Week 7 challenge

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2023-10-04

Question 1: Palmer Penguins

Solutions:

```
# Enter code here
library(tidyverse)
```

```
## ── Attaching core tidyverse packages ──────────────────────── tidyverse 2.0.0 ──
## ✓ dplyr     1.1.2     ✓ readr     2.1.4
## ✓ forcats   1.0.0     ✓ stringr   1.5.0
## ✓ ggplot2   3.4.3     ✓ tibble    3.2.1
## ✓ lubridate 1.9.2     ✓ tidyr     1.3.0
## ✓ purrr     1.0.2
## ── Conflicts ────────────────────────────────────────── tidyverse_conflicts() ──
## ✖ dplyr::filter() masks stats::filter()
## ✖ dplyr::lag()    masks stats::lag()
## ℹ Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to be
come errors
```

```
library(palmerpenguins)
glimpse(penguins)
```

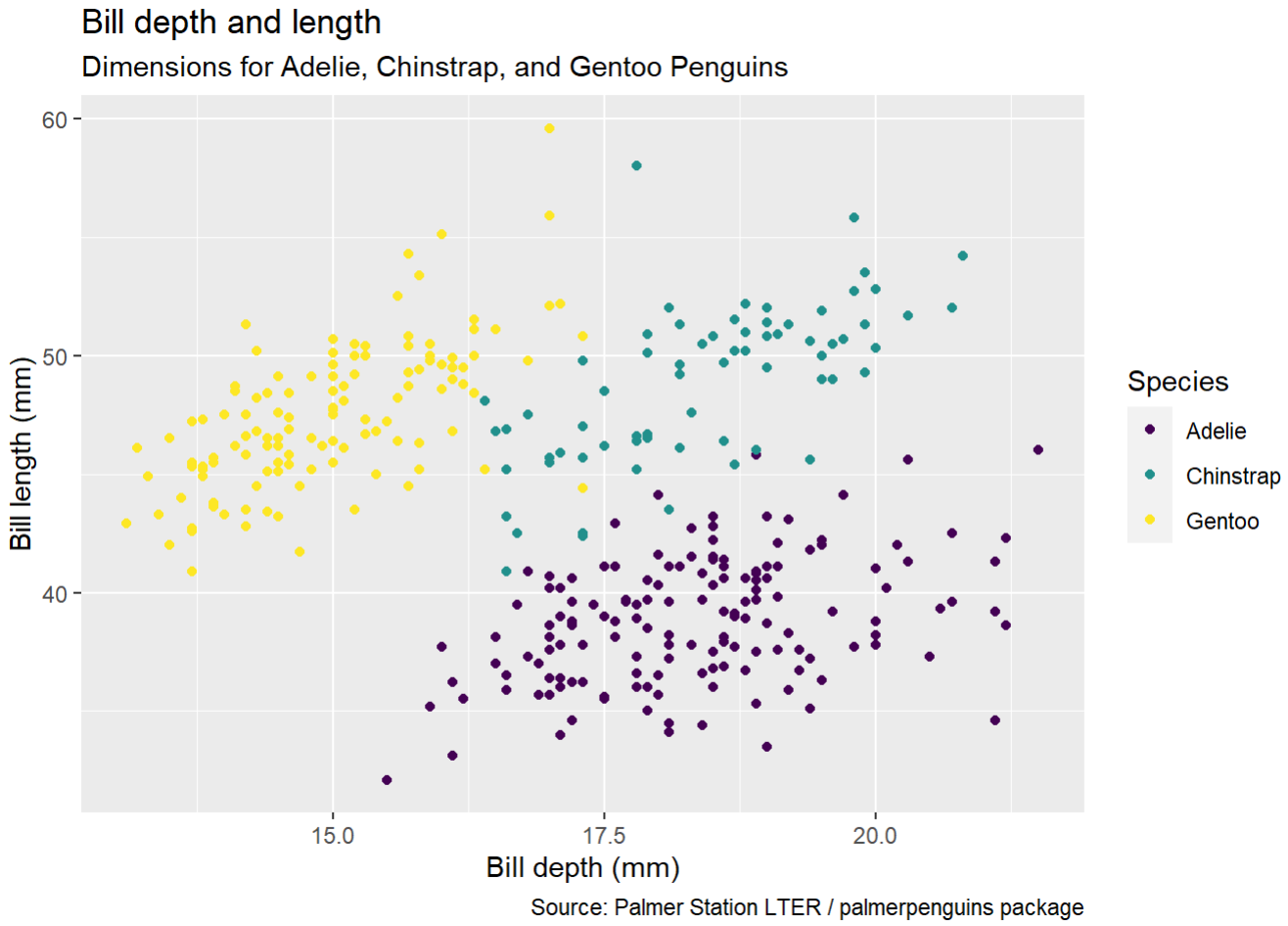
```
## Rows: 344
## Columns: 8
## $ species           <fct> Adelie, Adelie, Adelie, Adelie, Adelie, Adelie, Adel…
## $ island            <fct> Torgersen, Torgersen, Torgersen, Torgersen, Torgerse…
## $ bill_length_mm    <dbl> 39.1, 39.5, 40.3, NA, 36.7, 39.3, 38.9, 39.2, 34.1, …
## $ bill_depth_mm     <dbl> 18.7, 17.4, 18.0, NA, 19.3, 20.6, 17.8, 19.6, 18.1, …
## $ flipper_length_mm <int> 181, 186, 195, NA, 193, 190, 181, 195, 193, 190, 186…
## $ body_mass_g       <int> 3750, 3800, 3250, NA, 3450, 3650, 3625, 4675, 3475, …
## $ sex               <fct> male, female, female, NA, female, male, female, male…
## $ year              <int> 2007, 2007, 2007, 2007, 2007, 2007, 2007, 2007, 2007…
```

Question 1.2:Plot Palmer Penguins

Solutions:

```
# Enter code here
ggplot(data = penguins, mapping = aes(x = bill_depth_mm, y = bill_length_mm, colour = specie
s)) + # specifying x and y
  geom_point() + #represent each observation with a point
  labs(title = "Bill depth and length",
       subtitle = "Dimensions for Adelie, Chinstrap, and Gentoo Penguins",
       x = "Bill depth (mm)", y = "Bill length (mm)",
       colour = "Species", #map species to to the color of each point
       caption = "Source: Palmer Station LTER / palmerpenguins package") + #add caption for d
ata source
  scale_colour_viridis_d()#discrete colour scale that is designed to be perceived by viewers
with common forms of colour blindness
```

```
## Warning: Removed 2 rows containing missing values (`geom_point()`).
```

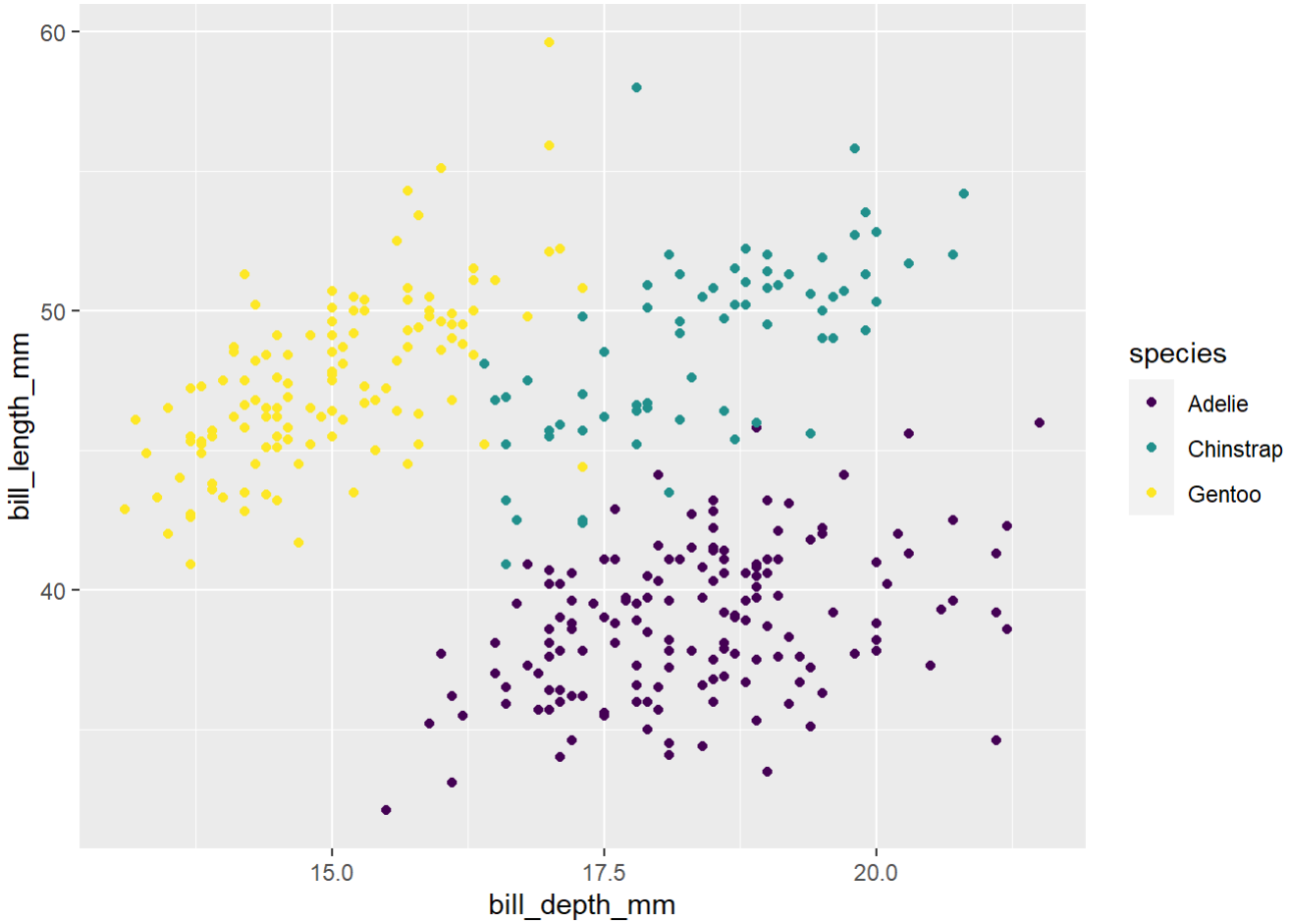


####Question 1.3:Palmer Penguins: colour

Solutions:

```
# Enter code here
ggplot(penguins) + aes(x = bill_depth_mm, y = bill_length_mm,
 colour = species) + # specifying x and y
 geom_point() + #represent each observation with a point
  scale_colour_viridis_d() #discrete colour scale that is designed to be perceived by viewers
with common forms of colour blindness
```

```
## Warning: Removed 2 rows containing missing values (`geom_point()`).
```

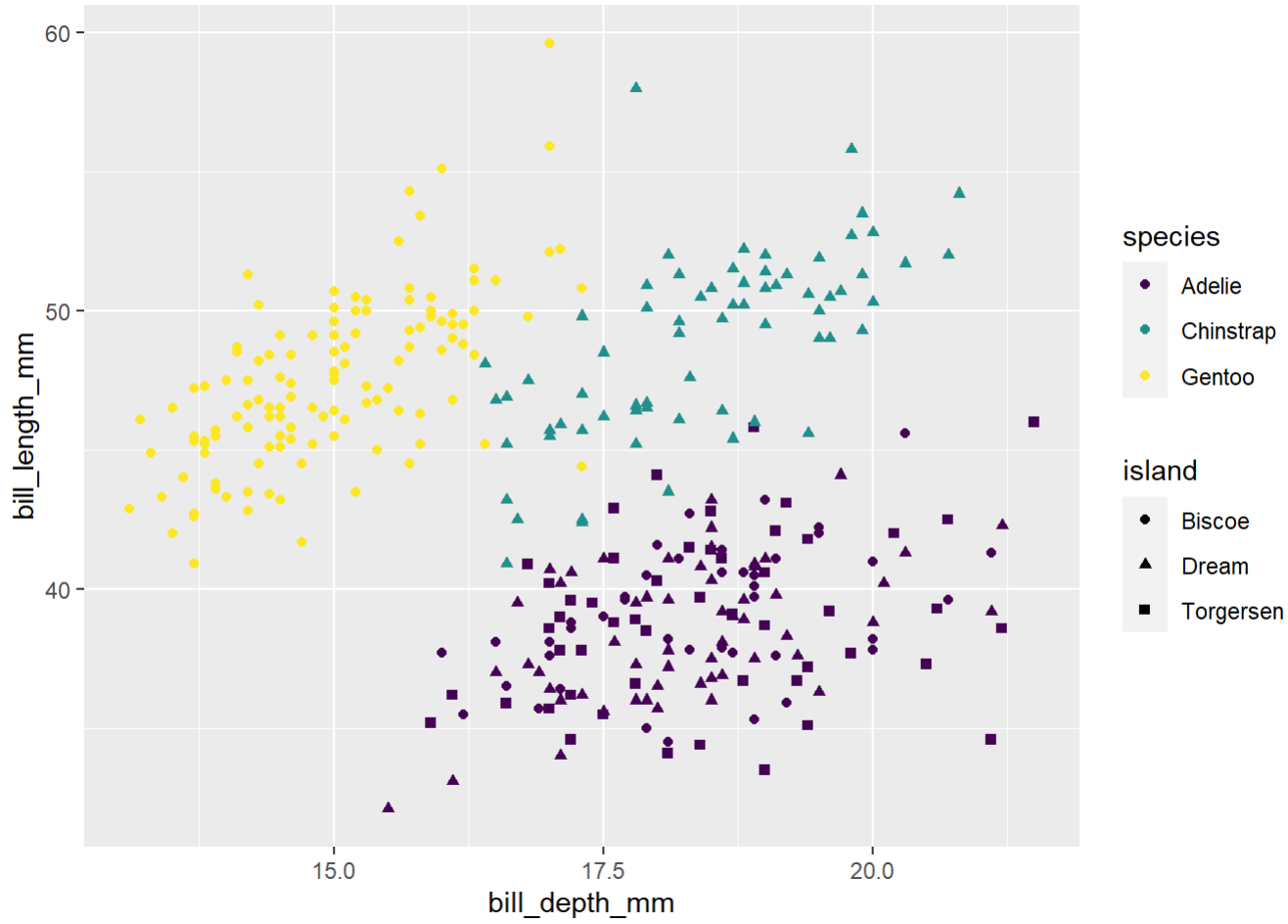


####Question 1.4:Palmer Penguins: shape

Solutions:

```
# Enter code here
ggplot(penguins, aes(x = bill_depth_mm, y = bill_length_mm, colour = species,#specifying x and y
 shape = island)) + #shaoe of points of islands
 geom_point() + #represent each observation with a point
  scale_colour_viridis_d() #discrete colour scale that is designed to be perceived by viewers with common forms of colour blindness
```

```
## Warning: Removed 2 rows containing missing values (`geom_point()`).
```

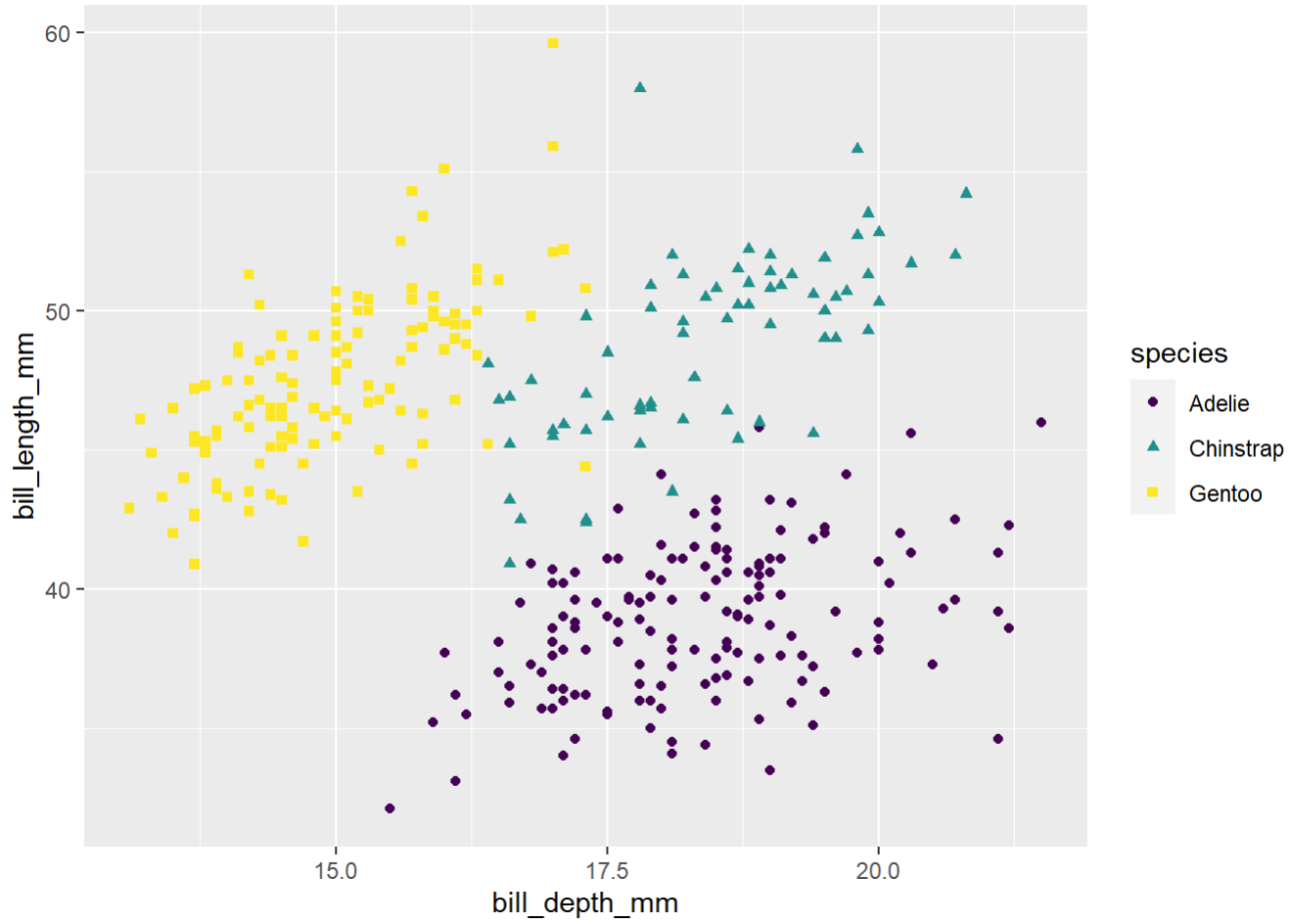


####Question 1.5:Palmer Penguins: shape

Solutions:

```
# Enter code here
ggplot(penguins, aes(x = bill_depth_mm, y = bill_length_mm, colour = species,#specifying x and y
 shape = species)) + #shape of points of species
 geom_point() + #represent each observation with a point
  scale_colour_viridis_d() #discrete colour scale that is designed to be perceived by viewers with common forms of colour blindness
```

```
## Warning: Removed 2 rows containing missing values (`geom_point()`).
```

