QTS0109 BUSINESS STATISTICS

CONTINUOUS ASSESSMENT 1

INDIVIDUAL ASSIGNMENT 100 marks (30%)

Read the instructions in your course documents, in your student portal, Course Outline, CA outline and Canvas portal carefully. You will be penalized with marks deduction if the instructions are not strictly followed. If you have queries, read the Canvas Help and then email queries via your student portal.

Students are to upload their assignment by the due date to their student portal account. After the due date, students' submissions will not be entertained.

Students should a keep a copy of assignment submitted. All workings must be shown. The submitted report must show evidence that this is students' own work.

Write your FULL Name AND your student ID as in the register on the answer script.

Please be reminded that plagiarism and collusion is a serious offence, and all cases will be referred to the administration. Grades will be withheld if the submission is suspected for plagiarism or collusion till investigations are completed.

Due date: 21 Oct 2022 (Friday), 11.59 am

Penalty Marks for Late Submission of Assignment

Within 24 hours: 20% to be deducted from total marks

More than 24 hours: submission will be graded zero

CA Submission

CAs must be submitted online via student portal. Please read through instructions in your student portal, CA outline and Canvas carefully before submitting. If you have further queries, please read the Canvas Help. If after you have read the Canvas Help, you need assistance on Canvas submission, please email to **itsd_simge@sim.edu.sg** or call **6248 9393**. For non-Canvas issues please email students@sim.edu.sg. Please email with your student portal accounts. Email from other addresses will not be entertained. If issues raised are covered, you will be directed to read through instructions first. Please take time to read through before raising issues.

CONTINUOUS ASSESSMENT 1 – INDIVIDUAL ASSIGNMENT [30%]

Answer ALL questions in Sections A and B

Submit two documents in Canvas:

(1)   A MS Word document (*use the template provided in Canvas*) answering Section A.
        (Save your Word file using the prescribed format *QTS0109yourname* e.g. *QTS0109JohnLee*.doc)

(2)   An Excel file answering Section B.
        (Save your Excel using the prescribed format QTS0109yourname e.g.*QTS0109johntan.xls*)

Answer Section A and B based on the following survey questions and survey results in Appendix 1

The Health Promotion Board launches healthy lifestyle campaigns from time to time. During a road show held recently at the Raffles Place Financial District, working executives were invited to do a survey. A $5 food voucher was given for each survey form completed.

The questionnaire (with selected questions) that was used to collect the data is shown below:

Healthy Lifestyle Survey (selected items)

Q1.   Age: _____ years   Q2a.   Height : _____ metres
                                     Q2b.   Weight: _____ kg

Q3.   Gender :   (1) Male   (2) Female

Q4.   Your most preferred way for staying healthy:
        (1) Eat healthily
        (2) Consume health supplements
        (3) Do general individual exercise
        (4) Take part in group fitness classes and events

Q5.   People sometimes make less healthy food choices. What would you say is your main reason for making less healthy food choice?
        (1) Healthy foods are more expensive
        (2) Need comfort food for stress relief
        (3) Less healthy food tastes better
        (4) Lack of healthy options

Q6.   On average, how many hours per week do you spend on moderate to rigorous exercise? _____ hours

Q7.   Activity tracking apps motivate me to keep healthy.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

Provide your rating for each of the statements stated below:
 (1)=Never (2) Seldom (3)Sometimes (4) Often (5)= Always

Q8.	I am very mindful of food intake watching portion sizes and food type.	1	2	3	4	5
Q9.	I have sufficient sleep.	1	2	3	4	5

The detailed data collected from 50 respondents are show in *Appendix 1 (Page 6)*.

Requirements:

Section A (50 marks)

(1)	For each variable listed below, state the variable type [*Qualitative or Quantitative (please state Discrete or Continuous*)]

Variable (refer questionnaire)	Variable Type
Q2b. Weight	
Q3. Gender	
Q5. Reason for less healthy food choice	
Q6. Hours of exercise	
Q7. Activity tracking apps	

(10 marks)

(2)	For each of the following variables, state the Level of Measurement *(Nominal, Ordinal, or Ratio).*

Variable (refer questionnaire)	Level of Measurement
Q1. Age	
Q2a. Height	
Q3. Gender	
Q4. Preferred way of staying healthy	
Q6. Hours of exercise	
Q7. Usefulness of activity tracking apps	

(6 marks)

(3)	The $5 food voucher was given to improve response rate. However, the survey may still be prone to non-response bias. Explain what is non-response bias and why such bias may be present here.

(4 marks)

(4)	State and explain whether the statements below refer to descriptive or inferential statistics.

(a)	Pharmacy chains in Singapore commented that the demand for health supplements is expected to increase by another 15% next year.

(b)	In a survey of 400 working adults, 100 cited busy work schedules as the main reason for not exercising regularly.

(6 marks)

(5a)	Explain what is meant by the statement "There is only one true population parameter whereas the value of a statistic is sample dependent".

(4 marks)

(5b)	For the value highlighted in bold in the statements below, explained whether it is a Parameter or a Statistic.

