MATH221 Statistics for Decision Making

Week 2 Lab

Statistical Concepts that you will learn after completing this Lab:

* What is an observation?
* What is a frequency distribution?
* What are qualitative variables?
* What are quantitative variables?
* What is a histogram?
* What does a histogram say about a distribution?
* What does a five-number summary say about a distribution?

# Week 2 Lab Instructions-BEGIN

* Data have already been uploaded to this link:

* You will need to copy data from outputs of application to answer questions in this lab.
* The names of each variable from the survey are in the first row of the data table in application. All other rows in the table represent answers to the survey questions by an individual student. Each cell in the table is called an **observation**.
* Follow the directions below and then paste the graphs and/or computation results from using the application. Use the gray area to paste your responses. Type your answers to the questions that require a free response. When asked for explanations, please give thorough, multi-sentence or paragraph length explanations.
* The completed Lab Word Document with your responses to the questions will be the **ONE and only document** submitted to the Week 2: Lab in Canvas.

Let us get started!

The application will show various tabs in orange lettering. *Go ahead and read the “Goals” tab*.

**Question 1.** From what you have read in this document and the application, what is an observation?

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| An observation would be a student’s response per question asked. In the dataset collect, it appears that there are 35 observations per question. ANSWERS WILL VARY. |

**Question 2.** In your own words, what do you anticipate qualitative and quantitative variables to be?

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| By the sound of the words, it could be that qualitative variables refers to qualities and quantitative variables refer to quantities. Answers may vary. |

**Question 3.** Click on dropdown menus for “Select a Qualitative Variable” and “Select a Quantitative Variable”. List each of the variables in the following table. Does your answer in question 2 appears to be correct?

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| |  |  | | --- | --- | | Qualitative Variables | Quantitative Variable | | State | Drive | | Gender | Shoe | | Car | Height | |  | Sleep | |  | TV | |  | Money | |  | Coin |   My answer from question 2 appears/didn’t appear to be correct. By looking at the list of variables, qualitative variables are describing a quality which would be expressed in text versus quantitative variables appear to be expressed in numbers. |

*Read the “Survey Info” tab.*

**Question 4.** How many students were surveyed? Why would it be interesting to ask students how many miles they drive to school and how many hours of sleep they got the previous night?

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| The survey info tab says that 35 DeVry students were asked to complete the survey. Administration would be interested to know how many miles students drive on average to figure out how flexible attendance policies need to be. Also, the amount of time students sleeps could affect their learning performance. |

*Click on “Table” tab.*

**Question 5.** Locate the show entries dropdown. Keep the number of entries as 50. What is the minimum and maximum height for students? Hint: click sort icon next to Height column.

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| The minimum appears to be 61 inches. The maximum appears to be 75 inches. |

**Question 6.** Locate the search box. Type the word red in the search box. How many students drive a red car? Describe one of them.

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| There seems to be a total of 3 students that drive red cars. One of the students drives 94 miles to school. They were born in Kentucky. Their shoe size is 11 and their height is 74 inches. They slept for 8 hours the night before. They identify themselves as male. They drive a red car. They watched TV for 3 hours. They have $55 on them and when they tossed coin 10 times, they got 4 tails.  Other observations are: |

**Question 7.** You will fill in the table below by locating certain observations in the search box. Make sure your “show 50 entries” is still showing on your application. Type each of the colors in the search box to show how many students drive that color of car. The total number of observations for that color will show at bottom right of table entries.

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| |  |  | | --- | --- | | Car Color | Number of students that drive that color of car | | black | 6 | | blue | 3 | | gold | 12 | | green | 3 | | red | 3 | | silver | 3 | | white | 5 | | Total | 35 | |

The small table you created is called a **frequency distribution**. In later weeks, you will learn how we use frequency distributions to compute other statistics on data sets.

*Click on “Histogram” tab.*

**Question 8.** You will see two graphs in this tab. The top histogram represents the number of students that drive given number of miles to attend school. The bottom histogram represents the number of students who have a given shoe size. You may change the color of the graph to help you identify differences.

Bin is the range for each bar in the histogram. In this application, you may have bins of 5 to 25 units.

* Set the number of bins for both graphs to be 10. Copy and paste what you see. Describe the shape of the histogram.
* Set the number of bins for both graphs to be 20. Copy and paste what you see. Describe the shape of the histogram.

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| We can see that there are more students that drive between 10 and 30 miles. For the shoe size, we can see that most students wear about a size 9.    By changing the number of bins to 20, we can see that there are some values not represented in the data set. For example, there doesn’t seem to be students that drive about 50 miles to school. For shoe size, it appears that size 9 and size 11 are the mode. |

*Click on “Summary” tab.* You will find the statistics summary of a data set:

* Minimum
* First quartile
* Median
* Mean
* Third quartile
* Maximum

**Question 9.** You will only be able to use the summary tab for quantitative data. Choose each variable. Copy and paste results.

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**Question 10.** Describe each of the means.

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| |  |  |  | | --- | --- | --- | | Variable | Mean (include units) | Description | | Drive | 43.74 miles | Students drive an average of approximately 44 miles. | | Shoe | 9.486 inches | Students on average wear size 9.486 inches. | | Height | 66.89 inches | Students on average are 66.89 inches. | | Sleep | 6.6 hours | Students on average slept 6.6 hours the night before. | | TV | 3.571 hours | Students on average watch 3.571 hours of TV. | | Money | 26.2 dollars | Students on average carry 26.2 dollars on them. | | Coin | 4.657 tails | Students on average tossed 4.657 tails in 10 tosses. | |