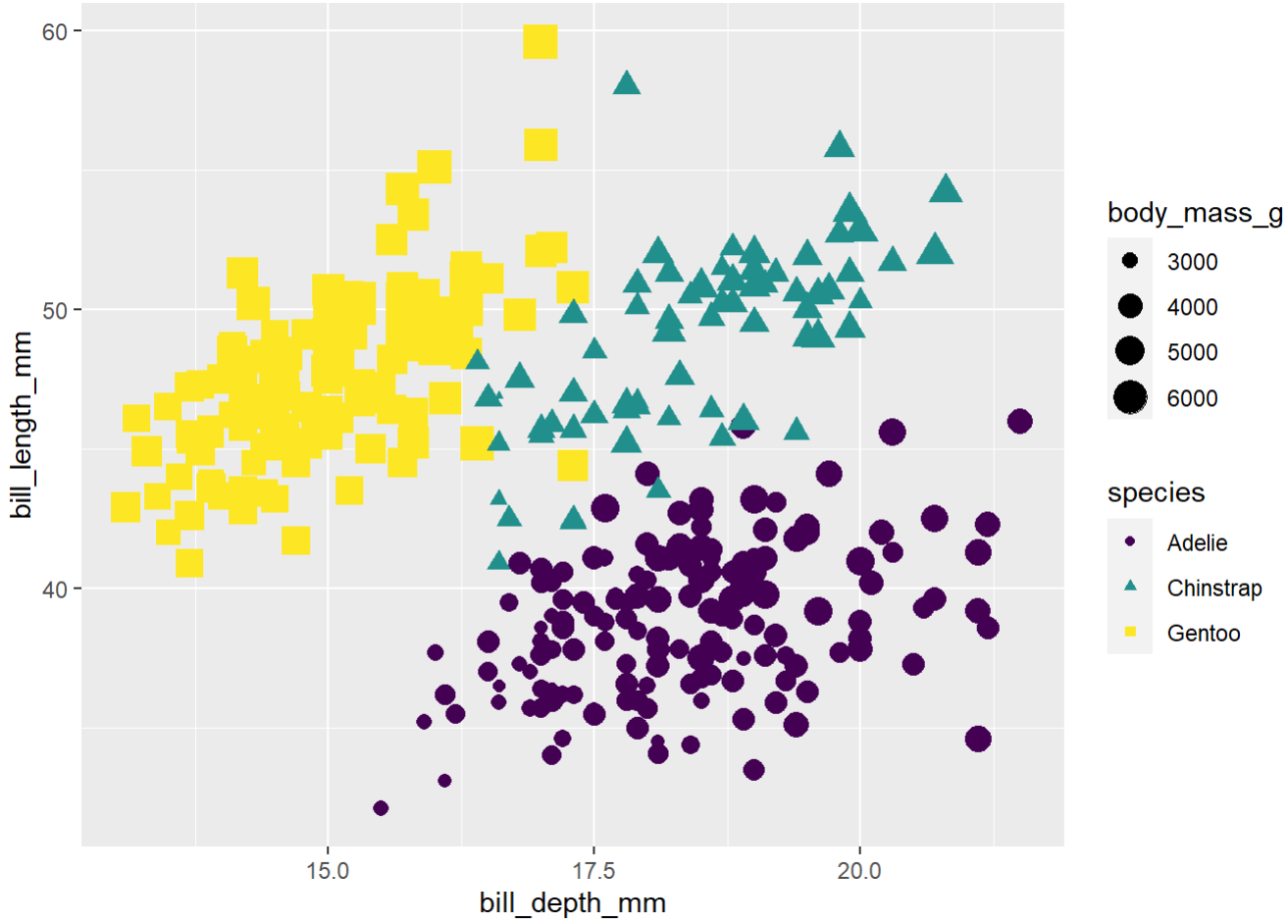


####Question 1.6:Palmer Penguins: size

Solutions:

```
# Enter code here
ggplot(penguins, aes(x = bill_depth_mm, y = bill_length_mm, colour = species, shape = specie
s,
 size = body_mass_g)) + #size of points by body mass
 geom_point() +  #represent each observation with a point
  scale_colour_viridis_d() #discrete colour scale that is designed to be perceived by viewers
with common forms of colour blindness
```

```
## Warning: Removed 2 rows containing missing values (`geom_point()`).
```

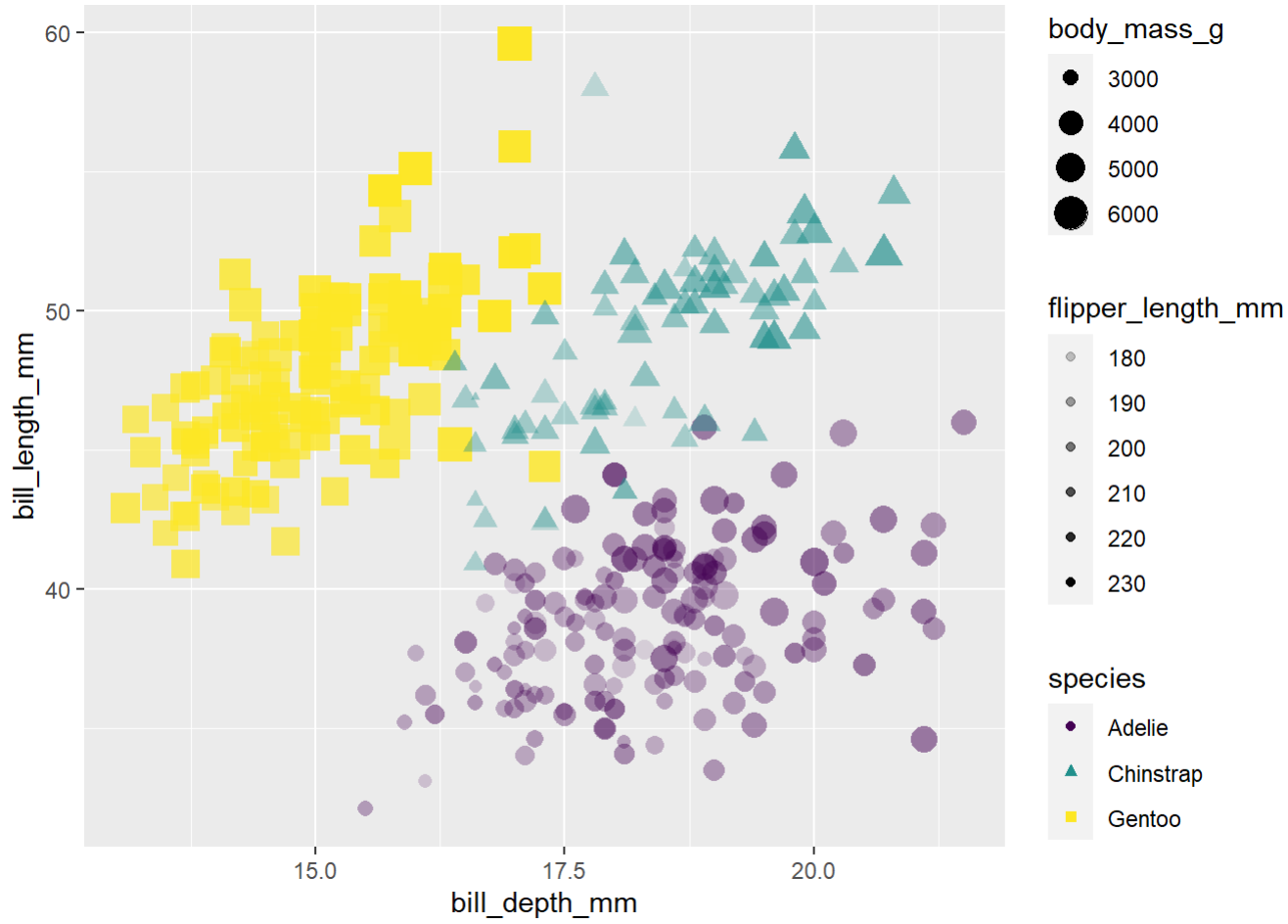


####Question 1.7:Palmer Penguins: Alpha

Solutions:

```
# Enter code here
ggplot(penguins, aes(x = bill_depth_mm, y = bill_length_mm, colour = species,
 shape = species, size = body_mass_g, alpha = flipper_length_mm)) + #alpha of points by flipp
erlength
 geom_point() + #represent each observation with a point
  scale_colour_viridis_d()#discrete colour scale that is designed to be perceived by viewers
with common forms of colour blindness
```

```
## Warning: Removed 2 rows containing missing values (`geom_point()`).
```

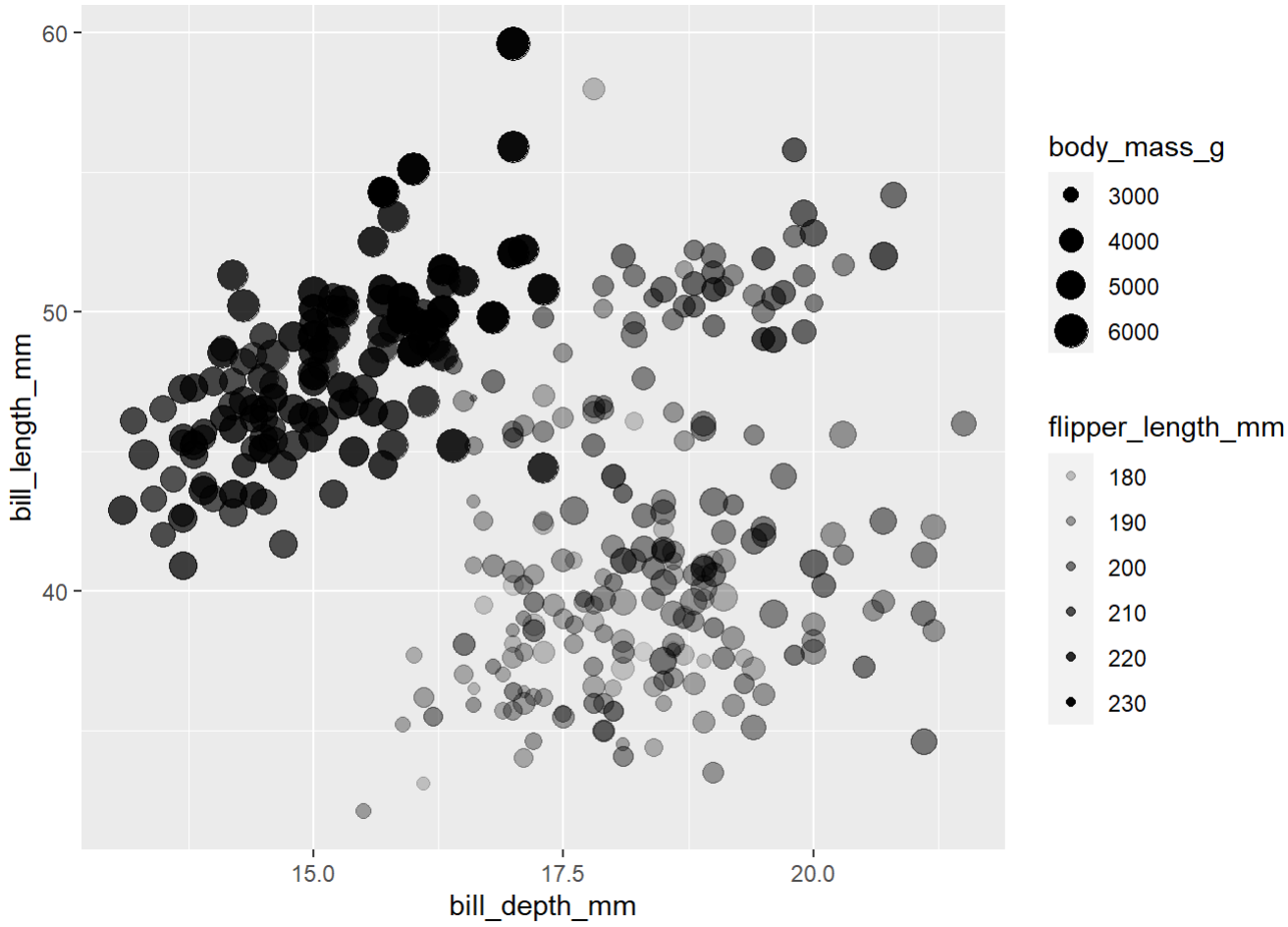


####Question 1.8:Palmer Penguins: Mapping vs Setting

Solutions:

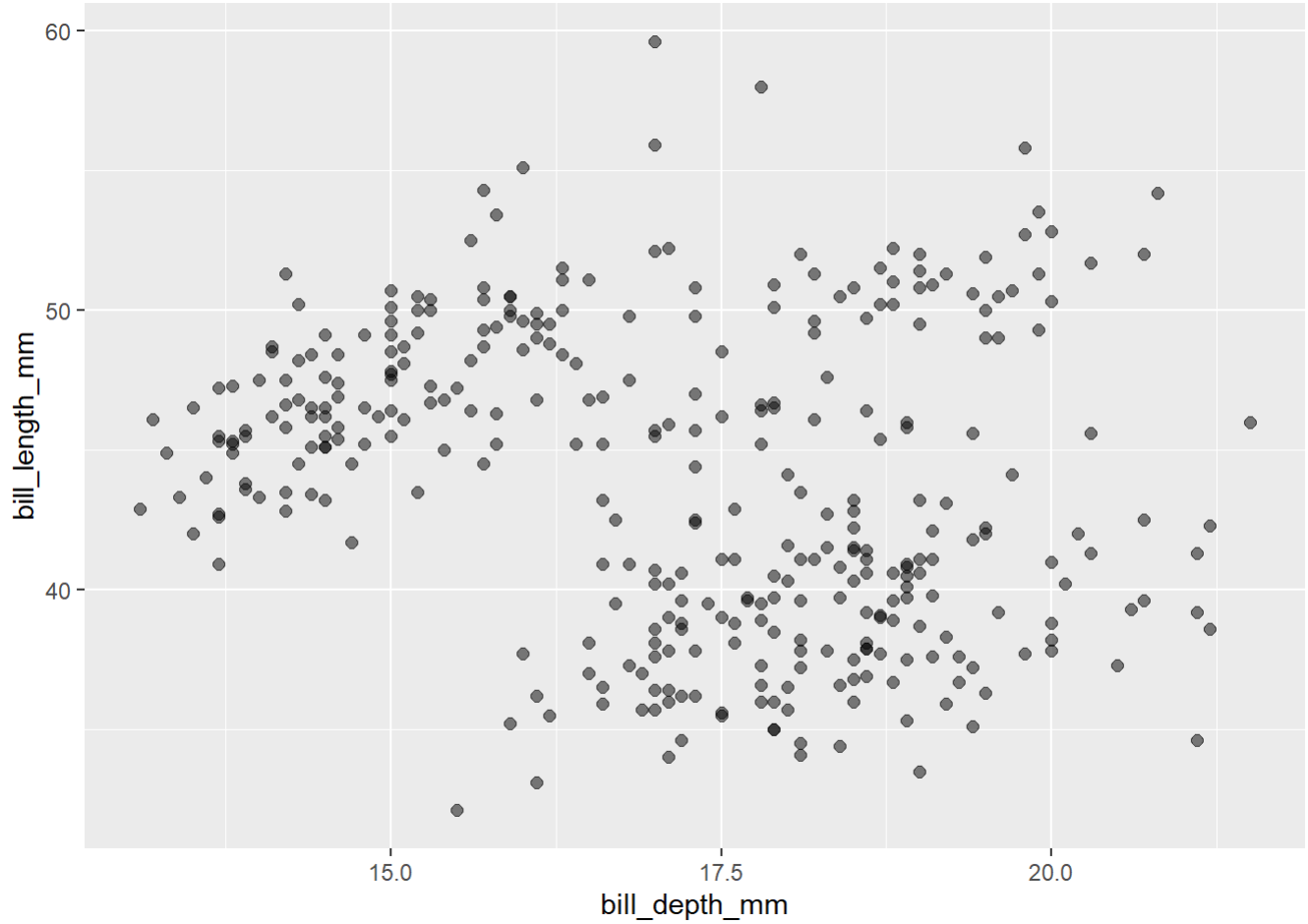
```
# Enter code here
ggplot(penguins) +
 aes(x = bill_depth_mm,
 y = bill_length_mm,
 size = body_mass_g,
 alpha = flipper_length_mm) +
 geom_point()
```

```
## Warning: Removed 2 rows containing missing values (`geom_point()`).
```




```
ggplot(penguins) +
 aes(x = bill_depth_mm,
 y = bill_length_mm) +
 geom_point(size = 2, alpha = 0.5)
```

```
## Warning: Removed 2 rows containing missing values (`geom_point()`).
```

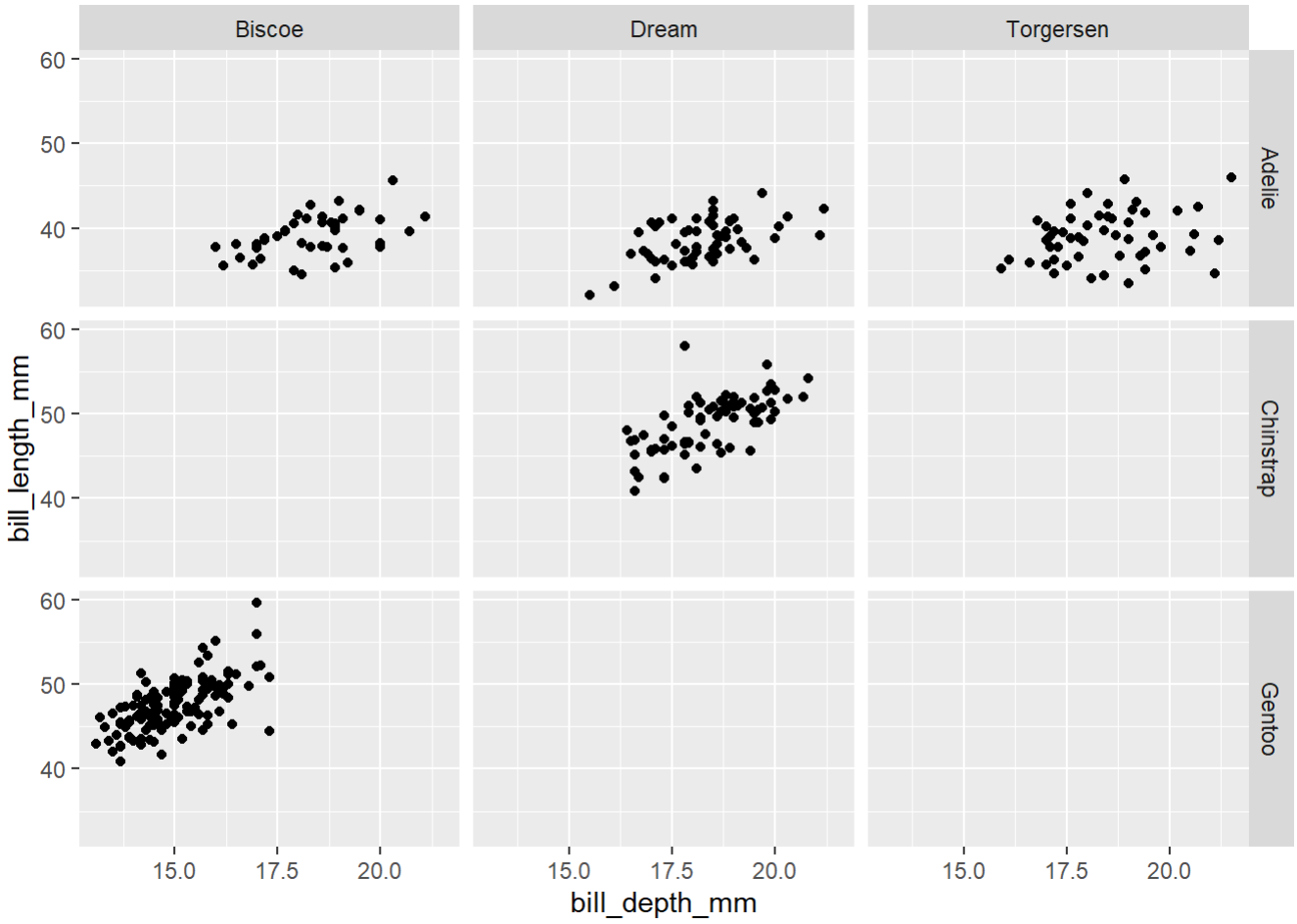


####Question 1.9:Palmer Penguins: Faceting

Solutions:

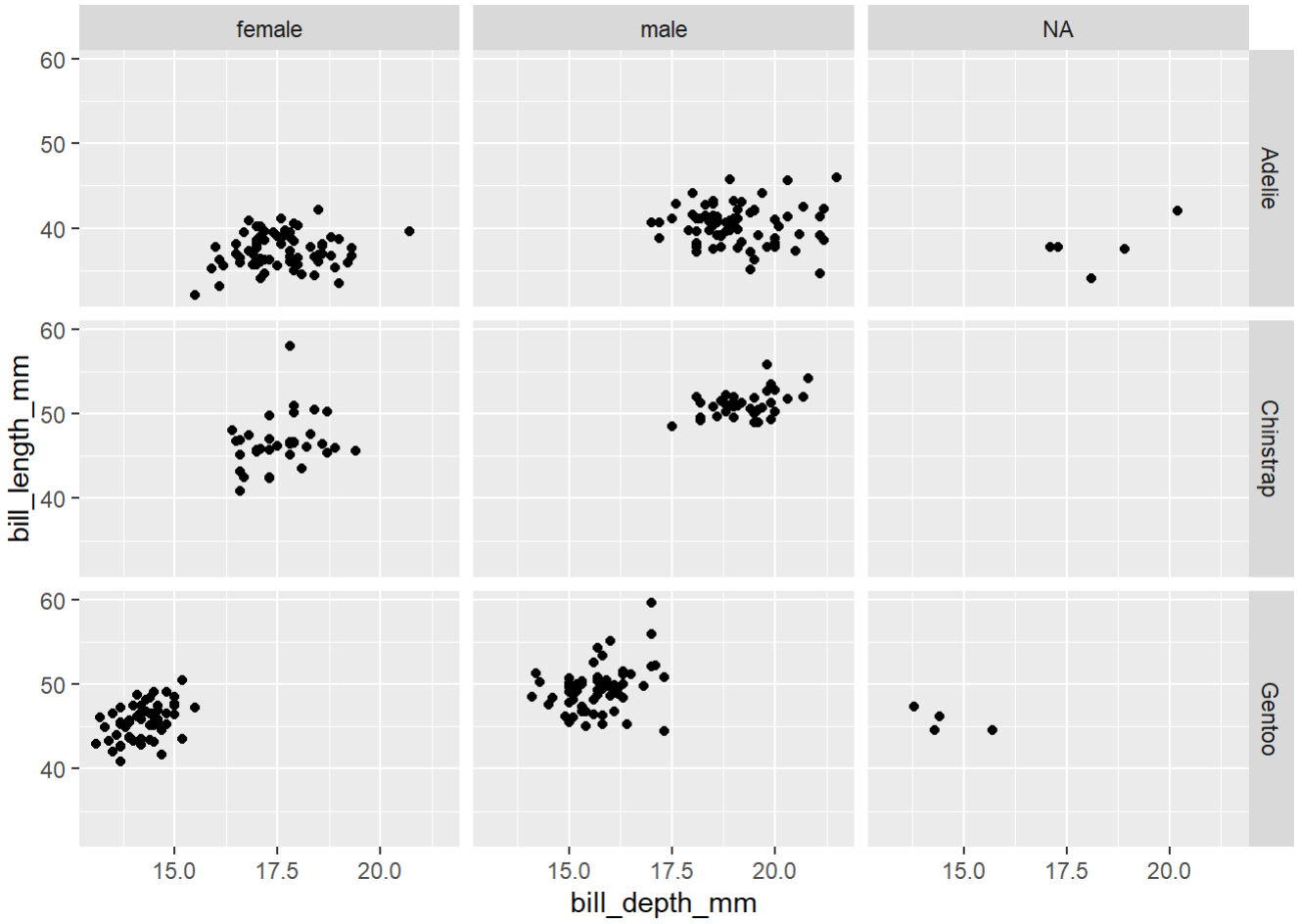
```
# Enter code here
ggplot(penguins) +
 aes(x = bill_depth_mm,
 y = bill_length_mm) +
 geom_point() + #represent each observation with a point
 facet_grid(species ~ island) #create smaller plots that display different subsets of the dat
a
```

```
## Warning: Removed 2 rows containing missing values (`geom_point()`).
```