(i)   In a random survey of a sample of 100 men who were overweight, **50** of them stated that they would cut their carbohydrate intake to reduce weight.

(ii) **40%** of all the employees in ABC Company did a health screening in the last two years.

(6 marks)

(6)   The following stem and leaf diagram shows the hours of exercise (Q6) for the respondents who were 35 years or younger.

STEM	LEAF							
3	5							
4	9							
5	5							
6	3							
7	0	6						
8	0	0	0	0	2	2	2	5	8
9	0	0	5					
10	0	5						
11	0	5						

(a)   State the stem unit and leaf unit.

(b)   Find the median, maximum and minimum values.

(c)   Would you expect the median to be higher than the mean? Describe the distribution of the stem and leaf diagram.

(d)   State one advantage of a stem and leaf diagram over a histogram.

(e)   Based on the stem and leaf diagram, what percent of the respondents who were 35 years or younger exercise more than 7 hours?

(14 marks)

Section B (50 marks)

Using EXCEL, carry out relevant computations and analyses to answer Questions 7 to 13.

(7)   Retrieve the excel datafile and create an additional variable known as BMI (Body Mass Index) where BMI = Weight/Height^2 . (*Round answers to one dec pl*)

(1 mark)

(8)   Create a frequency distribution for the variable BMI created in part (6)

BMI	Frequency	Relative frequency
11 up to 18		
18 up to 25		
25 up to 32		
32 up to 39		

(a)   Use COUNTIFS function to compute the frequency count. Calculate the relative frequency and comment on the frequency distribution.
[Note: BMI (below 18)= Underweight; BMI(18 up to 25) = Normal weight; BMI (25 up to 32)= Overweight; BMI (32 or more) = Obese)

(9 marks)

(b)   Based on the results from Part (8a), create a histogram for the variable BMI. Label all axes clearly. Describe the shape of the distribution.

(5 marks)

(c)   Calculate the grouped mean and grouped sample standard deviation based on the frequency distribution table.

(4 marks)

(9)   Calculate the mean and standard deviation for Q6 (Hours of exercise). Tabulate your statistics as follows:

	Male	**Female**
Mean		
Median		
Standard Deviation		

Based on the statistics obtained, discuss your findings. *[Format answers to 2 dec places]* (10 marks)

(10)   Create a scatter plot using Q1 (Age) on the horizontal axis and Q6 (hours of exercise) on the vertical axis.

State the direction of relationship between the variables. Explain why you think Q1 (Age) should be on the horizontal axis and Q6 (hours of exercise) on the vertical axis.

(4 marks)

(11)   Create a contingency table with variable Q5 (Main reason for less healthy food choice) as the Row variable and variable Q3 (Gender) as the column variable. Comment on the results obtained.

(4 marks)

(12)   For variable "Q8 Mindful of food intake" group Choices 1 and 2 as "Foodie", Choices 3 and 4" as "Moderate eater" and Choice 5 as "Health nut". Create and label a pie chart.

(5 marks)

(13)   Summary (maximum: 150 words):

Based on the results generated, provide a summary of the key findings of the survey. Suggest some strategies that the Health Promotion Board can adopt to promote healthy lifestyle amongst working adults.

[Note: you may use EXCEL to perform any additional analysis if you wish.]

(8 marks)

Appendix 1

Respondent	Q1	Q2a	Q2b	Q3	Q4	Q5	Q6	Q7	Q8	Q9
1	39	1.69	60.5	1	4	2	8.5	4.0	2	3
2	31	1.72	61.8	1	3	2	10.0	4.0	4	5
3	21	1.76	63.5	1	4	1	11.5	1.0	4	3
4	49	1.67	54.7	1	3	2	9.0	5.0	3	2
5	55	1.71	68.7	1	4	1	6.0	4.0	4	4
6	46	1.67	61.9	1	1	2	6.3	4.0	3	2
7	50	1.66	63.7	1	3	4	6.4	5.0	4	3
8	27	1.74	54.2	1	3	3	8.0	4.0	3	1
9	25	1.69	63.4	1	4	3	9.0	4.0	5	4
10	33	1.72	67.2	1	1	4	8.0	4.0	3	3
11	34	1.65	45.7	1	1	3	8.2	4.0	5	4
12	36	1.73	72.7	1	2	3	7.9	4.0	3	2
13	36	1.64	65.9	1	1	2	6.9	4.0	4	1
14	32	1.79	72.1	1	3	2	8.8	4.0	4	4
15	42	1.69	91.4	1	2	3	7.0	5.0	5	3
16	46	1.67	61.9	1	1	2	6.3	4.0	3	2
17	50	1.66	63.7	1	3	4	6.4	5.0	4	3
18	27	1.74	54.2	1	3	3	8.0	4.0	3	1
19	25	1.69	63.4	1	4	3	9.0	4.0	5	4
20	33	1.72	67.2	1	1	4	8.0	4.0	3	3
21	36	1.71	55.9	2	1	2	7.8	4.0	4	2
22	51	1.56	51.3	2	2	4	6.0	3.0	5	1
23	54	1.59	61.4	2	1	2	3.5	4.0	4	1
24	46	1.58	51.9	2	3	2	6.2	4.0	5	3
25	41	1.60	60.7	2	1	4	6.6	1.0	4	3
26	50	1.49	57.7	2	3	2	3.0	5.0	5	2
27	35	1.64	72.9	2	1	1	3.5	4.0	3	5
28	27	1.57	44.6	2	3	4	6.3	4.0	4	3
29	19	1.54	41.5	2	2	1	11.0	2.0	3	1
30	30	1.58	59.7	2	1	2	7.0	4.0	5	4
31	37	1.48	52.1	2	3	4	7.1	5.0	4	2
32	37	1.56	54.3	2	1	1	7.2	4.0	5	3
33	32	1.66	47.9	2	2	4	7.6	4.0	4	4
34	29	1.60	45.6	2	1	4	5.5	4.0	2	1
35	47	1.65	73.5	2	2	1	5.0	2.0	5	1
36	40	1.62	60.4	2	1	4	5.0	3.0	4	2
37	20	1.53	39.6	2	2	2	9.0	3.0	2	5
38	28	1.57	51.5	2	2	3	10.5	4.0	4	2

