Lab 2: Data visualization

Not graded, just practice

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1 Data visualization

We will continue working with the `ratings` dataset from the visualization lecture (part of the `languageR` package). It contains the following variables:

```
str(ratings)
```

```
'data.frame':   81 obs. of  14 variables:
 $ Word            : Factor w/ 81 levels "almond","ant",..: 1 2 3 4 5 6 7 8 9 10 ...
 $ Frequency       : num  4.2 5.35 6.3 3.83 3.66 ...
 $ FamilySize      : num  0 1.39 1.1 0 0 ...
 $ SynsetCount     : num  1.1 1.1 1.1 1.39 1.1 ...
 $ Length          : int  6 3 5 7 9 7 6 6 3 6 ...
 $ Class           : Factor w/ 2 levels "animal","plant": 2 1 2 2 2 2 1 2 1 1 ...
 $ FreqSingular    : int  24 69 315 26 19 24 53 74 155 37 ...
 $ FreqPlural      : int  42 140 231 19 19 6 78 77 103 14 ...
 $ DerivEntropy    : num  0 0.562 0.496 0 0 ...
 $ Complex         : Factor w/ 2 levels "complex","simplex": 2 2 2 2 2 2 2 2 2 2 ...
 $ rInfl           : num  -0.542 -0.7 0.309 0.3 0 ...
 $ meanWeightRating: num  1.49 3.35 2.19 1.32 1.44 ...
 $ meanSizeRating  : num  1.89 3.63 2.47 1.76 1.87 ...
 $ meanFamiliarity : num  3.72 3.6 5.84 4.4 3.68 4.12 2.12 5.68 3.2 2.2 ...
```

1. Fill in the blanks below with one of the following words: `data`, `aesthetics`, `geom`.

   The basic ggplot involves: (1) using your _____, (2) defining how variables are mapped to visual properties (_____), and (3) determining the geometrical object that a plot uses to represent data (_____)

2. When ggplot2 maps a categorical variable to an aesthetic, it automatically assigns a unique value of the aesthetic to each level of the variable. What is this process called?

   - (A) level assignment
   - (B) variable aestheticization
   - (C) autofill
   - (D) scaling

3. The code below generated which of the following figures?

   ::: {.cell}

   ```
   ggplot(
       data = ratings,
       mapping = aes(x = Frequency, y = meanFamiliarity)
   ) +
       geom_point(mapping = aes(color = Class)) +
       geom_smooth(method = "lm") +
       theme_classic(base_size=20)
   ```

   :::

   - (A) A
   - (B) B
   - (C) C

4. Suppose we want to map the variable `Complex` to the color aesthetic in a scatterplot. Which of the following arguments could we pass to `geom_point()`?

   - (A) color = Complex
   - (B) mapping=aes(color = Complex)
   - (C) color = mapping(Complex)
   - (D) aes(color=Complex)

5. Which geoms are depicted in the following figure?

   - (A) geom_histogram()

- (B) geom_density()
- (C) geom_bar()
- (D) geom_smooth()
- (E) geom_point()

6. Which geoms are depicted in the following figure?
   - (A) geom_histogram()
   - (B) geom_density()
   - (C) geom_bar()
   - (D) geom_smooth()
   - (E) geom_point()

