Lab 03

This lab has you practicing using loops over integers, as well as reinforcing previous concepts like collecting input from the user at run-time, using math/arithmetic operations, and using conditional statements. If a problem restricts you to a certain type of loop, you must use that loop. This is intentional because it would be easier to use another type of loop and we want to give you experience challenging yourself a bit :) For this lab, we consider user-inputted "numbers" to just mean integers – with the exception of Task 1 and Task 6, where the user input is assumed to be positive natural numbers, i.e. 1, 2, 3… and beyond.

In a new IntelliJ (or other IDE) project titled Lab03, please complete the following tasks. Use separate classes for each task. The class names aren't specified, so you can name them something reasonable for the task, such as `OddEvenCounter` for Task 1.

Once finished, compress your project folder into a zip file and submit to Canvas.

Productivity Tip in IntelliJ
Lab02 took a while for many students to complete, so we wanted to help speed up your workflow. Rather than writing out the entire main method and print statement syntax each time, there are shortcuts in IntelliJ you're now encouraged to use. They are:

- type `sout` and hit Tab in a method body to autocomplete `System.out.println("");`
- type `main` and hit Tab in a class body to autocomplete the main method.

You can look up others, and we'll feature more tips in the labs throughout the semester.

Task 1
Ask the user to input a number and **using a while loop** print out all numbers from 1 to that number and whether the number is odd or even. Sample output:

```
Enter a number: 3
1 Odd
2 Even
3 Odd
```

Hint: To check if a number is divisible by a given number, you can check if the remainder is zero or not. To calculate the remainder, you can use the % operator. So the expression (x % 2 == 0) will be true if x is even, and false if x is odd.

Task 2 Ask a user for three numbers. The first two numbers are the start and the end. The third number is the jump. Print out all the numbers starting from the first one till the second one with the jump. **Use a while loop (without using range function or break)**. Sample output:

```
Enter first number: 10
Enter second number: 18
Enter jump: 2
Here is your count:
10
```

```
12
14
16
18
```

Task 3 Ask a user for 3 numbers. The first two numbers are the start and the end. The third number is the jump. Print out all the numbers starting from the first going down to the second one with the given jump. **Use a while loop (without using range function or break).** Sample output:

```
Enter first number: 10
Enter second number: 6
Enter jump: 3
Here is your count:
10
7
```

Task 4 Ask a user for 3 numbers. The first two numbers are the start and the end, respectively. The third number is the jump. **The program should be able to determine on its own whether to count up or down.** Print out all the numbers starting from the first going up or down to the second one with the given jump. **Use a while loop**. You should be able to repurpose code from the previous tasks – it's not best practice and we'll show a better way later in the semester, but copy-and-paste would be great here

Sample output:

```
Enter first number: 10
Enter second number: 6
Enter jump: 3
Here is your count:
10
7
```

Another sample run:

```
Enter first number: 10
Enter second number: 18
Enter jump: 2
Here is your count:
10
12
14
16
18
```

Task 5 Write a program to display the multiplication table of a given integer using a loop. Sample output:

```
Enter the number for the multiplication table: 10
Here’s your table:
```

```
10 x 1 = 10
10 x 2 = 20
10 x 3 = 30
10 x 4 = 40
10 x 5 = 50
10 x 6 = 60
10 x 7 = 70
10 x 8 = 80
10 x 9 = 90
10 x 10 = 100
```

Task 6 Write a program to input a number from the user and find proper divisors of a given number. A proper divisor of a natural number is the divisor that is strictly less than the number. For example, number 20 has 5 proper divisors: 1, 2, 4, 5, 10.

Hint: Loop from i = 1 to (number-1) and check if the number is divisible by i.

Sample output:

```
Input any number: 10
Proper divisors of 10:
1
2
5
```