

CMPSC 221

OO Programming with Web-Based Applications

Spring 2020

Due Date: March 3rd, 2020 (6:15 p.m.)

Name: _____

Instructions: Please create a Java application to solve the following problem. Submit electronic (Canvas Dropbox) copies of your program source code and **two or more** sample runs to me by the deadline. Also submit printouts of your source code and runs by the deadline. Please note that printouts are **required** if you want your submission to be considered for a grade. (For the electronic submission of your program, you may: 1) compress (i.e., zip) your entire project folder (NetBeans, Eclipse, etc.) and upload that to Canvas OR 2) place your Java source code file(s) in a folder, compress the folder, and upload that to Canvas.) Documentation requirements follow the problem specification.

1. Problem: Create a Java application that implements an online store complete with shopping cart and check out procedure. To clarify the problem, I have divided it into 4 parts.

Part 1: Create Store Inventory. The program begins by creating an online store inventory from a list of items stored in a text file. A `try-catch` block must be used to handle checked exceptions.

Part 2: Create/Add to/Remove from Shopping Cart. After creating the store inventory, the program welcomes the customer, then provides him/her with a menu of options for creating a shopping cart, adding items to or removing items from the shopping cart, or checking out. Creating a shopping cart entails creating an empty shopping cart. Adding an item to the shopping cart entails searching the store inventory first by category then by item to locate an item to add. (If the customer chooses to add an item that is already in the cart, simply increase the quantity by one.) Removing an item from the shopping cart entails displaying the current contents of the shopping cart, then prompting the customer to enter the number of the item to remove. The shopping cart must be displayed after each addition or removal. All customer input must be validated. `try-catch` blocks must be used to handle unchecked exceptions. The program continues to display the main menu until the customer decides to check out.

Part 3: Check Out. Once the customer selects check out, the program displays a summary of the customer's order. Next, the program asks the customer how s/he wishes to pay for the order. If the customer chooses 1 to charge to a credit card on file, the program simply displays the payment summary. If the customer chooses 2 to charge to a new credit card, the program prompts the customer to enter payment information (card holder full name, followed by card type, number, and expiration date), then displays the credit payment summary. Both payment summaries must be formatted as shown in the sample runs. The customer's choice of payment option must be validated. With respect to the credit card information, you need only check that the card number consists of 16 digits. `try-catch` blocks must be used to handle unchecked exceptions.

Part 4: Thank Customer. Finally, the program thanks the customer for visiting the online store.

Implementation Requirements and Guidelines:

- All items **must** be stored in and read from a text file. An example of recommended formatting for the text file appears at the end of this document.
- Java code that accesses the text file **must** be enclosed in a `try-catch` block. Minimally, your program **must** handle the `FileNotFoundException`.

- You **must** use a minimum of two classes to implement this program: a “driver” containing `main` and an `Item` class. **Important Note: Each Java class must be stored in a separate *.java file.**
- The store inventory and the shopping cart **must** each be implemented as an `ArrayList` of `Item` objects.
- An `Item` object **must** have 5 attributes: item number (`int`), item name (`String`), item category (`String`), item price (`double`), and item quantity (`int`; initialize to 1).
- **Required** methods for the `Item` class include:
 - A five-argument constructor that initializes the five instance variables (specified above).
 - *set* and *get* methods for each of the five instance variables.
 - A *toString* method to generate nicely formatted output.
- The store inventory **must** contain at least 15 items from 3 or more categories with 3 or more items per category.
- Data read into the program from the text file **must not** be hard-coded into the program (e.g., item categories). All data **must** be manipulated using `ArrayLists`.
- As usual, your program output should *strongly* resemble the sample runs at the end of this document. Pay particular attention to the handling of invalid input.