7. Given code blocks a, b, and c; and the plot below:

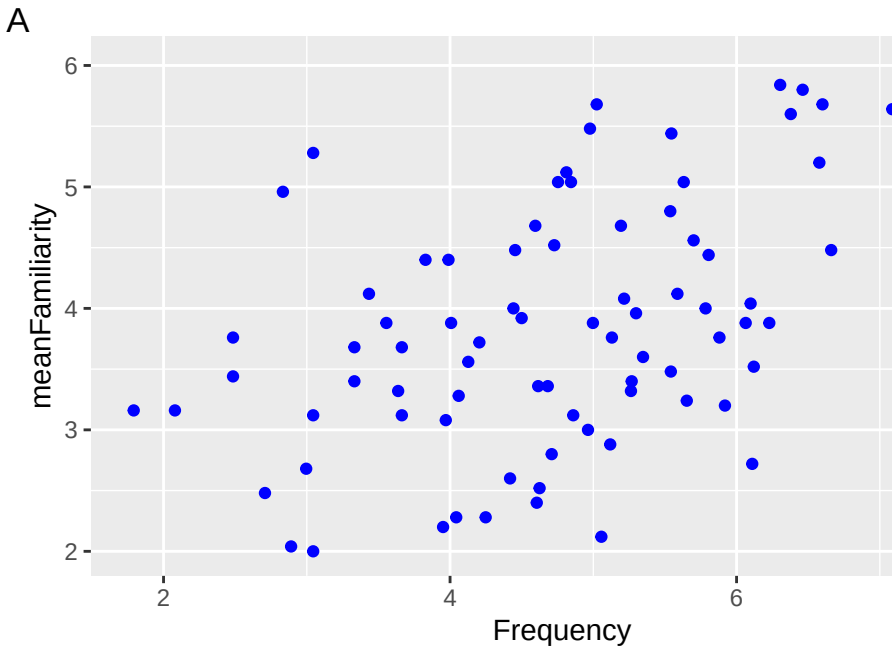
   ::: {.cell}

```
# CODE BLOCK a ---------------------------#
ggplot(
    data = ratings,
    mapping = aes(x = Frequency, y = meanFamiliarity)
    ) +
    geom_point(color = "blue")

# CODE BLOCK b ---------------------------#
ggplot(
    data = ratings,
    mapping = aes(x = Frequency, y = meanFamiliarity, color = "blue")
    )

# CODE BLOCK c ---------------------------#
ggplot(
    data = ratings,
    mapping = aes(x = Frequency, y = meanFamiliarity)
    ) +
    geom_point()
```

:::



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8. Which of the code blocks above generate plot A above?

   - (A) a
   - (B) b
   - (C) c

9. In plot A above, is the color aesthetic mapped, set, or both?

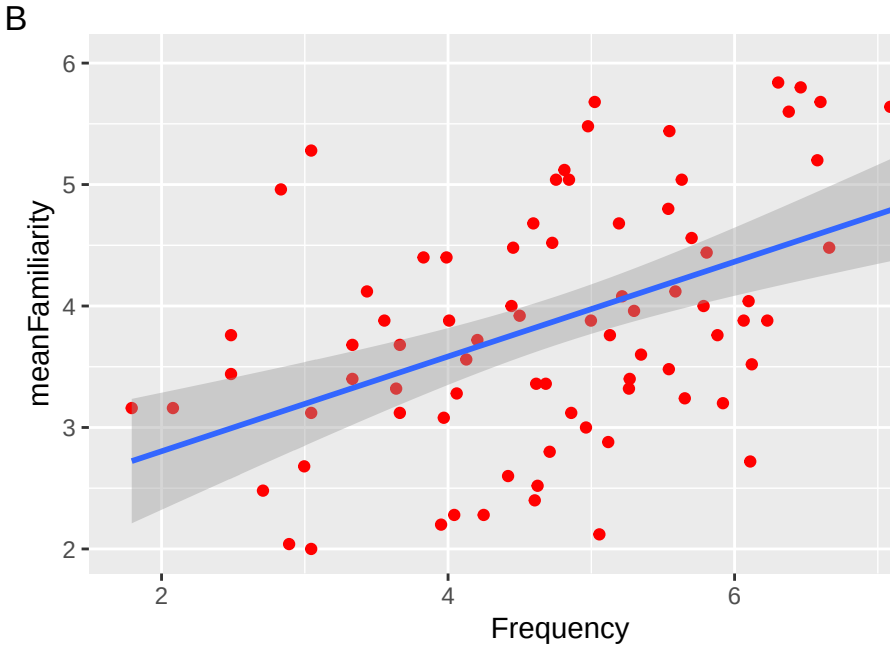
   - (A) mapped
   - (B) set
   - (C) both

10. In plot A above, which of the following aesthetics should we set to make the points more transparent?

    - (A) color

- (B) fill
- (C) alpha
- (D) shape

11. In plot A above, which of the following would change the x axis label to "FQ"?
    - (A) add a `labs()` layer with `x="FQ"` argument
    - (B) add a `labs()` layer with `y="FQ"` argument
    - (C) change the mapping argument from `x="Frequency"` to `x="FQ"`



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12. In plot B above, which geom(s) are used to represent the data?
    - (A) geom_histogram()
    - (B) geom_density()
    - (C) geom_bar()

- (D) geom_point()
- (E) geom_smooth()

True or false, the blue line in plot B above is mapped to the Class aesthetic?