39	42	1.54	50.0	2	1	3	4.0	4.0	4	2
40	35	1.62	44.6	2	2	3	4.9	5.0	2	4
41	27	1.55	48.1	2	2	2	8.5	4.0	3	5
42	22	1.49	57.3	2	1	2	8.2	4.0	1	5
43	43	1.46	37.3	2	4	3	5.2	4.0	3	5
44	38	1.52	45.1	2	4	3	5.1	4.0	4	4
45	36	1.53	42.2	2	1	2	5.0	4.0	5	1
46	41	1.63	60.4	2	1	4	5.0	3.0	4	2
47	23	1.49	57.3	2	1	2	8.2	4.0	1	5
48	44	1.46	37.3	2	4	3	5.2	4.0	3	5
49	39	1.52	45.1	2	4	3	5.1	4.0	4	4
50	59	1.49	42.2	2	1	2	4.0	4.0	5	1

Note : Please retrieve a copy of this Excel datafile from Canvas for your Section B analysis. You are NOT required to do input of above data into Excel.

Marking Rubric (100 marks): [Marks are given in brackets]

(1)   Variable type correctly identified.

[2 marks for each correct answer x 5= 10 marks]

(2)   Level of measurement correctly identified.

[1 mark for each correct answer x 6 = 6 marks]

(3)   Bias defined and explained correctly.

[2 marks for definition + 2 marks for explanation = 4 marks]

(4)   Descriptive/inferential statement identified and explained correctly.

[1 mark for stating the correct statistics + 2 marks for correct explanation x 2 = 6 marks]

(5a)   Correct explanation

[4 marks for explanation = 4 marks]

(5b)   Parameter/Statistic stated correctly. Provided the correct explanation.

[1 mark for stating the correct type + 2 marks for correct explanation x 2 = 6 marks]

(6a)   State the correct Stem and leaf Units,

[2 marks for the correct answer = 2 marks]

(6b)   State the correct median, minimum and maximum.

[1 mark for each correct answer x 3= 3 marks]

(6c)   State the correct answer and provide appropriate explanation.

[1 mark for stating the correct answer + 3 marks for the correct explanation = 4 marks]

(6d)   State one advantage of a stem and leaf diagram over a histogram.

[3 marks for the correct answer = 3 marks]

(6e)   The percent of the respondents exercise more than 7 hours.

[2 marks for the correct answer = 2 marks]

(7)   New variable created in Excel correctly.

[1 mark for the correct answer =1 mark]

(8a)   Frequency Distribution and relative frequency done accurately. Comments made.

[6 marks for columns + 3 marks for comments = 9 marks]

(8b)   Histogram has correct number of columns (no gaps) and correctly labeled. Shape of distribution identified correctly.

[3 marks for chart + 1 mark for labelling + 1 mark for shape] = 5 marks]

(8c)   Calculate the grouped mean and grouped sample standard deviation.

[2 marks for grouped mean + 2 marks for grouped standard deviation = 4 marks]

(9)   The mean, median and standard deviation are derived accurately and interpreted.

[6 marks for correct statistics + 4 marks for interpretation = 10 marks]

(10)   The scatter plot is labeled accurately and interpreted correctly.

[2 marks for correct chart + 2 marks for interpretation = 4 marks]

(11)   The contingency table is labeled accurately and interpreted correctly.

[3 marks for correct table + 1 mark for comment = 4 marks]

(12)   Pie chart has 3 categories and correctly labeled.

[3 marks for chart + 2 mark for labelling = 5 marks]

(13)   Summary (maximum: 150 words):

The summary is concise and clear based on the information derived. Suggestions made.

[6 marks for summary + 2 marks for suggestions = 8 marks]

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