References:

- Savitch: Chapters 1 – 5 (basics, classes); 9 (exception handling); 10 (file I/O); 14 (class `ArrayList`)
-

Documentation Requirements:

- 1) Each program source code file (i.e., each Java class) must have a header at the beginning of the class containing the following:

- Name of author, PSU e-mail address of author, name of course, assignment number and due date, name of file, purpose of class, compiler/IDE, operating system, and any external references used (e.g., Website)
- Example:

```
/*
Author:          Wanda Kunkle
E-mail:          wmk12@psu.edu
Course:          CMPSC 221
Assignment:      Programming Assignment 3
Due date:        3/3/2020
File:            ShoppingCartApplication.java
Purpose:         Java application that implements an online store complete
                  with shopping cart and check out procedure
Compiler/IDE:    Java SE Development Kit 8u192/Apache NetBeans IDE 9.0
Operating
system:          MS Windows 8.1
Reference(s):    Java 8 API - Oracle Documentation
                  (http://docs.oracle.com/javase/8/docs/api/)
                  (Include ALL additional references (Web page, etc.) here.)
*/
```

- 2) The purpose of each method in the source code file(s) must be documented as shown in the example below. I prefer that you use the **javadoc** comment style.

```
/** This method adds an item to the shopping cart.
 *
 * @param shoppingCartItem    The item to add to the shopping cart
 */
public void addToShoppingCart(Item shoppingCartItem)
{
    // Method definition (i.e., body)
}
```

Sample run #1 (Customer correctly creates a shopping cart, adds items to it, then checks out.):

```
run:
Creating inventory ...

/*****/

Welcome to Barnes & Noble Online!

Choose an option.
1) Create empty shopping cart
2) Add item to shopping cart
3) Remove item from shopping cart
4) Check out

Your choice? 1

/*****/

Shopping cart created!

/*****/

Welcome to Barnes & Noble Online!

Choose an option.
1) Create empty shopping cart
2) Add item to shopping cart
3) Remove item from shopping cart
4) Check out

Your choice? 2

/*****/

Choose a category.
1) Books
2) Home & Gifts
3) Movies & TV
4) Music

Your choice? 3

600 Bones: Season 12                $19.99
601 Logan                          $17.99
602 The Polar Express               $ 9.99

Enter the number of the item you wish to add.
Your choice? 600

Your choice "600 Bones: Season 12" has been added to the shopping cart.

Number:    600
Name:      Bones: Season 12
Category:  Movies & TV
Price:     $ 19.99
Quantity:  1

/*****/

Welcome to Barnes & Noble Online!

Choose an option.
1) Create empty shopping cart
2) Add item to shopping cart
3) Remove item from shopping cart
4) Check out
```

Your choice? 2

/*****

Choose a category.

- 1) Books
- 2) Home & Gifts
- 3) Movies & TV
- 4) Music

Your choice? 2

800 Doctor Who TARDIS Bookends Set of 2	\$51.95
801 Wallace Plaid Mini Umbrella	\$14.95
802 WonderFlex Light, Black	\$18.95

Enter the number of the item you wish to add.

Your choice? 801

Your choice "801 Wallace Plaid Mini Umbrella" has been added to the shopping cart.

Number: 600
Name: Bones: Season 12
Category: Movies & TV
Price: \$ 19.99
Quantity: 1

Number: 801
Name: Wallace Plaid Mini Umbrella
Category: Home & Gifts
Price: \$ 14.95
Quantity: 1

/*****

Welcome to Barnes & Noble Online!

Choose an option.

- 1) Create empty shopping cart
- 2) Add item to shopping cart
- 3) Remove item from shopping cart
- 4) Check out

Your choice? 3

/*****

Displaying the current contents of the shopping cart ...

Number: 600
Name: Bones: Season 12
Category: Movies & TV
Price: \$ 19.99
Quantity: 1

Number: 801
Name: Wallace Plaid Mini Umbrella
Category: Home & Gifts
Price: \$ 14.95
Quantity: 1

Enter the number of the item you wish to remove.

Your choice? 801

Item #801 has been removed from the shopping cart.

Displaying the current contents of the shopping cart ...

Number: 600
Name: Bones: Season 12
Category: Movies & TV
Price: \$ 19.99
Quantity: 1

/*****/

Welcome to Barnes & Noble Online!

