
Instructions: Please create a Java application to solve the following problem. Submit electronic (Canvas Dropbox) copies of your project files (specified below) and **two or more** sample runs to me by the deadline. For the electronic submission of your project: 1) place your Java source code file(s), Java class file(s), sample runs, and a JAR file of your program in a folder; 2) compress the folder; and 3) upload the compressed archive to Canvas. I recommend that you also place a “ReadMe” file with instructions for executing your JAR file in the folder. Documentation requirements follow the problem specification.

Important Note: Please be sure to upload your Project 3 files to Canvas by the deadline. If you miss the deadline, you WILL automatically receive a grade of 0 (zero).

1. *Problem:* Create a Java application that enables a user to create a favorites bar from a collection (i.e., history) of previously visited Web sites. To clarify the problem, I have divided it into 3 parts.

Part 1: Create Collection of Web Sites Visited. The program begins by creating a collection of previously visited Web sites from a list of Web sites stored in a text file.

Part 2: Create/Delete/Modify Favorites Bar. After creating the collection of previously visited Web sites, the program welcomes the user, then provides him/her with a menu of options for creating or deleting a favorites bar, adding a Web site to or removing a Web site from the favorites bar, or quitting the application. Creating a favorites bar entails creating an empty favorites bar. Adding a Web site to the favorites bar entails searching the collection of Web sites visited first by topic then by name to locate the Web site to add. Removing a Web site from the favorites bar entails displaying the items (i.e., Web sites) in the favorites bar, numbered, then prompting the user to enter the number of the item to remove. Deleting a favorites bar entails simply deleting it (i.e., you do not have to empty it first). The favorites bar should be displayed after each addition or removal. As usual, all user input must be validated. The program continues to loop until the user decides to quit.

Part 3: Thank User. Finally, the program thanks the user for visiting the collection of previously visited Web sites.

Implementation Requirements and Guidelines:

- All Web sites **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 a `WebSite` class.
- The collection of previously visited Web sites and the favorites bar **must** each be implemented as an `ArrayList` of `WebSite` objects.
- A `WebSite` object **must** have a minimum of 5 attributes: rating, topic, Web site name, Web site address (i.e., URL), and date last visited.
- **Required** methods for the `WebSite` 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.

Implementation Requirements and Guidelines (continued):

- The collection of previously visited Web sites **must** contain a minimum of 15 Web sites representing 5 different topics with at least 3 Web sites per topic.
- As usual, your program output should resemble the sample runs at the end of this document.

References:

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

Documentation Requirements:

- 1) Each program source code file (i.e., 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:    3/30/2021
File:        FavoritesBar.java
Purpose:     Java application that enables a user to create a favorites bar
              from a collection (i.e., history) of previously visited
              Web sites
Compiler/IDE: Java SE Development Kit 15.0.2/Apache NetBeans IDE 11.3
Operating
system:      MS Windows 10 Home
Reference(s): Java 15 API - Oracle Documentation
              (https://docs.oracle.com/en/java/javase/15/docs/api/index.html);
              (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 a Web site to the favorites bar.
 *
 * @param favoritesBarItem    The Web site to add to the favorites bar
 */
public void addToFavoritesBar(WebSite favoritesBarItem)
{
    // Method definition (i.e., body)
}
```

Sample run #1 (User creates a favorites bar without making any input errors, then quits.):

```
C:\Users\Owner\Desktop\CMPSC 221 - Spring 2021\Projects\Programming Projects\Project 3>java
FavoritesBarWithDriver
```

```
Creating list of Web sites visited ...
```

```
/*****
```

```
Welcome to the Doctor's collection of recently visited Web sites!
```

```
Choose an option.
```

- 1) Create Favorites Bar
- 2) Delete Favorites Bar
- 3) Add Web Site to Favorites Bar
- 4) Remove Web Site from Favorites Bar
- 5) Quit

```
Your choice? 1
```

```
/*****
```

```
Favorites bar created!
```

```
/*****
```

```
Welcome to the Doctor's collection of recently visited Web sites!
```

```
Choose an option.
```

- 1) Create Favorites Bar
- 2) Delete Favorites Bar
- 3) Add Web Site to Favorites Bar
- 4) Remove Web Site from Favorites Bar
- 5) Quit