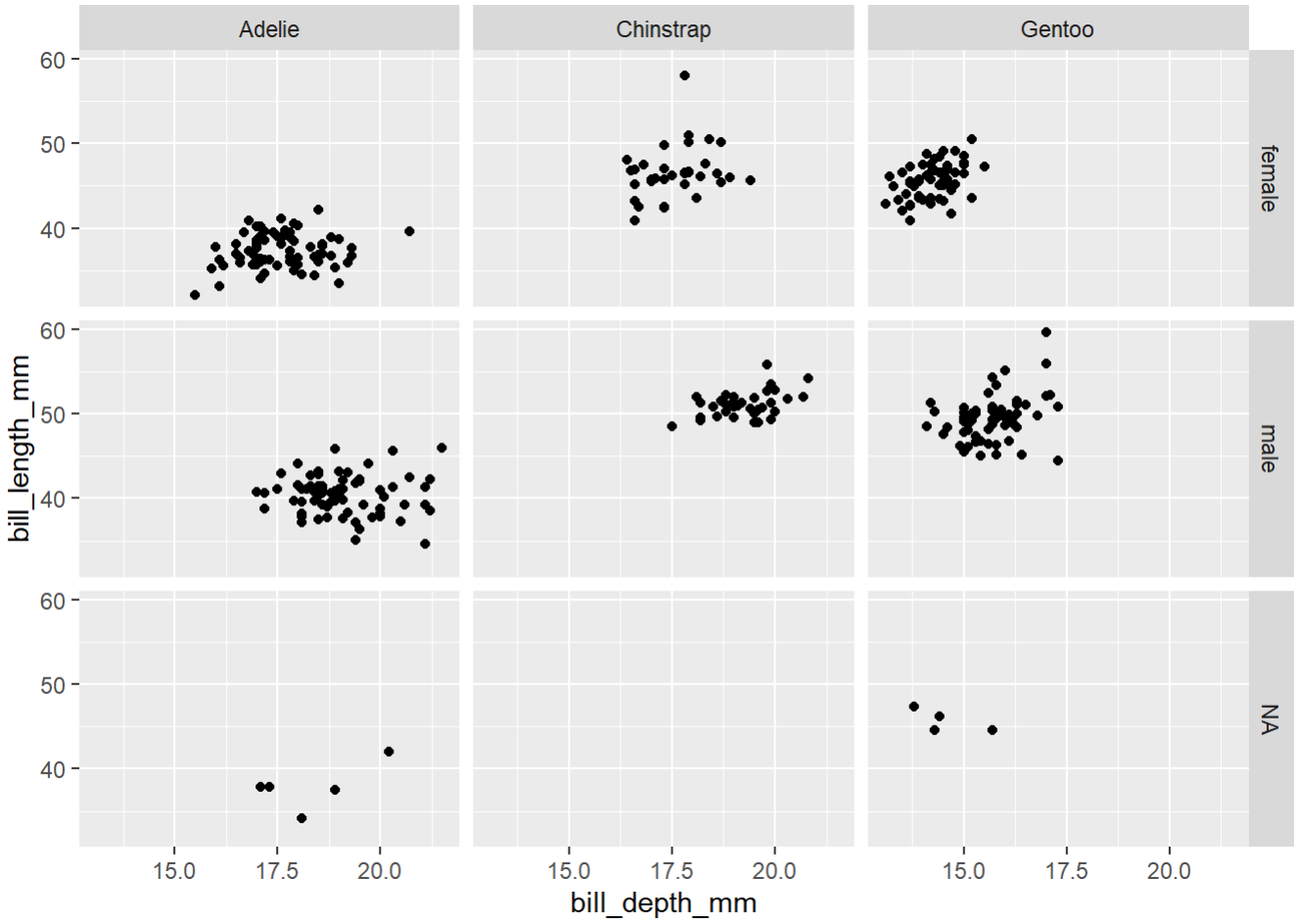

```
# Enter code here
ggplot(penguins, aes(x = bill_depth_mm, y = bill_length_mm)) + geom_point() + #represent each observation with a point
 facet_grid(species ~ sex)#create smaller plots that display different subsets of the data
```

```
## Warning: Removed 2 rows containing missing values (`geom_point()`).
```



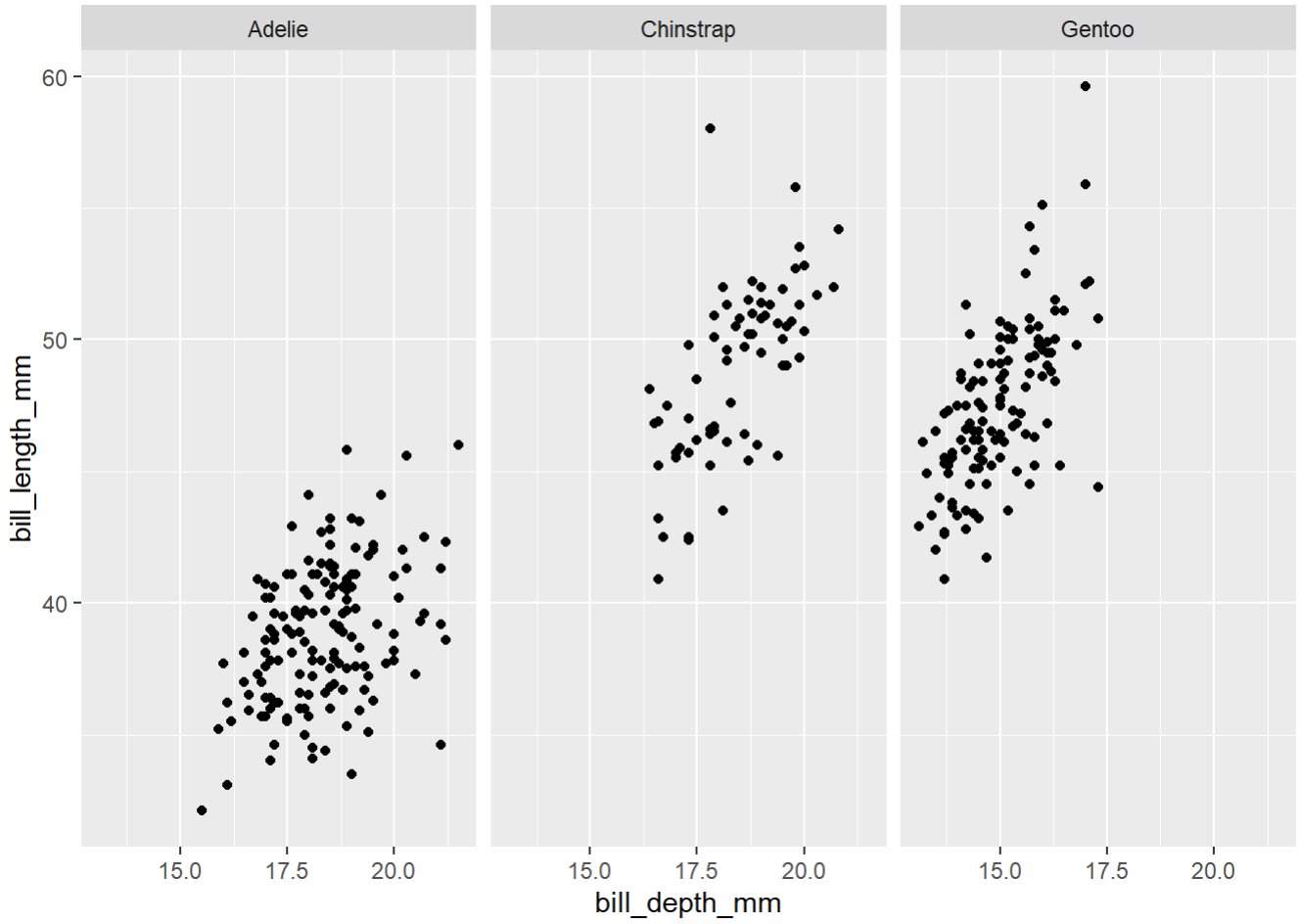

```
# Enter code here
ggplot(penguins, aes(x = bill_depth_mm, y = bill_length_mm)) + geom_point() + #represent each observation with a point
facet_grid(sex ~ species)#create smaller plots that display different subsets of the data base on sex and species
```

```
## Warning: Removed 2 rows containing missing values (`geom_point()`).
```



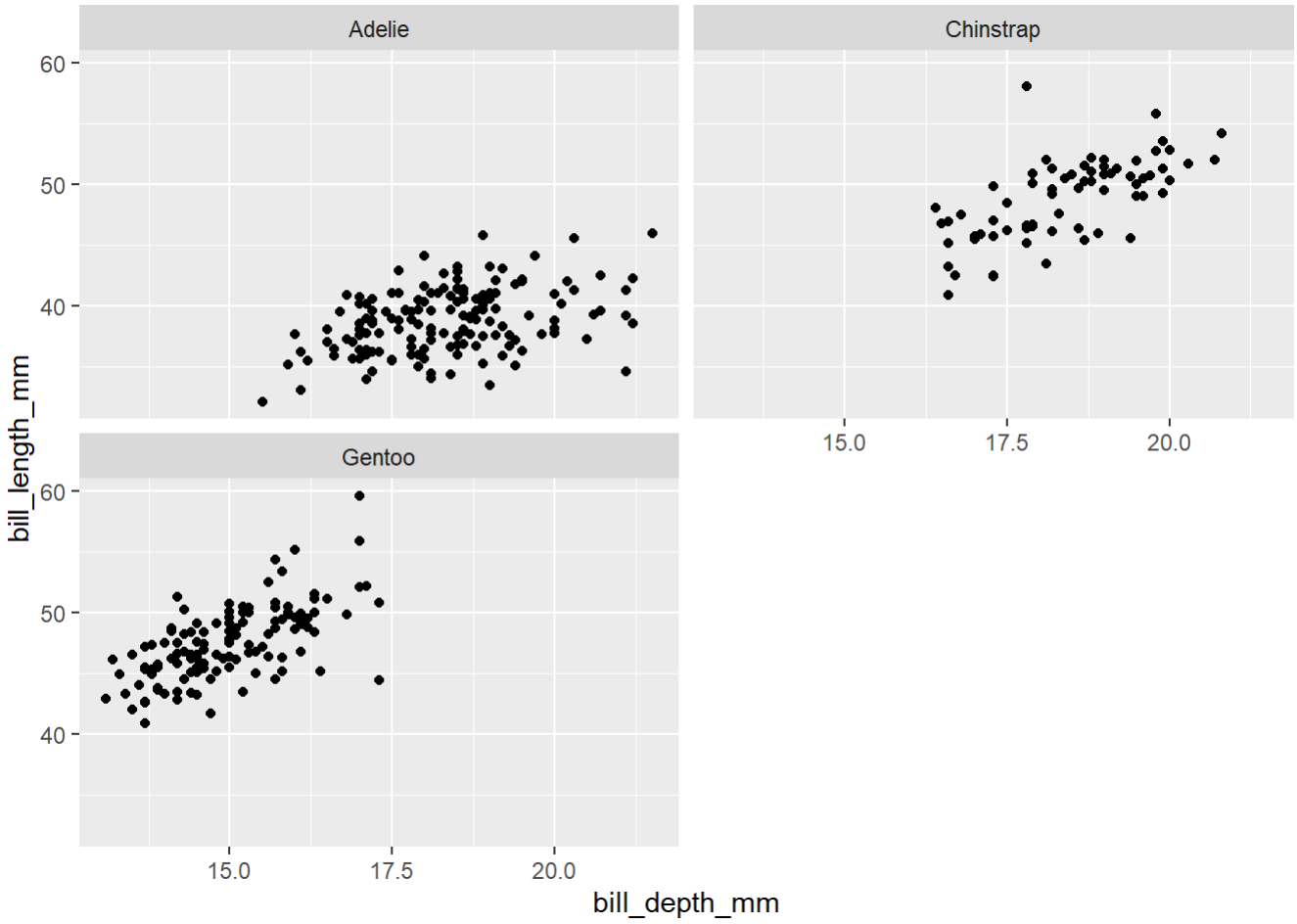

```
# Enter code here
ggplot(penguins, aes(x = bill_depth_mm, y = bill_length_mm)) + geom_point() + #represent each observation with a point
facet_wrap(~ species)#create smaller plots that display different subsets of the data base on species not sex
```

```
## Warning: Removed 2 rows containing missing values (`geom_point()`).
```



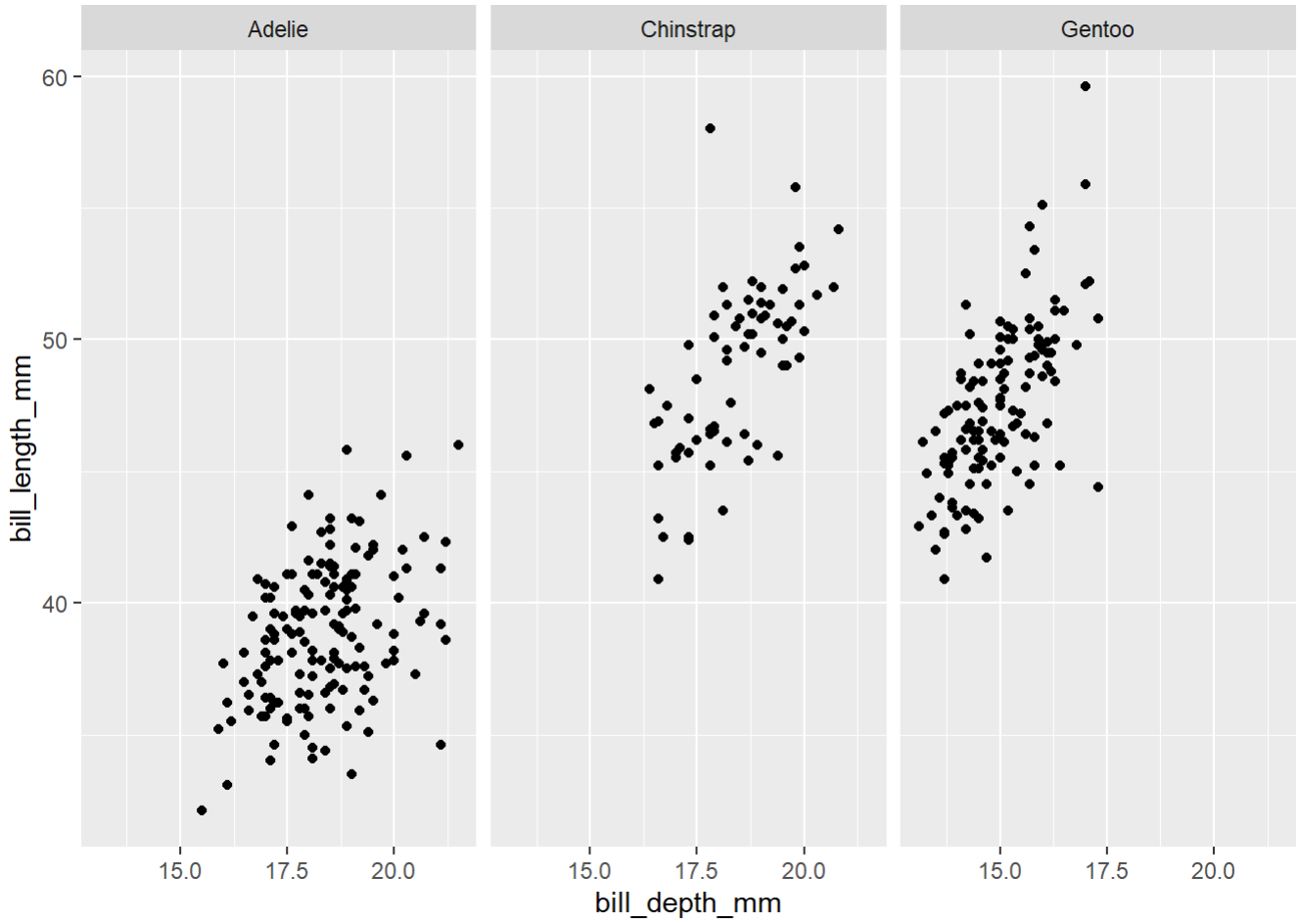

```
# Enter code here
ggplot(penguins, aes(x = bill_depth_mm, y = bill_length_mm)) + geom_point() + #represent each observation with a point
facet_wrap(~ species, ncol = 2)#create smaller plots that display different subsets of the data base on species, arranged in 2 columns
```

```
## Warning: Removed 2 rows containing missing values (`geom_point()`).
```



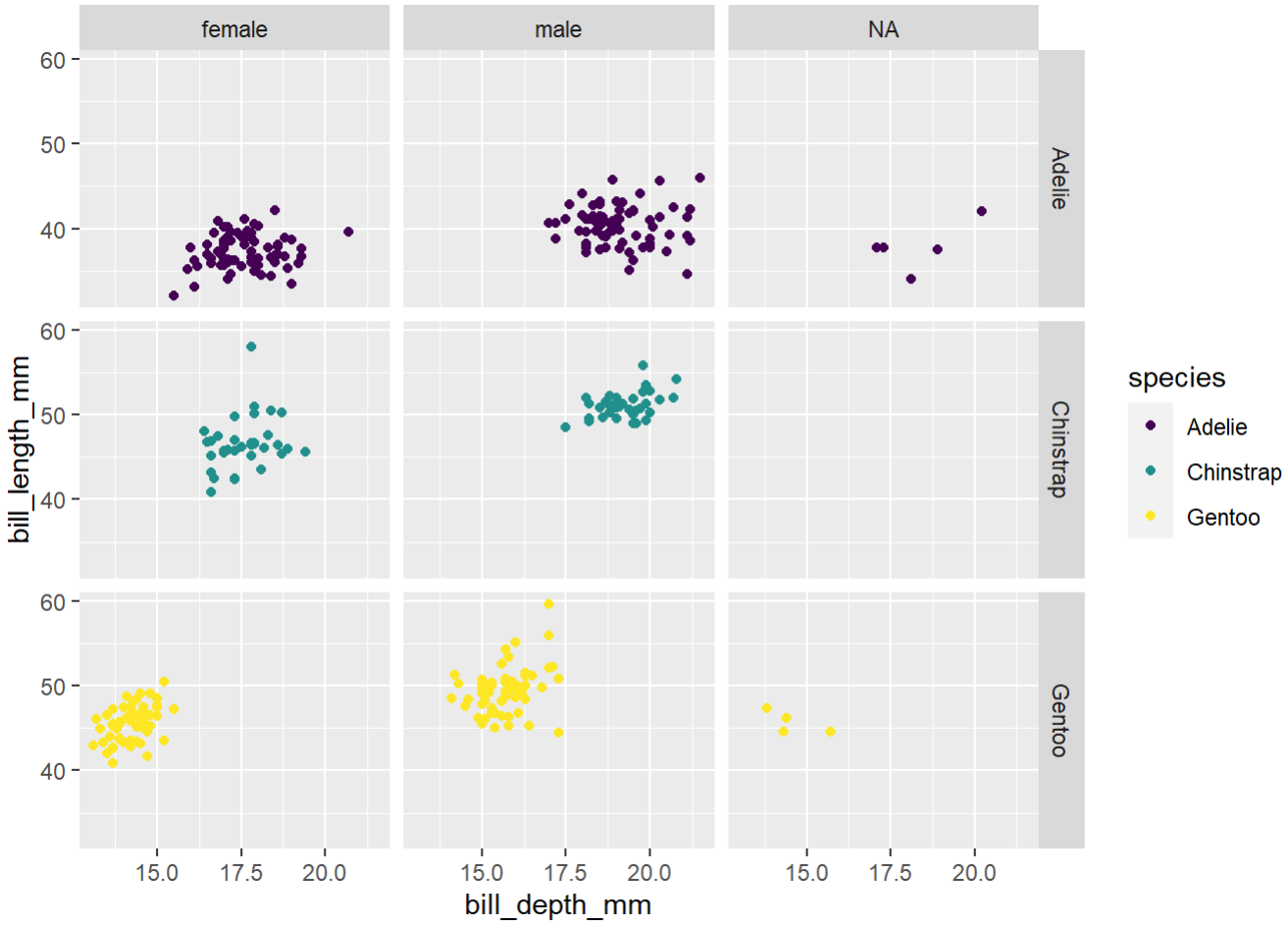

```
# Enter code here
ggplot(penguins, aes(x = bill_depth_mm, y = bill_length_mm)) + geom_point() + #represent each observation with a point
facet_wrap(. ~ species)#create smaller plots that display different subsets of the data base on species
```

```
## Warning: Removed 2 rows containing missing values (`geom_point()`).
```



