data151eda2

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2022-10-25

```
library(tidyverse)
```

```
## -- Attaching packages --------------------------------------- tidyverse 1.3.2 --
## v ggplot2 3.3.6      v purrr   0.3.4
## v tibble  3.1.8      v dplyr   1.0.10
## v tidyr   1.2.1      v stringr 1.4.1
## v readr   2.1.2      v forcats 0.5.2
## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```
library(ggplot2)
?ggplot2
```

```
# IMPORTING DATASETS
tuition_cost <- readr::read_csv('https://raw.githubusercontent.com/rfordatascience/tidytuesday/master/da
```

```
## Rows: 2973 Columns: 10
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## chr (5): name, state, state_code, type, degree_length
## dbl (5): room_and_board, in_state_tuition, in_state_total, out_of_state_tuit...
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
tc = tuition_cost

tuition_income <- readr::read_csv('https://raw.githubusercontent.com/rfordatascience/tidytuesday/master/
```

```
## Rows: 209012 Columns: 7
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## chr (4): name, state, campus, income_lvl
## dbl (3): total_price, year, net_cost
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
ti = tuition_income

salary_potential <- readr::read_csv('https://raw.githubusercontent.com/rfordatascience/tidytuesday/maste
```

```
## Rows: 935 Columns: 7
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## chr (2): name, state_name
## dbl (5): rank, early_career_pay, mid_career_pay, make_world_better_percent, ...
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
sp = salary_potential

historical_tuition <- readr::read_csv('https://raw.githubusercontent.com/rfordatascience/tidytuesday/ma
```

```
## Rows: 270 Columns: 4
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## chr (3): type, year, tuition_type
## dbl (1): tuition_cost
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
ht = historical_tuition

diversity_school <- readr::read_csv('https://raw.githubusercontent.com/rfordatascience/tidytuesday/maste
```

```
## Rows: 50655 Columns: 5
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## chr (3): name, state, category
## dbl (2): total_enrollment, enrollment
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
ds = diversity_school
```

```
# Time to explore the data!

table(tc$state,tc$degree_length)
```

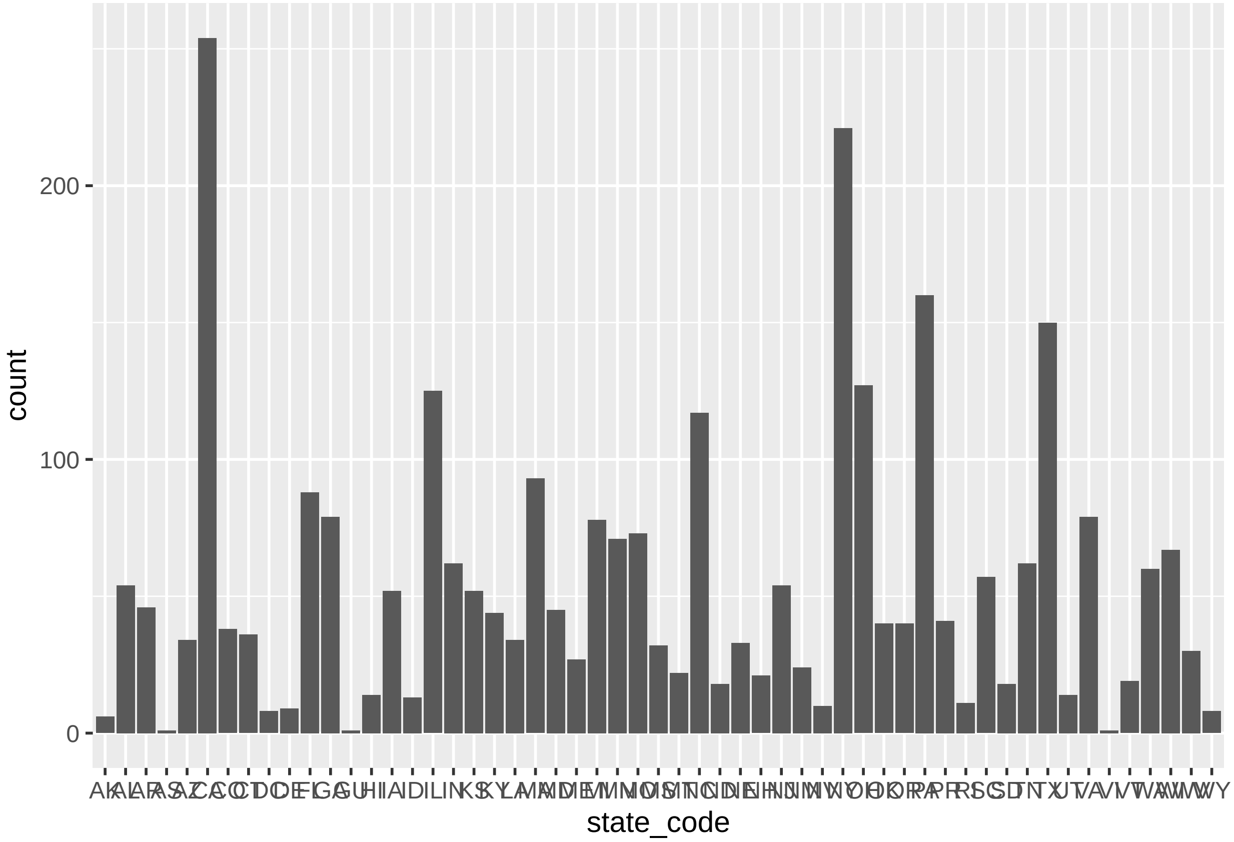
```
##
##                   2 Year 4 Year Other
##   Alabama             21     33     0
##   Alaska               1      5     0
##   Arizona             23     11     0
##   Arkansas            24     22     0
##   California         119    135     0
##   Colorado            18     20     0
##   Connecticut         14     22     0
##   Delaware             4      5     0
##   Florida             33     55     0
##   Georgia             29     50     0
##   Hawaii               8      6     0
##   Idaho                4      9     0
##   Illinois            52     73     0
##   Indiana             18     44     0
##   Iowa                18     34     0
##   Kansas              25     27     0
##   Kentucky           15     29     0
##   Louisiana           8     26     0
##   Maine               9     18     0
##   Maryland           16     29     0
##   Massachusetts      21     72     0
##   Michigan           30     48     0
##   Minnesota          33     38     0
##   Mississippi        15     17     0
##   Missouri           23     50     0
##   Montana            11     11     0
##   Nebraska           10     23     0
##   Nevada              4      6     0
##   New Hampshire       7     14     0
##   New Jersey         21     33     0
##   New Mexico         14     10     0
##   New York           58    163     0
##   North Carolina     59     58     0
##   North Dakota        9      9     0
##   Ohio               47     80     0
##   Oklahoma           15     25     0
##   Oregon             15     25     0
##   Pennsylvania       31    129     0
##   Rhode Island        1     10     0
##   South Carolina     23     34     0
##   South Dakota        5     13     0
##   Tennessee          17     45     0
##   Texas              67     82     1
##   Utah                4     10     0
##   Vermont             3     16     0
##   Virginia           30     49     0
##   Washington         33     27     0
##   West Virginia       9     21     0
##   Wisconsin          31     36     0
##   Wyoming             7      1     0
```

```
table(tc$state)
```

```
## 
##         Alabama         Alaska        Arizona       Arkansas     California 
##              54              6             34             46            254 
##        Colorado    Connecticut       Delaware        Florida        Georgia 
##              38             36              9             88             79 
##          Hawaii          Idaho       Illinois        Indiana           Iowa 
##              14             13            125             62             52 
##          Kansas       Kentucky      Louisiana          Maine       Maryland 
##              52             44             34             27             45 
##   Massachusetts       Michigan      Minnesota    Mississippi       Missouri 
##              93             78             71             32             73 
##         Montana       Nebraska         Nevada  New Hampshire     New Jersey 
##              22             33             10             21             54 
##      New Mexico       New York North Carolina   North Dakota           Ohio 
##              24            221            117             18            127 
##        Oklahoma         Oregon   Pennsylvania   Rhode Island South Carolina 
##              40             40            160             11             57 
##    South Dakota      Tennessee          Texas           Utah        Vermont 
##              18              62             150              14              19
##        Virginia      Washington   West Virginia       Wisconsin         Wyoming
##              79              60              30              67               8
```

