MATH 155 Final Project 7

Description: Does gender or lifestyle have an impact on a person's physical status? To answer this question, students in an introductory statistics course participated in a simple experiment. Each student recorded his or her height, weight, gender, smoking preference, usual activity level, resting pulse, and the pulse after a one-minute running. You are given part of the dataset to perform analysis. There are two columns in the dataset:

* Weight M represents the weight of Male students
* Weight F represents the weight of Female students

Tasks:

1. Summarize the data: use MINITAB to obtain quantitative (minimum, first quartile, median, third quartile, maximum, mean, and standard deviation) and graphical (histogram and boxplot) summary for each column of the dataset. Copy the MINITAB results to a word document. Describe your comparison and observation, especially state whether there is a difference between the two sample means.
2. Construct 95% confidence intervals for each column and for the difference between the two samples (use the sample with a large mean minus the sample with a smaller mean). You are expected to specify what method (1-sample t, 1-sample z, 2-sample t, or paired t) you use and why you use this method, not other methods. Copy the MINITAB results to the word document and describe your observation and reasoning.
3. Perform hypotheses test. You are required to perform hypotheses test using to see whether the samples provide sufficient evidence for you to conclude that:

* Male’s weight differs from Female’s weight

To complete a hypothesis test, you are required to complete the 8 steps (see Appendix I). Copy all 8 steps of the Appendix I to the word document. Run the MINITAB and copy the results to the word document. Answer all the 8 step questions.

1. Based on the word document, write a project report. Detailed requirements of a project report can be found on Appendix II. An example is also provided on Appendix III.

Submit your work:

Submit your word project report to MyClasses – Math 155 – Modules – Final Project by 5/16/2023 11:59PM. No late submissions will be accepted.

**Appendix I** 8 Steps for hypothesis testing

1. State the researcher’s hypothesis in words
2. State hypotheses in symbols

*H*0:

*Ha*:

1. List the known information to determine what method to be used

Sample size *n* = additional assumptions if needed

Method to be sued:

1. Explain what is level of significance α and what is P-value. Specify what is the α value in this test
2. State the decision rule in terms of P-value
3. Minitab output
4. State conclusion in terms of original problem (Answer the question)
5. What type of error is possible? Do we know the probability of this error?

**Appendix II Lab report template**

**Lab reports should be written in a paragraph form.   
Start each lab report with the purpose of the lab as you understand it and a short introduction.   
Do not start report with a table or graph.  
The entire lab report should be a smooth text where EXCEL outputs (printouts and or graphs) are naturally incorporated into the text. If there are several parts in the lab, write a transitional sentence between the parts.  
Assume that a reader has not seen the questions, however, do not copy and paste questions into the reports. Instead write a couple of paragraphs making sure you answered all questions.**

**The written part of the report should strive for:**

* **Clarity**
* **Precision / accuracy**
* **Completeness**
* **Brevity**
* **Proper use of technical terms**
* **Sentence structure that is not overly complex (avoid lengthy sentences)**
* **Rare use of personal pronouns I and you.**

For math courses you can begin by studying the style in texts. Imitating that style will give you a good start. Make it part of your effort in writing up the solution of homework problems. It will make it easier later when you are going over a problem in preparation for an exam.

Keep in mind that a few years from now you could be in a work position that requires skill in communication such as oral presentation and technical writing. Communication skills are an important part of obtaining a position and performing well in that position. Employers place huge importance on communication skills.

**Do not forget to upload your lab report to MyClasses.**

**All lab reports will be graded according to the following:**

**(2 point)** Include your name, class, lab/assignment number and **purpose of the lab.**

**(4 points)** **Start with an introduction:**What is your sample? What data are you using? How big is the data set? You could get (and copy into your report) some information from the help menu. What will be done with that data? If several sets are used, then introduce each of them.

**(4 points)** Display the results. Include EXCEL graphs and printouts in the reports. All graphs should have meaningful titles and your name.

**(2 point)** Correct calculations.

**(8 points)** **Explanations.** This is the most important part of any report. Pretend your reader did not see the lab assignment and is not familiar with EXCEL. Do not go into technical details about how you got any particular graph, analysis or what program you used. Write what is important about the picture or numbers you see: Is it a confidence interval? A histogram? A sample mean? Why it is important and what information can you gain from this knowledge?  In each assignment, you will get a list of questions to guide you through analysis. Some of them will be very direct, some will require deeper understanding.  
Although the labs will be graded on mathematical correctness, there will be a significant emphasis on grammar and the proper use of English!

**Writing across the curriculum**: Correct grammar, spelling, and use of the English language will be taken into consideration when grading lab reports.   
At the University Writing Center (Guerrieri Academic Commons, Room 260), trained consultants are ready to help you at any stage of the writing process. It is often helpful for writers to share their work with an attentive reader. Consultations allow writers to test and refine their ideas before having to hand papers in or to release documents to the public. In addition to the important writing instruction that occurs in the classroom and during office hours, the center offers another site for learning about writing.  All undergraduates are encouraged to make use of this important student service. For more information about the writing center's hours and policies, visit the writing center or its [website](http://www.salisbury.edu/uwc) .

**Appendix III** An example of lab report

FirstName LastName

Math 216

Lab 5: Probability

Purpose: The purpose of today’s lab assignment is to practice answering probability questions; select random sample from the given population and compare samples and entire population.

Introduction: The data for today’s lab assignment has students in an introductory statistics course. Each student recorded his or her height, weight, gender, smoking preference, usual activity level, and resting pulse. Then they all flipped coins, and those whose coins came up heads ran in place for one minute. Then the entire class recorded their pulses once more.

After observing the data, we see that it will be more convenient to analyze the data if we recode some of the variables. In particular, Gender variable initially had values 1 and 2, corresponding to male and female respectively. I recoded the values using MINITAB functionality. Also, activity variable had values 1, 2 and 3, corresponding to slight, moderate and a lot of physical activity.

After these two variables we recoded from numerical values to text, I used MINITAB to create the following table:

**Tabulated statistics: Gender, Activity**

Rows: Sex Columns: Activity

a lot of moderate slight

activity activity activity Missing All

female 5 26 4 0 35

male 16 35 5 1 56

All 21 61 9 \* 91

Cell Contents: Count

From that table I can find the following probabilities:

P(male)=56/91

P(male|moderate activity)=35/61

Treating the sample of 92 statistics students as entire population, I will select random sample of size 35 from the given population. The table below contains descriptive statistics of random sample:

**Descriptive Statistics: random sample**

Variable N Mean StDev Min Q1 Median Q3 Maximum

C9 35 68.229 3.588 61.000 66.000 69.000 71.000 74.000

From the table we see that sample’s mean hei