Lab 3: Java Fundamentals **III**

20 pts

Distribute on September 22, 2025
Due before September 28, 2025, Sunday, 11:59 PM, before 12:00 midnight

Learning Outcomes (CLO vs SO Mapping)

- Recognize the software and hardware components of a computer system (1)vs(6)
- Utilize Java syntax in fundamental programming algorithms (3)vs(1)
- Recognize and apply the various input and output devices in programming (4)vs(2)

Requirements

For this lab, you will create a small Java program to practice

- declaring, initializing, and assigning values to variables
- manipulating String objects
- using decision structures such as if-else statements.
- reading input data from the console
- reading more input data from message dialog boxes.
- applying Scanner class methods
- applying Java's wrapper classes for converting strings to numbers
- displaying output on the console window
- displaying output using message dialog boxes

Preliminaries

1. Create a Java project. The name of the project must be **lab03_<your FirstNameLastName >**. For example, my project would be named lab03_PeterNg.
2. Add a Java class named **`IO_Practice`. Declare it as your main class** when the project is set up with Eclipse
3. Add the following comment block to the beginning of your Java class:

```
/*
 *  <your name>
 *  CS 16000-01 – 02/03 Fall Semester 2025
 *  (Note: Write either 02 or 03, depending on which section your section is.)
 *  Lab 3
 *
 */
```

Exercises

Recommended Reading: Chapters 2 and 3 of the textbook.
Note: After assigning a literal value to a variable, the code must **always use the variable**

1. Add the import statement

`import java.util.Scanner;` //required for Scanner class.

and

import javax.swing.JOptionPane; //required for JOptionPane class.

with

System.exit(0); //required for JOptionPane class.

Add the first two import statements into your code above the class header, and the statement "System.exit(0)" must be added before the end of the main method. All the rest of the code shall be written in the main method. For example,

```
package lab03_...

import java.util.Scanner; //required for Scanner class.
import javax.swing.JOptionPane; //required for JOptionPane class.
public class IO_Practice2 {

    public static void main(String[] args) {
        //declaration block
        …
        System.exit(0); // required for JOptionPane class.
    }// end of main

}// end of class IO_Practice2
```

2. Declare the following variables:
   - **numberOfBooks** of type **`int`**
   - **titleLength** of type **`int`**
   - **unitPrice** of type **`double`**
   - **totalCost** of type **`double`**
   - **authorName, bookTitle, publisher, edition, yearPublished, firstName, middleName, lastName,** all of type **`String`** except **yearPublished** of type **`int`** and **middleInitial** of type **`char`**
   - The customer names **cFirstName, cMiddleName,** and **cLastName** are all **`String`** types.
   - The customer address **streetAddress, cityName, stateName,** and **zipCode** are all **`String`** types.
   - **`thisYear`** of type **`int`**

3. Declare and instantiate a Scanner object that can read data from the console (suggested reading the textbook Chapter 2: 2.15 Reading Keyboard Input, pp 130-140)
4. Solicit and read an integer value from the console (choose an integer as the input). Store the input in the variable **numberOfBooks**
5. Solicit and read a number with a decimal point from the console (you choose the decimal number as the input). Store the input in the variable **unitPrice**

6. Assign **totalCost** the total cost of all books

7. Solicit the customer's name on the console. Ensure that the input has a first, middle, and last name. If there is no middle name or you do not know it, add a replacement name of your choice. If there is more than one word for the middle name, use a hyphen – to join words. For example, John-Elizabeth is the middle name of the customer. Apply the next() method three times to make Scanner:

- read the first name; then store it in the memory and reference it by the variable **cFirstName**. e.g., Caleb;
- read the middle name; then store it in the memory and reference it by the variable **cMiddleName**, e.g., John-Elizabeth; and
- read the last name; then store it (in upper case) in the memory and reference it by the variable **cLastName**. e.g., Henricks.

The console yields

```
Enter the customer's first name, middle name, and last name:
Caleb John-Elizabeth Henricks
```

Re-assign all characters of the cLastName to all uppercase versions.
Use next().toUpperCase() to transform all the input characters of the last name to upper case.

