FISH 552 Homework 3

Open a new script in R and put the following information at the top using comments:

# Name: First Last

# Homework 3

Complete the tasks below and be sure to label each question with comments as before

#==Question 1a

R Code . . .

#==Question 1b

R Code . . .

When your script is complete, save it as LastName\_Homework3.R, then clear your workspace (Workspace/Clear all) and run through your script again to make sure you don’t have any ‘object not found’ errors. Then go to the drop box at the course website to submit your R script.

# Part 1 – Commit Log

While working on this assignment, please record a commit message at the end of each work session. Here is a reminder of what components to include:

New files created in this work session:

Existing files edited in this work session:

Brief summary of activity/changes completed in this work session (<=10 words):

Description of activity/changes completed in this work session (bullet points or 2 sentences):

Note to self for next time (what should you start on the next time you open this assignment?):

# Part 2 – Programming Assignment

Note: Read Part 3 before beginning the programming assignment.

## **Question 1**

Ram Myers compiled a very substantial stock-recruitment database of hundreds of fish from all over the world. This data was used in many of his and colleagues’ notable papers appearing in *Ecology, Science and Nature.* This data can be found at [https://www.ramlegacy.org](https://www.ramlegacy.org/). For this question we will focus on just one species, Atlantic Mackerel.

1. Read in the three data sets found on our Canvas webpage for Homework 3. Call each data set mack.black, mack.nafo and mack.ices respectively. The column names are

"Year" "spawners" "recruits" "catch" "fishMortality"

Be sure that these are used instead of V1, V2, . . . . .

1. Create a single data set from mack.black and mack.nafo that contains all of the variables in each data set (spawners recruits catch fishMortality), but is restricted to years that the two data sets have in common. One function will do this. Call this data frame mack.partial. The column names of mack.partial should have suffices corresponding to the specific data set. By that I mean: "spawners.black" "recruits.black" . . . "spawners.nafo" "recruits.nafo" . Specifying one option in this function will do this for you.
2. Create a single data set from mack.partial and mack.ices that contains all of the variables in each data set, but is restricted to years that the two data sets have in common. One function will do this. Call this data frame mack.
3. Change the column names in mack that are uninformative to "spawners.ices"

"recruits.ices" "catch.ices" "fishMortality.ices".

1. Create this graph with the data in mack. A slick way to do this is with the matplot() function. Look up the help on this function to get started. If you prefer to not use this function you may use plot()and then lines().

Atlantic mackerel plot to replicate.

## **Question 2**

For this question we’ll be creating our own set of simulated data.

1. Create a data frame named temperature which has 2 columns: the dates Jan 1 2010 through Jun 30 2010 and a randomly generated temperature for each day. Use rnorm to generate the temperatures with the means listed below and a standard deviation of 5, then round to the nearest whole number. Hint: you only have to call rnorm once if you first create a vector of means.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Month | Jan | Feb | Mar | Apr | May | Jun |
| Mean | 40 | 42 | 51 | 55 | 58 | 62 |

1. Calculate the observed means for each month (based on the data you generated) and compare to the values specified in part a.
2. Check if you have any duplicate temperatures. On which days does this happen? (Note that this answer will change if you regenerate the data)
3. Now create a second data frame named observations which has 3 columns: the dates Jan 1 2010 through Jul 31 2010, but only every other day, the conditions (sunny, cloudy, or partly cloudy) as a factor (how you assign conditions to days is up to you), and the wind speed. Use rnorm to generate the wind speed with a mean of 5 and a standard deviation of 3, but change any negative values to 0.
4. Combine the 2 data frames into a single data frame weather, omitting any rows that don’t match.
5. Calculate the min and max temperature for each of the conditions, as well as how many days of each condition there were.

# Part 3 – Checking for Understanding: Error Mindfulness

This week you are going to keep track of the type of error messages and mistakes you encounter while completing your programming assignment. Our goal is to start noticing the potential coding pitfalls and to practice our defensive programming skills. We must protect ourselves, from ourselves! In a Word document, please keep track of:

* Unique error messages you generate in RStudio. If you encounter it more than once, you only need to record it once in this document.
* Your interpretation of what each unique error message means (i.e., what mistake was made?).
* The solution to the mistake AKA bug in your code.
* Did you encounter any code bugs that DID NOT result in an error message? (i.e., the code worked, but was still incorrect) What are your examples of this, if applicable?
* Any remaining questions you have related to your coding bug/error message.

# Reminder of what to upload to Canvas:

1. Homework 3 Commit Log
2. Homework 3 R Script
3. Error Mindfulness Word Document