- (A) True
- (B) False

13. In plot B above, which of the following variables is mapped to the x aesthetic?
    - (A) Frequency
    - (B) meanFamiliarity
    - (C) FreqSingular
    - (D) FreqPlural
14. True or false, in plot B above, the default statistical transformation in the geom responsible for the red dots is "identity".
    - (A) True
    - (B) False
15. Suppse we run the code below. Which of the following plots will be returned?
    - (A) C
    - (B) D

```
ggplot(
    data = ratings,
    mapping = aes(x = Frequency, y = meanFamiliarity, color = Class)
    ) +
    geom_point() +
    geom_smooth(method = "lm", color = "red")
```

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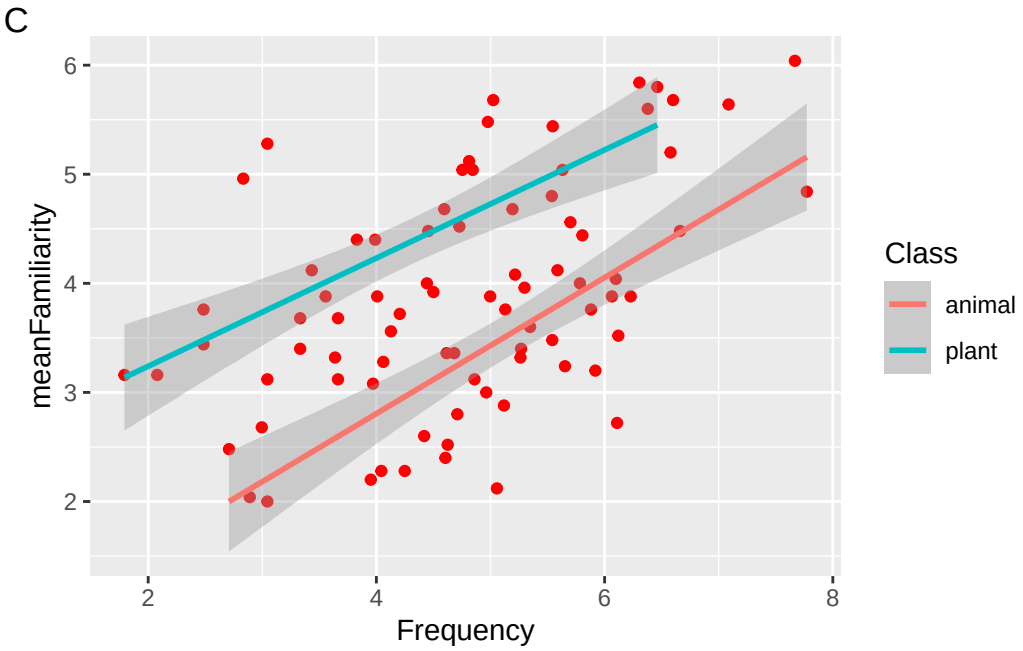

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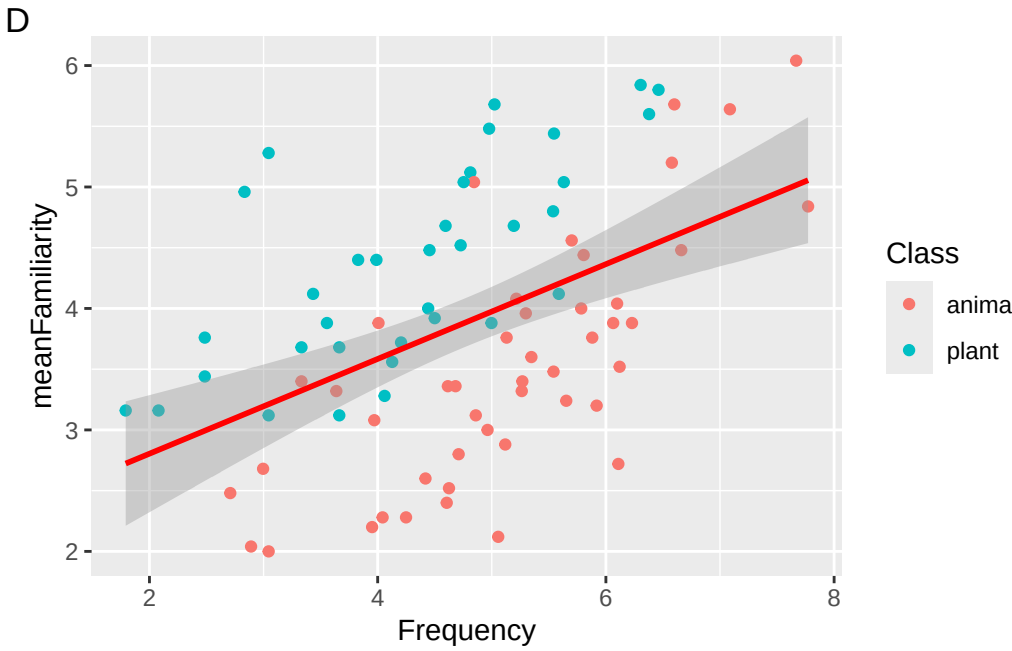

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16. Suppose we run the following code block, which plot will be returned?

