

Kuwait University
College of Science
Department of Statistics and Operations Research

Stat 101

Lab Booklet

Second Term 2013/2014

Lab # 1

- Objective:** Create and List Data Using MINITAB
- Enter data, proofread it, and revise it
 - Save data, and retrieve it

Problem 1

The following table indicates the sales of a car dealer (in Kuwait) of the 2009 model of a given make of cars.

Color	Sales	Average sale Price in KD
White	5800	4805
Red	120	4950
Silver	2400	4980
Golden	3600	5200
Black	978	4600
Other	22	4725

- a. Enter the following data into the spreadsheet of Minitab
- b. Save the data into a file titled “sales”.
- c. Print a table displaying the color and number of cars sold.
- d. The above table contains a typo. The average sales price of a golden car is in reality 5187. Correct this observation and print a table displaying the color and average sale price of the cars sold by the car dealer.
- e. Close the file.

Problem 2

The file entitled “students” contains information regarding a group of students that were enrolled in one section of an introductory statistics course during one of the previous semesters.

- a. Retrieve the file.
- b. Indicate the variables that are reported, and specify the type of each variable.
- c. Take a sample of ten of these students and copy their names, GPA, major, and grade in the course into a new spreadsheet.
- d. Save the new spreadsheet as “sample”.

Lab # 2

Objective: Use MINITAB to summarize qualitative and quantitative data graphically, and draw appropriate conclusions.

Problem 1

The following table indicates the sales of a car dealer of the 2009 model of a given make of cars.

Color	Sales		
	2007	2008	2009
White	5000	2200	5800
Red	580	50	120
Silver	3600	2000	2400
Golden	4800	2200	3600
Black	200	300	978
Other	25	10	22

1. Consider the 2009 sales.
 - a. Use Minitab to display the sales of this car dealer using a bar graph, and a pie chart. What can you conclude from each graph?
 - b. Generate a relative frequency table.
 - c. What percent of the sales do white and golden cars represent for this car dealer?
 - d. Use Minitab to display a bar chart reflecting the relative frequency of the sales of each car type. How different is this chart from the one generated in (1.a)?
2. Consider the sales of white cars during 2007-2009. Use Minitab to graphically display the sales of white cars.
3. Consider all car sales made during 2007-2009.
 - a. Use Minitab to display the total sales of cars per year.
 - b. Use Minitab to display the total sales of cars per year and per color.

Problem 2

The file entitled "students_1" contains information regarding a group of students that were enrolled in one section of an introductory statistics course during a previous semester.

1. Classify the students according to their GPA, where the total number of classes is eight and the width of each class is 0.5.
2. Compute the relative and cumulative frequencies for each class of students.
3. How many students have a GPA less than 2.0?
4. What percent of students have a GPA of 3.5 or above?
5. Use Minitab to draw a frequency histogram with 8 classes of width 0.5 each. Comment on the distribution of the GPAs.

6. The files entitled “students_2” and “students_3” contain the GPAs of two other groups of students from two other sections of the same introductory statistics course.
 - a. Use Minitab to present the students’ GPA using a histogram.
 - b. Comment on the distribution of the GPAs.
7. Compare the distribution of the GPAs of the three groups of students.
8. Repeat Steps 1-7 using a class width of 1.0 and 0.25.
9. The file “sample_1” contains data relative to a sample of fifteen of the students of the first section.
 - a. Use Minitab to draw a dot plot of the GPAs.
 - b. Use Minitab to draw a stem and leaf plot of the GPA of the students.
 - c. Use Minitab to draw a frequency histogram of the GPAs.
 - d. What is the most appropriate graphical display of the data in this case?

Lab # 3

Objective: Use MINITAB to summarize the data (graphically / numerically), and draw appropriate conclusions.

Problem 1

The files entitled “students_1”, “students_2” and “students_3” contain information regarding three groups of students that were enrolled in three sections of an introductory statistics course during Spring 2009.

1. For each group of students, use Minitab to draw a histogram of the GPA and comment on its distribution.
2. Compare the distribution of the GPAs of the three groups of students.
3. For each of the three sections, use Minitab to compute the following numerical measures and indicate which measure is most appropriate in each case:
 - a. The mean, median, and mode of the GPA;
 - b. The standard deviation, range, and inter-quartile range.
4. Present each of the three sets of data using a box plot. What can you conclude? Compare your conclusion to that obtained in (2) and (3).

Lab # 4

Objective: Convergence of the sampling distribution of \bar{X} and \hat{p} to the normal distribution.

Problem 1

Part 1

1. Draw the Beta(1,4) distribution. Comment on its shape.
2. Generate 1000 random numbers from the Beta(1,4) and round each of them to the nearest integer.
3. Compute μ and σ for this data set.

Part 2

1. From this data set, take a random sample of size 6. Compute its average \bar{x} .
2. Repeat step 1 (Part 2) twenty times.
3. Using the twenty samples, generate a relative frequency table for \bar{x} and draw the corresponding histogram.
4. Comment on the shape of the distribution function of \bar{X} .
5. Compute $\mu_{\bar{x}}$ and $\sigma_{\bar{x}}$, the mean and standard deviation of \bar{X} , and compare them to μ and σ .
6. What percentage of the twenty sample means found in step 3 (Part 2) lie in the interval
 - a. $\mu_{\bar{x}} - \sigma_{\bar{x}}$ to $\mu_{\bar{x}} + \sigma_{\bar{x}}$
 - b. $\mu_{\bar{x}} - 2\sigma_{\bar{x}}$ to $\mu_{\bar{x}} + 2\sigma_{\bar{x}}$
 - c. $\mu_{\bar{x}} - 3\sigma_{\bar{x}}$ to $\mu_{\bar{x}} + 3\sigma_{\bar{x}}$
7. How do the percentages obtained in step 6 compare to the corresponding percentages for a normal distribution?

Part 3

Repeat Part 2 using twenty random samples of size 36 each.

Problem 2

Consider the file “students”. Let p denote the proportion of students that have a GPA of 3.0 or more.

1. Find p .
2. Select twenty random samples of six students each and find the sample proportion \hat{p} for each sample.
3. Compute the mean and standard deviation of the twenty sample proportions obtained in step 2.
4. Compute the mean and standard deviation of the sample proportion using the formulas given in class.
5. Compare the values obtained in steps 3 and 4.
6. Using the twenty samples, generate a relative frequency table for \hat{p} and draw the corresponding histogram.
7. Comment on the shape of the distribution function of \hat{p} .
8. Repeat steps 2-7 using twenty samples of size 36 each.