CSE20 : Lab #11 - Arrays

Overview

This week we are going to learn to use arrays to hold multiple data entries without having to declare a variable for each entry.

Array Syntax

Declaration Form:

<*type*> [] <*var*>;

Examples:

```
int [] intArr;
double [] doubleArr;
String[] stringArr;
```

The general form of array construction is:

<*var*> = new <*type*> [<int expression>]

Examples:

```
intArr = new int[100];
doubleArr = new double[max];
stringArr = new String[max+100];
```

Declaration with initialization:

<*type*> [] <*var*> = new <*type*> [<int expression>]
<*type*> [] <*var*> = { <*type*>, <*type*>, … , <*type*> }

Examples:

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

Access:

0^{th} entry of intArr is intArr[0]
1^{st} entry of inArr is intArr[1]
…
Nth entry of inArr is intArr[n]

Can both be read and written to just like any variable

(Reading) Chapter 5.1 & 5.2

- Answer Participation Activity Question Set 5.2.4

Getting started

After starting Eclipse, create a new project called Lab 11. Import SumAllArr.java and run it. You can see how it works by entering a few values for max number.

(Exercise) Create – SumSquareArr.java

This program should ask the user for the maximum number to print out to and then calculate each number starting from 1 to the maximum along with it squared. It will do that using 3 types of loops into 3 different arrays (like SumAllArr). Then it will print out the each array entry along with the sum of all the square numbers like this:

```
Please enter the max number:5
Arr1 0 Arr2 0 Arr3 0
Arr1 1 Arr2 1 Arr3 1
Arr1 5 Arr2 5 Arr3 5
Arr1 14 Arr2 14 Arr3 14
Arr1 30 Arr2 30 Arr3 30
Arr1 55 Arr2 55 Arr3 55
Sum of Squares is 55
```

```
Please enter the max number:10
Arr1 0 Arr2 0 Arr3 0
Arr1 1 Arr2 1 Arr3 1
Arr1 5 Arr2 5 Arr3 5
Arr1 14 Arr2 14 Arr3 14
Arr1 30 Arr2 30 Arr3 30
Arr1 55 Arr2 55 Arr3 55
Arr1 91 Arr2 91 Arr3 91
Arr1 140 Arr2 140 Arr3 140
Arr1 204 Arr2 204 Arr3 204
Arr1 285 Arr2 285 Arr3 285
Arr1 385 Arr2 385 Arr3 385
Sum of Squares is 385
```

(Exercise) Create AnyAverageArr.java

Program asks the user to enter amount of numbers to average

- Creates a new array of the size as amount of numbers (max)
- It stores each number in an array entry
- Prints the numbers entered

- 5 numbers on a line (use print)
- Put a println appropriately (use % check)

- Print the average of all the numbers

Sample Output:

```
This program will find the average of any numbers
Please choose amount of numbers to average : 20
Please enter 0 number: 1
Please enter 1 number: 2
Please enter 2 number: 3
Please enter 3 number: 4
Please enter 4 number: 5
Please enter 5 number: 6
Please enter 6 number: 7
Please enter 7 number: 8
Please enter 8 number: 9
Please enter 9 number: 10
Please enter 10 number: 10
Please enter 11 number: 9
Please enter 12 number: 8
Please enter 13 number: 7
Please enter 14 number: 6
Please enter 15 number: 5
Please enter 16 number: 4
Please enter 17 number: 3
Please enter 18 number: 2
Please enter 19 number: 1
The numbers being averaged:
1 2 3 4 5
6 7 8 9 10
10 9 8 7 6
5 4 3 2 1
Average is : 5
```

```
This program will find the average of any numbers
Please choose amount of numbers to average : 5
Please enter 0 number: 5
Please enter 1 number: 6
Please enter 2 number: 4
Please enter 3 number: 2
Please enter 4 number: 1
The numbers being averaged:
5 6 4 2 1
Average is : 3
```

```
This program will find the average of any numbers
Please choose amount of numbers to average : 8
Please enter 0 number: 324
Please enter 1 number: 23
Please enter 2 number: 34
Please enter 3 number: 45
Please enter 4 number: 65
Please enter 5 number: 53
Please enter 6 number: 24
```

```
Please enter 7 number: 63
The numbers being averaged:
324 23 34 45 65
53 24 63
Average is : 78
```

(Assessment) Logic Check

1) Consider the declaration in SumAllArr: `int[]arr1 = new int[max+1];`
   a) How many entries does it create?
   b) Why do we have "max+1"?
   c) Can we just use "max" and have the program still work correctly?

2) Before while loop (SumAllArr.java) we have "i = 1;"
   a) Why is it there?
   b) Can we use another variable instead?

3) Do-while loop is implemented using (++i <= max)
   a) Give an alternative expression that does the same logic
   b) What would (i++ <= max) result in?

What to hand in

When you are done with this lab assignment, you are ready to submit your work. Make sure you have done the following ***before*** you press Submit:

- Include answers to Participation Activity 5.2.4
- Include answers to Assessment questions
- Attach created SumSquareArr.java and AnyAverageArr.java
- List of Collaborators