




School of Science

COSC1284 Programming Techniques

Assignment 2

	<p>Assessment Type: Individual assignment; no group work.</p> <p>Submit online via Canvas→Assignments→Programming Assignment #2. Marks awarded for meeting requirements as closely as possible. Clarifications/updates may be made via announcements/relevant discussion forums.</p>
	<p>Due date: 9 am, 23 September 2020.</p> <p>Deadlines will not be advanced, but they may be extended under exceptional circumstances.</p> <p>Late Submissions/Extensions: A penalty of 10% per day is applied to late submissions up to 5 days, after which you will lose ALL the assignment marks. Extensions will be given only in exceptional cases; please refer to the special consideration process.</p> <p>Please check Canvas→Syllabus or via Canvas→Assignments→Programming Assignment #2 for the most up to date information.</p>
	<p>Weighting: 30 marks</p>

1. Overview

MiChef has setup a new online service for delivering meals prepared by a local chef in your area.

Your task is to implement some basic operations on the menu, provided to you in our skeleton code for a simple command line application. **The menu is modelled as an array of strings**. Each string represents a meal in the menu, and it is the aggregation of three substrings separated by a special symbol (`|`), namely:

- A **Cuisine**: this field can be either **INDIAN, CHINESE, MIDDLE_EASTERN, THAI, GREEK, JAPANESE** and **ITALIAN**.
- A **Meal**: this field represents the name of the meal to be delivered.
- A **Price**: the price of the meal.

Cuisine	Meal	Price
INDIAN	Biryani	\$16.99
VIETNAMESE		\$17.00
CHINESE	Chicken with Black Bean Sauce	\$16.50
MIDDLE_EASTERN	Falafel	\$17.99
Indian	Butter Chicken	\$17.00
THAI	Pad Thai	\$23.00
	Orange & Poppyseed Cake	\$15.99
GREEK	Moussaka	\$18.50
JAPANESE	Sushi	
ITALIAN	Lasagne	\$18.50
INDIAN	Dhal Tadka	\$9.50
INDIAN	Brinjal	\$11.50

Figure 1. A sample of the dataset provided in your skeleton code.

NOTE: The dataset provided in the skeleton code contains deliberate errors.

When processing data your program should ignore any records that contain errors except when explicitly instructed otherwise.

Errors present in the dataset include:

- incorrect casing such as cuisines that have any lowercase letters. Any items not in full caps are considered errors.
- missing values.

Question 1 (7 points) - Meals

Implement the method **String getMealSummaryInRange(double startPrice, double upperPrice)** that has been defined in the skeleton code. This method must not print the result but instead return a formatted string to be printed by the calling method. You must not change the definition (signature of this method).

Implementing user input or the Scanner in this question will result in a zero grade for this question.

The implementation of this method must abide by these constraints:

- MS1. Check the price range provided and create a formatted string that contains only those meals that fall within that range (inclusive).
- MS2. The string must contain the name of each meal and its associated price.
- MS3. The string format must be in two columns with the first column must be 20 characters wide and left-aligned and the second column must be 10 characters wide, right-aligned and display exactly two decimal places.
- MS4. If no meals are found within the price range provided, then the string should indicate this in the result.
- MS5. Return the formatted string to the calling method.
- MS6. You must analyse the meals dataset, but you are not permitted to modify the dataset.

Sample Tests:

TESTING - MEAL SUMMARY (VALID)
(16.99 - 18.50)

Biryani	\$16.99
Falafel	\$17.99
Moussaka	\$18.50
Lasagne	\$18.50

TESTING - MEAL SUMMARY (NOT FOUND)
(30.00 - 50.00)
No meals found within range.

Figure 2. A sample of the formatted string returned for a given set of inputs.

HINT: make use of the **indexOf** and **substring** methods as shown in lecture and tutorial classes.

Question 2 (8 points) - Get change

Implement the method **String getChange(String[] meals, double paid)** that has been defined in the skeleton code, which returns the amount of change owed after paying for the indicated meals. If the amount paid is insufficient a negative return value will indicate the error. You must not change the definition (signature of this method).

Implementing user input or the Scanner in this question will result in a zero grade for this question.

The implementation of this method must abide by these constraints:

- GC1. Calculate the total cost of all the meals provided and the difference between the amount tendered and the total cost of all the meals.
- GC2. Create a formatted string that indicates the change that should be given.
- GC3. If the amount tendered is insufficient then the returned string should indicate the first single meal that could be removed which would allow the customer to make a successful order.
- GC4. If the meals array passed into the method is null then you should return a single string value that indicates a null value was passed to the method.
- GC5. If the meals array passed into the method contains meals represented by empty strings then you should return a single string value that indicates the meal data supplied was invalid.
- GC6. If the amount tendered is \$0.00 or less then you should return an appropriate error message.
- GC7. Return the formatted string to the calling method.
- GC8. You must analyse the meals dataset, but you are not permitted to modify the dataset.