- (A) E
- (B) F
- (C) G
- (D) H

```
ggplot(
    data = ratings,
    mapping = aes(x = Class, fill = Complex)
    ) +
    geom_bar()
```

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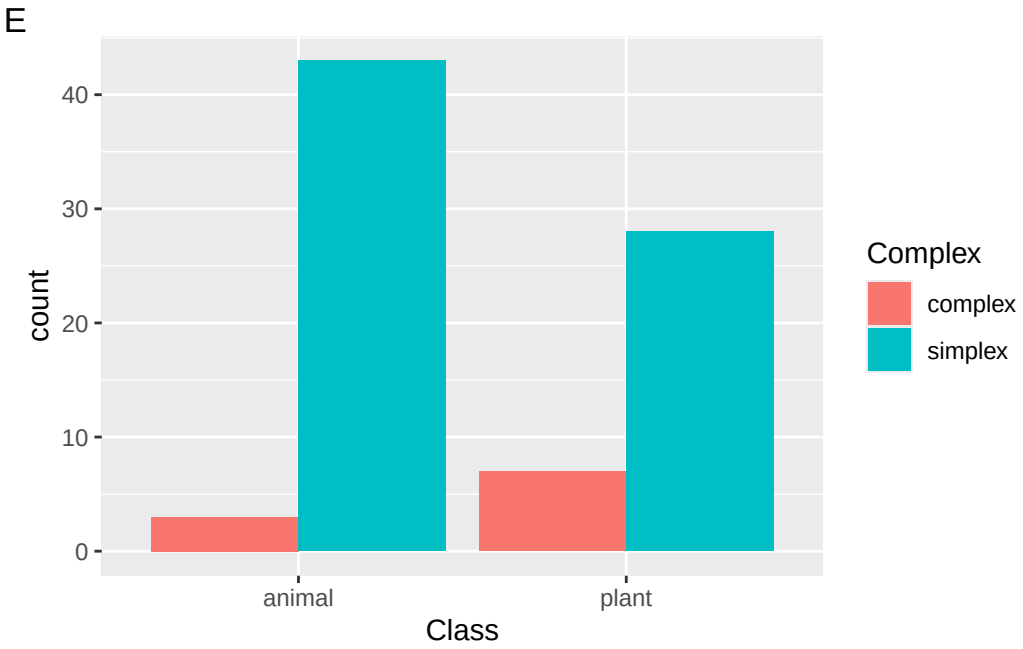

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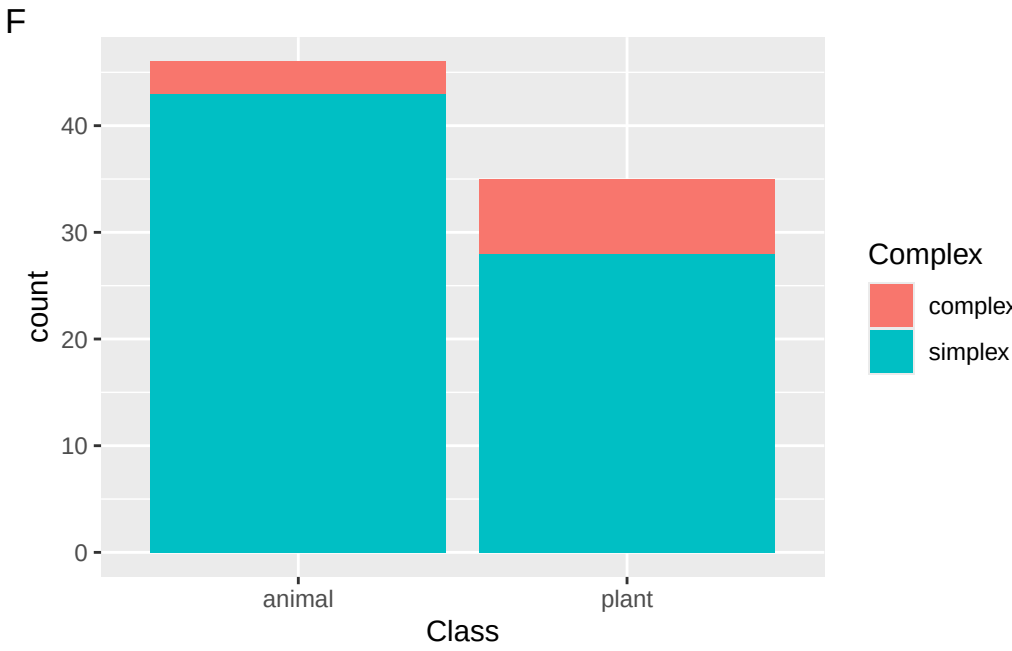

