Overview

This week we are going to learn to use While-loop to do repetitive tasks so our programs can handle different inputs easily. We will solve similar problems to the ones in the previous lab, but this time we won't need to copy and paste the same code over and over.

While-loop Syntax

One statement form for a while-loop is as follows.

```
while (booleanExpr)
    statement;
```

The general form of a while-loop has a block statement as the body:

```
while (booleanExpr) {
    statement 1;
    statement 2;
    ...
    Statement n;
}
```

Getting Started

After starting Eclipse, create a new project called **Lab20_09**. Import the `AllNumWhile.java` file from the Lab 09 assignment page into the project and load it. This program should ask the user for the maximum number to output and then print out each number starting from 0 till the maximum. All the exercises must use while-loop to solve the problem.

Part 1: Create – Multiples.java

This program should ask the user for a maximum number `max` and another number `mul` whose multiples to print out until the maximum. The program should then print out multiples of `mul` starting from 1 till `max`. To do this, your program **MUST to use the % operator**. The operation `a % b` gives you the remainder after dividing `a` by `b`. Some results of the operator are as follows:

$0 \% 2 = 0$
$1 \% 2 = 1$
$2 \% 2 = 0$
$3 \% 2 = 1$
$4 \% 2 = 0$

Your program must produce an output as follows (inputs are shown in green):

```
This program prints out multiples of a given number till a specified maximum.

Please enter the maximum number: 25
Please enter the number whose multiples to print: 3

Multiples of 3 from 1 till 25 are:
Number 3
Number 6
Number 9
Number 12
Number 15
Number 18
Number 21
Number 24
```

Part 2: Create – SumAll.java

This program should ask the user for the maximum number to output and then print each number starting from 0 till the maximum. It must also print out the sum of all the numbers as shown below (inputs are shown in **green**):

```
This program will find the sum of all numbers till a specified maximum.

Please enter the max amount of numbers to add: 5
Number 0
Number 1
Number 2
Number 3
Number 4
Number 5

The sum of all numbers from 0 till 5 is: 15
-------------------------------------------------------------------------------
This program will find the sum of all numbers till a specified maximum.

Please enter the max amount of numbers to add: 10
Number 0
Number 1
Number 2
Number 3
Number 4
Number 5
Number 6
Number 7
Number 8
Number 9
Number 10

The sum of all numbers from 0 till 10 is: 55
```

Part 3: Create – AnyAverage.java

This program will average a set of numbers entered by the user (similar to `TenAverage.java` from Lab 9 but not limited to 0-10) and will proceed as follows:

- Asks the user to input a number (this time it need not be between 0 and 10). This will be the count (number of values to average).
- Gets numbers to average from the user from 0 to count.
- Prints out the average of the numbers entered.

Your program must produce an output as follows (inputs are shown in **green**):

```
This program will find the average of as many numbers as you like.

Please choose the number of values to average: 5
Please enter the 1 number: 1
Please enter the 2 number: 2
Please enter the 3 number: 3
Please enter the 4 number: 4
Please enter the 5 number: 5

The average of all the numbers is: 2.5
-------------------------------------------------------------------------------
This program will find the average of as many numbers as you like.

Please choose the number of values to average: 0

The average of all the numbers is: 0.0
```

```
--------------------------------------------------------------------------------
This program will find the average of as many numbers as you like.

Please choose the number of values to average: 15
Please enter the 1 number: -7
Please enter the 2 number: -6
Please enter the 3 number: -5
Please enter the 4 number: -4
Please enter the 5 number: -3
Please enter the 6 number: -2
Please enter the 7 number: -1
Please enter the 8 number: 0
Please enter the 9 number: 1
Please enter the 10 number: 2
Please enter the 11 number: 3
Please enter the 12 number: 4
Please enter the 13 number: 5
Please enter the 14 number: 6
Please enter the 15 number: 7

The average of all the numbers is: 0.0
```

What to hand in

When you are done with this lab assignment, submit all your work through CatCourses.

Before you submit, make sure you have done the following:
- Attached the created `Multiples.java`, `SumAll.java` and `AnyAverage.java` files.
- Filled in your collaborator's name (if any) in the "Comments…" text-box at the submission page.

Also, remember to demonstrate your code to the TA or instructor before the end of the grace period.