Sample Tests:

You can assume that we will not use data that contains meals that don't exist or would require the removal of multiple items in our testing scenarios.

TESTING - GET CHANGE (VALID)

(Biryani, Falafel, Moussaka, Lasagne)

You tendered: \$ 123.00

The total cost of the meal was: \$ 71.98

Your change: \$ 51.02

TESTING - GET CHANGE (INSUFFICIENT FUNDS)

(Biryani, Falafel, Moussaka, Lasagne)

You tendered: \$ 53.99

The total cost of the meal was: \$ 71.98

You provided insufficient funds. Please remove Falafel from your order

TESTING - GET CHANGE (EMPTY)

Your meals data is invalid.

TESTING - GET CHANGE (NULL)

The method was passed a null value for meals

Figure 3. A sample of the formatted string returned for a given set of inputs.

Question 3 (7 points)

Implement the method **String[] getMealsByCuisine(String cuisine)** that has been defined in the skeleton code, which returns a String array that represents a list of all the meals in the dataset that are categorised as the provided cuisine.

You must not change the definition (signature of this method).

Implementing user input or the Scanner in this question will result in a zero grade for this question.

The implementation of this method must abide by these constraints:

MC1. Create an array that is only large enough to hold the meals that have the same cuisine as the value of the parameter.

When the array is returned it must not contain any null values or empty strings.

MC2. Populate the array with only those meals that have the same cuisine as the value of the parameter.

MC3. If the cuisine passed into the method does not exist, then this method should return an array with a single string value that indicates the cuisine was not found.

MC4. If the cuisine passed into the method is passed a null value, then this method should return an array with a single string value that indicates a null value was passed to the method.

MC5. If the cuisine passed into the method is passed an empty string, then this method should return an array with a single string value that indicates an empty string was passed to the method.

MC6. Return the array to the calling method.

MC7. You must analyse the meals dataset, but you are not permitted to modify the dataset.

Sample Tests:

TESTING - MEALS BY CUISINE

(INDIAN)

Biryani

Dhal Tadka

Brinjal

TESTING - MEALS BY CUISINE

(RUSSIAN)

Meal not found

TESTING - MEALS BY CUISINE

(Empty)

Meal not found

TESTING - MEALS BY CUISINE

(NULL)

A null value was provided for cuisine.

Figure 4. A sample of the formatted string returned for a given set of inputs.

Question 4 (8 points)

Implement the method **String mealsAvailableHistogram()** in the skeleton code, which returns a formatted string representing a histogram of the meals for each of the cuisine categories:

Implementing user input or the Scanner in this question will result in a zero grade for this question.

The implementation of this method must abide by these constraints:

MH1. Create a formatted string that contains the list of all the cuisines in the underlying dataset.

MH2. The formatted string must contain the number of valid items for each cuisine in the list.

MH3. The formatted string must contain the number of invalid items that were found in the underlying dataset.

MH4. Return the formatted string to the calling method.

INDIAN:	3
VIETNAMESE:	0
CHINESE:	1
MIDDLE_EASTERN:	1
THAI:	1
GREEK:	1
JAPANESE:	0
ITALIAN:	1
INVALID:	4

Figure 5. A sample of the formatted string returned for a given dataset.

This program will demonstrate the following key skills:

1. Creating a small program to demonstrate what you have learned as a developer.
2. Analysing a problem and developing an algorithm to solve the problem.
3. Converting an algorithm to computer code.
4. Debugging your code on test data sets.

Read the requirements thoroughly!

There are specific constraints that have been placed on you for this assignment to force you to work within defined parameters. The ability to work within a pre-defined set of parameters is a fundamental skill required by any software developer.

You will also need to debug code on your own.

You are given marks on your ability to fulfil all requirements of this document.

Develop this assignment in an iterative fashion, as opposed to completing it in one sitting.

Any questions regarding this assignment must be asked via the relevant Canvas discussion forums **only** (no emails to teaching staff, please) in a general manner.

Questions about clarifying the specifications can be asked, but questions about how to write the code cannot be answered.

DO NOT post any code from your assignment on the discussion forums.

2. Assessment Criteria

This assignment will assess several skills:

1. Following coding conventions and behavioural requirements provided in this document and in the lessons.
2. Independently solving a problem by using programming concepts taught over the first eight weeks of the course.
3. Writing and debugging Java code independently.
4. Meeting deadlines.
5. Seeking clarifications from your teaching team, when needed, **via discussion forums**.
6. Creating a program by recalling concepts taught in class, understanding and applying concepts relevant to the solution, analysing components of the problem, and evaluating different approaches.

