Questions from Part 1

1. Report the 90% and 95% confidence intervals for the mean systolic blood pressure based on:
(a) SBP1

90% = [122.8644, 134.2180] 95% = [121.7537, 135.3286]

(b) SBP2

90% = [121.6044, 132.9838] 95% = [120.4912, 134.0970]

(c) SBP3

90% = [120.8833, 131.8932] 95% = [119.8062, 132.9703]

2. Do you believe the measurements for SBP1, SBP2 and SBP3 are reasonably consistent, based on your confidence intervals? Explain.

Yes, since most endpoints overlap and very similar and the means all lie within the intervals.

3. Healthy systolic blood pressure should not exceed 120. Report your upper bound for the mean systolic blood pressure from SBP1 and explain whether this population seems to be averaging in the healthy range.

We can be 95% confident the mean has a upper bound of 135.328 and hence the population is probably unhealthy.

Questions from Part 2

1. With 95% confidence, is it plausible that the mean miles per gallon is 30? Explain.

It's not possible as the true mean is 26.8 which is under 30.

2. Can you confirm the claim that the mean miles per gallon is not lower than 22? Explain.

We can be 99% confident that the lower bound will be 24.21 which is greater than 22 so its probably a true claim.

3. Based on your 90% confidence interval for the mean level of arsenic, would you conclude that the wells are not dangerous? Explain.

[7.84, 11.6] It's probably toxic as the interval suggests.

4. Is it possible that the 95% confidence interval will indicate the mean arsenic level is acceptable? Explain why or why not, WITHOUT computing the 95% interval.

It indicates the mean will be between the interval with 95% confidence. It's possible that the mean can be outside the intervals. While unlikely, it's still possible.

5. Report the 98% confidence upper bound for the mean level of arsenic.

12.43

6. Explain why it's not necessary to compute a confidence lower bound in this scenario.

Since this is a critical metric involving human safety, it's best to use the upper bound as lower bound.

Questions from Part 3

1. Report the 90%, 95% and 99% confidence intervals for the mean of the Binomial dataset.

90% = [29.8, 30.2] 95% = [29.755, 30.31] 99% = [29.66, 30.4]

2. What is μ for $X \sim Bin(100, 0.30)$?

$\mu = 30.035$

3. Do all of your confidence intervals cover the TRUE mean of this distribution? How can you tell?

$\mu = np$

All confidence intervals cover the true mean as they fall in the intervals.

4. TRUE or FALSE: When running this simulation (ie. creating random binomial data and constructing a confidence interval), the interval you construct with ALWAYS cover the true value of μ.

True

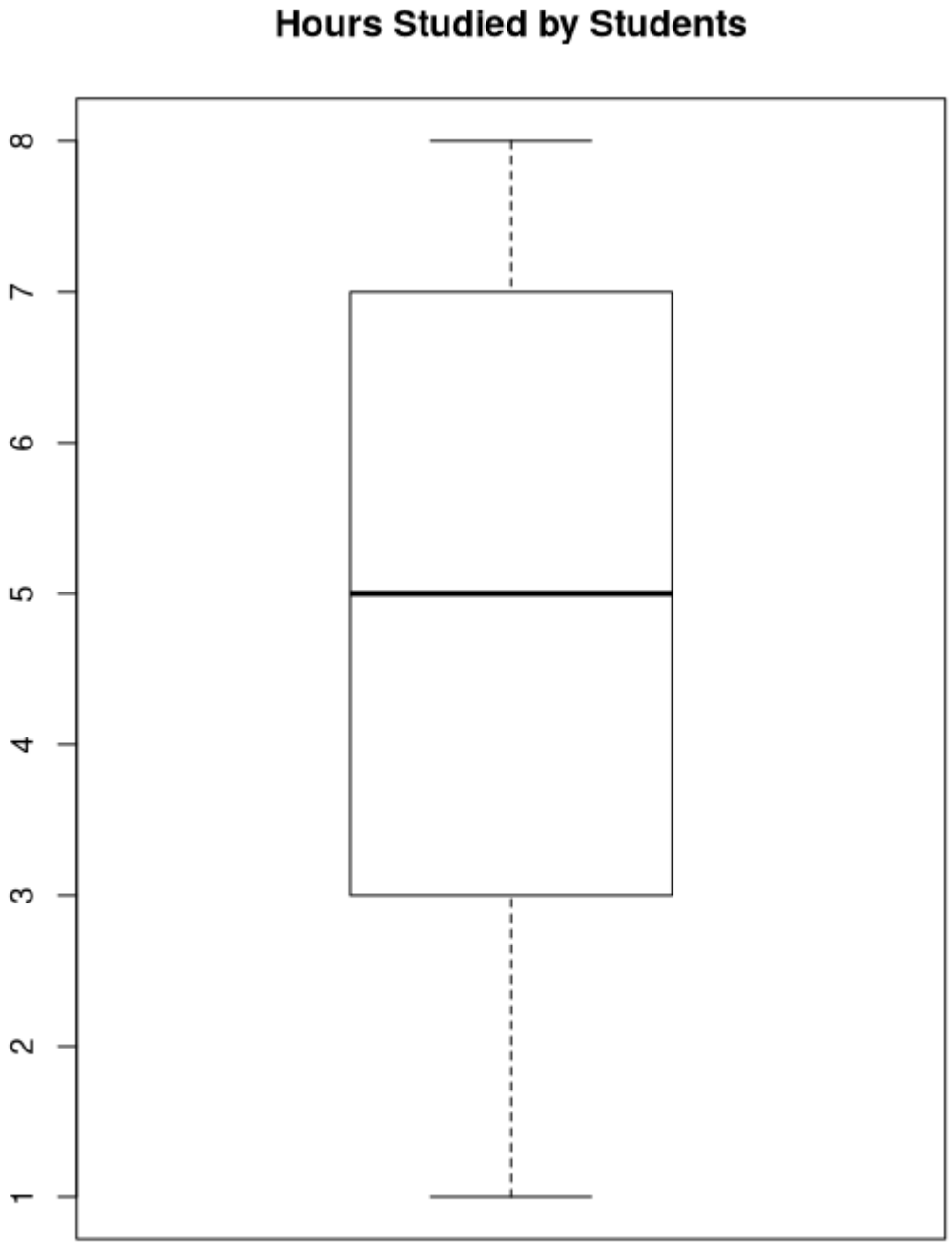
Questions from Part 4

1. By hand, construct a 95% confidence interval for the true mean study time for Exam I.

(1,2,3,4,5,5,7,7,8,8) Mean = 5, sd = 2.494438 , 95% = 100 (1 – alpha)% => alpha = 0.05 => z(alpha/2) = 1.96
95% => 5 ± 1.96 (2.494438/sqrt(10)) => [3.456, 6.54]

2. Do you believe the results of this interval are reliable? Explain your reasoning based on the boxplot you generated from your data. *You need to turn this boxplot in.*

Yes, as the box plot indicates, the data is fairly symmetrical, and the mean should be roughly equal to median, which is 5.


Hours Studied by Students
1
2
3
4
5
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