Choose an option.

- 1) Create empty shopping cart
- 2) Add item to shopping cart
- 3) Remove item from shopping cart
- 4) Check out

Your choice? 2

/*****/

Choose a category.

- 1) Books
- 2) Home & Gifts
- 3) Movies & TV
- 4) Music

Your choice? 1

100 Doctor Who: Deep Time	\$ 8.47
101 Doctor Who: Heart of Stone	\$ 9.99
102 The Hitchhiker's Guide to the Galaxy	\$ 7.99

Enter the number of the item you wish to add.

Your choice? 100

Your choice "100 Doctor Who: Deep Time" has been added to the shopping cart.

Number: 600
Name: Bones: Season 12
Category: Movies & TV
Price: \$ 19.99
Quantity: 1

Number: 100
Name: Doctor Who: Deep Time
Category: Books
Price: \$ 8.47
Quantity: 1

/*****/

Welcome to Barnes & Noble Online!

Choose an option.

- 1) Create empty shopping cart
- 2) Add item to shopping cart
- 3) Remove item from shopping cart
- 4) Check out

Your choice? 2

/*****/

Choose a category.

- 1) Books
- 2) Home & Gifts
- 3) Movies & TV
- 4) Music

Your choice? 1

100 Doctor Who: Deep Time	\$ 8.47
101 Doctor Who: Heart of Stone	\$ 9.99
102 The Hitchhiker's Guide to the Galaxy	\$ 7.99

Enter the number of the item you wish to add.
Your choice? 100

Your choice "100 Doctor Who: Deep Time" has been added to the shopping cart.

Number: 600
Name: Bones: Season 12
Category: Movies & TV
Price: \$ 19.99
Quantity: 1

Number: 100
Name: Doctor Who: Deep Time
Category: Books
Price: \$ 8.47
Quantity: 2

/*****/

Welcome to Barnes & Noble Online!

Choose an option.

- 1) Create empty shopping cart
- 2) Add item to shopping cart
- 3) Remove item from shopping cart
- 4) Check out

Your choice? 4

/*****/

ORDER SUMMARY:

Number: 600
Name: Bones: Season 12
Category: Movies & TV
Price: \$ 19.99
Quantity: 1

Number: 100
Name: Doctor Who: Deep Time
Category: Books
Price: \$ 8.47
Quantity: 2

Order Total: \$ 39.15 (6.0% tax included)

/*****/

How do you wish to pay for your order?

(Enter 1 to charge to credit card on file or 2 to charge to new credit card.): 2

Please enter your payment information:

Card holder name: Jane Wymark
Credit card type (e.g., MasterCard): Visa
Credit card number (e.g., 5201345098756420): 4321009854761189
Expiration date (e.g., 10/2016): 08/2021

/*****/

Credit payment summary:

Customer name: Jane Wymark
Payment amount: \$ 39.15
Card type: Visa
Card number: *****1189
Exp date: 08/2021

/*****/

Thanks for shopping at Barnes & Noble Online.
Please come back soon!

/*****/

BUILD SUCCESSFUL (total time: 5 minutes 29 seconds)

Sample run #2 (Customer makes a variety of invalid choices while shopping but finally checks out.):

```
run:
Creating inventory ...

/*****/

Welcome to Barnes & Noble Online!

Choose an option.
1) Create empty shopping cart
2) Add item to shopping cart
3) Remove item from shopping cart
4) Check out

Your choice? 2

/*****/

Please create a shopping cart!

/*****/

Welcome to Barnes & Noble Online!

Choose an option.
1) Create empty shopping cart
2) Add item to shopping cart
3) Remove item from shopping cart
4) Check out

Your choice? 1

/*****/

Shopping cart created!

/*****/

Welcome to Barnes & Noble Online!

Choose an option.
1) Create empty shopping cart
2) Add item to shopping cart
3) Remove item from shopping cart
4) Check out

Your choice? 2

/*****/

Choose a category.
1) Books
2) Home & Gifts
3) Movies & TV
4) Music

Your choice? 5

5 is not a valid choice! Please enter a number from 1 to 4.
Enter 0 to return to the main menu.

Your choice? 4

500 Acoustic Christmas                $31.34
501 Hamilton (Original Broadway Cast Recording) $22.39
502 Les Miserables (Original Broadway Cast)    $30.16
```

Enter the number of the item you wish to add.
Your choice? 503

Item #503 was not found in the inventory.