```
Your choice? 3
```

```
/*****
```

```
Choose a topic.
```

- 1) Art
- 2) Energy company
- 3) Grocery shopping
- 4) Music
- 5) Science fiction

```
Your choice? 5
```

```
Your choice (5) is being processed ...
```

```
Choose a Web site.
```

- 1) Home Page - Doctor Who
- 2) Star Trek: Picard
- 3) Stargate SG-1 - Episodes - IMDb

```
Your choice? 2
```

```
Your choice (2) is being processed ...
```

Your choice "Star Trek: Picard" in the category Science fiction has been added to the favorites bar.

Selection #1:
Rating: *****
Topic: Science fiction
Web Site Name: Star Trek: Picard
Web Site Address: <https://www.startrek.com/shows/star-trek-picard>
Date Last Visited: 03/15/2021

/*****/

Welcome to the Doctor's collection of recently visited Web sites!

Choose an option.
1) Create Favorites Bar
2) Delete Favorites Bar
3) Add Web Site to Favorites Bar
4) Remove Web Site from Favorites Bar
5) Quit

Your choice? 3

/*****/

Choose a topic.

1) Art
2) Energy company
3) Grocery shopping
4) Music
5) Science fiction

Your choice? 4

Your choice (4) is being processed ...

Choose a Web site.

1) Philadelphia Orchestra Home
2) The Score with Edmund Stone
3) WRTI - Your Classical & Jazz Source

Your choice? 3

Your choice (3) is being processed ...

Your choice "WRTI - Your Classical & Jazz Source" in the category Music has been added to the favorites bar.

Selection #1:
Rating: *****
Topic: Science fiction
Web Site Name: Star Trek: Picard
Web Site Address: <https://www.startrek.com/shows/star-trek-picard>
Date Last Visited: 03/15/2021

Selection #2:
Rating: *****
Topic: Music
Web Site Name: WRTI - Your Classical & Jazz Source
Web Site Address: <https://www.wrti.org/>
Date Last Visited: 03/13/2021

```

/*****/

Welcome to the Doctor's collection of recently visited Web sites!

Choose an option.
1) Create Favorites Bar
2) Delete Favorites Bar
3) Add Web Site to Favorites Bar
4) Remove Web Site from Favorites Bar
5) Quit

Your choice? 3

/*****/

Choose a topic.

1) Art
2) Energy company
3) Grocery shopping
4) Music
5) Science fiction

Your choice? 1

Your choice (1) is being processed ...

Choose a Web site.

1) Barnes Foundation
2) Metropolitan Museum of Art
3) Philadelphia Museum of Art

Your choice? 1

Your choice (1) is being processed ...

Your choice "Barnes Foundation" in the category Art has been added to the favorites bar.

Selection #1:
Rating:          *****
Topic:           Science fiction
Web Site Name:   Star Trek: Picard
Web Site Address: https://www.startrek.com/shows/star-trek-picard
Date Last Visited: 03/15/2021

Selection #2:
Rating:          *****
Topic:           Music
Web Site Name:   WRTI - Your Classical & Jazz Source
Web Site Address: https://www.wrti.org/
Date Last Visited: 03/13/2021

Selection #3:
Rating:          *****
Topic:           Art
Web Site Name:   Barnes Foundation
Web Site Address: https://www.barnesfoundation.org/
Date Last Visited: 02/14/2021

```

```

/*****/

Welcome to the Doctor's collection of recently visited Web sites!

Choose an option.
1) Create Favorites Bar
2) Delete Favorites Bar
3) Add Web Site to Favorites Bar
4) Remove Web Site from Favorites Bar
5) Quit

Your choice? 3

/*****/

Choose a topic.

1) Art
2) Energy company
3) Grocery shopping
4) Music
5) Science fiction

Your choice? 5

Your choice (5) is being processed ...

Choose a Web site.

1) Home Page - Doctor Who
2) Star Trek: Picard
3) Stargate SG-1 - Episodes - IMDb

Your choice? 1

Your choice (1) is being processed ...

