

Instructions:

- Upload the Excel workbook to the Carmen when you are finished.
- You have 55 minutes **only** to finish the Excel Competency Exam. You will be locked out from the Carmen folder if you exceed the given time limit.
- Answer all the questions to the best of your ability. Partial credit will be given.
- Use Excel Techniques to answer all the questions.
- Your worksheets are already labeled for you. ***Use the relevant sheets to answer.***
- A portion of your grade will depend on the cleanliness and presentation of your results. This involves clearly labeling your results, graphs, etc.
- To save time, **don't write or copy your answers to a word file**, all answers can be contained in excel workbook.
- **YOU MAY NOT USE ANY TABLES OUTSIDE OF EXCEL** (e.g. t-table sheet). **ALL VALUES NEED TO BE OBTAINED THROUGH EXCEL COMMANDS OR DATA ANALYSIS TOOLBOX.** UNLESS STATED OTHERWISE IN THE QUESTION. FULL CREDITS ARE GIVEN ONLY WHEN YOU DO SO.
- You must not use the Internet for this Excel exam. Anyone who use the Internet during exam (with exception of downloading files), will automatically receive a 0.
- Good luck!

Make sure the Data Analysis Tool Box is available and follow these steps to add it
File ----> Options ----> From the list select on the left Add-ins ----> At the very bottom in the Manage drop-down list select "Excel Add-ins" ---->Click Go---->check "Analysis ToolPak"---->Press OK

- ❖ For this Excel Competency Exam, you can open up the "Excel Competency Exam Fall 2019.xlsx" to find a **sample of 99 respondents to the Current Population Survey, 2006-2010.**
- ❖ You will be analyzing this data set for the purposes of the Excel Competency Exam.
- ❖ On the sheet "Current Population Survey Data," you will find the data on that sheet in the range **A1:I100**. You can also find a description of the variables on the sheet "Variable Descriptions."
- ❖ Answer each question on the spreadsheets named 1-7, extra_a, and extra_b.

SUMMARY STATISTICS & ASSOCIATION

We aim to *examine the labor supply choices of household heads*. The amount of labor supplied by each household head is the **number of hours worked in a calendar year**, which is given in the sample by the variable **hrswrk**.

To get a basic handle on the data, do the following:

1. Calculate the *covariance* between **hrswrk** and **salary**. [5pts]
2. Generate a histogram for the variable **salary**. Be sure to present this carefully. The histogram should show enough detail to see the central tendency, but not be too disaggregated to be unable to notice any trends in the data. [10pts]

RANDOM NUMBERS GENERATION

3. Create 50 random numbers that range from 10 to 500. Find their mean and variance.

Leave your answers in formula form (Do not copy & paste as values. You are graded based on Excel formulas instead of numerical answers). [10pts]

CONFIDENCE INTERVALS

4. Calculate the 95% confidence interval of **salary**. Make sure to show your critical t value formula. [15 pts]

ANOVA

5. We want to know if salary differs by race. Please use a one-way ANOVA (Single Factor ANOVA) to test the following hypothesis using a 10% significance level:

$$H(0): \mu(\text{sal}_{\text{race } 1}) = \mu(\text{sal}_{\text{race } 2}) = \mu(\text{sal}_{\text{race } 3})$$

H(a): at least one inequality between the above means

Your answer should both yield the output table from the Excel procedure and whether you would reject or fail to reject the null. The data is already sorted based on race. [20 pts]

REGRESSION

Now, we want to further estimate how some of the variables contained in our sample might impact the labor supplied by a worker in a year. Thus, do the following in Excel:

6. In Excel, run a regression with **salary** as the *dependent* variable and **hrswrk**, **age**, **educ**, **gender**, **race** as the *independent* variables. [20pts]

HYPOTHESIS TEST

7. We assume that the average salary of a full time worker is at least \$45,000. Full time is considered as completing at least 2080 hours in total in a calendar year.
 - a. Develop the null and alternative hypothesis to explore this conjecture [10pts]
 - b. Conduct the hypothesis test using a 5% significance level [10pts]

EXTRA CREDIT

- a. In sheet "extra_a", create a **cross tabulation** between the variable **health** and **hrswrk**. [+5 bonus points] Hint: *pivot table*
- b. Go to sheet "extra_b". In column B, create a new variable to indicate the following: if a person's salary is greater than \$45,000, that person is identified as "1" and if a person's salary is less than or equal to \$45,000, that person is identified as "2" [+5 bonus pts] Hint: "if" function