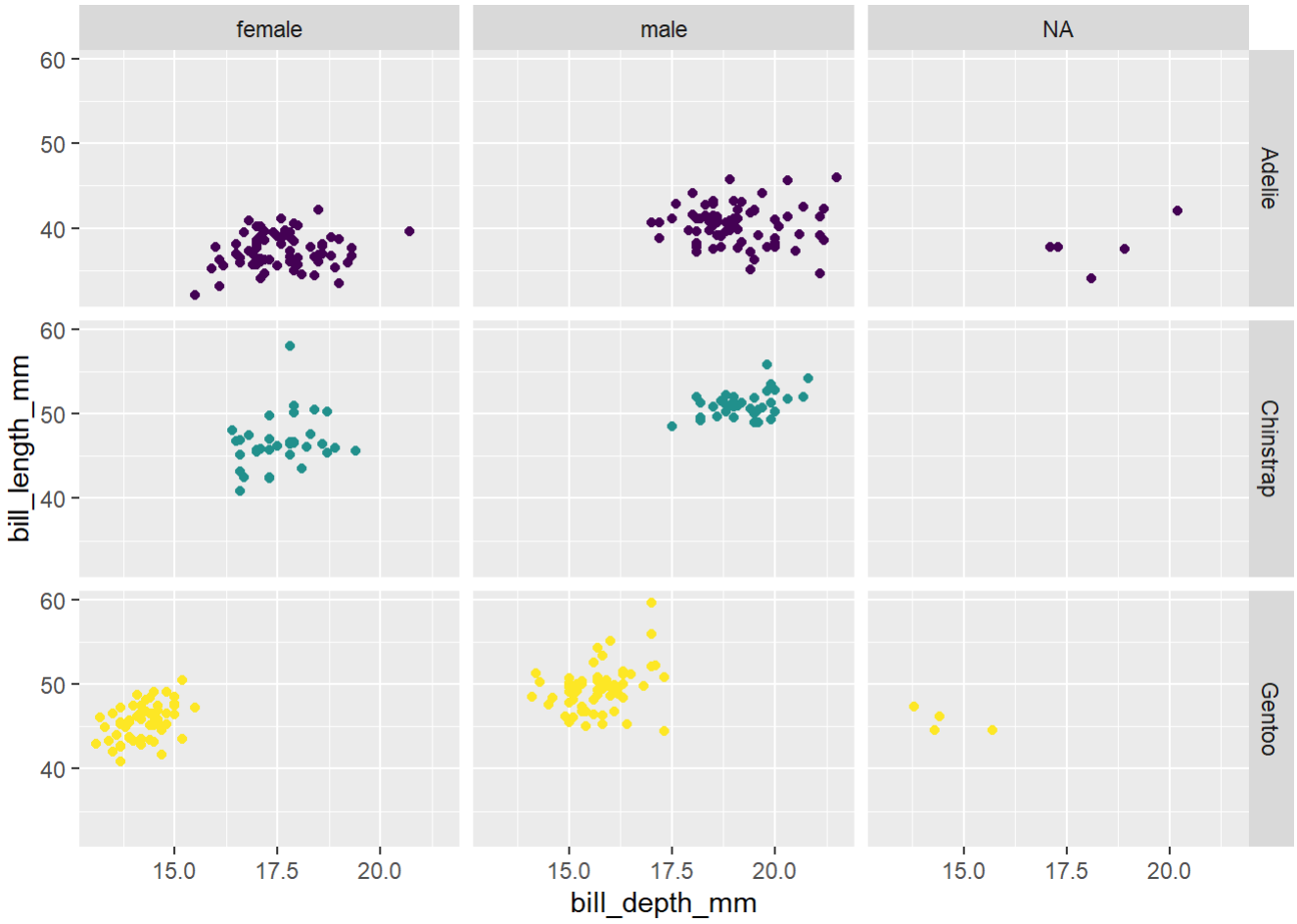

```
# Enter code here
ggplot(penguins, aes(x = bill_depth_mm, y = bill_length_mm, color = species)) +
 geom_point() + #represent each observation with a point
  facet_grid(species ~ sex) + #create smaller plots that display different subsets of the dat
a base on sex and species
    scale_color_viridis_d()#discrete colour scale that is designed to be perceived by viewers
with common forms of colour blindness
```

```
## Warning: Removed 2 rows containing missing values (`geom_point()`).
```




```
# Enter code here
ggplot(penguins, aes(x = bill_depth_mm, y = bill_length_mm, color = species)) +
 geom_point() + #represent each observation with a point
  facet_grid(species ~ sex) + #create smaller plots that display different subsets of the dat
a base on sex and species
    scale_color_viridis_d() + #discrete colour scale that is designed to be perceived by view
ers with common forms of colour blindness
      guides(color = "none") #  Remove the color legend.
```

```
## Warning: Removed 2 rows containing missing values (`geom_point()`).
```



####Question 2: Lending set

Solutions:

```
# Enter code here
library(openintro)
```

```
## Loading required package: airports
```

```
## Loading required package: cherryblossom
```

```
## Loading required package: usdata
```

```
glimpse(loans_full_schema)#peek at data
```

```
## Rows: 10,000
## Columns: 55
## $ emp_title                         <chr> "global config engineer ", "warehouse…
## $ emp_length                        <dbl> 3, 10, 3, 1, 10, NA, 10, 10, 10, 3, 1…
## $ state                             <fct> NJ, HI, WI, PA, CA, KY, MI, AZ, NV, I…
## $ homeownership                     <fct> MORTGAGE, RENT, RENT, RENT, RENT, OWN…
## $ annual_income                     <dbl> 90000, 40000, 40000, 30000, 35000, 34…
## $ verified_income                   <fct> Verified, Not Verified, Source Verifi…
## $ debt_to_income                    <dbl> 18.01, 5.04, 21.15, 10.16, 57.96, 6.4…
## $ annual_income_joint               <dbl> NA, NA, NA, NA, 57000, NA, 155000, NA…
## $ verification_income_joint         <fct> , , , , Verified, , Not Verified, , ,…
## $ debt_to_income_joint              <dbl> NA, NA, NA, NA, 37.66, NA, 13.12, NA,…
## $ delinq_2y                         <int> 0, 0, 0, 0, 0, 1, 0, 1, 1, 0, 0, 0, 0…
## $ months_since_last_delinq          <int> 38, NA, 28, NA, NA, 3, NA, 19, 18, NA…
## $ earliest_credit_line              <dbl> 2001, 1996, 2006, 2007, 2008, 1990, 2…
## $ inquiries_last_12m                <int> 6, 1, 4, 0, 7, 6, 1, 1, 3, 0, 4, 4, 8…
## $ total_credit_lines                <int> 28, 30, 31, 4, 22, 32, 12, 30, 35, 9,…
## $ open_credit_lines                 <int> 10, 14, 10, 4, 16, 12, 10, 15, 21, 6,…
## $ total_credit_limit                <int> 70795, 28800, 24193, 25400, 69839, 42…
## $ total_credit_utilized             <int> 38767, 4321, 16000, 4997, 52722, 3898…
## $ num_collections_last_12m          <int> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0…
## $ num_historical_failed_to_pay      <int> 0, 1, 0, 1, 0, 0, 0, 0, 0, 0, 1, 0, 0…
## $ months_since_90d_late             <int> 38, NA, 28, NA, NA, 60, NA, 71, 18, N…
## $ current_accounts_delinq           <int> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0…
## $ total_collection_amount_ever      <int> 1250, 0, 432, 0, 0, 0, 0, 0, 0, 0, 0,…
## $ current_installment_accounts      <int> 2, 0, 1, 1, 1, 0, 2, 2, 6, 1, 2, 1, 2…
## $ accounts_opened_24m               <int> 5, 11, 13, 1, 6, 2, 1, 4, 10, 5, 6, 7…
## $ months_since_last_credit_inquiry <int> 5, 8, 7, 15, 4, 5, 9, 7, 4, 17, 3, 4,…
## $ num_satisfactory_accounts         <int> 10, 14, 10, 4, 16, 12, 10, 15, 21, 6,…
## $ num_accounts_120d_past_due        <int> 0, 0, 0, 0, 0, 0, 0, NA, 0, 0, 0, 0, …
## $ num_accounts_30d_past_due         <int> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0…
## $ num_active_debit_accounts         <int> 2, 3, 3, 2, 10, 1, 3, 5, 11, 3, 2, 2,…
## $ total_debit_limit                 <int> 11100, 16500, 4300, 19400, 32700, 272…
## $ num_total_cc_accounts             <int> 14, 24, 14, 3, 20, 27, 8, 16, 19, 7, …
## $ num_open_cc_accounts              <int> 8, 14, 8, 3, 15, 12, 7, 12, 14, 5, 8,…
## $ num_cc_carrying_balance           <int> 6, 4, 6, 2, 13, 5, 6, 10, 14, 3, 5, 3…
## $ num_mort_accounts                 <int> 1, 0, 0, 0, 0, 3, 2, 7, 2, 0, 2, 3, 3…
## $ account_never_delinq_percent      <dbl> 92.9, 100.0, 93.5, 100.0, 100.0, 78.1…
## $ tax_liens                         <int> 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0…
## $ public_record_bankrupt            <int> 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0…
## $ loan_purpose                      <fct> moving, debt_consolidation, other, de…
## $ application_type                  <fct> individual, individual, individual, i…
## $ loan_amount                       <int> 28000, 5000, 2000, 21600, 23000, 5000…
## $ term                              <dbl> 60, 36, 36, 36, 36, 36, 60, 60, 36, 3…
## $ interest_rate                     <dbl> 14.07, 12.61, 17.09, 6.72, 14.07, 6.7…
## $ installment                       <dbl> 652.53, 167.54, 71.40, 664.19, 786.87…
## $ grade                             <fct> C, C, D, A, C, A, C, B, C, A, C, B, C…
## $ sub_grade                         <fct> C3, C1, D1, A3, C3, A3, C2, B5, C2, A…
## $ issue_month                       <fct> Mar-2018, Feb-2018, Feb-2018, Jan-201…
## $ loan_status                       <fct> Current, Current, Current, Current, C…
## $ initial_listing_status            <fct> whole, whole, fractional, whole, whol…
## $ disbursement_method               <fct> Cash, Cash, Cash, Cash, Cash, Cash, C…
## $ balance                           <dbl> 27015.86, 4651.37, 1824.63, 18853.26,…
## $ paid_total                        <dbl> 1999.330, 499.120, 281.800, 3312.890,…
## $ paid_principal                    <dbl> 984.14, 348.63, 175.37, 2746.74, 1569…
```

```
## $ paid_interest                    <dbl> 1015.19, 150.49, 106.43, 566.15, 754.…
## $ paid_late_fees                   <dbl> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0…
```

####Question 2.1: Lending set: Selected variables

Solutions:

```
# Enter code here
loans <- loans_full_schema %>%
 select(loan_amount, interest_rate, term, grade,
 state, annual_income, homeownership, debt_to_income)
glimpse(loans)
```

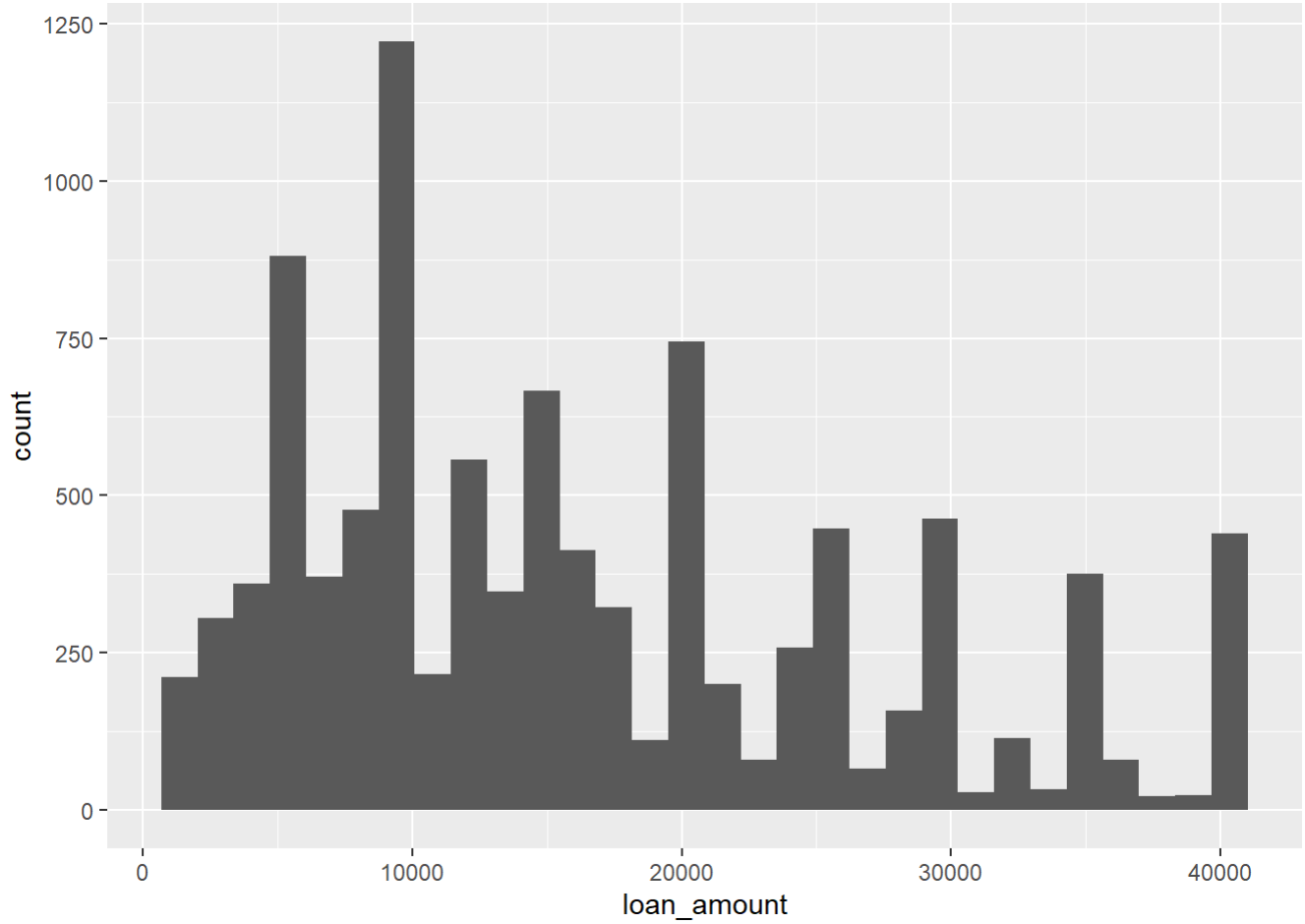
```
## Rows: 10,000
## Columns: 8
## $ loan_amount    <int> 28000, 5000, 2000, 21600, 23000, 5000, 24000, 20000, 20…
## $ interest_rate  <dbl> 14.07, 12.61, 17.09, 6.72, 14.07, 6.72, 13.59, 11.99, 1…
## $ term           <dbl> 60, 36, 36, 36, 36, 36, 60, 60, 36, 36, 60, 60, 36, 60,…
## $ grade          <fct> C, C, D, A, C, A, C, B, C, A, C, B, C, B, D, D, D, F, E…
## $ state          <fct> NJ, HI, WI, PA, CA, KY, MI, AZ, NV, IL, IL, FL, SC, CO,…
## $ annual_income  <dbl> 90000, 40000, 40000, 30000, 35000, 34000, 35000, 110000…
## $ homeownership  <fct> MORTGAGE, RENT, RENT, RENT, RENT, OWN, MORTGAGE, MORTGA…
## $ debt_to_income <dbl> 18.01, 5.04, 21.15, 10.16, 57.96, 6.46, 23.66, 16.19, 3…
```

####Question 2.2: Lending set: Histogram

Solutions:

```
# Enter code here
ggplot(loans) + aes(x = loan_amount) +
 geom_histogram() # Create a histogram plot of loan amounts from the 'loans' dataset with 'lo
an_amount' on the x-axis.
```

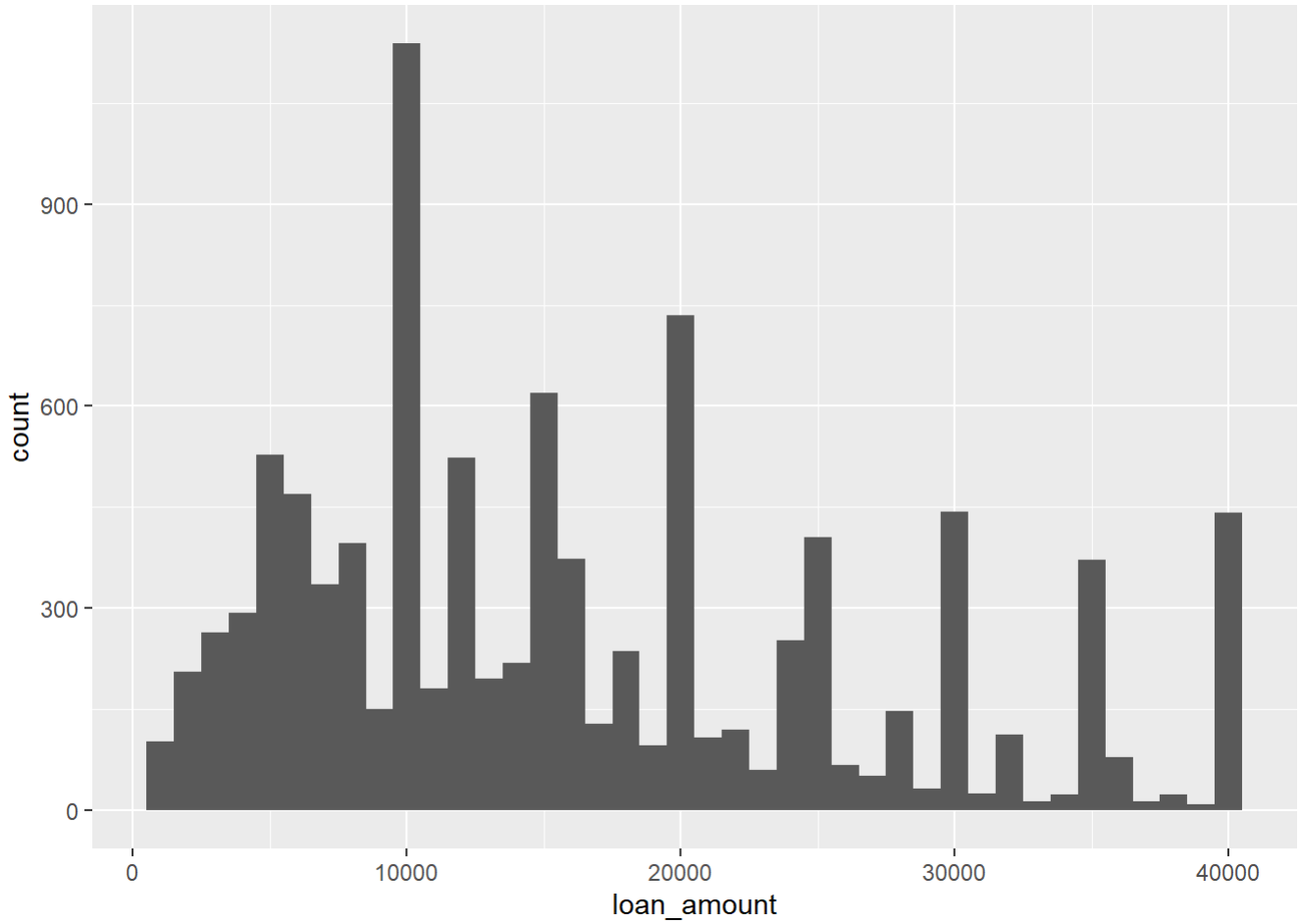
```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```



####Question 2.3: Lending set: Histograms and binwidth=100

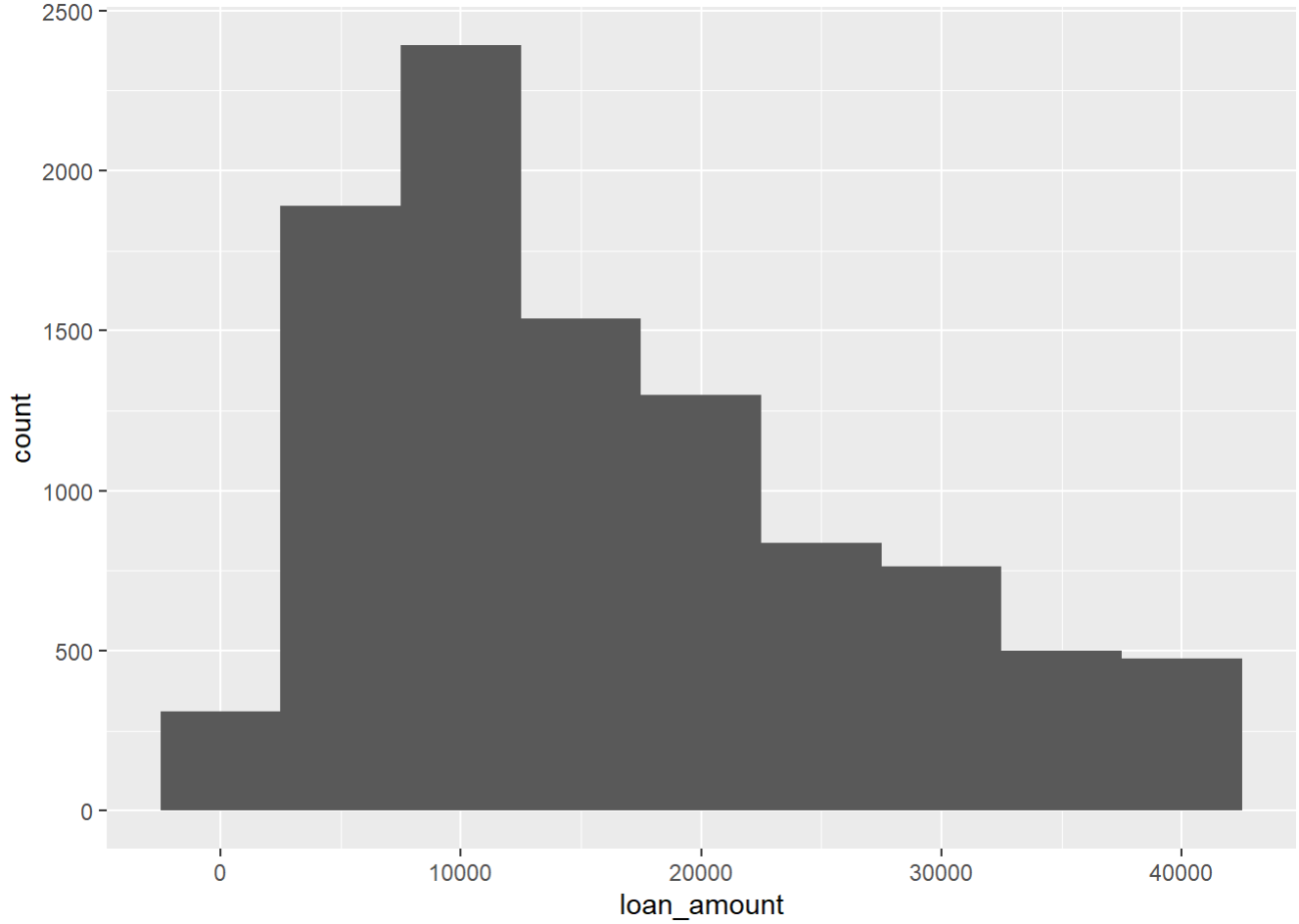
Solutions:

```
# Enter code here
# binwidth = 1000
ggplot(loans, aes(x = loan_amount)) +
 geom_histogram(binwidth = 1000) # Create a histogram plot of loan amounts from the 'loans' d
ataset with 'loan_amount' on the x-axis and specified binwidth of 1000.
```



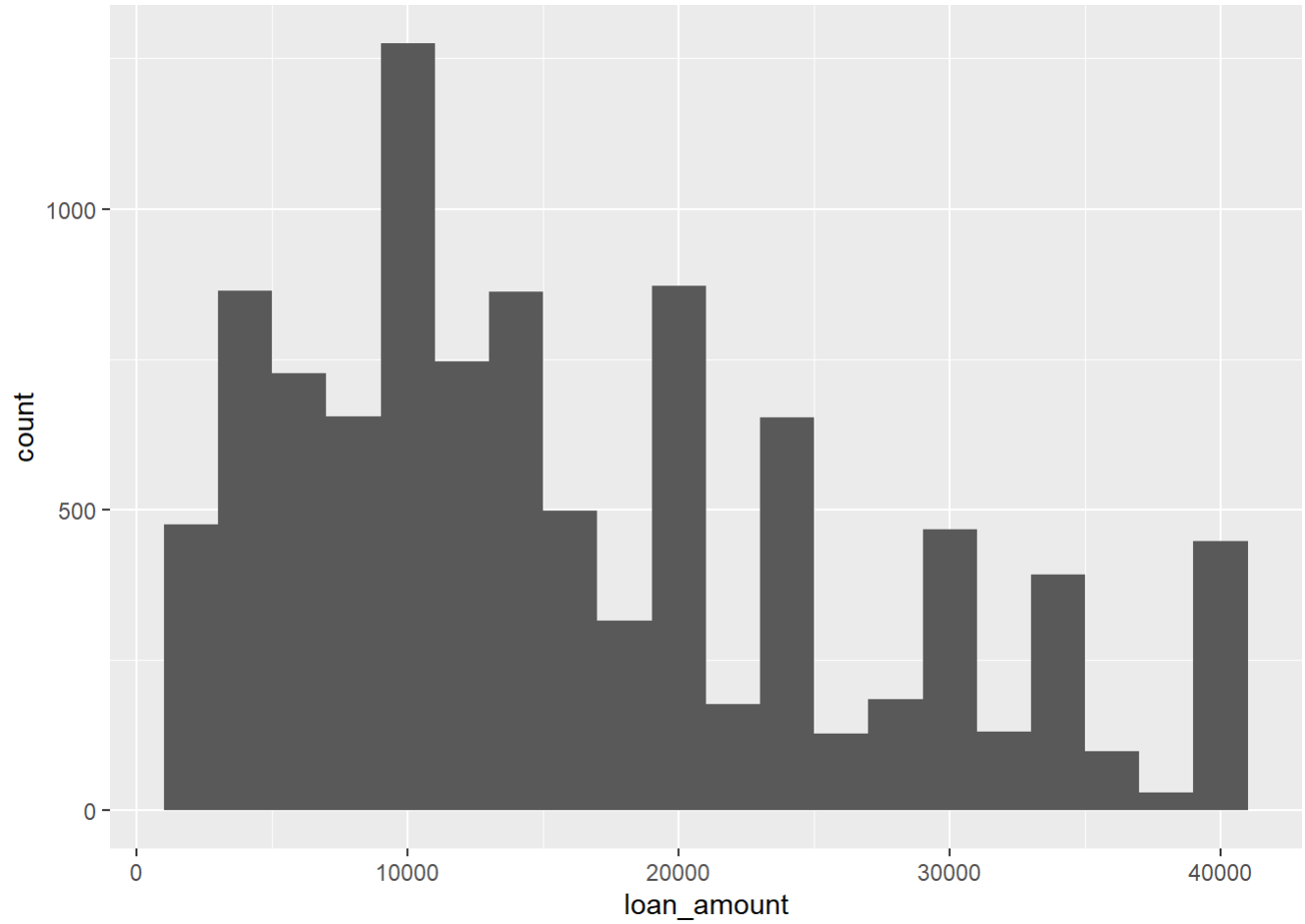
Solutions:

```
# Enter code here
# binwidth = 1000
ggplot(loans, aes(x = loan_amount)) +
 geom_histogram(binwidth = 5000) # Create a histogram plot of loan amounts from the 'loans' d
ataset with 'loan_amount' on the x-axis and specified binwidth of 5000.
```



Solutions:

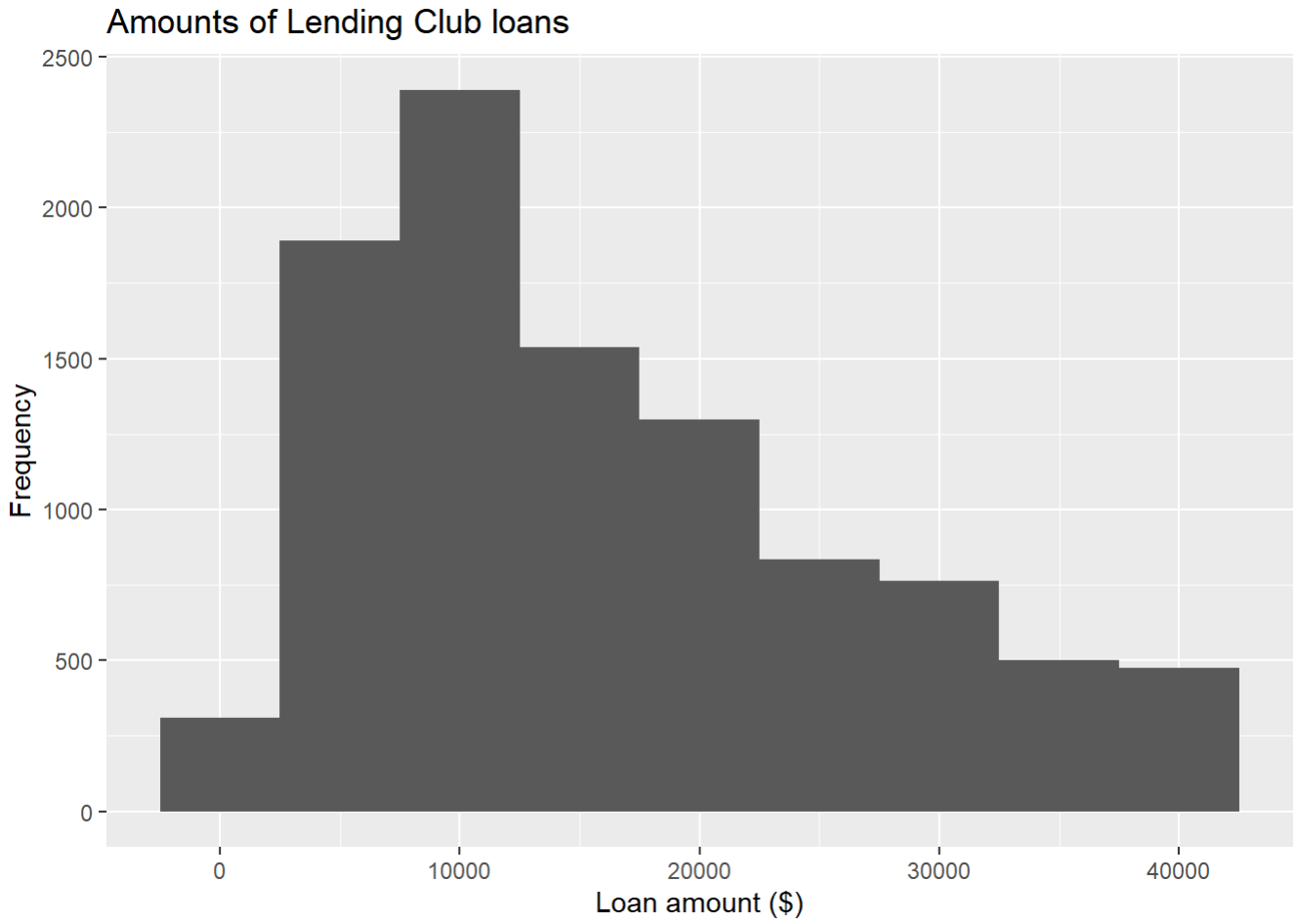
```
# Enter code here
# binwidth = 1000
ggplot(loans, aes(x = loan_amount)) +
 geom_histogram(binwidth = 2000) # Create a histogram plot of loan amounts from the 'loans' d
ataset with 'loan_amount' on the x-axis and specified binwidth of 2000.
```



####Question 2.4: Lending set: Customizing histograms

Solutions:

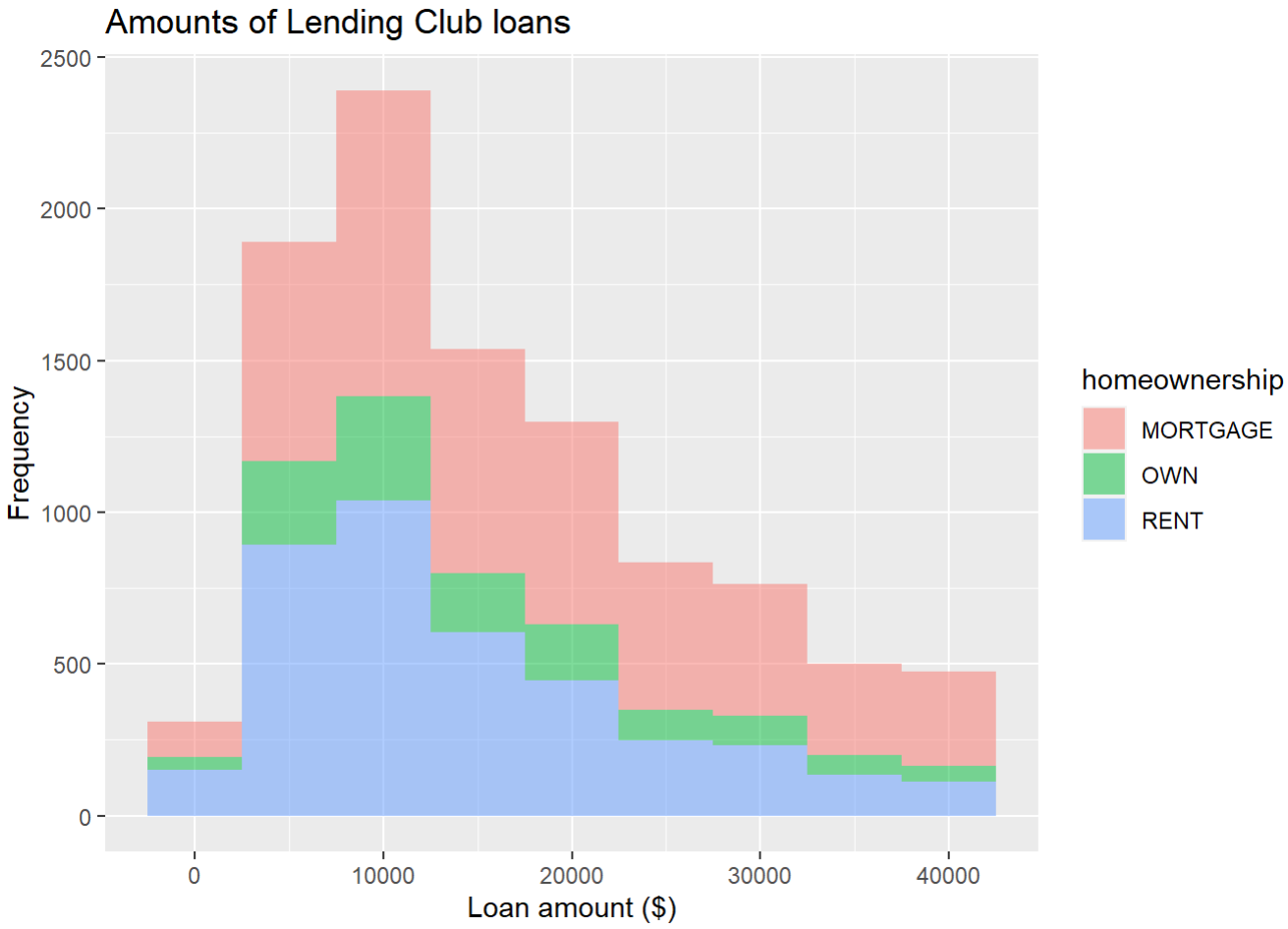
```
# Enter code here
ggplot(loans, aes(x = loan_amount)) + geom_histogram(binwidth = 5000) + # Create a histogram plot of loan amounts from the 'loans' dataset with 'loan_amount' on the x-axis and a specified binwidth of 5000.
 labs(x = "Loan amount ($)", y = "Frequency", title = "Amounts of Lending Club loans" ) # Add labels to the x-axis, y-axis, and title of the plot for clarity.
```



####Question 2.5: Lending set: Fill with a categorical variable

Solutions:

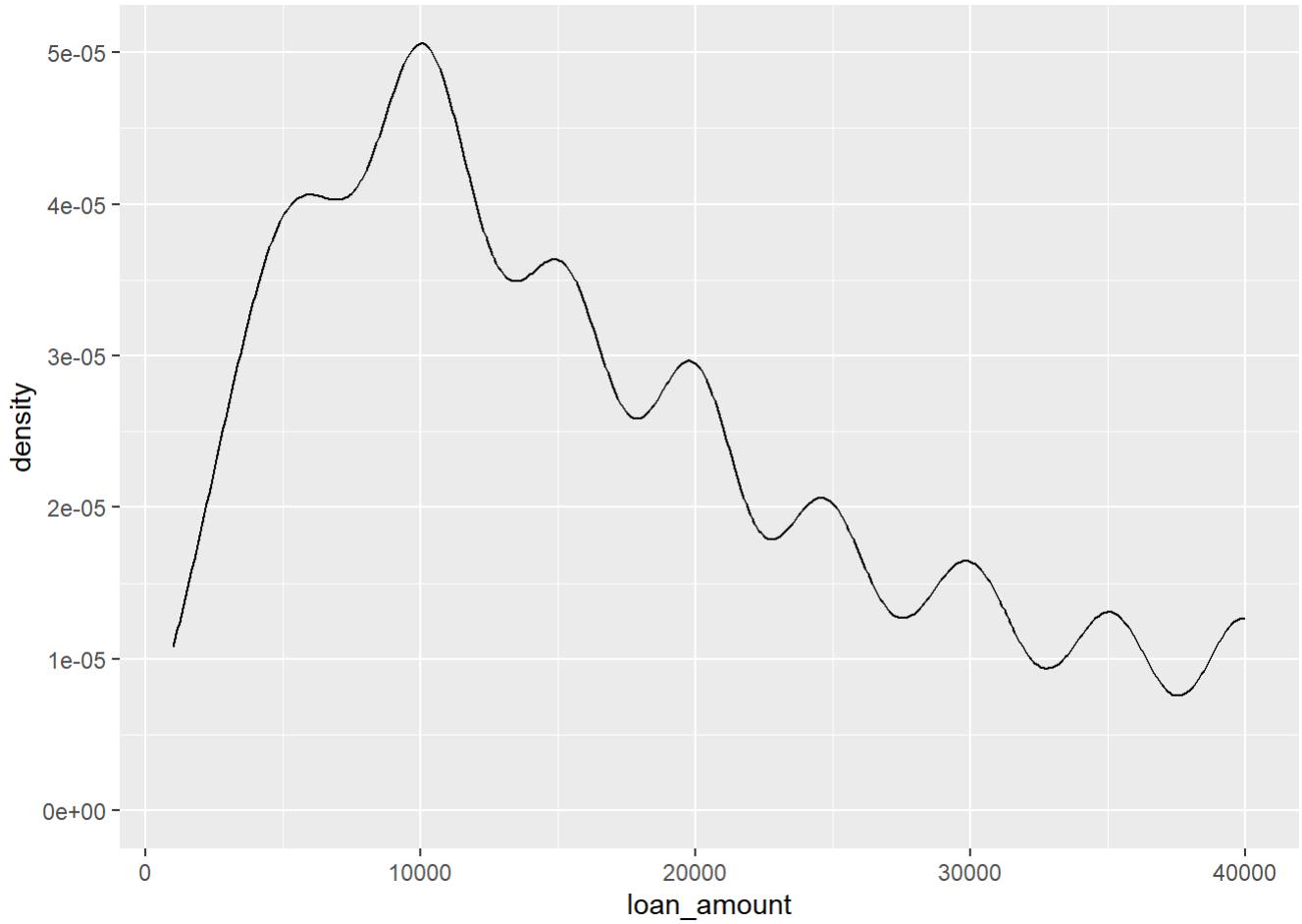
```
# Enter code here
ggplot(loans, aes(x = loan_amount, fill = homeownership)) +
 geom_histogram(binwidth = 5000, alpha = 0.5) + #specifies binwidth and setsalpha transparenc
y to 0.5 for the bars
 labs(x = "Loan amount ($)",y = "Frequency",title = "Amounts of Lending Club loans")
```



####Question 2.6: Lending set: Density plot

Solutions:

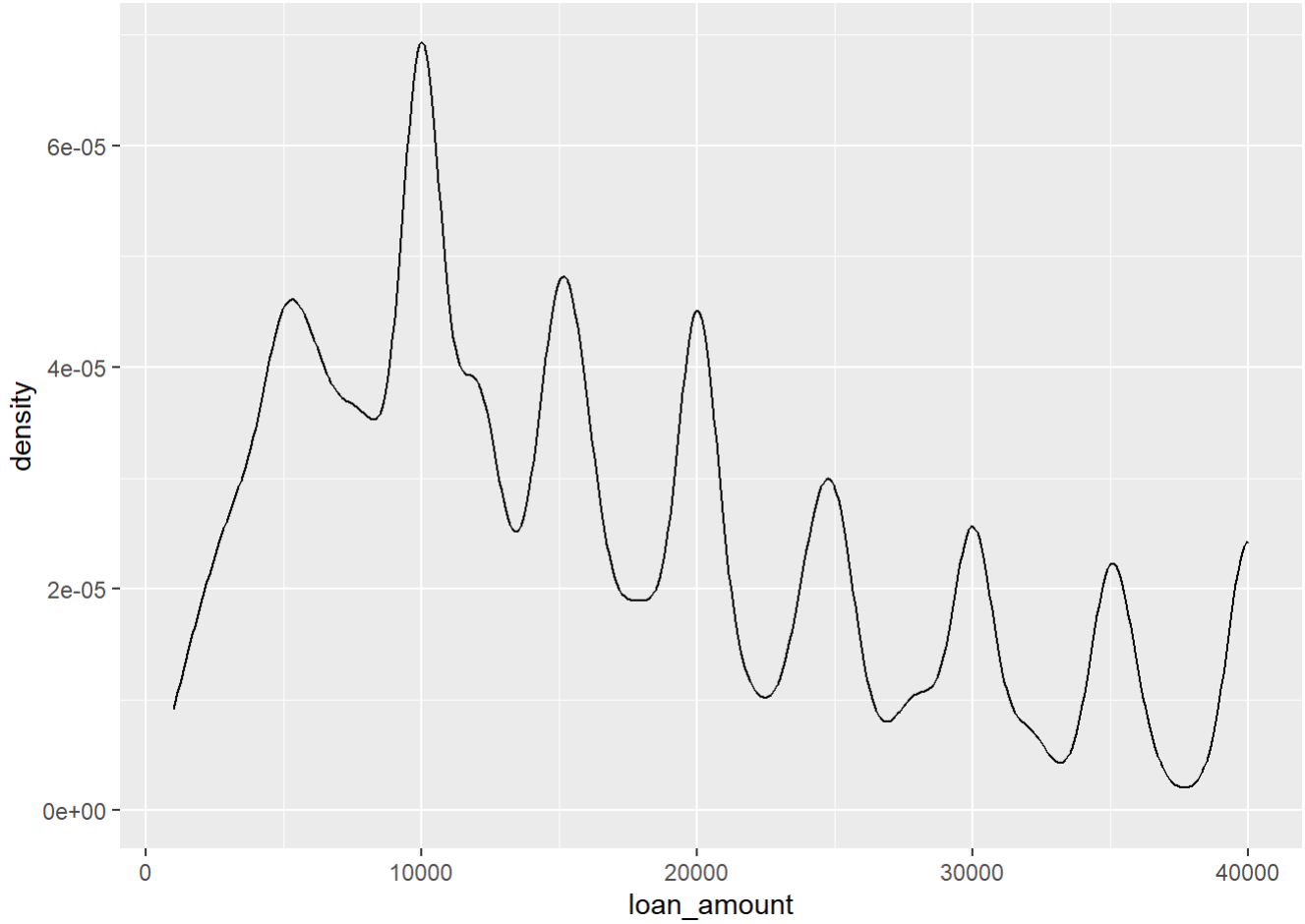
```
# Enter code here
ggplot(loans, aes(x = loan_amount)) +
 geom_density() # Creates a kernel density plot of loan amounts from the 'loans' dataset with 'loan_amount' on the x-axis.
```



####Question 2.7: Lending set: Density plots and adjusting bandwidth

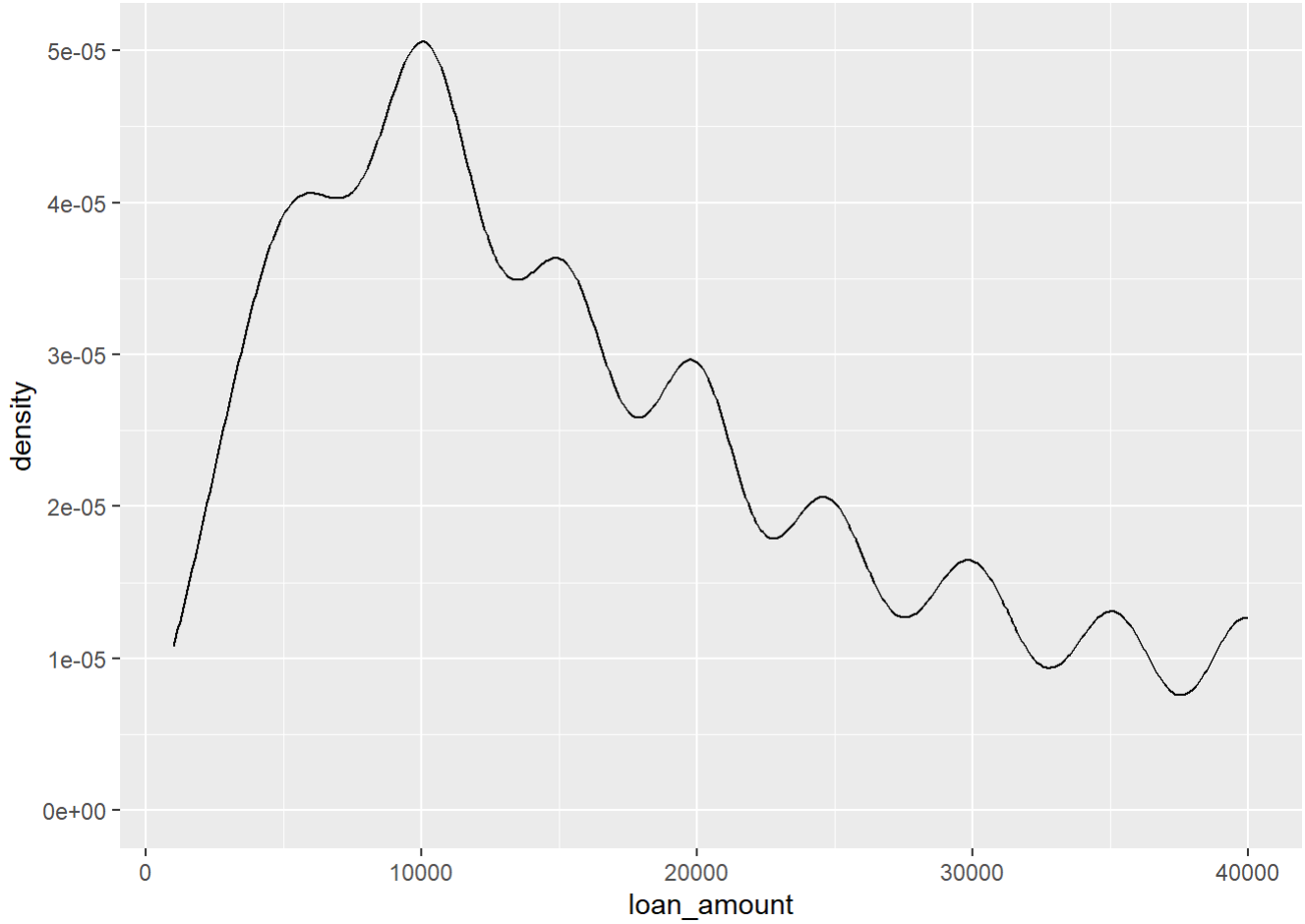
Solutions:

```
# Enter code here
ggplot(loans, aes(x = loan_amount)) +
 geom_density(adjust = 0.5) # Creates a kernel density plot of loan amounts from the 'loans' dataset with 'loan_amount' on the x-axis, and adjust the smoothing bandwidth to 0.5.
```



Solutions:

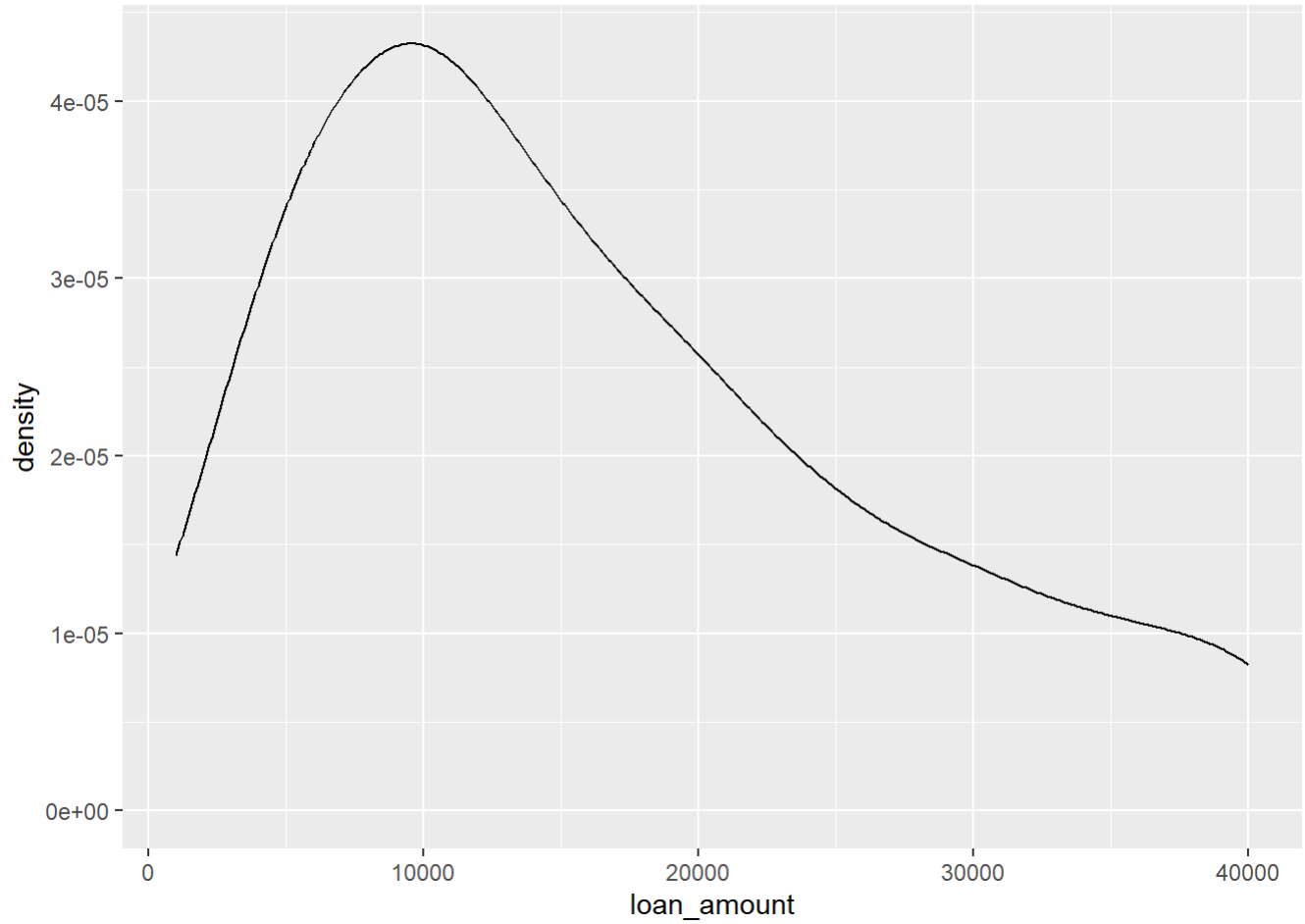
```
# Enter code here
ggplot(loans, aes(x = loan_amount)) +
 geom_density(adjust = 1) # default bandwidth
```