Likewise, on the console, solicit and make the Scanner read the customer's street address; then store it in the memory and reference it using the variable **streetAddress**.

```
Enter the customer's street address (i.e., nos. and street):
   100056 Weeping Cherry Drive
```

Then, on the console, solicit and make the scanner read the city name, state name, and zip code, store them in the memory, and reference them using the variables **cityName**, **stateName**, and **zipCode**, respectively. Examples are as follows:

```
Enter the name of the city:
Well Fargo City
Enter the name of the state:
Rhode Island
Enter the Zip Code:
02485
```

If the Scanner does not read during these operations, write a statement, such as

referenceVariable.nextLine();

This will consume the remaining line.

8. Solicit the name of your favorite author from the console. Ensure that the input has a first, middle, and last name. If there is no middle name or you do not know it, add a replacement name of your own choice. If there is more than one word for the middle name, use a hyphen – to join words. For example, John-Huffam is the middle name of Charles Dickens.

Apply the next() method three times to make the Scanner read the author's name accordingly:

- read the first name; then store it in the memory and reference it by the variable **firstName**. e.g., Charles;
- read the middle name; then store it in the memory and reference it by the variable **middleName**, e.g., John-Huffam; and
- read the last name; then store it in the memory and reference it by the variable **lastName**. Dickens.

9. Extract the middle initial as a character from the middle name and store it in the middleInitial. e.g., J is the middleInitial of John-Huffam.

10. Re-assign all characters of the lastName to be all uppercase versions.

11. Rebuild the author's name to be of the format (last name (all in uppercase), first name, middle initial), e.g., **DICKENS, Charles J. Store it in the memory and reference it using** the variable **authorName**.

12. Solicit the title of your favorite book from the console. e.g., A Tale of Two Cities.

13. Using the nextLine( ) method, read the title, and then store it in memory and reference it by the variable **bookTitle**.

Note that you must make a dummy call of the nextLine( ) before reading the input works; see pp 136 – 140 of your book. This helps to consume the remaining newline.

14. Re-assign **bookTitle** its own all-uppercase version. Find the length of the book title and store it in the variable **titleLength**.

15. Solicit the name of the publisher and the edition for the book; then store them in the memory and reference them by the variables **publisher** and **edition,** respectively**.** Solicit the year for publishing the book; store it in the variable **yearPublished**. Solicit the year of today and store it in the variable **thisYear**.

16. To the console, print the author's name (lastName(upper case), firstName Initial), the **bookTitle** of the book (upper case), followed by the publisher, edition, and year published. Then what is the length of the title, and how old is the book? (If it is a year-old or less book, you should print "It is a one-year-old book. If more than a year, such as 160 years, then you need to print "It is a book that is 160 years old.")

```
For problem 20.(b): Output Data from the above Input Data Requested

Information about the customer's Favorite Book:
The customer's favorite author is:
        DICKENS, Charles J.
The customer's favorite book from Charles is
        A TALE OF TWO CITIES,
        Chapman and Hall Publisher, London, 1st Edition, 1860.
The length of the title is: 20.
It is a book that is 163 years old.
```

17. Print the result of the order for the book to console as shown in the following template:

```
The total cost of 10 books of unit price $6,900.65 is $ 69,006.50
from the Chapman and Hall Publisher, London.
```

18. Use the JOptionPane input dialog box to prompt whether you want to reorder the book. (Read Appendix A: JOptionPane Dialogs or the lecture notes Chapter 2 Dialog Boxes)

If yes, use the JOptionPane input dialog boxes to enter the number of the book to be re-ordered and the unit price of the book. If there is no book order, print on the console, "**There is no reorder of the book**."