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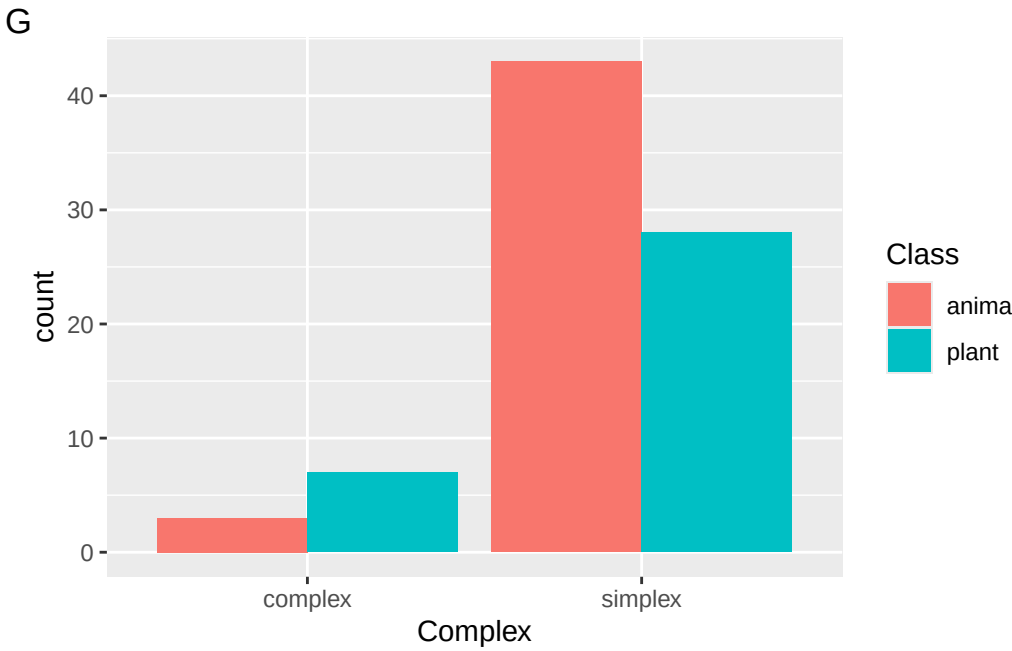

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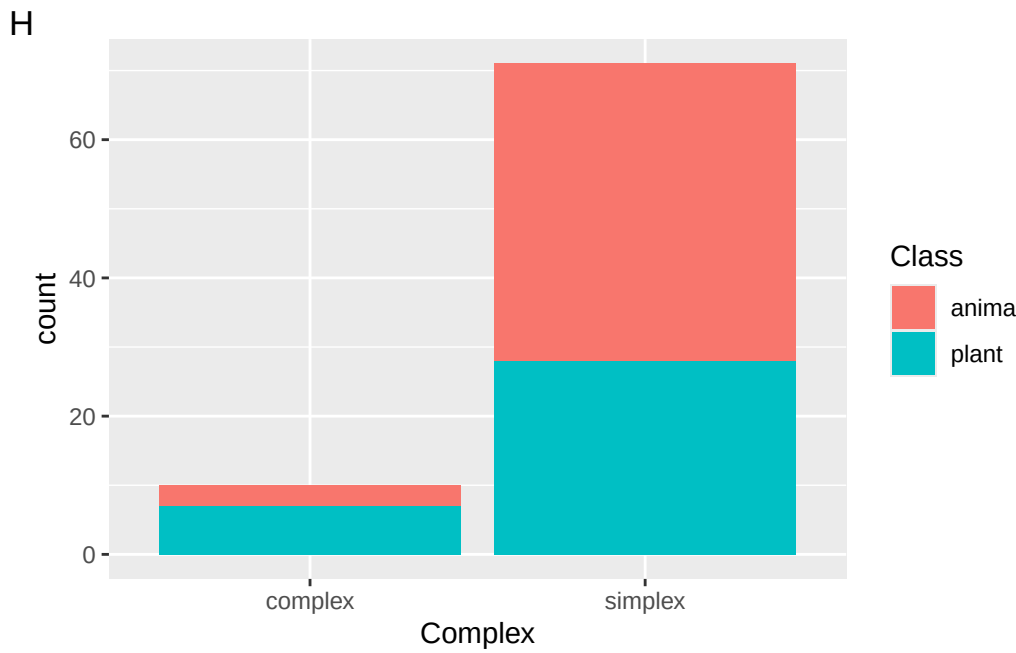