3. Learning Outcomes

This assessment is relevant to the following Course Learning Outcomes (CLOs):

- CLO1.** Demonstrate (through small programming exercises) knowledge and skills with concepts of program design and acceptable coding standards.
- CLO2.** Use Java programming language as a vehicle to demonstrate good software development practices.
- CLO3.** Use arrays and control structures to demonstrate skills of basic algorithms and data structures.
- CLO4.** Apply knowledge of the basic principles of the object-oriented development process to the analysis and design of solutions for small scale problems.
- CLO6.** Design and implement small-scale software systems.

4. Assessment details

Note: Please ensure that you have read sections 1-3 of this document before going further.

Your code must meet the following code requirements and debugging requirements (please, consult the table in Section 9):

5. Submission format

Follow the instructions below to complete this assessment:

Follow the instructions below to complete this assignment:

1. Download skeleton code for **Assignment 2 from Canvas**
2. Unzip the archive you have downloaded to a folder on your computer.
3. Open the folder in **Visual Studio Code** selecting **File->Open Folder (File->Open on Mac OS)** and then picking your folder.
4. You will need to complete the code, in response to Questions 1-4 by the due date.
5. You can attempt to solve the questions in any order.
6. **DO NOT** modify the file **Driver.java** and follow instructions in the comments to test the run method in the file **A2.java**. These files are included in the skeleton code assigned to you.
7. Sample data is provided in the skeleton code, but during assessment the sample data will be replaced with different data. Your code must work for other data supplied and not just the sample data.
8. Use Visual Studio Code as **your only editor** to complete the program as per the specification provided to you in the questions.
9. Submit your entire project, as a **.zip archive**, using the submission link on Canvas for this assignment.
10. Make sure that you download your code after submission and thoroughly check that you have submitted correctly.

6. Academic integrity and plagiarism (standard warning)

Academic integrity is about honest presentation of your academic work. It means acknowledging the work of others while developing your own insights, knowledge and ideas.

You should take extreme care that you have:

Acknowledged words, data, diagrams, models, frameworks and/or ideas of others you have quoted (i.e. directly copied), summarised, paraphrased, discussed or mentioned in your assessment through the appropriate referencing methods, Provided a reference list of the publication details so your reader can locate the source if necessary. This includes material taken from Internet sites.

If you do not acknowledge the sources of your material, you may be accused of plagiarism because you have passed off the work and ideas of another person without appropriate referencing, as if they were your own.

RMIT University treats plagiarism as a very serious offence constituting misconduct. Plagiarism covers a variety of inappropriate behaviours, including:

- Failure to properly document a source
- Copyright material from the internet or databases
- Collusion between students

For further information on our policies and procedures, please refer to the [University website](#).

7. Assessment declaration

When you submit work electronically, you agree to the [assessment declaration](#).

8. Penalties

Code must be valid, runnable Java to be given a mark

(code can only be marked as submitted, no corrections to code will be made in order to run your program).

Each instance of the following will incur a 20% marking penalty:

- Compilation errors
- Runtime errors that could have been prevented such as NullPointerException & ArrayIndexOutOfBoundsException Exceptions
- The use of any data structures other than an array.
- You must not use the Array class methods such as copy but must implement your own algorithm.

See Marking Rubric on following page:

9. Rubric/assessment criteria for marking

<p>Q1 - Meals Summary</p> <p>Implementing user input or the Scanner in this question will result in a zero grade for this question.</p> <p>MS1. Check the price range provided and create a formatted string that contains only those meals that fall within that range (inclusive).</p> <p>MS2. The string must contain the name of each meal and its associated price.</p> <p>MS3. The string format must be in two columns with the first column must be wide enough to accommodate the largest item in the dataset and left-aligned and the second column must be 10 characters wide, right-aligned and display exactly two decimal places.</p> <p>MS4. If no meals are found within the price range provided, then the string should indicate this in the result.</p> <p>MS5. Return the formatted string to the calling method.</p> <p>MS6. You must analyse the meals dataset, but you are not permitted to modify the dataset.</p>	<p>7 pts 6 items met</p> <p>are functionally correct and no improvements were identified.</p>	<p>5.8 pts 5 items met</p> <p>are functionally correct and no improvements were identified.</p>	<p>4.65 pts 4 items met</p> <p>are functionally correct and no improvements were identified.</p>	<p>3.5 pts 3 items met</p> <p>are functionally correct and no improvements were identified.</p>	<p>2.23 pts 2 items met</p> <p>are functionally correct and no improvements were identified.</p>	<p>1.16 pts 1 item met</p> <p>is functionally correct and no improvements were identified.</p>	<p>0 pts 0 items met</p> <p>are functionally correct and no improvements were identified.</p>	7 pts		
<p>Q2 - Get change</p> <p>Implementing user input or the Scanner in this question will result in a zero grade for this question.</p> <p>GC1. Calculate the total cost of all the meals provided and the difference between the amount tendered and the total cost of all the meals.</p> <p>GC2. Create a formatted string that indicates the change that should be given.</p> <p>GC3. If the amount tendered is insufficient then the returned string should indicate the first single meal that could be removed which would allow the customer to make a successful order.</p> <p>GC4. If the meals array passed into the method is null then you should return a single string value that indicates a null value was passed to the method.</p> <p>GC5. If the meals array passed into the method contains meals represented by empty strings then you should return a single string value that indicates the meal data supplied was invalid.</p> <p>GC6. If the amount tendered is \$0.00 or less then you should return an appropriate error message.</p> <p>GC7. Return the formatted string to the calling method.</p> <p>GC8. You must analyse the meals dataset, but you are not permitted to modify the dataset.</p>	<p>8 pts 8 items met</p> <p>are functionally correct and no improvements were identified.</p>	<p>7 pts 7 items met</p> <p>are functionally correct and no improvements were identified</p>	<p>6 pts 6 items met</p> <p>are functionally correct and no improvements were identified</p>	<p>5 pts 5 items met</p> <p>are functionally correct and no improvements were identified.</p>	<p>4 pts 4 items met</p> <p>are functionally correct and no improvements were identified.</p>	<p>3 pts 3 items met</p> <p>are functionally correct and no improvements were identified.</p>	<p>2 pts 2 items met</p> <p>are functionally correct and no improvements were identified.</p>	<p>1 pts 1 item met</p> <p>is functionally correct and no improvements were identified.</p>	<p>0 pts 0 items met</p> <p>are functionally correct and no improvements were identified.</p>	8 pts

<p>Q3 - Get meals by cuisine</p> <p>Implementing user input or the Scanner in this question will result in a zero grade for this question.</p> <p>MC1. Create an array that is only large enough to hold the meals that have the same cuisine as the value of the parameter.</p> <p>When the array is returned it must not contain any null values or empty strings.</p> <p>MC2. Populate the array with only those meals that have the same cuisine as the value of the parameter.</p> <p>MC3. If the cuisine passed into the method does not exist, then this method should return an array with a single string value that indicates the cuisine was not found.</p> <p>MC4. If the cuisine passed into the method is passed a null value, then this method should return an array with a single string value that indicates a null value was passed to the method.</p> <p>MC5. If the cuisine passed into the method is passed an empty string, then this method should return an array with a single string value that indicates an empty string was passed to the method.</p> <p>MC6. Return the array to the calling method.</p> <p>MC7. You must analyse the meals dataset, but you are not permitted to modify the dataset.</p>	<p>7 pts 7 items met</p> <p>are functionally correct and no improvements were identified.</p>	<p>6 pts 6 items met</p> <p>are functionally correct and no improvements were identified.</p>	<p>5 pts 5 items met</p> <p>are functionally correct and no improvements were identified.</p>	<p>4 pts 4 items met</p> <p>are functionally correct and no improvements were identified.</p>	<p>3 pts 3 items met</p> <p>are functionally correct and no improvements were identified.</p>	<p>2 pts 2 items met</p> <p>are functionally correct and no improvements were identified.</p>	<p>1 pts 1 item met</p> <p>is functionally correct and no improvements were identified.</p>	<p>0 pts 0 items met</p> <p>are functionally correct and no improvements were identified.</p>	7 pts
<p>Q4 - Histogram</p> <p>Implementing user input or the Scanner in this question will result in a zero grade for this question.</p> <p>MH1. Create a formatted string that contains the list of all the cuisines in the underlying dataset.</p> <p>MH2. The formatted string must contain the number of valid items for each cuisine in the list.</p> <p>MH3. The formatted string must contain the number of invalid items that were found in the underlying dataset.</p> <p>MH4. Return the formatted string to the calling method.</p>	<p>8 pts 4 items met</p> <p>4 of the items listed in this criterion are functionally correct and no improvements were identified.</p>	<p>6 pts 3 items met</p> <p>3 of the items listed in this criterion are functionally correct and no improvements were identified.</p>	<p>4 pts 2 items met</p> <p>2 of the items listed in this criterion are functionally correct and no improvements were identified.</p>	<p>2 pts 1 item met</p> <p>1 of the items listed in this criterion is functionally correct and no improvements were identified.</p>	<p>0 pts 0 items met</p> <p>0 of the items listed in this criterion are functionally correct and no improvements were identified.</p>	8 pts			

Total Points: 30