

## Skill Check 1: Basics of R

### Exam Agreement

This Skill Check is an individual assessment and you should not receive or offer help on it from any other human. Cell phones are to be handed in to the instructor and all other digital devices must be stored in bags underneath the bench or in the lab cubbies.

You may use any **physical** resource to complete the work. This includes:

- Any notes, code, slides, papers, or previous feedback from the instructor as long as they are on paper.
- Any books that you have with you.
- Any scholarly works such as papers that you have with you.

You may NOT use:

- Help from any other student or person. **This is an individual assessment.**
- Any digital resource that does not exist as a physical copy present in class.
- The use of generative artificial intelligence (e.g., ChatGPT).
- Help from homework websites such as Course Hero or Chegg.

By signing, you agree that you have neither given nor received unauthorized aid on this examination.

**Printed Name:** \_\_\_\_\_

**Chapman ID:** \_\_\_\_\_

**Signed:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**Include this signed page as the first page of your submitted work.**

**Skill Check Instructions**

You must answer every question on the exam to the best of your ability. Include all appropriate code, syntax, and functions that would lead to the code to run successfully.

**Question 1: Access help**

You've just installed and loaded the package `ggplot2` and are looking to use the function `scale_color_manual()`. Write out how you would look up the help documentation for this function in the command line.

**Question 2: Basic syntax**

In one line of code, add the numbers 34 and 5 together and assign the output to an object named `added_dat`.

**Question 3: Vectors**

Your environment has a vector `vec2` that is a sequence of numbers 0 to 500 separated by 0.001. In one line of code, add 0.02 to every element of this vector and store the result as `vec3`.

**Question 4: Matrices and Arrays**

Create a 5D array with random numbers. Each dimension should have a value of at least 2. Find the number of elements in your array.

**Question 5: Lists**


I have created a list stored with the name `my_list` with the following code:

```
my_list <- list("flower" = c(1, 4.9, 18, 38, 20, 10.02),  
              "micha" = matrix(runif(30), nrow = 5),  
              "color" = data.frame("x" = c(1.1, 1.2, 1.3),  
                                   "y" = c(2.3, 5.6, 6.2)),  
              1:40)
```

How many members does this list contain? What data class is each member? How would you reference the fifth row and second column in the matrix in `my_list`?

**Question 6: Data frames**

Calculate the mean number of breaks in the `warpbreaks` data set for wool type B if the tension is high (H).

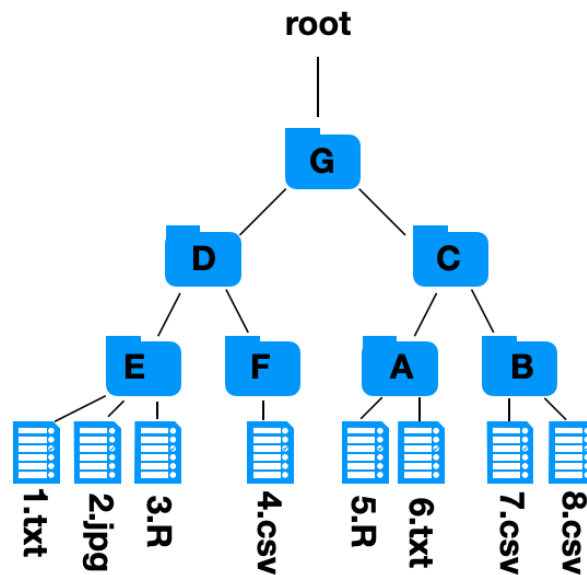
▼ warpbreaks	54 obs. of 3 variables	
\$ breaks	: num 26 30 54 25 70 52 51 26 67 18 ...	
\$ wool	: Factor w/ 2 levels "A","B": 1 1 1 1 1 1 1 1 1...	
\$ tension	: Factor w/ 3 levels "L","M","H": 1 1 1 1 1 1 1 1...	

**Question 7: Data Classes**

List the five atomic data classes in R and give an example of each.

**Question 8: Factors**

Create an ordered factor vector with the levels `good < better < best` to describe your preference for the following disciplines: biology, chemistry, mathematics, computer science, humanities.

**Question 9: Filesystems**

Write out the absolute path to file 8.csv.

**Question 10: Troubleshooting**

For the data set below:

C02	84 obs. of 5 variables
\$ Plant	: Ord.factor w/ 12 levels "Qn1"<"Qn2"<"Qn3"<...
\$ Type	: Factor w/ 2 levels "Quebec","Mississippi": ...
\$ Treatment	: Factor w/ 2 levels "nonchilled","chilled": ...
\$ conc	: num 95 175 250 350 500 675 1000 95 175 250...
\$ uptake	: num 16 30.4 34.8 37.2 35.3 39.2 39.7 13.6 ...
- attr(*, "formula")=Class 'formula' language uptake ~ ...	
.. ..- attr(*, ".Environment")=<environment: R_EmptyEnv...	
- attr(*, "outer")=Class 'formula' language ~Treatment ...	
.. ..- attr(*, ".Environment")=<environment: R_EmptyEnv...	

Correct the following line of code:

```
mean(C02$uptake(C02$plant == "Qn2"))
```