2024.04.08

Homework 3

1. Consider a two-by-three integer array *t*.

a) Write a statement that declares and creates *t*.

```
int[][] t = new int[2][3];
```

b) How many rows does *t* have?

2 rows

c) How many columns does *t* have?

3 columns

d) How many elements does *t* have?

6 elements

e) Write access expressions for all the elements in row 1 of *t*.

t[1][0], t[1][1], t[1][2]

f) Write access expressions for all the elements in column 2 of *t*.

t[0][2], t[1][2]

g) Write a single statement that sets the element of *t* in row 0 and column 1 to zero.

t[0][1] = 0;

h) Write individual statements to initialize each element of *t* to zero.

t[0][0] = 0;
t[0][1] = 0;
t[0][2] = 0;
t[1][0] = 0;
t[1][1] = 0;
t[1][2] = 0;

i) Write a nested for statement that initializes each element of *t* to zero.

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

j) Write a nested for statement that inputs the values for the elements of *t* from the user.

```
Scanner scanner = new Scanner(System.in);
for (int i = 0; i < t.length; i++) {
    for (int j = 0; j < t[i].length; j++) {
        System.out.println("Enter the value for t[" + i + "][" + j + "]:
");
        t[i][j] = scanner.nextInt();
    }
}
```

k) Write a series of statements that determines and displays the smallest value in *t*.

```
int smallest = t[0][0];
for (int i = 0; i < t.length; i++) {
    for (int j = 0; j < t[i].length; j++) {
        if (t[i][j] < smallest) {
```

```
            smallest = t[i][j];
        }
    }
}
System.out.println("The smallest value in t: " + smallest);
```

l) Write a single printf statement that displays the elements of the first row of *t*.
System.out.printf("%d %d %d\n", t[0][0], t[0][1], t[0][2]);

m) Write a statement that totals the elements of the third column of *t*. Do not use iteration.
int total = t[0][2] + t[1][2];

n) Write a series of statements that displays the contents of *t* in tabular format. List the column indices as headings across the top, and list the row indices at the left of each row.

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

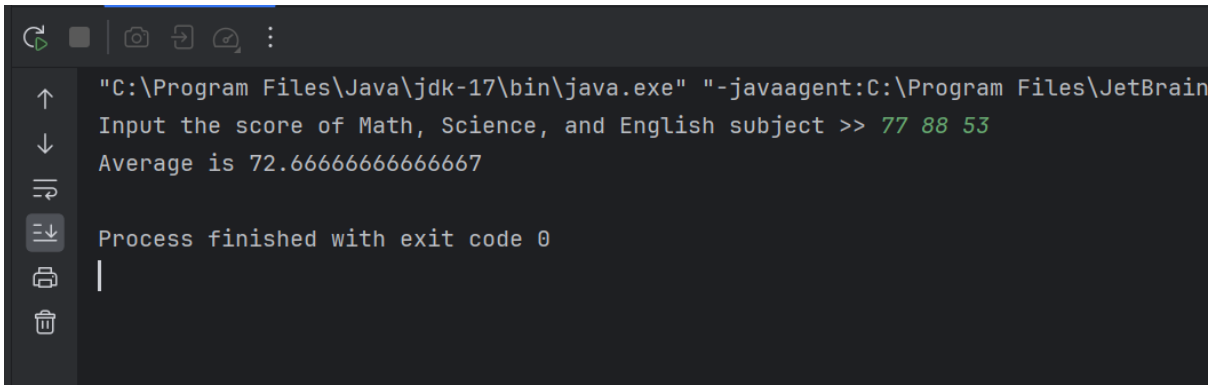
2. Implement Grade class to make the following program work. Grade class's main method is as follows:

```
public static void main(String [] args) {
    Scanner scanner = new Scanner(System.in);
    System.out.print("Input the score of Math, Science, and English subject >> ");
    int math = scanner.nextInt();
    int science = scanner.nextInt();
    int english = scanner.nextInt();
    Grade me = new Grade(math, science, english);
    System.out.println("Average is " + me.average());
    scanner.close();
}
```

```
package homework.hw3;

import java.util.Scanner;

public class Grade {
    private int math;
    private int science;
    private int english;

    public Grade(int math, int science, int english) {
        this.math = math;
        this.science = science;
        this.english = english;
    }
```

```
    public double average() {
        return (math + science + english) / 3.0;
    }

    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Input the score of Math, Science, and English
subject >> ");
        int math = scanner.nextInt();
        int science = scanner.nextInt();
        int english = scanner.nextInt();
        Grade me = new Grade(math, science, english);
        System.out.println("Average is " + me.average());
        scanner.close();
    }
}
```

Output:



3. Write a program that:

- Contains a Book class with:
    - Private fields: title (String) and author (String)
    - A constructor to initialize these fields
    - Getter methods for both fields
- Contains a Library class that:
    - Asks the user for the number of books to add to the collection
    - Creates an array of Book instances based on the user input
    - Allows the user to input the title and author for each book
    - Ends if the user types "stop" at any point during the data entry process

Book class code:

```
package homework.hw3;

public class Book {
    private String title;
    private String author;
```

```
    public Book(String title, String author) {
        this.title = title;
        this.author = author;
    }

    public String getTitle() {
        return title;
    }

    public String getAuthor() {
        return author;
    }

}
```

Library class code:

```
package homework.hw3;

import java.util.Scanner;

public class Library {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.println("How many books do you want to add to the
library?");
        int bookNum = scanner.nextInt();

        Book[] books = new Book[bookNum];

        for (int i = 0; i < bookNum; i++) {

            System.out.println("Enter book title or type 'stop' to finish:
");
            String title = scanner.next();
            if(title.equals("stop")){
                break;
            }

            System.out.println("Enter author's name: ");
            String author = scanner.next();
            if(author.equals("stop")){
                break;
            }

            books[i] = new Book(title, author);
        }

        for (int i = 0; i < bookNum; i++) {
            if (books[i] != null) {
                System.out.println("Title: " + books[i].getTitle() + ",
Author: " + books[i].getAuthor());
            }
        }

    }
```

```
}
```

Outputs

```
Enter book title or type 'stop' to finish:
1
Enter author's name:
2
Enter book title or type 'stop' to finish:
3
Enter author's name:
4
Title: 1, Author: 2
Title: 3, Author: 4

Process finished with exit code 0
```

:

```
"C:\Program Files\Java\jdk-17\bin\java.exe" "-javaagent:C:\Pr
How many books do you want to add to the library?
2
Enter book title or type 'stop' to finish:
12
Enter author's name:
stop

Process finished with exit code 0
```