/*****/

Welcome to Barnes & Noble Online!

Choose an option.

- 1) Create empty shopping cart
- 2) Add item to shopping cart
- 3) Remove item from shopping cart
- 4) Check out

Your choice? 2

/*****/

Choose a category.

- 1) Books
- 2) Home & Gifts
- 3) Movies & TV
- 4) Music

Your choice? 4

500 Acoustic Christmas	\$31.34
501 Hamilton (Original Broadway Cast Recording)	\$22.39
502 Les Miserables (Original Broadway Cast)	\$30.16

Enter the number of the item you wish to add.
Your choice? 502

Your choice "502 Les Miserables (Original Broadway Cast)" has been added to the shopping cart.

Number: 502
Name: Les Miserables (Original Broadway Cast)
Category: Music
Price: \$ 30.16
Quantity: 1

/*****/

Welcome to Barnes & Noble Online!

Choose an option.

- 1) Create empty shopping cart
- 2) Add item to shopping cart
- 3) Remove item from shopping cart
- 4) Check out

Your choice? 2

/*****/

Choose a category.

- 1) Books
- 2) Home & Gifts
- 3) Movies & TV
- 4) Music

Your choice? 1

100 Doctor Who: Deep Time	\$ 8.47
101 Doctor Who: Heart of Stone	\$ 9.99
102 The Hitchhiker's Guide to the Galaxy	\$ 7.99

Enter the number of the item you wish to add.
Your choice? 101

Your choice "101 Doctor Who: Heart of Stone" has been added to the shopping cart.

Number: 502
Name: Les Miserables (Original Broadway Cast)
Category: Music
Price: \$ 30.16
Quantity: 1

Number: 101
Name: Doctor Who: Heart of Stone
Category: Books
Price: \$ 9.99
Quantity: 1

/*****/

Welcome to Barnes & Noble Online!

Choose an option.

- 1) Create empty shopping cart
- 2) Add item to shopping cart
- 3) Remove item from shopping cart
- 4) Check out

Your choice? four

For input string: "four" is not a valid format for an integer. Please re-enter your choice.

Your choice? 4

/*****/

ORDER SUMMARY:

Number: 502
Name: Les Miserables (Original Broadway Cast)
Category: Music
Price: \$ 30.16
Quantity: 1

Number: 101
Name: Doctor Who: Heart of Stone
Category: Books
Price: \$ 9.99
Quantity: 1

Order Total: \$ 42.56 (6.0% tax included)

/*****/

How do you wish to pay for your order?

(Enter 1 to charge to credit card on file or 2 to charge to new credit card.): 3

3 is not a valid payment option.

Please enter 1 to charge to card on file or 2 to charge to new card.

How do you wish to pay for your order?

(Enter 1 to charge to credit card on file or 2 to charge to new credit card.): 1

Payment summary:

Payment amount: \$ 42.56 charged to card on file

/*****/

Thanks for shopping at Barnes & Noble Online.

Please come back soon!

/*****/

BUILD SUCCESSFUL (total time: 8 minutes 28 seconds)

Sample text file (*Excerpt*):

(*Note format: item number, name, category, price, and quantity listed on separate lines for each attribute with no blank line(s) between items.*)

```
100
Doctor Who: Deep Time
Books
8.47
1
101
Doctor Who: Heart of Stone
Books
9.99
1
800
Doctor Who TARDIS Bookends Set of 2
Home & Gifts
51.95
1
801
WonderFlex Light, Black
Home & Gifts
18.95
1
500
Acoustic Christmas
Music
31.34
1
501
Hamilton (Original Broadway Cast Recording)
Music
22.39
1
```