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ECON1310
Introductory Statistics for Social Sciences

Tutorial 2: DESCRIPTIVE STATISTICS II

Tutor: Francisco Tavares Garcia

Who's your Tutor?

Name: Francisco Tavares Garcia (he/him)

Program: Bachelor of Economics (2nd year)

Original from: Brazil, Sao Paulo state, Ourinhos

Your CML 01 is open!!! (first attempt)

CML 1 (1st Attempt) Now Open

Posted on: Wednesday, 7 December 2022 09:00:00 o'clock AEST

Dear Students,

A reminder that **CML 1 (1st Attempt) is now open** and will close at **4pm on Monday 12 December 2022** (Week 3).

The quiz is based on the content you are learning and you will be able to save your answers, exit and re-enter the quiz as many times as you want (i.e. you can progressively work on the quiz) until you submit your attempt. Please note that you **MUST submit** the quiz before the closing time, as the quiz does NOT auto-submit.

Please make sure to **read the CML Information Sheet** (in particular the **rules**), which can be accesed through the 'Assessment' tab > 'CML Quizzes' > 'CML Administration Folder', as well as the **quiz instructions.** You will note that the quizzes have specific rules which must be followed. Therefore, please make sure you follow all the rules when completing your quiz so that you do not lose unnecessary marks.

Please also have a look at the **Assessment Summary** under the 'Assessment' tab or in the ECP, as it gives you all the **key dates and times** for CMLs and LBRTs.

Please contact me at cml.1310@uq.edu.au if you have any questions regarding quiz rules/admin.

Kind Regards

Dominic

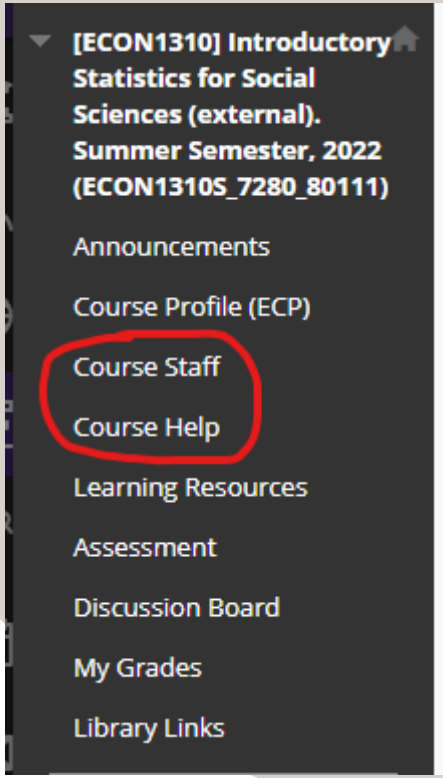
How to complete this course?

Assessment Task	Due Date	Weighting	Learning Objectives
CML Quiz 1 Descriptive Statistics	07 Dec 22 9:00 - 12 Dec 22 16:00 2nd attempt: 14-16 Dec 2022, 09:00-16:00	8%	1, 2, 3, 4, 5
CML Quiz 2 Probability	14 Dec 22 9:00 - 19 Dec 22 16:00 2nd attempt: 21-23 Dec 2022, 09:00-16:00	8%	1, 2, 3, 4, 5
Online Quiz LBRT #1	03 Jan 23 9:00 - 04 Jan 23 16:00 2nd attempt: 5-6 Jan 2023, 09:00-16:00	20%	1, 2, 3, 4, 5
CML Quiz 3 Normal and Sampling Distributions	04 Jan 23 9:00 - 09 Jan 23 16:00 2nd attempt: 11-13 Jan 2023, 09:00-16:00	8%	1, 2, 3, 4, 5
CML Quiz 4 Confidence Intervals	11 Jan 23 9:00 - 16 Jan 23 16:00 2nd attempt: 18-20 Jan 2023, 09:00-16:00	8%	1, 2, 3, 4, 5
Online Quiz LBRT #2	17 Jan 23 9:00 - 18 Jan 23 16:00 2nd attempt: 19-20 Jan 2023, 09:00-16:00	20%	1, 2, 3, 4, 5
CML Quiz 5 Hypothesis Testing	18 Jan 23 9:00 - 23 Jan 23 16:00 2nd attempt: 25-27 Jan 2023, 09:00-16:00	8%	1, 2, 3, 4, 5
CML Quiz 6 Simpler Linear Regression	25 Jan 23 9:00 - 06 Feb 23 16:00 NO SECOND ATTEMPT	8% (Best 5 of 6 CML quizzes. See Section 5.4)	1, 2, 3, 4, 5
Online Quiz LBRT #3	07 Feb 23 9:00 - 08 Feb 23 16:00 2nd attempt: 9-10 Feb 2023, 09:00-16:00	20%	1, 2, 3, 4, 5

I need HELP!!!

