University of New Mexico
Take Home Project for STAT 345 (Section 01)
Elements of Mathematical Statistics and Probability Theory
Summer 2014

Instructor: Fares Qeadan
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Class Meeting Times: MTWRF 10:30 - 11:30 am
Course Website: http://www.mathalpha.com/teaching.html
Office Hours: F 8:00 -10:30 AM or by an appointment

(55 points) Consider the following simple random sample data[1] of 20 birthweights (in hundreds of grams) of babies born in New Mexico in 1981:

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34.87 27.79 33.74 33.17 27.50 33.59 32.60 32.18 33.03 38.56
30.62 43.66 29.00 38.00 24.38 31.75 27.22 20.70 30.90 29.48
```

Report Contents: Your report must answer and discuss the following points:
- The population of interest.
- Use R to provide some summary statistics for the sample data.
- Use R to plot the histogram, boxplot and stem and leaf plot of the sample data.
- Use R to find the 95% confidence interval for the population mean birth weight.
- Use R to test if there is sufficient evidence to conclude that the mean birth weight of babies born to mothers in NM is above 3000 grams (the true population mean birth weight in NM for the year 1981 was $\mu = 32.38$).
- Suppose a friend of yours has given birth to a 4.5 kilograms baby. Is this unusual? Why or why not?
- Suppose that birth weights are categorized as 1. Low birth (< 2500 g) 2. Normal birth weight ($2500 - 4000$ g) and 3. High birth weight (> 4000 g). Create a contingency table and report the 95% confidence interval for the proportion of each category? A population percentage cannot be less than 0%. What to do if the lower endpoint of a confidence interval for a population percentage is negative?

- Do bullet 3 above step by step by hand calculation to be attached to your report as an appendix-2 and compre your results with the R output.

Report Structure: Your report must be organized as follows:
- Cover sheet with your names, class, date, title;
- At least four typewritten (size 12 font and double-spaced) pages not including the hand written appendix;
- At least three references (Internet references are accepted)[2];
- Your report must have: summary, introduction, methods, results and conclusion (plus appendix-1 for the used R code).
- All tables and figures must be numbered and given captions.

The take home project report is due on Friday July 25, 2014 at class time and it is worth 55 points.

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[1]Data published by NCHS in the annual publication Vital Statistics of the US on Birth data
[2]The use of copy-and-paste method will be considered as plagiarism and may result in zero credit for the report.