
Lab 1

1. Consider having three integers, write a program to calculate their sum, product, and average and then print them in the same `System.out.println` statement.
2. The body mass index (BMI) is calculated according to the following formula:

$$BMI = \frac{Weight\ in\ Kilograms}{Height\ in\ Meters^2}$$

Create a program to calculate BMI given the weight and height then displays it, also display what that value represent:

- “Underweight”: less than 18.5.
 - “Normal”: between 18.5 and 24.9.
 - “Overweight”: between 25 and 29.9.
 - “Obese”: 30 or above.
3. Write the change in memory after each line is executed in the following code:

```
int x;  
double y = 12.5;  
x = 7;
```

What is the difference between initialization and declaration?

4. Write a Java program that takes 10 integers from the user, calculate their sum and average, and print them.
5. Rewrite Question 4 but this time the user will enter an unknown number of integers. (Hint: The user will enter 0 to specify that there are no more numbers).
6. What is a reference variable? How it differs from primitive datatypes (regarding memory and the content of the variable)?
7. Write the change in memory after each line is executed in the following code:

```
int[] arr_int;  
arr_int = new int[5];  
for(int i = 0 ; i < 5 ; i++){  
    System.out.println(arr_int[i]);  
}
```

8. Write a Java method that takes the length of an array as a parameter and creates it, and then ask the user to enter a second number and then initialize the array with the multiples of that number and then return the array. For example, if the second number was 3, the initialization of the array will be 3, 6, 9, 12, 15 ... and so on.
9. Create a 2D array of any dimensions, initialize it, and calculate the sum of each row and column in separate arrays. For example, if the array's dimensions are $m \times n$, you will have an array of size m to hold the sums of the rows and an array of size n to hold the sum of columns. Try to print the length of the 2D array and discuss the output in terms of what does that output represents and why only one number represents the length although it is a 2D array?