- d.byrne@uq.edu.au – for academic or administrative questions.
- cml.1310@uq.edu.au – for CML quiz administration.
- Consultation every weekday!! (Mostly afternoon)

TIME	MON	TUE	WED	THU	FRI
10:00-10:30					
10:30-11:00					
11:00-11:30					
11:30-12:00					
12:00-12:30					DOMINIC (12pm – 1pm) https://uqz.zoom.us/j/5207526654
12:30-13:00					
13:00-13:30		BEN (1pm – 2pm) https://uqz.zoom.us/j/7884658078	PETER (1pm – 3pm) https://uqz.zoom.us/j/84419335972	BEN (1pm – 2pm) https://uqz.zoom.us/j/7884658078	
13:30-14:00					
14:00-14:30					
14:30-15:00					
15:00-15:30					
15:30-16:00					
16:00-16:30	FRANCISCO (4pm – 5pm) https://uqz.zoom.us/j/3181814065		FRANCISCO (4pm – 5pm) https://uqz.zoom.us/j/3181814065		
16:30-17:00					



Stats from Tutorial 01:

Students attending: **30**

- Students enrolled in this tutorial: **26**
- Students not enrolled: **4** (Welcome!)
  - If you haven't yet, please email d.byrne@uq.edu.au to inform him you would like to attend this tutorial (4 pm).

Poll participation

- Answered all 4 polls: **11** students
- 3 polls: **6** students
- 2 polls: **7** students
- 1 poll: **4** students
- 0 polls: **2** students

Time Spent (total time per student – multiple logins added)

- Max time: **110** minutes (not me, Francisco – 104min)
- Min time: **11** minutes (does it count as attending?)
- Mean time: **80.35** minutes (This is good ☺)
- Standard deviation: **24.5** minutes

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Tutorial 2 – Week 3

DESCRIPTIVE STATISTICS II

At the end of this tutorial you should be able to

- Define measures of central tendency, variation and shape for ungrouped data.
- Calculate measures of central tendency and variation using a calculator or Excel.
- Draw and interpret a box and whisker plot.
- Calculate a coefficient of correlation using Excel and interpret the answer.

adm T02 Q1 (a) (b) (c) Q2 Q3 Q4 (a) (b)

Q1. a) Suppose a distribution is symmetrical with mean μ.

i) The median must equal the mean μ. T/F

ii) The mode must equal the mean μ. T/F

iii) The mode must equal the median. T/F

iv) Approx 68% of the values must lie within one standard deviation of the mean T/F

b) An additional observation is added to a data set and this observation is larger than all the previous observations. The new observation

i) always causes the median to increase. T/F

ii) sometimes causes the median to increase. T/F

iii) always causes the mean to increase. T/F

c) i) If the standard deviation is large, the data are less dispersed. T/F

ii) A data set with more than one mode is said to be bimodal. T/F

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(Poll)

adm T02 Q1 (a) (b) (c) Q2 Q3 Q4 (a) (b)

Q1. a) Suppose a distribution is symmetrical with mean μ.

i) The median must equal the mean μ.	T/F	True
ii) The mode must equal the mean μ.	T/F	False
iii) The mode must equal the median.	T/F	False
iv) Approx 68% of the values must lie within one standard deviation of the mean	T/F	False

adm T02 Q1 (a) (b) (c) Q2 Q3 Q4 (a) (b)

b) An additional observation is added to a data set and this observation is larger than all the previous observations. The new observation

i) always causes the median to increase. T/F

ii) sometimes causes the median to increase. T/F

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adm T02 Q1 (a) (b) (c) Q2 Q3 Q4 (a) (b)

b) An additional observation is added to a data set and this observation is larger than all the previous observations. The new observation

i) always causes the median to increase. T/F False

ii) sometimes causes the median to increase. T/F True

iii) always causes the mean to increase. T/F True

adm T02 Q1 (a) (b) (c) Q2 Q3 Q4 (a) (b)

c) i) If the standard deviation is large, the data are less dispersed. T/F
ii) A data set with more than one mode is said to be bimodal. T/F

(Poll)

adm T02 Q1 (a) (b) (c) Q2 Q3 Q4 (a) (b)

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c) i) If the standard deviation is large, the data are less dispersed. T/F False

ii) A data set with more than one mode is said to be bimodal. T/F Possibly True, but could be False if more than two modes.

adm T02 Q1 (a) (b) (c) Q2 Q3 Q4 (a) (b)

Q2. Each of ten taste-testers rated a new brand of barbecue sauce on a 10-point scale where 1 = awful and 10 = excellent. The ten ratings are 8, 7, 9, 6, 8, 10, 9, 9, 5, 7. Which measure of central tendency would be the most appropriate to use here. Why?

(Poll)

Q2. Each of ten taste-testers rated a new brand of barbecue sauce on a 10-point scale where 1 = awful and 10 = excellent. The ten ratings are 8, 7, 9, 6, 8, 10, 9, 9, 5, 7. Which measure of central tendency would be the most appropriate to use here. Why?

Since the data are categorical, ordinal, ie qualitative in nature ('awful' to 'excellent'), the mean is NOT appropriate. The mode or median would be better.

Mode = 9 or the median = 8 (since the categories are ordered.)

Q3. a) The following are fourteen responses to a graduate survey on the salaries offered to Bachelor of Business graduates (in $ thous).