Your choice "Home Page - Doctor Who" in the category Science fiction has been added to the
favorites bar.

Selection #1:
Rating:          *****
Topic:           Science fiction
Web Site Name:   Star Trek: Picard
Web Site Address: https://www.startrek.com/shows/star-trek-picard
Date Last Visited: 03/15/2021

Selection #2:
Rating:          *****
Topic:           Music
Web Site Name:   WRTI - Your Classical & Jazz Source
Web Site Address: https://www.wrti.org/
Date Last Visited: 03/13/2021

Selection #3:
Rating:          ****
Topic:           Art
Web Site Name:   Barnes Foundation
Web Site Address: https://www.barnesfoundation.org/
Date Last Visited: 02/14/2021

Selection #4:
Rating:          *****
Topic:           Science fiction
Web Site Name:   Home Page - Doctor Who
Web Site Address: https://www.doctorwho.tv/
Date Last Visited: 03/01/2021

```

/*****/

Welcome to the Doctor's collection of recently visited Web sites!

Choose an option.

- 1) Create Favorites Bar
- 2) Delete Favorites Bar
- 3) Add Web Site to Favorites Bar
- 4) Remove Web Site from Favorites Bar
- 5) Quit

Your choice? 4

/*****/

Displaying current favorites bar ...

Selection #1:

Rating: *****
Topic: Science fiction
Web Site Name: Star Trek: Picard
Web Site Address: <https://www.startrek.com/shows/star-trek-picard>
Date Last Visited: 03/15/2021

Selection #2:

Rating: *****
Topic: Music
Web Site Name: WRTI - Your Classical & Jazz Source
Web Site Address: <https://www.wrti.org/>
Date Last Visited: 03/13/2021

Selection #3:

Rating: *****
Topic: Art
Web Site Name: Barnes Foundation
Web Site Address: <https://www.barnesfoundation.org/>
Date Last Visited: 02/14/2021

Selection #4:

Rating: *****
Topic: Science fiction
Web Site Name: Home Page - Doctor Who
Web Site Address: <https://www.doctorwho.tv/>
Date Last Visited: 03/01/2021

Please enter the number of the selection you wish to remove.

Your choice? 3

Your choice (3) is being processed ...

Selection #3 has been removed from the favorites bar.

Selection #1:

Rating: *****
Topic: Science fiction
Web Site Name: Star Trek: Picard
Web Site Address: <https://www.startrek.com/shows/star-trek-picard>
Date Last Visited: 03/15/2021

Selection #2:

Rating: *****
Topic: Music
Web Site Name: WRTI - Your Classical & Jazz Source
Web Site Address: <https://www.wrti.org/>
Date Last Visited: 03/13/2021

Selection #3:
Rating: *****
Topic: Science fiction
Web Site Name: Home Page - Doctor Who
Web Site Address: <https://www.doctorwho.tv/>
Date Last Visited: 03/01/2021

/*****/

Welcome to the Doctor's collection of recently visited Web sites!

Choose an option.

- 1) Create Favorites Bar
- 2) Delete Favorites Bar
- 3) Add Web Site to Favorites Bar
- 4) Remove Web Site from Favorites Bar
- 5) Quit

Your choice? 4

/*****/

Displaying current favorites bar ...

Selection #1:
Rating: *****
Topic: Science fiction
Web Site Name: Star Trek: Picard
Web Site Address: <https://www.startrek.com/shows/star-trek-picard>
Date Last Visited: 03/15/2021

Selection #2:
Rating: *****
Topic: Music
Web Site Name: WRTI - Your Classical & Jazz Source
Web Site Address: <https://www.wrti.org/>
Date Last Visited: 03/13/2021

Selection #3:
Rating: *****
Topic: Science fiction
Web Site Name: Home Page - Doctor Who
Web Site Address: <https://www.doctorwho.tv/>
Date Last Visited: 03/01/2021

Please enter the number of the selection you wish to remove.
Your choice? 2

Your choice (2) is being processed ...

Selection #2 has been removed from the favorites bar.

Selection #1:
Rating: *****
Topic: Science fiction
Web Site Name: Star Trek: Picard
Web Site Address: <https://www.startrek.com/shows/star-trek-picard>
Date Last Visited: 03/15/2021

Selection #2:
Rating: *****
Topic: Science fiction
Web Site Name: Home Page - Doctor Who
Web Site Address: <https://www.doctorwho.tv/>
Date Last Visited: 03/01/2021


```

/*****/

Welcome to the Doctor's collection of recently visited Web sites!