19. Print the result regarding the re-ordered information to the console as shown in the following template:

```
Information about Customer:
Name:   Caleb John-Elizabeth HENRICKS
Street Address:    100056 Weeping Cherry Drive
City:   Wells Fargo City
State:  Rhode Island
ZipCode:  02485

The total cost for reordering 1 book at the unit price of $6,900.65
is $ 6,900.65 from the Chapman and Hall Publisher, London.
```

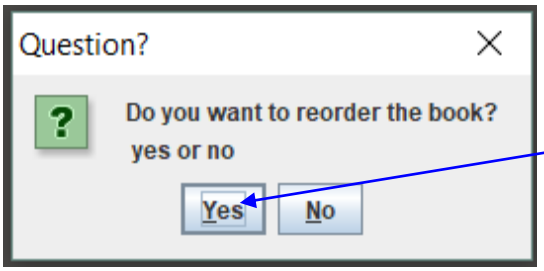
20. (a) Use the following given data. Your printing on the console must follow the exact layout shown below. Use two blocks, one for the input data requested. The other one is for the output data from the above input data requested. As in the input data requested, show the title "For problem 20. (a): Input Data Requested". Then show the questions asked with the user's responses. You do not have to show the showInputDialog for the input data, which is used to compute the statement of the re-ordered book.

(b) The consecutive printing of output statements has a title "For problem 20. (b): Output data from the above Input Data Request" followed by "Information about the Customer's Favorite Book:" After entering all the data regarding the customer's favorite book. Continue with a title "Information about Customer:". Then, output the customer's data to the console.

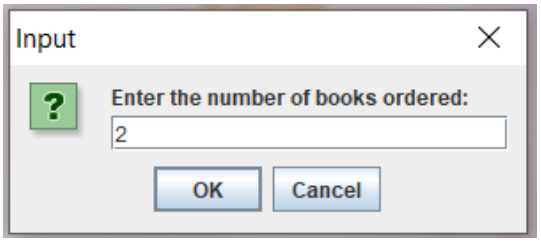
You must hold off on the output until you have all the input data requested. Ensure that the singular/plural nouns, such as book or books, and year or years, are used correctly. You need to use a decision structure to get these options.

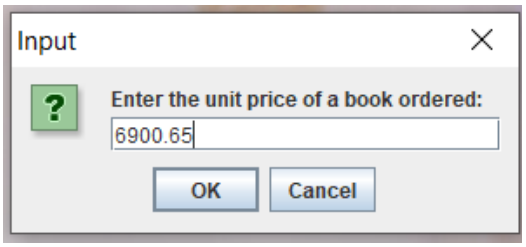
```
For problem 20. (a): Input Data Requested

Number of books ordered?
10
Unit price of the book?
6900.65
Enter the customer's first name, middle name, and last name:
Caleb John-Elizabeth Henricks
Enter the customer's street address(i.e., nos. and street):
100056 Weeping Cherry Drive
Enter name of the city:
Wells Fargo City
Enter name of the state:
Rhode Island
Enter the Zip Code:
02485
Enter the customer's favorite author's first name, middle name, and
last name:
Charles John-Huffam Dickens
Title of the customer's favorite book:
A Tale of Two Cities
Enter the name of the publisher for the book:
Chapman and Hall Publisher, London
Enter the edition for the book:
1st
Enter the year for publishing the book:
1859
What is this year? such as 2025
2025

For problem 20.(b): Output Data from the above Input Data Requested

Information about the customer's Favorite Book:
The customer's favorite author is:
     DICKENS, Charles J.
The customer's favorite book from Charles is
     A TALE OF TWO CITIES,
     Chapman and Hall Publisher, London, 1st Edition, 1859.
The length of the title is: 20.
It is a book that is 166 years old.
The total cost of 10 books of unit price $6,900.65 is $ 69,006.50
from the Chapman and Hall Publisher, London.

Information about Customer:
Name: Caleb John-Elizabeth HENRICKS
Street Address:  100056 Weeping Cherry Drive
```

```
City: Well Fargo City
State: Rhode Island
ZipCode:  02485

There is no reorder of the book.

The end of the invoice.

or
The total cost for reordering 1 book of unit price $8,500.00 is $
8,500.00
from the Chapman and Hall Publisher, London.

The end of the invoice.
```



Note: Here, use the JOptionPane dialog box to prompt yes or no for reordering the book; then input the number of books to be reordered and state the unit price as shown above. These three message dialog boxes are shown before the "The total cost for reordered 2 books of ….publisher, London."






```
The total cost for reordering 2 books of unit price $6900.65 is $ 13,801.30
from the Chapman and Hall Publisher, London.
```

```
The end of the invoice.
```

Submit: Upload your zipped project folder to the class website on Brightspace.