

# Lab Guidelines

## CMPS 161/280 Algorithm Design and Implementation I/II

**Fall 2018**

Lab session attendance is required. Work must be done on the machines provided in FAY-125. These machines run a current version of Windows and have the most recent versions of Java and Eclipse installed on them.

Outside of the lab, students can either work on the machines in FAY-125 or work on their own machine. Resources for class software are provided below. If students wish, work can be transported between machines using a self-provided flash drive.

Help for Eclipse is provided in the lab sessions. Help is always available from the instructor in the lab, either by email or by coming to his office. Outside of the lab, the instructor and tutors are generally available.

### <<=== **Resources: Class Software** ===>

If students want to use their own computer for writing code, they need to install Java Development software (JDK) and Eclipse IDE (Integrated Development Environment). They are available by free download.

- Java Standard Edition (Java SE): [Java SE Downloads](https://www.oracle.com/technetwork/java/javase/downloads/index.html)  
<https://www.oracle.com/technetwork/java/javase/downloads/index.html>
- Integrated Development Environment (IDE): [eclipse](https://www.eclipse.org)  
<https://www.eclipse.org>

Documentation for the Java platform is available online.

- Java Application Program Interface (API): [Java 8 API Specification](https://docs.oracle.com/javase/8/docs/api/index.html)  
<https://docs.oracle.com/javase/8/docs/api/index.html>

# CMPS 161

## Algorithm Design and Implementation I

Fall 2018

### *Lab 1*

**Due: 08/30/2018**

(Displaying three messages) Write a program that displays Welcome to Java, Welcome to Computer Science, and Programming is fun.

```
/* Sample Run:
   Welcome to Java
   Welcome to Computer Science
   Programming is fun
*/
```

---

### *Lab 2*

**Due: 09/06/2018**

(Converting Celsius to Fahrenheit) Write a program that reads a Celsius degree in double from the console, then converts it to Fahrenheit and displays the result. The formula for the conversion is as follows:

$$\text{fahrenheit} = (9 / 5) * \text{celsius} + 32$$

Hint: In Java,  $9 / 5$  is 1, but  $9.0 / 5$  is 1.8.

```
/* Sample Run:
   Enter a temperature in Celsius: 43
   43.0 Celsius is 109.4 Fahrenheit
*/
```

---

### *Lab 3*

**Due: 09/13/2018**

(Financial application: compound value)

Suppose you save \$100 each month into a savings account with the annual interest rate 5%.

Thus, the monthly interest rate is  $0.05/12 = 0.00417$ .

After the first month, the value in the account becomes

*Notice that the detailed guidelines may be changed for each semester.*

2018FA

$$100 * (1 + 0.00417) = 100.417$$

After the second month, the value in the account becomes

$$(100 + 100.417) * (1 + 0.00417) = 201.252$$

After the third month, the value in the account becomes

$$(100 + 201.252) * (1 + 0.00417) = 302.507$$

and so on.

Write a program that prompts the user to enter a monthly saving amount and displays the account value after the sixth month. (In Exercise 5.30, you will use a loop to simplify the code and display the account value for any month.)

Enter the monthly saving amount: 100

After the sixth month, the account value is \$608.81

```
/* Sample Run:
   Enter the monthly saving amount: 100
   After the sixth month, the account value is $608.8181155768638
*/
```

---

## ***Lab 4***

**Due: 10/02/2018**

(Compute the perimeter of a triangle) Write a program that reads three edges for a triangle and computes the perimeter if the input is valid. Otherwise, display that the input is invalid. The input is valid if the sum of every pairs of two edges is greater than the remaining edge.

```
/* Sample Run
   Enter three edges: 3.0 4.0 5.0
   The perimeter of the triangle is 12.0

   Enter three edges: 1.0 2.0 3.0
   Input is invalid
*/
```

---

## ***Lab 5***

**Due: 10/16/2018**

(Finding the character of an ASCII code) Write a program that receives an ASCII code (an integer between 0 and 127) and displays its character. Here is a sample run:

```
/* Sample Run
   Enter an ASCII code: 69
   The character for ASCII code 69 is E
*/
```

*Notice that the detailed guidelines may be changed for each semester.*

2018FA

---

## *Lab 6*

**Due: 01/23/2018**

(Finding numbers divisible by 5 or 6, but not both) Write a program that displays all the numbers from 100 to 200, ten per line, that are divisible by 5 or 6, but not but both.

```
/* Sample Run
  100 102 105 108 110 114 115 125 126 130
  132 135 138 140 144 145 155 156 160 162
  165 168 170 174 175 185 186 190 192 195
  198 200
*/
```

---