enter score number 1, score number 2, etc.
（4）Creat calculateMean – this is a method that uses a for loop to access each score in the array and add it to a running total.
（5）Creat toString— returns a String containing data in descending order and the mean.
（6）Creat selectionSort—this method uses the selection sort algorithm to rearrange the data set from highest to lowest.

Task 2:

Create an AverageDriver class. This class only contains the main method. The main method should declare and instantiate an Average object.

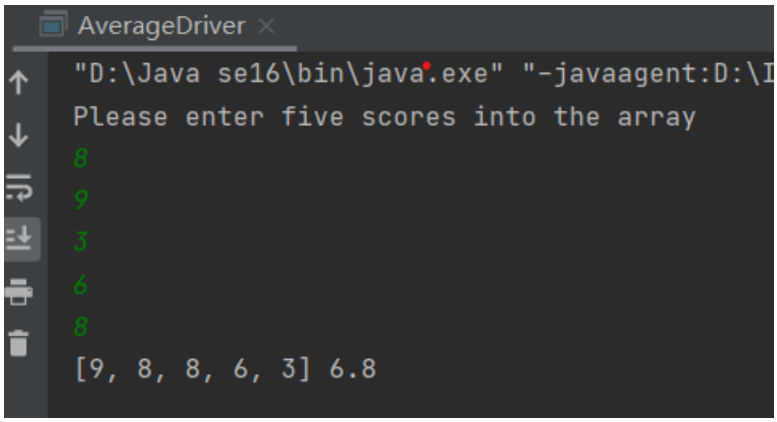
Task 3:

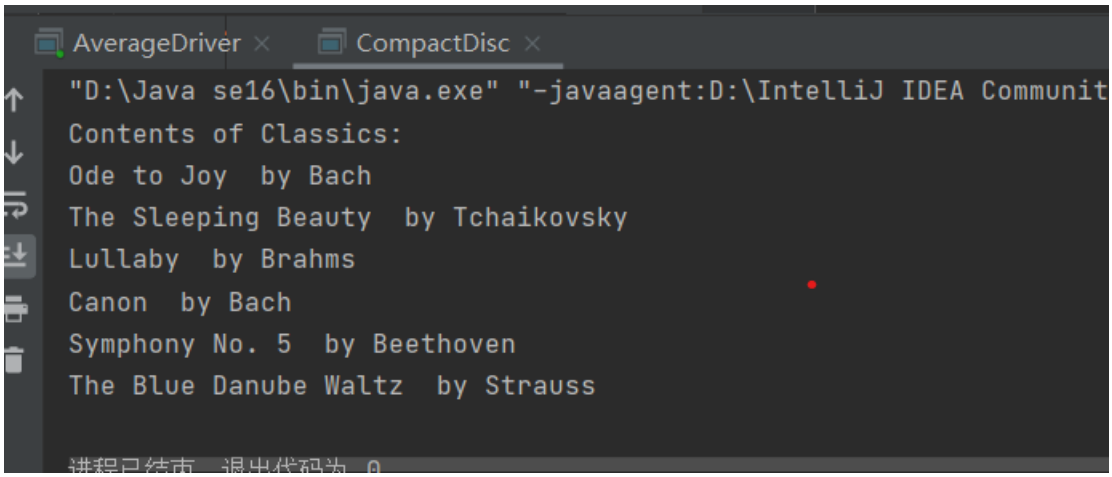
(1) Copy the files Song.java (code listing 7.1), CompactDisc.java (code listing 7.2) and Classics.txt (code listing 7.3) from the Student CD
(2) Declare an array of Songs, called cd, to be of size 6.
(3) Fill the array by creating a new song with the title and artist and storing it in the appropriate position in the array.
(4) Print the contents of the array to the console.

五、 实验结论

The experimental requirements have been successfully realized.

The given results are same as those calculated by my codes.





六、实验体会和收获

1. Through I successfully put arrays into practice and write javadoc correctly.By writing these code,I have a deepy realize to array.Mainly about how to creat a new array and store data in it.

2. When writing these codes,i meet some difficults.But I solve these problemss by search relevant information on the Internet and review PPT.

3. I successfully practiced bubble sorting.It’s so cool.

4. By writing these codes i have a deeper realize about toSring.

5. By writing this task I am more interested in Java.

七、程序代码

(1) Average.java

```
import java.lang.reflect.Array;

import java.util.Arrays;

import java.util.Scanner;

public class Average

{

    private final int [] data = new int[5];

    private double mean;

    public Average()

    {

        System.out.println("Please enter five scores into the array");

        for(int i = 0;i<5;i++)

        {

            Scanner scanner = new Scanner(System.in);

            data[i]=scanner.nextInt();

        }

        selectionSort();

        calculateMean();

    }

    public void calculateMean()

    {

        double sum = 0;

       for(int i = 0;i < data.length;i++)
```

```
        {
            sum += data[i];
        }
        mean=sum/data.length;
    }
    public String toString()
    {
       return Arrays.toString(data)+" "+mean;
    }
    public void selectionSort()
    {
        int k;
        for(int i = 0;i<4;i++)
        {
            for(int j = 0;j<4-i;j++)
            {
                if(data[j]<data[j+1])
                {
                    k=data[j];
                    data[j]=data[j+1];
                    data[j+1]=k;
                }
```

```
            }
        }
    }
}
```

(2) AverageDriver.java

```
public class AverageDriver
{
    public static void main(String[] args)
    {
        Average average = new Average();
        System.out.println(average);
    }
}
```

(3) Song.java

```
/*This program represents a song*/
public class Song
{
    /**The title of the song*/
    private final String title;
    /**The artist who sings the song*/
    private final String artist;

    /**constructor
```

```
     @param title The title of the song
     @param artist The artist who sings the song*/
    public Song(String title, String artist)
    {
        this.title = title;
        this.artist = artist;
    }

    /**toString method returns a description of the song
     @return a String containing the name of the song and the artist*/
    public String toString()
    {
        return title + " by " + artist + "\n";
    }
}
```

(4) CompactDisc.java

```
/*This program creates a list of songs for a CD by reading from a file*/
import java.io.*;
public class CompactDisc
{
    public static void main(String [] args) throws IOException
    {
```

```
        FileReader file = new FileReader("D:\\FFF\\计算机科学导论\\Classics.txt");
        BufferedReader input = new BufferedReader(file);
        String title;
        String artist;

        //Declare an array of songs, called cd, of size 6
        String[] cd = new String[6];
        for (int i = 0; i < cd.length; i++)
        {
            title = input.readLine();
            artist = input.readLine();
            Song song = new Song(title,artist);
            cd[i] = song.toString();
            // fill the array by creating a new song with
            // the title and artist and storing it in the appropriate position in the
array
        }

        System.out.println("Contents of Classics:");
        for(int i = 0; i < cd.length; i++)
        {
            System.out.print(cd[i]);
```

```
            //print the contents of the array to the console
        }
    }
}
```