University of Westminster

School of Computer Science and Engineering

4COSC00W: Software Development I **Assignment Specification (2021/22) – Referral/Deferral**	
Module leader:	Wendy Purdy
Unit:	Coursework
Weighting:	50%
Qualifying mark:	30%
Description:	Practical Work
Learning Outcomes Covered in this Assignment:	The coursework rationale is: • LO1 - Analyse specific problems and design their solutions by applying appropriate algorithmic techniques; • LO2 - Apply programming concepts to implement solutions in the taught programming language; • LO3 - Implement and manipulate simple data structures; • LO4 - Use an integrated development environment to create programs to satisfy a simple specification.
Handed Out:	24th June 2022
Due Date:	**12th July 2022 before 1:00 pm**
Expected deliverables:	a) Python program code - **Important:** Submit your python code file using the name convention: "student_id.py", e.g. w1234567.py - **DO NOT** submit your code as a word, notepad or PDF document. b) Submit your completed test plans
Method of Submission:	Submitted online via Blackboard
Type of Feedback and Due Date:	Written feedback and marks 15 working days (3 weeks) after the submission deadline. All marks will remain provisional until formally agreed by an Assessment Board.

Assessment regulations

Refer to section 4 of the "How you study" guide for undergraduate students for a clarification of how you are assessed, penalties and late submissions, what constitutes plagiarism etc.

Penalty for Late Submission

If you submit your coursework late but within 24 hours or one working day of the specified deadline, 10 marks will be deducted from the final mark, as a penalty for late submission, except for work which obtains a mark in the range 40 – 49%, in which case the mark will be capped at the pass mark (40%). If you submit your coursework more than 24 hours or more than one working day after the specified deadline you will be given a mark of zero for the work in question unless a claim of Mitigating Circumstances has been submitted and accepted as valid.

It is recognised that on occasion, illness or a personal crisis can mean that you fail to submit a piece of work on time. In such cases you must inform the Campus Office in writing on a mitigating circumstances form, giving the reason for your late or nonsubmission. You must provide relevant documentary evidence with the form. This information will be reported to the relevant Assessment Board that will decide whether the mark of zero shall stand. For more detailed information regarding University Assessment Regulations, please refer to the following website: **http://www.westminster.ac.uk/study/currentstudents/resources/academic-regulations**

This document contains:

- Coursework Specification;
- Test Plans: Part A to D;
- Test Plan: Part E;
- Marking Scheme.

Coursework Specification

Mini-Assignment: Grocery Discount
General Notes

- Use descriptive names for your variables and user-defined functions.
- Reference within your code any code adapted from external or other sources.

Part A) Coupon Calculation with Validation

A supermarket is running a promotion and requires a program to calculate coupon awards conditional on how much a customer spends on groceries. For example, if you spend £50, you will be awarded a coupon worth eight percent of that amount. Table 1 shows the percentage used to calculate the coupon based on the amount spent.

- Write a Python program that calculates and displays the value of the coupon a person can receive based on the cost of groceries purchased.
- Include validation to check that:
  - the amount entered is greater than £0;
  - input is the right date type.
- Note: the coupon value for groceries over £210 is capped at £33.

Money spent	**Coupon percentage**
Less than £10	No coupon
£10 to £60	8%
£61 to £150	9%
£151 to £210	10%
£211 and above	11% Capped at £33

Table 1: Coupon % Based on Money Spent

Part A sample run:

```
Cost of groceries: 14
Awarded a discount coupon of £1.12 (8% of purchase).
```

- Your program should use conditions and user-defined functions in your solution as appropriate.
- Complete the test plan with the results of testing your solution. Remember to indicate if a test is a pass or fail.

Part B) Multiple Customers with Results

- This is an extended version on your Part A solution.
- The program should loop to accept multiple inputs. For each input, display the amount spend and discount for that amount.
- When 'e' or 'E' is entered, the program will display the following results.
  - The total spent (before coupon)
  - The total amount of coupons awarded.
  - The total spent minus total coupon.
  - A 'Histogram' where each star represents the coupon range shown in table 1. The histogram should relate to the data input during the running of the program and work for groceries of any amount.
- Use user-defined functions as appropriate.

- Complete the test plan with the results of testing your solution.

Part B sample run:

```
Cost of groceries: 10
Awarded a discount coupon of £0.80 (8% of purchase)
Cost of groceries: 14
Awarded a discount coupon of £1.12 (8% of purchase)
Cost of groceries: 58
Awarded a discount coupon of £4.64 (8% of purchase)
Cost of groceries: 62
Awarded a discount coupon of £5.58 (9% of purchase)
Cost of groceries: 200
Awarded a discount coupon of £20 (10% of purchase)
Cost of groceries: 8
Less than £10 - No coupon
Cost of groceries: 512
Awarded a discount coupon of £33 (capped)
Cost of groceries: e

Total groceries: 864
Total discount: 65.14
Groceries – discount: 798.86

Histogram
<£10 (0%)       : *
£10-£60 (8%)    : ***
£61-£150 (9%)   : *
£151-£210 (10%) : *
>£211 (11%/Cap) : *

7 customers
```

Part C) Vertical Histogram (extension)

Extend your Part B program to add a vertical histogram.

Part C sample run (extension to Part B):

```
0%   8%    9%    10%   11%
 *    *     *     *     *
      *
      *
```

- If attempted, keep both versions of the histograms in your program for marking purposes. E.g., display both the Horizontal Histogram (part B) and the Vertical Histogram (part C) underneath each other when the program is run.
- Complete the test plan with the results of testing your solution.

Part D) Statistics (extension)

Extend your Part B program to display the following statistics.