```
# Creates a kernel density plot of loan amounts from the 'loans' dataset with 'loan_amount' o
n the x-axis, and adjust the smoothing bandwidth to 1
```

Solutions:

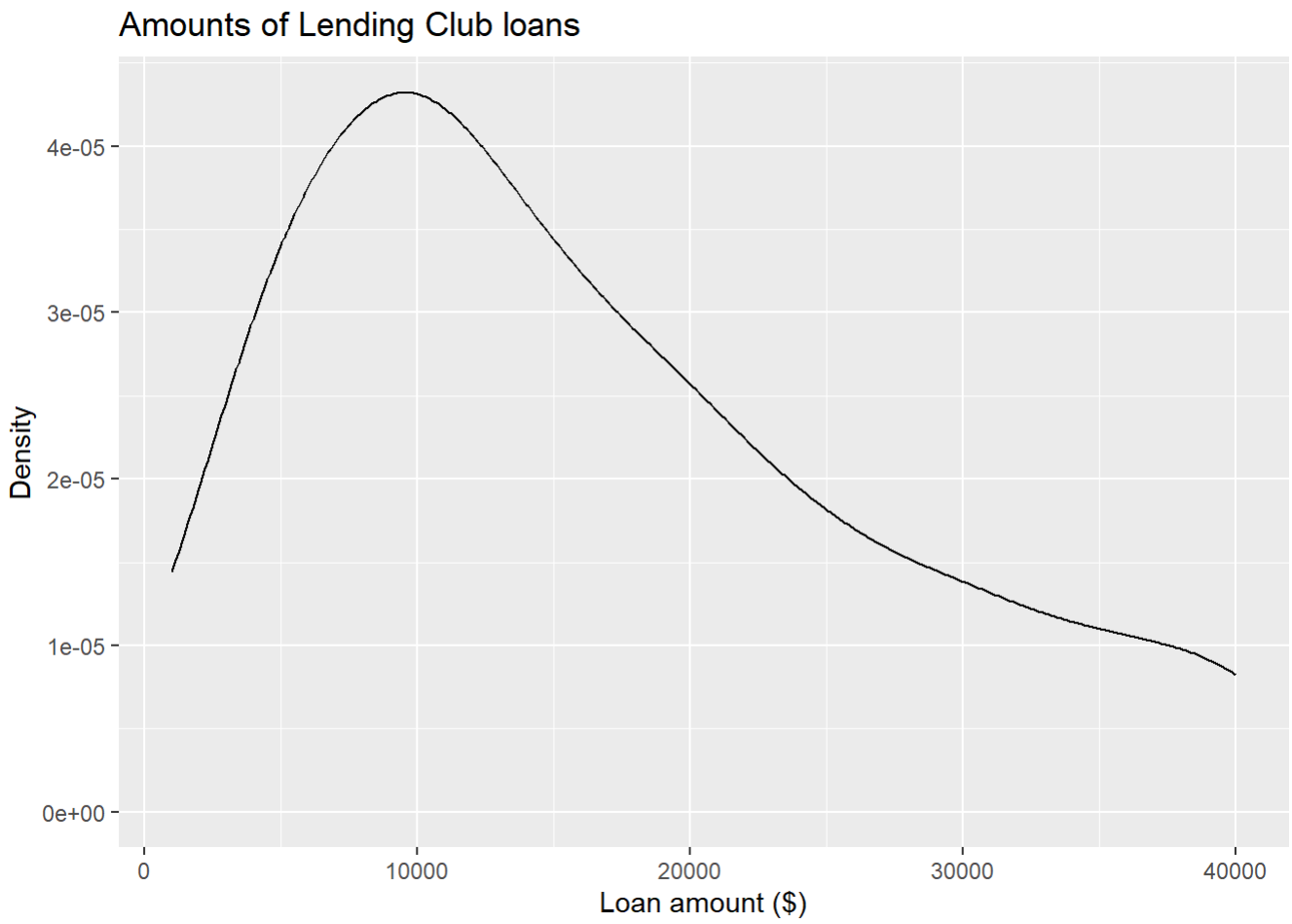
```
# Enter code here
ggplot(loans, aes(x = loan_amount)) +
 geom_density(adjust = 2) # Creates a kernel density plot of loan amounts from the 'loans' da
taset with 'loan_amount' on the x-axis, and adjust the smoothing bandwidth to 2.
```



####Question 2.7: Lending set: Customizing density plots

Solutions:

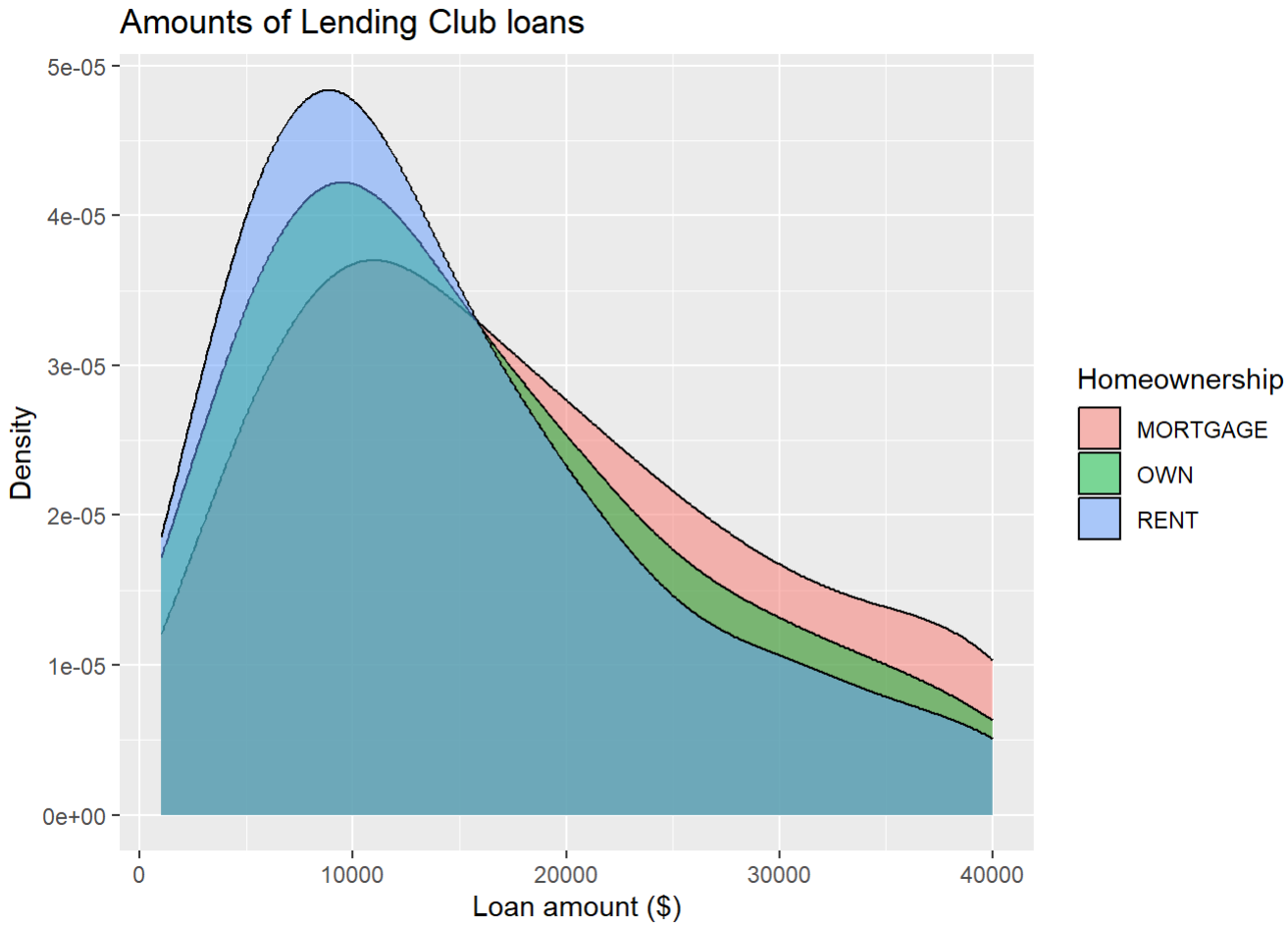
```
# Enter code here
ggplot(loans, aes(x = loan_amount)) +
 geom_density(adjust = 2) +  # Creates a kernel density plot of loan amounts from the 'loans' dataset with 'loan_amount' on the x-axis, and adjust the smoothing bandwidth to 2.
 labs( x = "Loan amount ($)", y = "Density", title = "Amounts of Lending Club loans" ) # Add labels to the x-axis, y-axis, and title of the plot for clarity.
```



####Question 2.8: Lending set:Adding a categorical variable

Solutions:

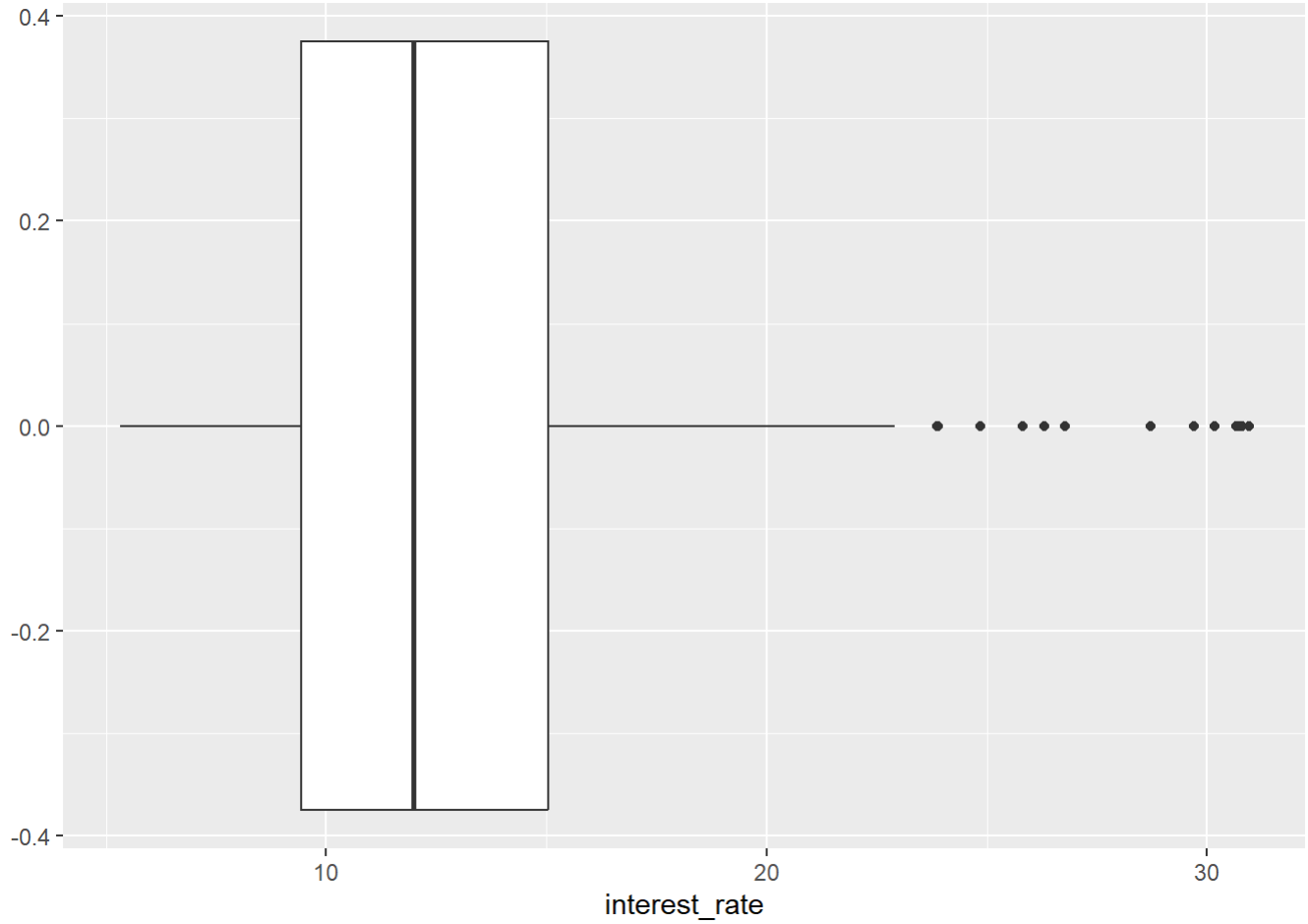
```
# Enter code here
ggplot(loans, aes(x = loan_amount, fill = homeownership)) +
 geom_density(adjust = 2, alpha = 0.5) + # Add a density plot layer to the plot with a smooth
ing bandwidth adjustment of 2 and set the transparency of the density curves to 0.5.
  labs(x = "Loan amount ($)",y = "Density",title = "Amounts of Lending Club loans", fill = "H
omeownership") #Add labels to the x-axis, y-axis, and title of the plot for clarity, and labe
l the legend as "Homeownership" for the fill colors.
```



####Question 2.9: Lending set:Box plot

Solutions:

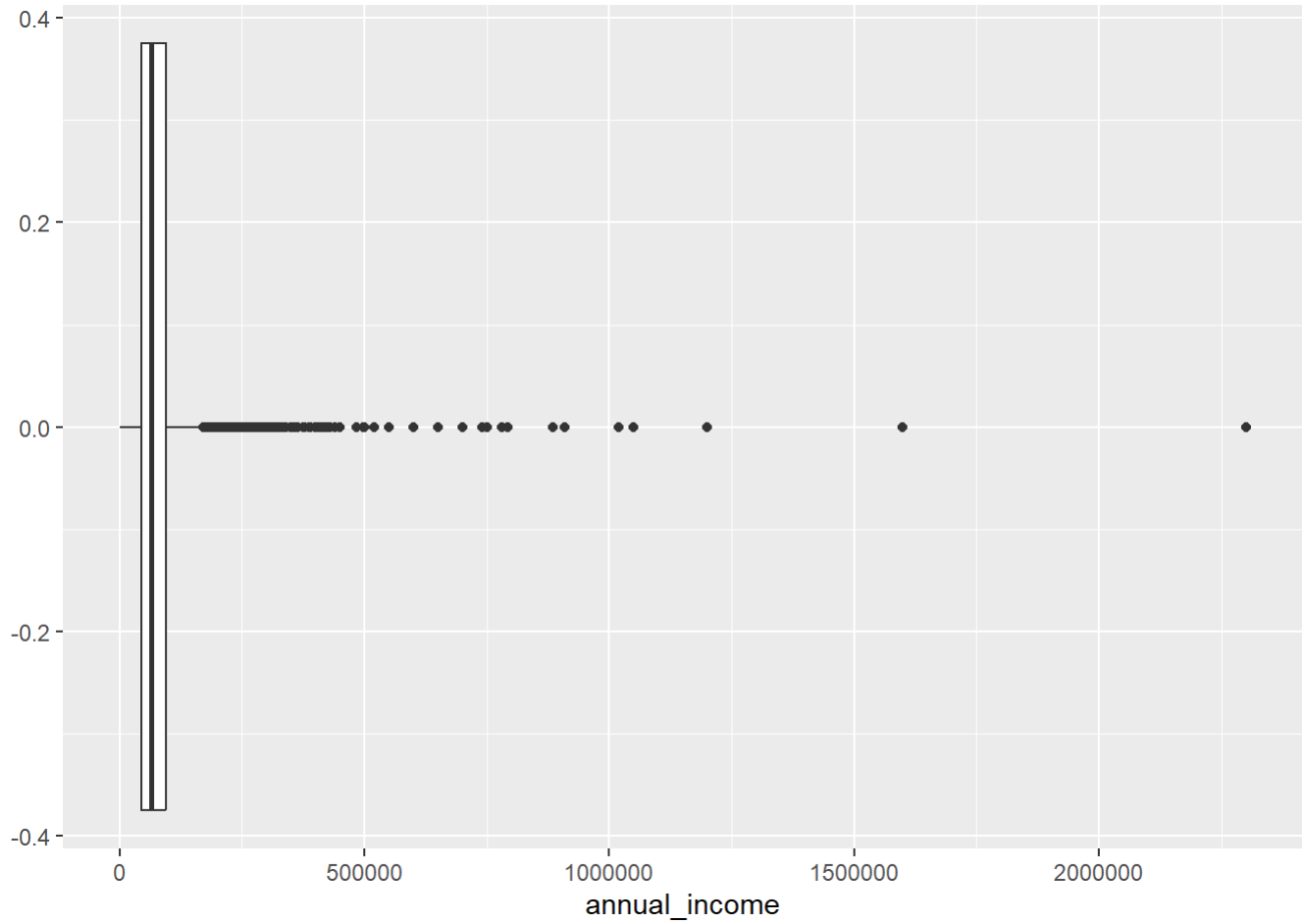
```
# Enter code here
ggplot(loans, aes(x = interest_rate)) + # Create a ggplot object using the 'loans' dataset, s
pecifying 'interest_rate' for the x-axis.
 geom_boxplot() # Add a boxplot layer to the plot to visualize the distribution of interest r
ates.
```



###Question 2.10: Lending set:Box plot and outliers

Solutions:

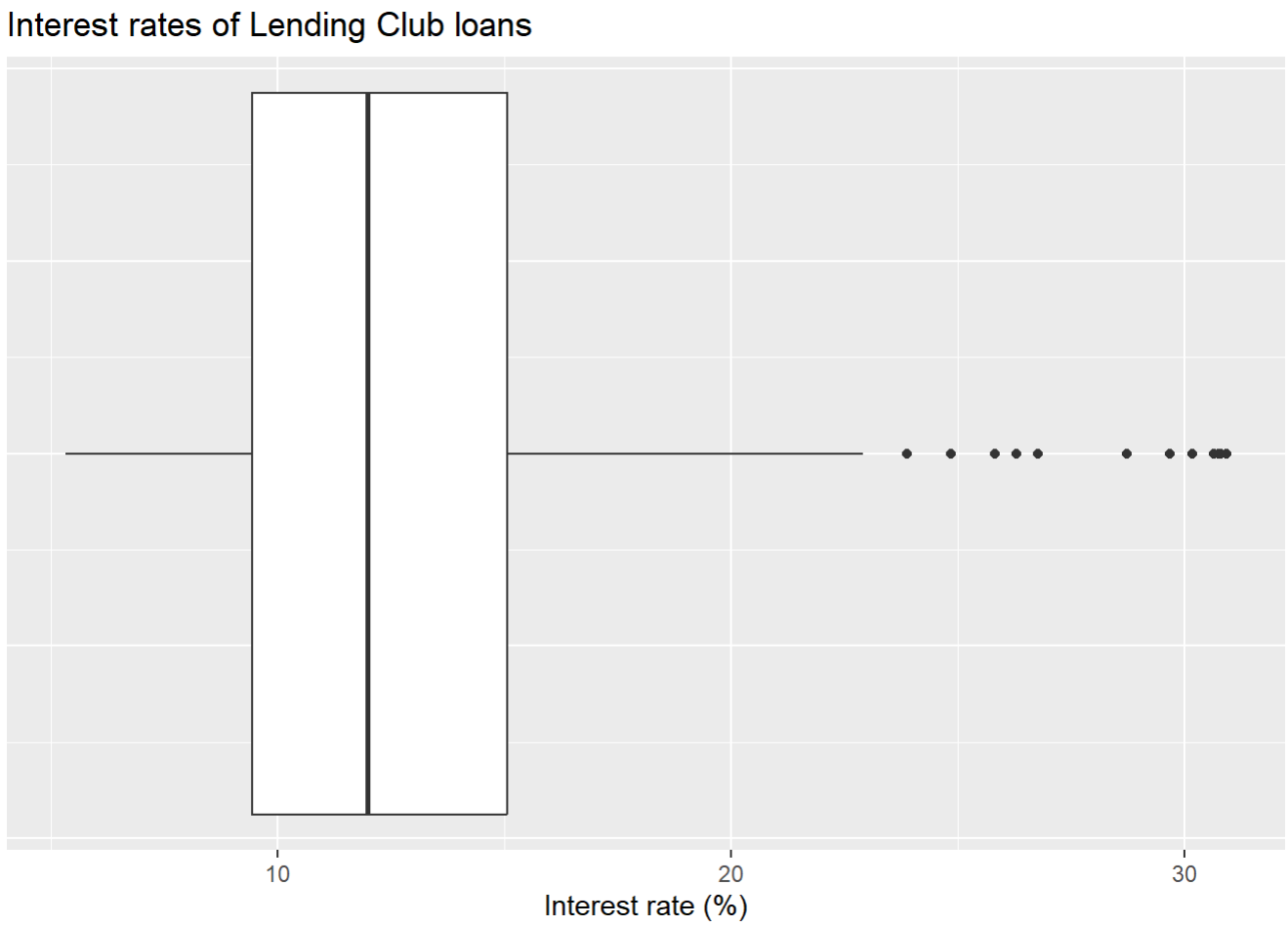
```
# Enter code here
ggplot(loans, aes(x = annual_income)) + # Create a ggplot object using the 'loans' dataset, s
pecifying 'annual_income' for the x-axis
 geom_boxplot() #Add a boxplot layer to the plot to visualize the distribution of annual inco
me.
```



###Question 2.11: Lending set:Customizing box plots

Solutions:

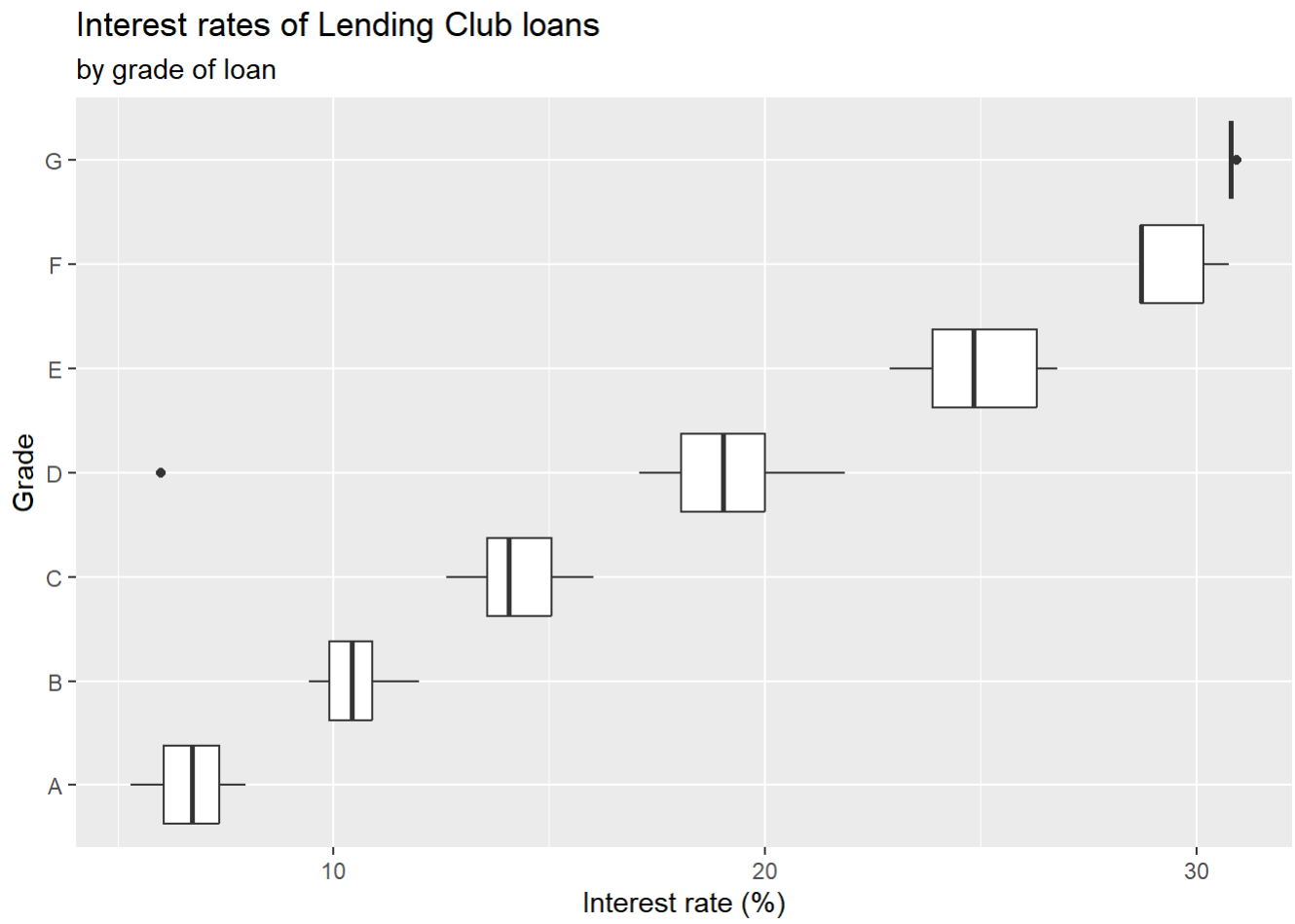
```
# Enter code here
ggplot(loans, aes(x = interest_rate)) +
  geom_boxplot() + # Add a boxplot layer to the plot to visualize the distribution of interes
t rates.
    labs(x = "Interest rate (%)",y = NULL,
 title = "Interest rates of Lending Club loans") + # Add a label to the x-axis, remove the la
bel for the y-axis, and set the title of the plot.
 theme( axis.ticks.y = element_blank(), axis.text.y = element_blank() ) # Customize the appea
rance of the y-axis by removing ticks and text.
```



###Question 2.12: Lending set:Adding a categoric variable

Solutions:

```
# Enter code here
ggplot(loans, aes(x = interest_rate,
 y = grade)) + # Create a ggplot object using the 'loans' dataset, specifying 'interest_rate' for the x-axis and 'grade' for the y-axis.
 geom_boxplot() + # Add a boxplot layer to the plot to visualize the distribution of interest rates for different grades.
geom_boxplot() +
 labs(x = "Interest rate (%)",y = "Grade",title = "Interest rates of Lending Club loans",subtitle ="by grade of loan") # Add labels to the x-axis and y-axis, as well as a title and a subtitle to the plot for clarity.
```

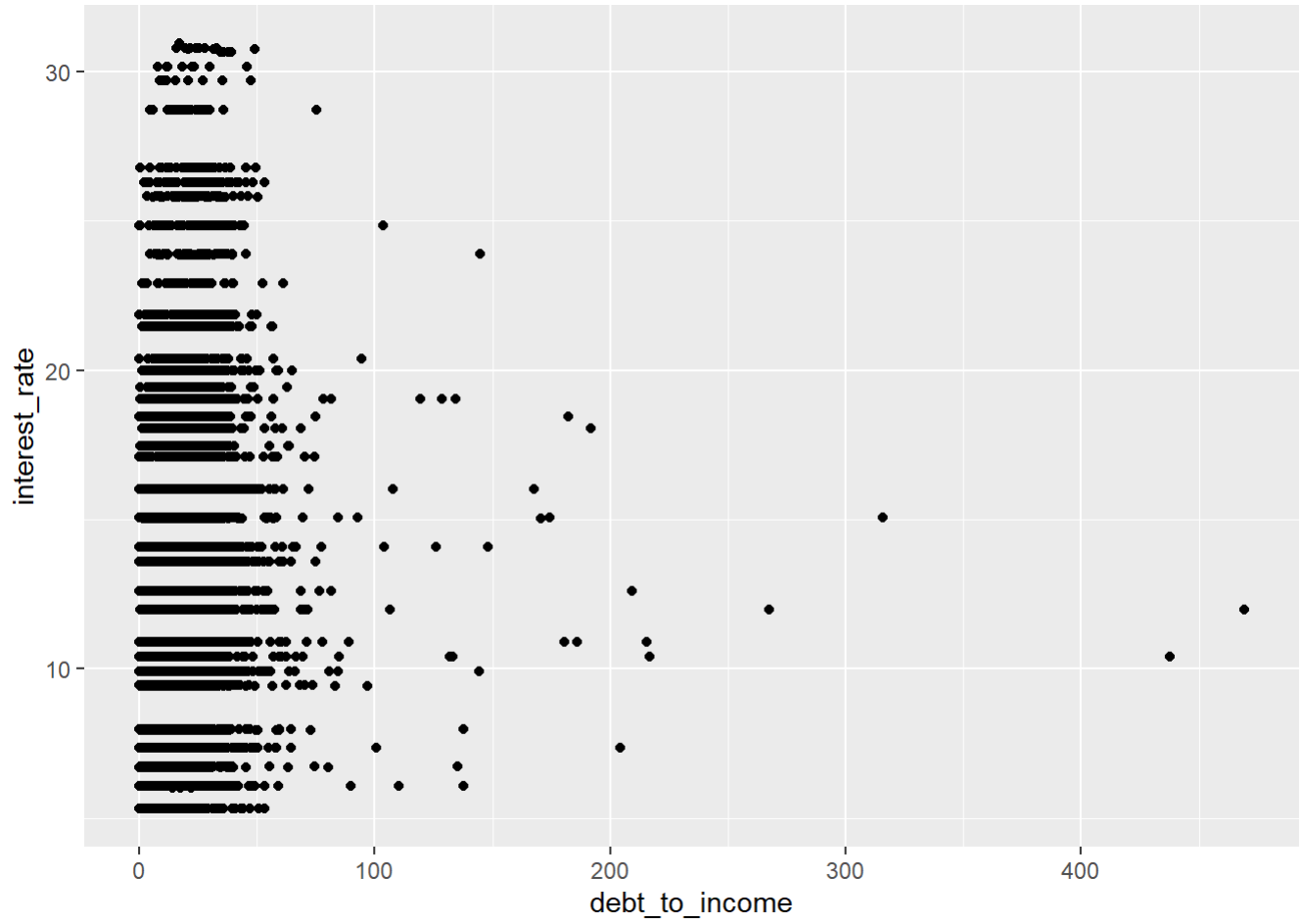


###Question 2.13: Lending set:Scatterplot

Solutions:

```
# Enter code here
ggplot(loans, aes(x = debt_to_income, y = interest_rate)) +  # Add a scatterplot layer to the plot to visualize the relationship between debt-to-income ratio and interest rates.
 geom_point()
```

```
## Warning: Removed 24 rows containing missing values (`geom_point()`).
```



###Question 2.14: Lending set:Hex Plot

Solutions:

```
# Enter code here
ggplot(loans, aes(x = debt_to_income, y = interest_rate)) + # Add a hexbin plot layer to the plot to visualize the relationship between debt-to-income ratio and interest rates using hexagonal bins.
 geom_hex()
```