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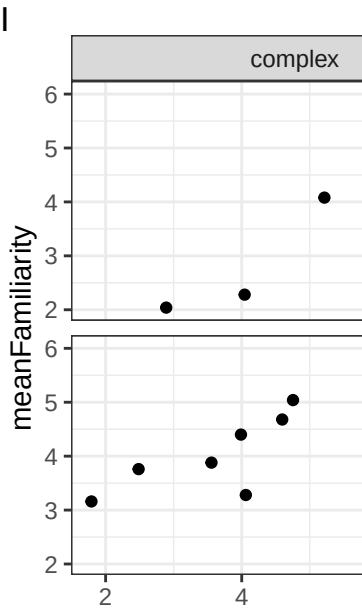
17. To generate the facets in the plot below, which of the following lines of code must be included?

    - (A) `facet_grid(Complex ~ Class)`
    - (B) `facet_grid(Class ~ Complex)`
    - (C) `facet_grid(.~ Complex)`
    - (D) `facet_wrap(Class~Complex, ncol = 2)`



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18. To adjust the size of the font to 20pt in the complete theme `theme_minimal()`, what argument should we include?

    - (A) `base_size(20)`
    - (B) `size=20`
    - (C) `font_family_size=20`
    - (D) None of the above

19. What would happen if we added the layer `scale_fill_manual(values = c("green", "orange"))` to the following plot?

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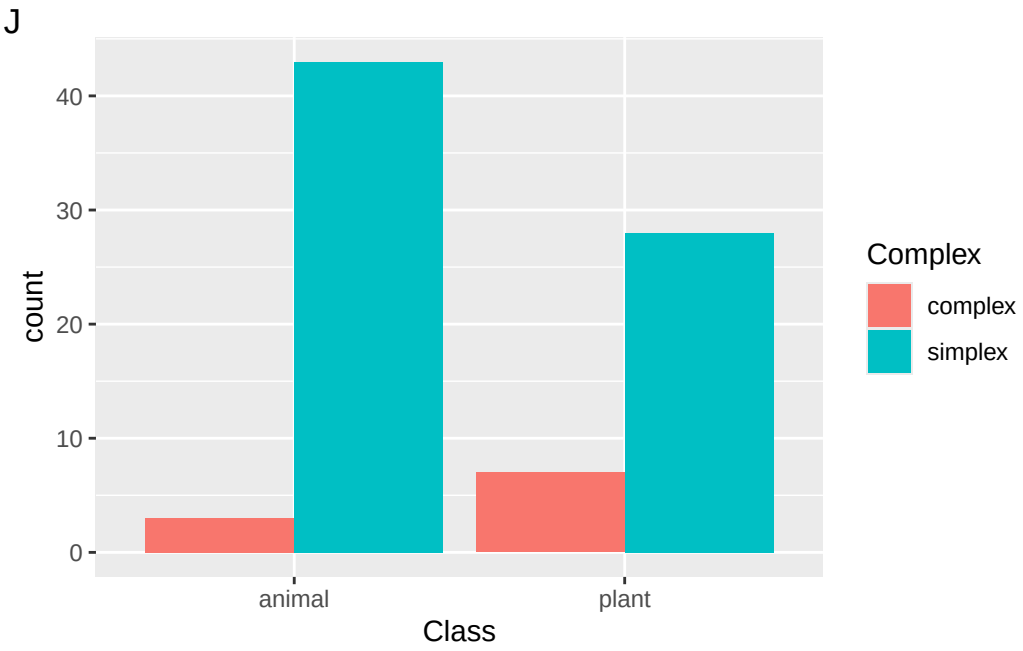

display}
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- (A) error: no fill aesthetic specified
- (B) complex would turn green and simplex would turn orange
- (C) simplex would turn green and complex would turn orange
- (D) No change