- Minimum groceries amount
- Maximum groceries amount
- Minimum coupon awarded
- Maximum coupon awarded

Part D sample run (extension to Part B):

```
Minimum groceries: 8
Maximum groceries: 512
Minimum coupon: 0
Maximum coupon: 33
```

- Complete the test plan with the results of testing your solution.

Part E) Alternative Staff Version (Separate Program)

- For this version the data will be already stored in a list, tuple or dictionary and will NOT take grocery values from inputs.
- When the program is run, a 'histogram' related to the data stored in the list, tuple or dictionary should be displayed.
- The sample data to use is shown in the table 2.
- The solution should use user-defined functions.
- Complete and submit the test plan with your Python program code solution.

Part E - Grocery Data
10
14
58
62
200
8
512

Table 2: Data for Part E

Part E sample run (no user input used).

```
Awarded a discount coupon of £0.80 (8% of purchase)
Awarded a discount coupon of £1.12 (8% of purchase)
Awarded a discount coupon of £4.64 (8% of purchase)
Awarded a discount coupon of £5.58 (9% of purchase)
Awarded a discount coupon of £20(10% of purchase)
Less than £10 - No coupon
Awarded a discount coupon of £33 (capped)

Total groceries: 864
Total discount: 65.14
Groceries – discount: 798.86

Histogram
<£10 (0%)        : *
£10-£60 (8%)     : ***
£61-£150 (9%)    : *
£151-£210 (10%) : *
>£211 (11%/Cap) : *

7 customers
```

Test Plans: Part A to D

No.	Test	Input	Expected output	Actual Output	Test Pass/Fail
Part A					
1	Validation	0	Message: Cost of groceries should be greater than £0		
2	Validation	A	Message: Wrong data type		
3	Coupon	5	Message: Less than £10 (No coupon)		
4	Coupon	10	Message: Awarded a discount coupon of £0.8 (8% of purchase).		
5	Coupon	70	Message: Awarded a discount coupon of £6.3 (9% of purchase).		
6	Coupon	160	Message: Awarded a discount coupon of £16.0 (10% of purchase).		
7	Coupon	220	Message: Awarded a discount coupon of £24.2 (11% of purchase).		
8	Coupon	500	Message: Awarded a discount coupon of £33 (capped)		
Part B					
9	Coupon	10	Awarded a discount coupon of £0.80 (8% of purchase)		
10	Coupon	14	Awarded a discount coupon of £1.12 (8% of purchase)		
11	Coupon	58	Awarded a discount coupon of £4.64 (8% of purchase)		
12	Coupon	62	Awarded a discount coupon of £5.58 (9% of purchase)		
13	Coupon	200	Awarded a discount coupon of £20 (10% of purchase)		
14	Coupon	8	Less than £10 - No coupon		
15	Coupon	512	Awarded a discount coupon of £33 (capped)		
16	Results	'e' or 'E'	Total groceries: 864 Total discount: 65.14 Groceries – discount: 798.86 Histogram <£10 (0%) : * £10-£60 (8%) : *** £61-£150 (9%) : * £151-£210 (10%) : * >£211 (11%/Cap) : * 7 customers		
17	Part C Vertical Histogram	Inputs for tests 9-16	0% 8% 9% 10% 11% * * * * * * * *		
18	Part D Statistics	Inputs for tests 9-16	Minimum groceries: 8 Maximum groceries: 512 Minimum coupon: 0 Maximum coupon: 33		

Test Plan: Part E

Part E) Alternative Staff Version				
No.	Test	Expected output	Actual Output	Test Pass/Fail
19	Program is run	Awarded a discount coupon of £0.80 (8% of purchase) Awarded a discount coupon of £1.12 (8% of purchase) Awarded a discount coupon of £4.64 (8% of purchase) Awarded a discount coupon of £5.58 (9% of purchase) Awarded a discount coupon of £20(10% of purchase) Less than £10 - No coupon Awarded a discount coupon of £33 (capped) Total groceries: 864 Total discount: 65.14 Groceries – discount: 798.86 Histogram <£10 (0%) : * £10-£60 (8%) : *** £61-£150 (9%) : * £151-£210 (10%) : * >£211 (11%/Cap) : * 7 customers		

Marking Scheme

The Coursework will be marked based on the following marking criteria.

Criteria	Max. Marks per subcomponent	Max. Marks	Comments
Grocery Discount Program			
Part A: Single Customers • Validation - amount greater than £0 (3) • Validation - catches wrong data type (3) Calculates discount coupon (3) • < £10 - No coupon (3) • £10 to £60 - 8% coupon (3) • £61 to £150 - 9% coupon (3) • £151 to £210 - 10% coupon (3) • > £211 - 11% coupon (3) • Coupon capped at £33 (3) User-defined functions (3) Part A Test Plan (completed and pass recorded) (8)	/38	(38)	
Part B: Multiple Customers, Totals and Histogram • Program loops to accept multiple inputs (5) • Displays the amount spend and discount for each customer (5) • Loop ends when user enters 'e' or 'E' (2) • Correct total spent & total discount, total-discount (6) • 'Histogram' (2) correct (5) • User-defined functions (3) • Part B Test Plan (completed and pass recorded) (8)	/36	(74)	
Part C: Extension: Vertical histogram • Vertical histogram displays correctly (5) • Part C Test Plan (completed and pass recorded) (1)	/6	(80)	
Part D: Extension: Stats • Display minimum & maximum groceries (4) • Display minimum and maximum coupon (4) • Part C Test Plan (completed and pass recorded) (1)	/9	(89)	
Part E: Alternative version (Separate program) • Implementation (5) • User-defined functions (2) • Part E Test Plan (1)	/8	(97)	
Programming style - descriptive variable/function names	/3	(100)	
	Total		