Homework 7

STA-360-602

Total points: 10 (reproducibility) + 30 (Q1) = 40 points.

General instructions for homeworks: Please follow the uploading file instructions according to the syllabus. You will give the commands to answer each question in its own code block, which will also produce plots that will be automatically embedded in the output file. Each answer must be supported by written statements as well as any code used. Your code must be completely reproducible and must compile.

Advice: Start early on the homeworks and it is advised that you not wait until the day of. While the professor and the TA's check emails, they will be answered in the order they are received and last minute help will not be given unless we happen to be free.

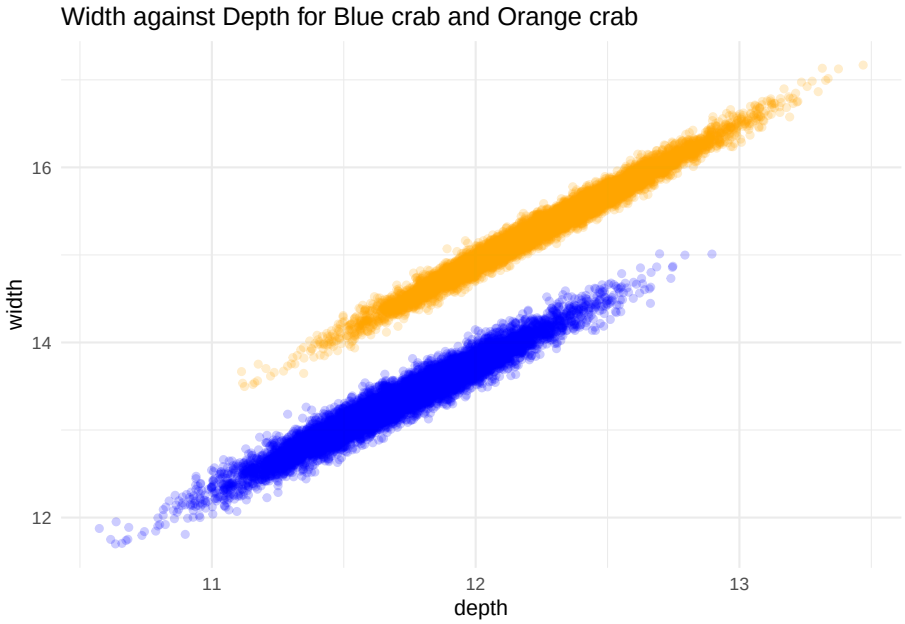
Commenting code Code should be commented. See the Google style guide for questions regarding commenting or how to write code https://google.github.io/styleguide/Rguide.xml. No late homework's will be accepted.

Please look over the homework before lab this week. TA's will answer questions on the homework this week regarding these two problems below. I recommend that you work through them as much as possible before lab this week.

1. (Multivariate Normal, 30 points, 10 points each) Hoff exercise 7.3 (Australian crab data).

(a)
- Code not displayed in pdf

(b)

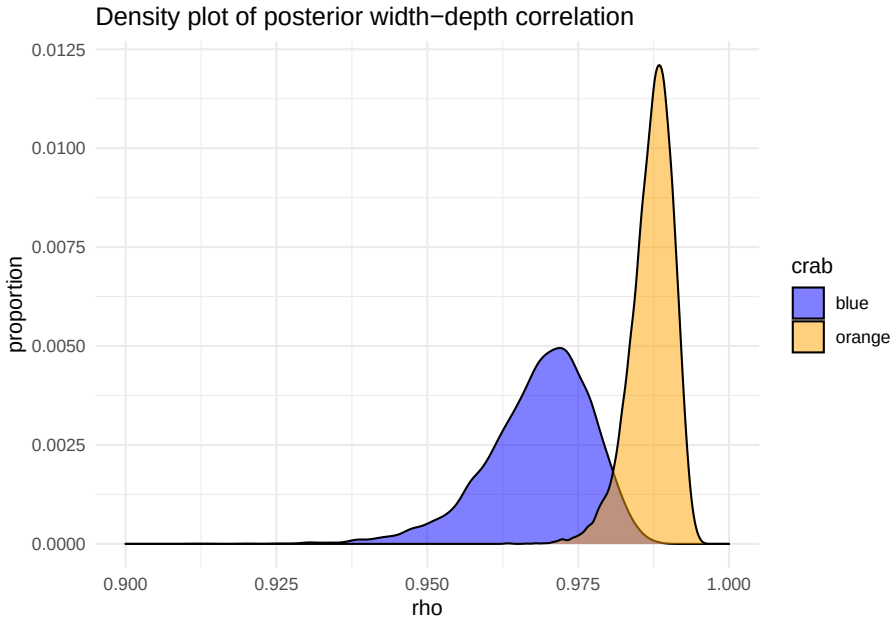


- Orange crabs on average have greater depths and widths than blue crabs.

  - For both blue crabs (plotted in blue) and orange crabs (plotted in orange), the posterior samplers of their width and depth suggest that those two measures are strongly positively correlated in each group.

  - Said linear relations for blue and orange crabs seem to be the same– seemingly parallel slopes.

(c)




```
## [1] 0.98981
```

- The density plots suggest that we have more precise estimates for orange crabs' width-depth correlation than blue crabs', as indicated by the narrower peak.
- The correlation is also higher for orange crabs than blue crabs on average.
- The estimated P(blue $<$ orange $\mid$ data) is 0.9898, which is very strong evidence that orange crabs have higher width-depth correlation than blue crabs.

2. (Imputation, 50 points, 10 points each) Hoff 7.4 (Marriage data), **This is left as an optional exercise that will not be graded.**