Choose an option.
1) Create Favorites Bar
2) Delete Favorites Bar
3) Add Web Site to Favorites Bar
4) Remove Web Site from Favorites Bar
5) Quit

Your choice? 2

/*****/

Favorites bar contains entries. Are you sure you want to delete it (Y/N)? Y

Favorites bar deleted!

/*****/

Welcome to the Doctor's collection of recently visited Web sites!

Choose an option.
1) Create Favorites Bar
2) Delete Favorites Bar
3) Add Web Site to Favorites Bar
4) Remove Web Site from Favorites Bar
5) Quit

Your choice? 5

/*****/

Thanks for viewing the Doctor's collection of recently visited Web sites.
Please visit again soon!

C:\Users\Owner\Desktop\CMPSC 221 - Spring 2021\Projects\Programming Projects\Project 3>

```

Sample run #2 (User chooses various invalid options, then successfully creates a favorites bar and quits.):

```
C:\Users\Owner\Desktop\CMPSC 221 - Spring 2021\Projects\Programming Projects\Project 3>java
FavoritesBarWithDriver
```

```
Creating list of Web sites visited ...
```

```
/*****/
```

```
Welcome to the Doctor's collection of recently visited Web sites!
```

```
Choose an option.
```

- 1) Create Favorites Bar
- 2) Delete Favorites Bar
- 3) Add Web Site to Favorites Bar
- 4) Remove Web Site from Favorites Bar
- 5) Quit

```
Your choice? 3
```

```
/*****/
```

```
Please create a favorites bar!
```

```
/*****/
```

```
Welcome to the Doctor's collection of recently visited Web sites!
```

```
Choose an option.
```

- 1) Create Favorites Bar
- 2) Delete Favorites Bar
- 3) Add Web Site to Favorites Bar
- 4) Remove Web Site from Favorites Bar
- 5) Quit

```
Your choice? 1
```

```
/*****/
```

```
Favorites bar created!
```

```
/*****/
```

```
Welcome to the Doctor's collection of recently visited Web sites!
```

```
Choose an option.
```

- 1) Create Favorites Bar
- 2) Delete Favorites Bar
- 3) Add Web Site to Favorites Bar
- 4) Remove Web Site from Favorites Bar
- 5) Quit