```
## Warning: Removed 24 rows containing non-finite values (`stat_binhex()`).
```

```
## Warning: Computation failed in `stat_binhex()`
## Caused by error in `compute_group()`:
## ! The package "hexbin" is required for `stat_binhex()`
```

Solutions:

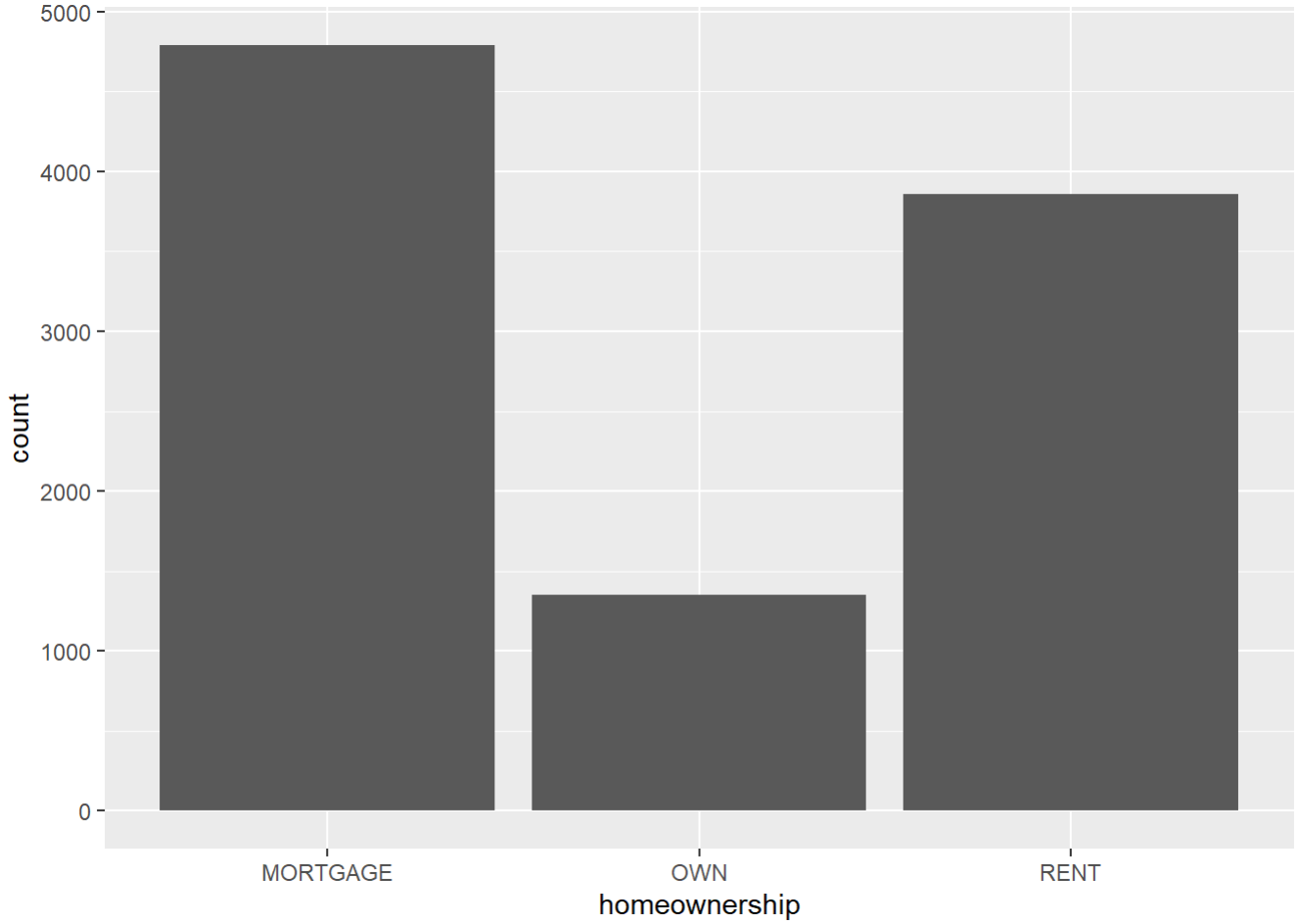
```
# Enter code here
ggplot(loans %>% filter(debt_to_income < 100),
 aes(x = debt_to_income, y = interest_rate)) +
 geom_hex()
```

```
## Warning: Computation failed in `stat_binhex()`
## Caused by error in `compute_group()`:
## ! The package "hexbin" is required for `stat_binhex()`
```

###Question 2.15: Lending set:Bar Plot

Solutions:

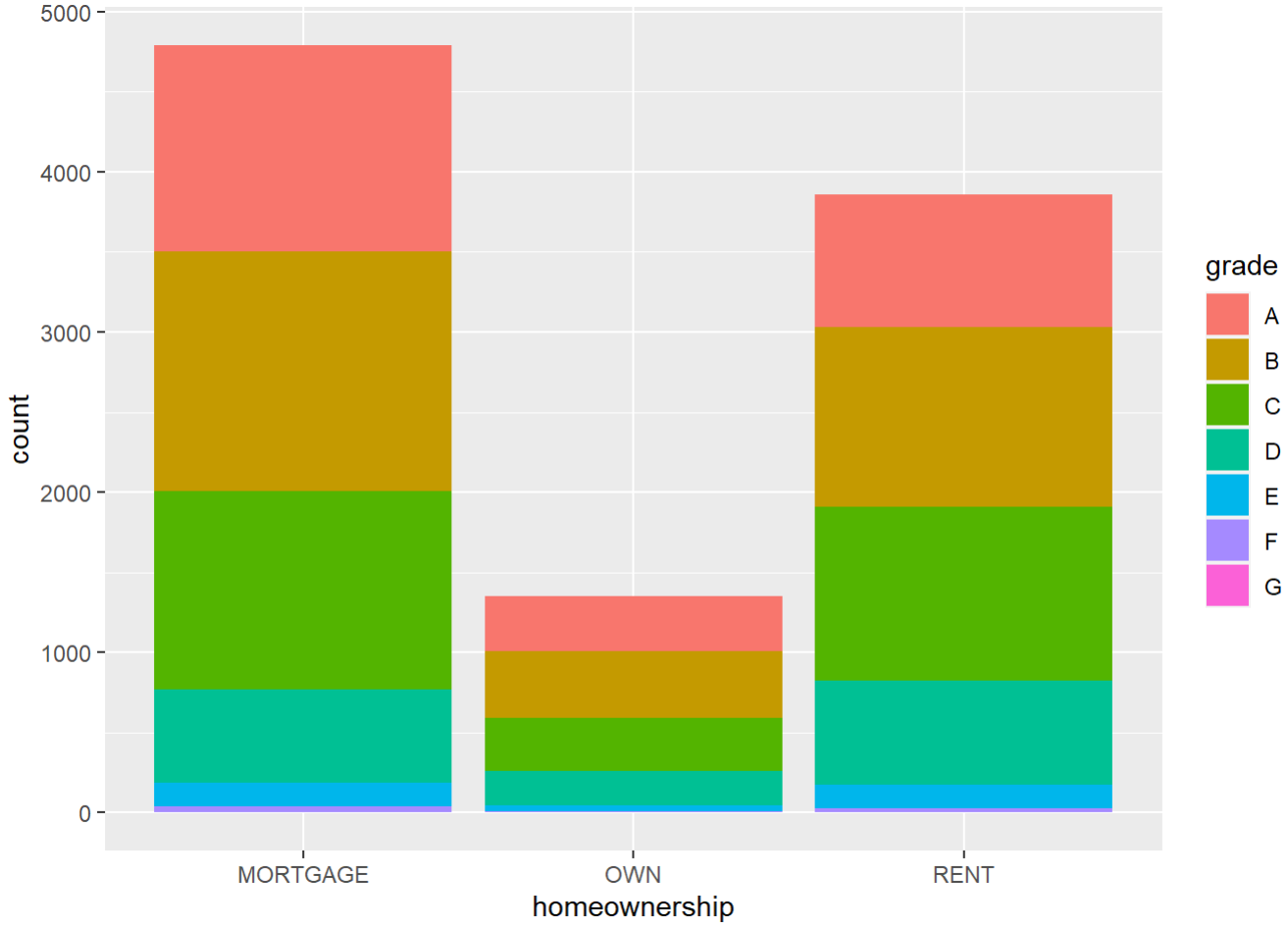
```
# Enter code here
ggplot(loans, aes(x = homeownership)) +
 geom_bar()
```



###Question 2.16: Lending set:Segmented bar plot

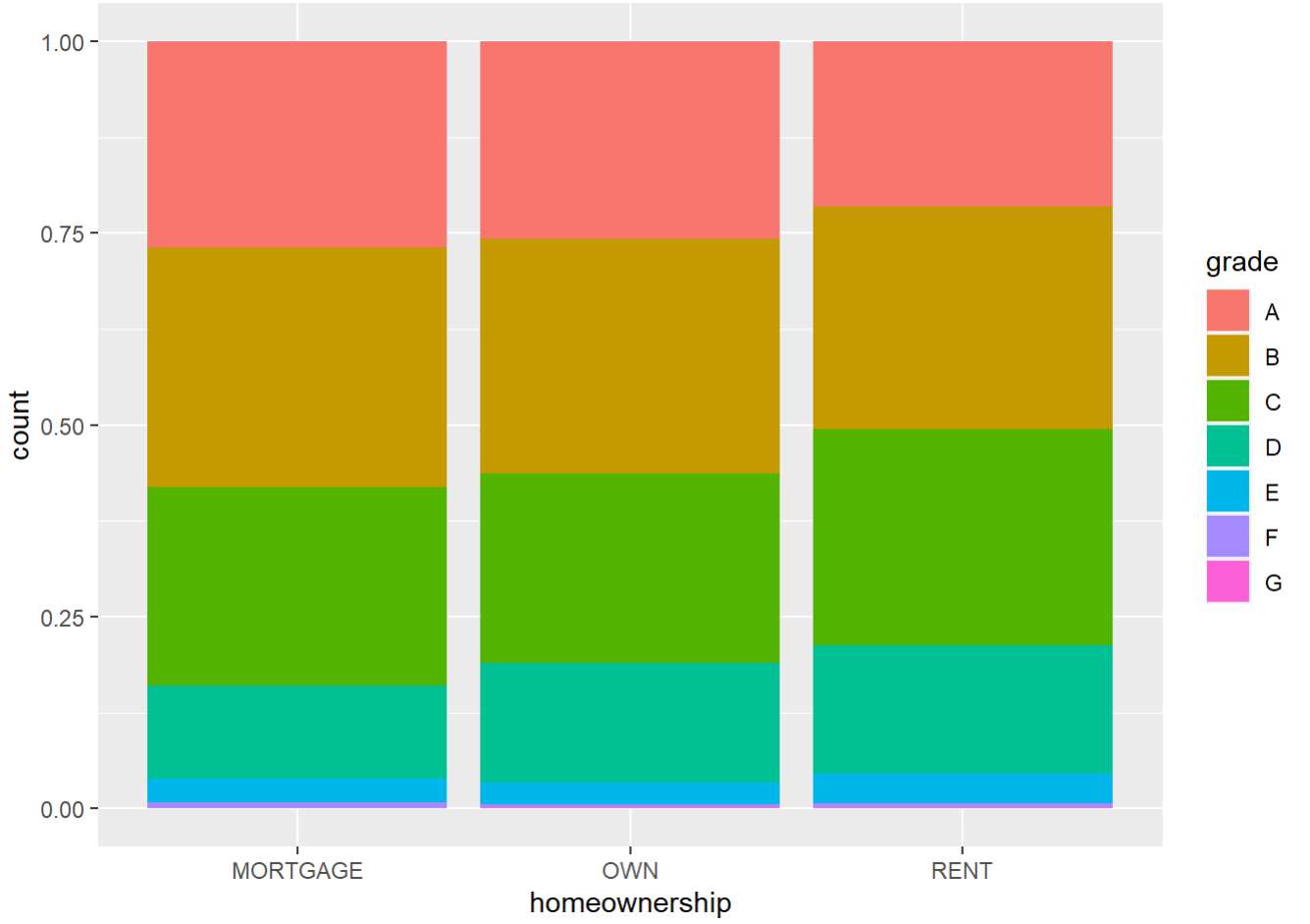
Solutions:

```
# Enter code here
ggplot(loans, aes(x = homeownership,
 fill = grade)) +
 geom_bar()
```



Solutions:

```
# Enter code here
ggplot(loans, aes(x = homeownership, fill = grade)) +
 geom_bar(position = "fill")
```



###Question 2.17: Lending set: Customiszing bar plot

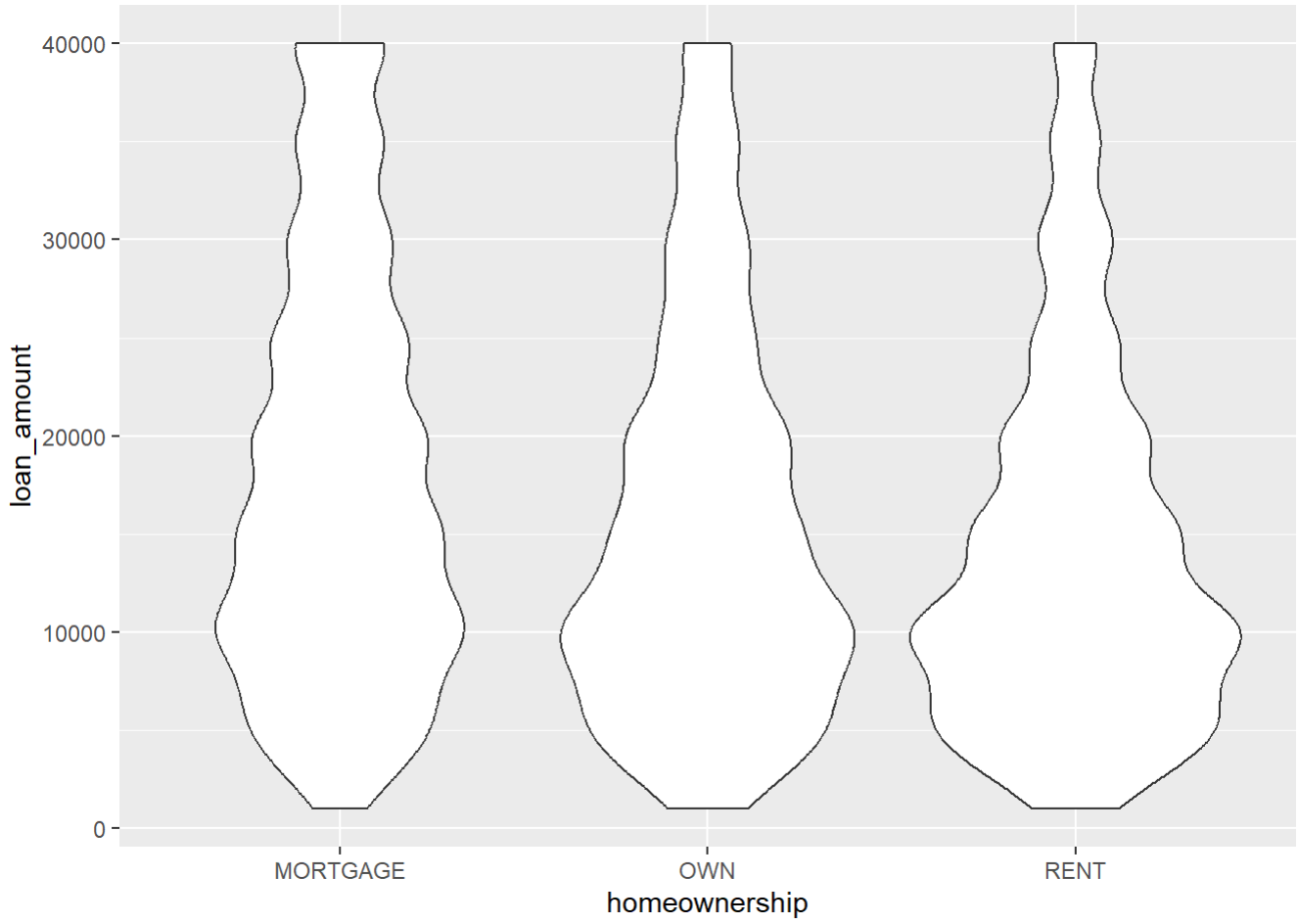
Solutions:

```
# Enter code here
ggplot(loans, aes(y = homeownership, fill = grade)) + geom_bar(position = "fill") +
labs( x = "Proportion", y = "Homeownership", fill = "Grade", title = "Grades of Lending Club
loans", subtitle = "and homeownership of lendee")
```

###Question 2.18: Lending set: Violin plot

Solutions:

```
# Enter code here
ggplot(loans, aes(x = homeownership, y = loan_amount)) +
 geom_violin()
```

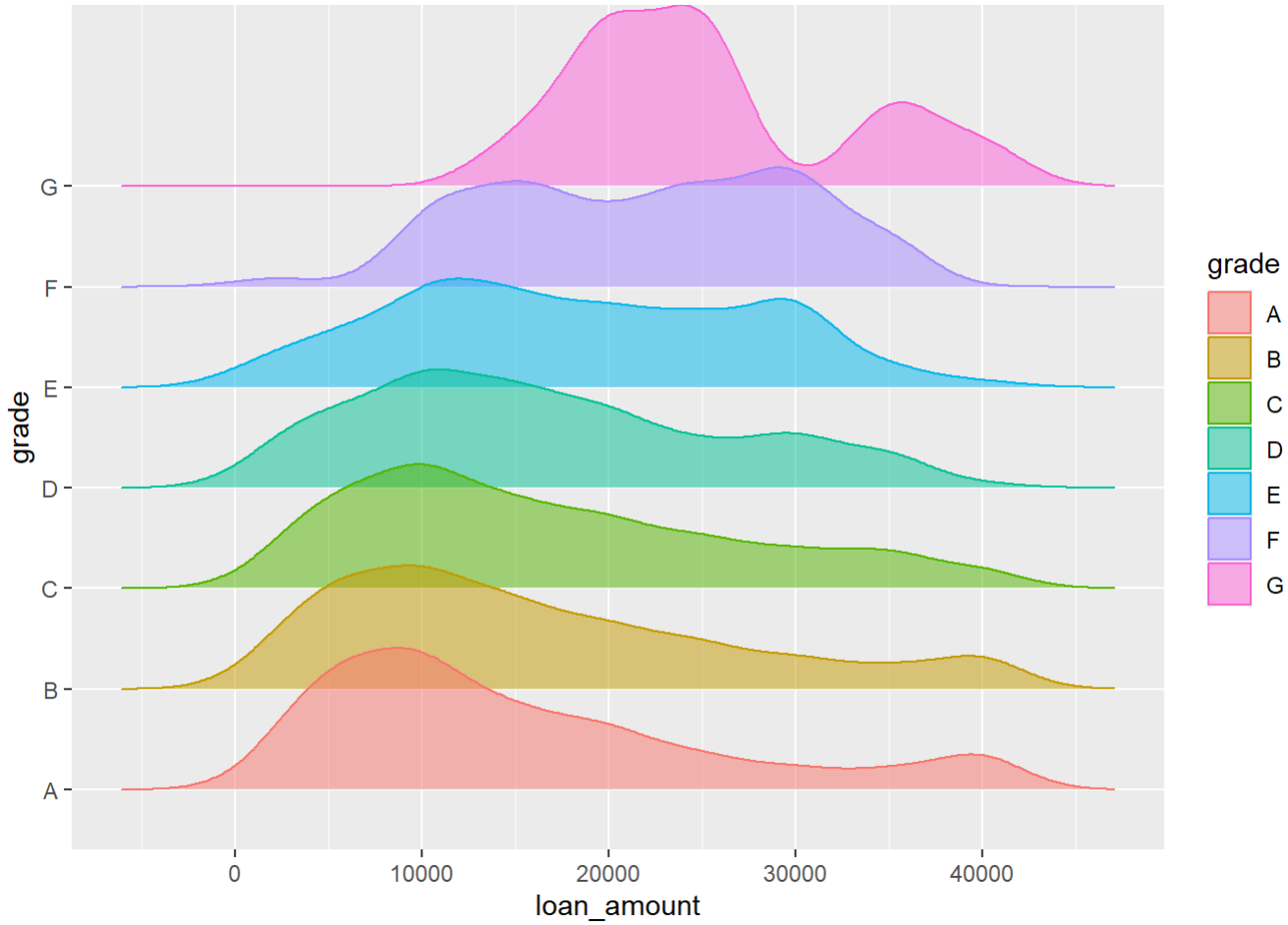


###Question 2.19: Lending set: Ridge plot

Solutions:

```
# Enter code here
library(ggridges)
ggplot(loans, aes(x = loan_amount, y = grade, fill = grade, color = grade)) +
 geom_density_ridges(alpha = 0.5) # Add a density ridge plot layer to visualize the distribut
ion of loan amounts by grade, with transparency set to 0.5.
```

```
## Picking joint bandwidth of 2360
```


grade
G
F
E
D
C
B
A
0
10000
20000
30000
40000
loan_amount
grade
A
B
C
D
E
F
G