29.7	26.5	18.0	27.0	30.2	37.7	32.9
22.0	38.6	25.3	19.6	36.0	31.9	38.6

Calculate the five number summary and draw a box plot by hand. How would you describe the shape?
Calculate the overall average salary in dollars.
Does it matter here whether you are using units of $thous or dollars?
Calculate the length of the whiskers. Discuss.
What is the absolute value of the difference between the median and mean of the sample?

adm T02 Q1 (a) (b) (c) Q2 Q3 Q4 (a) (b)

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(Excel)

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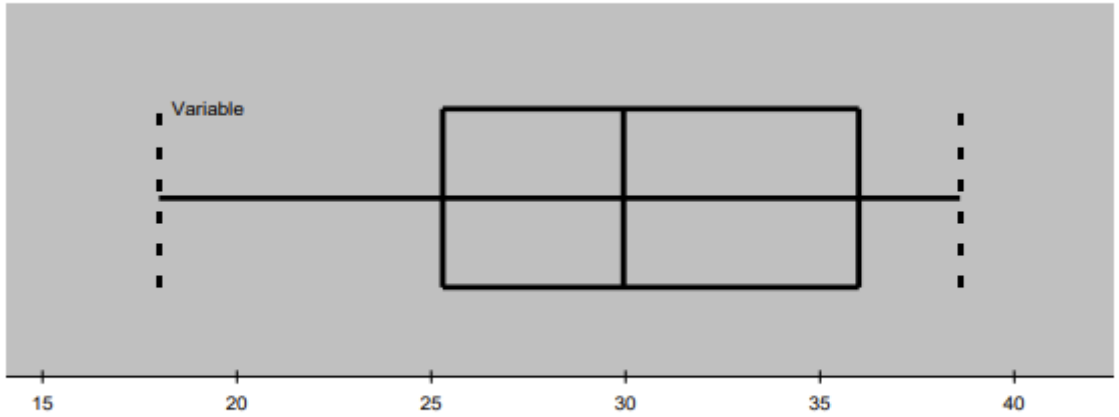
Calculate the five number summary and draw a box plot by hand. How would you describe the shape?

18.0, 25.3, 29.95, 36, 38.6



Would describe data as **left skewed**.

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Calculate the five number summary and draw a box plot by hand. How would you describe the shape?
Calculate the overall average salary in dollars.

Mean = $29,571.40

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Does it matter here whether you are using units of $thous or dollars? *No, it does not matter here, as long as the units used are stated in your written answer. However, in a **CML quiz question**, it does matter that the correct numerical value is entered, and this value WILL depend on the units asked for in the CML question.*

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Left whisker length: $Q_1 - \min = 25.3 - 18 = 7.3$

Right whisker length: $\text{Max} - Q_3 = 38.6 - 36 = 2.6$

Discuss: the right whisker is much shorter, so the distribution is **left skewed**

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Absolute difference between mean and median =

$$|\text{mean} - \text{median}| = |29.57 - 29.95| = |-0.38| = \mathbf{0.38} = |\text{median} - \text{mean}|$$

Q4. a) Currently your inventory consists of 20 bottles of discounted wine that you are willing to sell at cost. You purchased 6 bottles for \$12/bottle, 8 bottles for \$14/bottle and 6 bottles for \$6/bottle. If a single selling price (the weighted average price) is to be set for all 20 bottles, what price/bottle should be set in order to recover all of your costs?

b) A student's best attempt for each of their six CML quizzes at the end of the semester in ECON1310 were 14/24, 21/27, 22/30, 14/26, 11/26, and 17/30. Their mid semester exam mark was 34/50. The best five out of six CML quizzes contribute 20% to the end of semester grade, the mid semester exam 25%, and the final exam 55%. By referring to the ECON1310 course profile, what minimum percentage mark would be required on the final exam for the student to receive:

i) a grade of 4?

ii) a grade of 5?

If this same student had not attempted quiz 3 at all (and so received a score of 0 instead of 22/30), while the scores for the other five quizzes remained the same, what minimum percentage mark would be required on the final exam for the student to receive:

iii) a grade of 4?

iv) a grade of 5?

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Q4. a) Currently your inventory consists of 20 bottles of discounted wine that you are willing to sell at cost. You purchased 6 bottles for \$12/bottle, 8 bottles for \$14/bottle and 6 bottles for \$6/bottle. If a single selling price (the weighted average price) is to be set for all 20 bottles, what price/bottle should be set in order to recover all of your costs?

(Excel)

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	Quantity	Price	Total			
	6	\$ 12.00	\$ 72.00			
	8	\$ 14.00	\$ 112.00			
	6	\$ 6.00	\$ 36.00		avg price per bottle	
Total	20		\$ 220.00		\$ 11.00	

\$11 per bottle

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iii) a grade of 4? iv) a grade of 5?

i) 36.73% ii) 64.00% iii) 38.99% iv) 66.26

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Tutorial 2 – Week 3

DESCRIPTIVE STATISTICS II

At the end of this tutorial you should be able to

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Thank you

Francisco Tavares Garcia

Academic Tutor | School of Economics

tavaresgarcia.github.io

Reference

Black et al. (2016), Australasian Business Statistics, 4th Edition, Wiley Australia.