```
Your choice? 3
```

```
/*****/
```

Choose a topic.

- 1) Art
- 2) Energy company
- 3) Grocery shopping
- 4) Music
- 5) Science fiction

Your choice? 6

6 is not a valid choice!
Please enter a number from 1 to 5.

Your choice? 3

Your choice (3) is being processed ...

Choose a Web site.

- 1) Giant Food Stores Supermarket & Pharmacy
- 2) Welcome - Trader Joe's
- 3) Whole Foods Market

Your choice? 4

4 is not a valid choice!
Please enter a number from 1 to 3.

Your choice? 1

Your choice (1) is being processed ...

Your choice "Giant Food Stores Supermarket & Pharmacy" in the category Grocery shopping has been added to the favorites bar.

Selection #1:
Rating: ****
Topic: Grocery shopping
Web Site Name: Giant Food Stores Supermarket & Pharmacy
Web Site Address: <https://giantfoodstores.com/>
Date Last Visited: 03/07/2021

/*****/

Welcome to the Doctor's collection of recently visited Web sites!

Choose an option.

- 1) Create Favorites Bar
- 2) Delete Favorites Bar
- 3) Add Web Site to Favorites Bar
- 4) Remove Web Site from Favorites Bar
- 5) Quit

Your choice? 1

/*****/

Favorites bar already exists!

/*****/

Welcome to the Doctor's collection of recently visited Web sites!

Choose an option.

- 1) Create Favorites Bar
- 2) Delete Favorites Bar
- 3) Add Web Site to Favorites Bar
- 4) Remove Web Site from Favorites Bar
- 5) Quit

Your choice? 3

/*****

Choose a topic.

- 1) Art
- 2) Energy company
- 3) Grocery shopping
- 4) Music
- 5) Science fiction

Your choice? 2

Your choice (2) is being processed ...

Choose a Web site.

- 1) Green Mountain Energy Company
- 2) PECO - An Exelon Company
- 3) PPL Electric Utilities

Your choice? 2

Your choice (2) is being processed ...

Your choice "PECO - An Exelon Company" in the category Energy company has been added to the favorites bar.

Selection #1:

Rating: ****
Topic: Grocery shopping
Web Site Name: Giant Food Stores Supermarket & Pharmacy
Web Site Address: <https://giantfoodstores.com/>
Date Last Visited: 03/07/2021

Selection #2:

Rating: ***
Topic: Energy company
Web Site Name: PECO - An Exelon Company
Web Site Address: <https://www.peco.com/>
Date Last Visited: 02/07/2021

/*****

Welcome to the Doctor's collection of recently visited Web sites!

Choose an option.

- 1) Create Favorites Bar
- 2) Delete Favorites Bar
- 3) Add Web Site to Favorites Bar
- 4) Remove Web Site from Favorites Bar
- 5) Quit

Your choice? 6

/*****

6 is not a valid choice!

Please enter a number from 1 to 5.

```

/*****/

Welcome to the Doctor's collection of recently visited Web sites!

Choose an option.
1) Create Favorites Bar
2) Delete Favorites Bar
3) Add Web Site to Favorites Bar
4) Remove Web Site from Favorites Bar
5) Quit

Your choice? 4

/*****/

Displaying current favorites bar ...

Selection #1:
Rating:      ****
Topic:       Grocery shopping
Web Site Name: Giant Food Stores Supermarket & Pharmacy
Web Site Address: https://giantfoodstores.com/
Date Last Visited: 03/07/2021

Selection #2:
Rating:      ***
Topic:       Energy company
Web Site Name: PECO - An Exelon Company
Web Site Address: https://www.peco.com/
Date Last Visited: 02/07/2021

Please enter the number of the selection you wish to remove.
Your choice? 3

3 is not a valid choice!
Please enter a number from 1 to 2.

Your choice? 2

Your choice (2) is being processed ...

Selection #2 has been removed from the favorites bar.

Selection #1:
Rating:      ****
Topic:       Grocery shopping
Web Site Name: Giant Food Stores Supermarket & Pharmacy
Web Site Address: https://giantfoodstores.com/
Date Last Visited: 03/07/2021

/*****/

Welcome to the Doctor's collection of recently visited Web sites!

Choose an option.
1) Create Favorites Bar
2) Delete Favorites Bar
3) Add Web Site to Favorites Bar
4) Remove Web Site from Favorites Bar
5) Quit

Your choice? 5

/*****/

Thanks for viewing the Doctor's collection of recently visited Web sites.
Please visit again soon!

C:\Users\Owner\Desktop\CMPSC 221 - Spring 2021\Projects\Programming Projects\Project 3>

```

Sample text file (*Excerpt*):

(*Note format: Rating, topic, Web site name, Web site address (i.e., URL), date last visited, all listed on separate lines for each Web site with no blank line(s) between Web sites.*)

```
****
Grocery shopping
Giant Food Stores Supermarket & Pharmacy
https://giantfoodstores.com/
03/07/2021
***
Grocery shopping
Welcome - Trader Joe's
https://www.traderjoes.com/
11/20/2020
****
Grocery shopping
Whole Foods Market
https://www.wholefoodsmarket.com/
12/23/2020
*****
Science fiction
Home Page - Doctor Who
https://www.doctorwho.tv/
03/01/2021
*****
Science fiction
Star Trek: Picard
https://www.startrek.com/shows/star-trek-picard
03/15/2021
*****
Science fiction
Stargate SG-1 - Episodes - IMDb
https://www.imdb.com/title/tt0118480/episodes
03/13/2021
```