This is a graph of the number of higher-education schools in each U.S. territory and state.

```
ggplot(tc, aes(x=state_code))+
  geom_bar()
```



```
#indexing each row in the table to have a unique identifier
tc$index <- 1:nrow(tc)

tc
```

```
## # A tibble: 2,973 x 11
##    name      state state~1 type  degre~2 room_~3 in_st~4 in_st~5 out_o~6 out_o~7
##    <chr>     <chr> <chr>   <chr> <chr>     <dbl>   <dbl>   <dbl>   <dbl>   <dbl>
##  1 Aaniiih ~ Mont~ MT      Publ~ 2 Year       NA    2380    2380    2380    2380
##  2 Abilene ~ Texas TX      Priv~ 4 Year    10350   34850   45200   34850   45200
##  3 Abraham ~ Geor~ GA      Publ~ 2 Year     8474    4128   12602   12550   21024
##  4 Academy ~ Minn~ MN      For ~ 2 Year       NA   17661   17661   17661   17661
##  5 Academy ~ Cali~ CA      For ~ 4 Year    16648   27810   44458   27810   44458
##  6 Adams St~ Colo~ CO      Publ~ 4 Year     8782    9440   18222   20456   29238
##  7 Adelphi ~ New ~ NY      Priv~ 4 Year    16030   38660   54690   38660   54690
##  8 Adironda~ New ~ NY      Publ~ 2 Year    11660    5375   17035    9935   21595
##  9 Adrian C~ Mich~ MI      Priv~ 4 Year    11318   37087   48405   37087   48405
## 10 Advanced~ Virg~ VA      For ~ 2 Year       NA   13680   13680   13680   13680
## # ... with 2,963 more rows, 1 more variable: index <int>, and abbreviated
## #   variable names 1: state_code, 2: degree_length, 3: room_and_board,
## #   4: in_state_tuition, 5: in_state_total, 6: out_of_state_tuition,
## #   7: out_of_state_total
```

```
## Joint distributions
#tc2way<-tc %>%
#  group_by(state_code, degree_length)%>%
#  mutate(freq=sum(Freq))

#tc2way
```

```
tc_with_count2 = tc %>%
  group_by(state_code) %>%
  mutate(school_count = n())

tc_with_count2
```

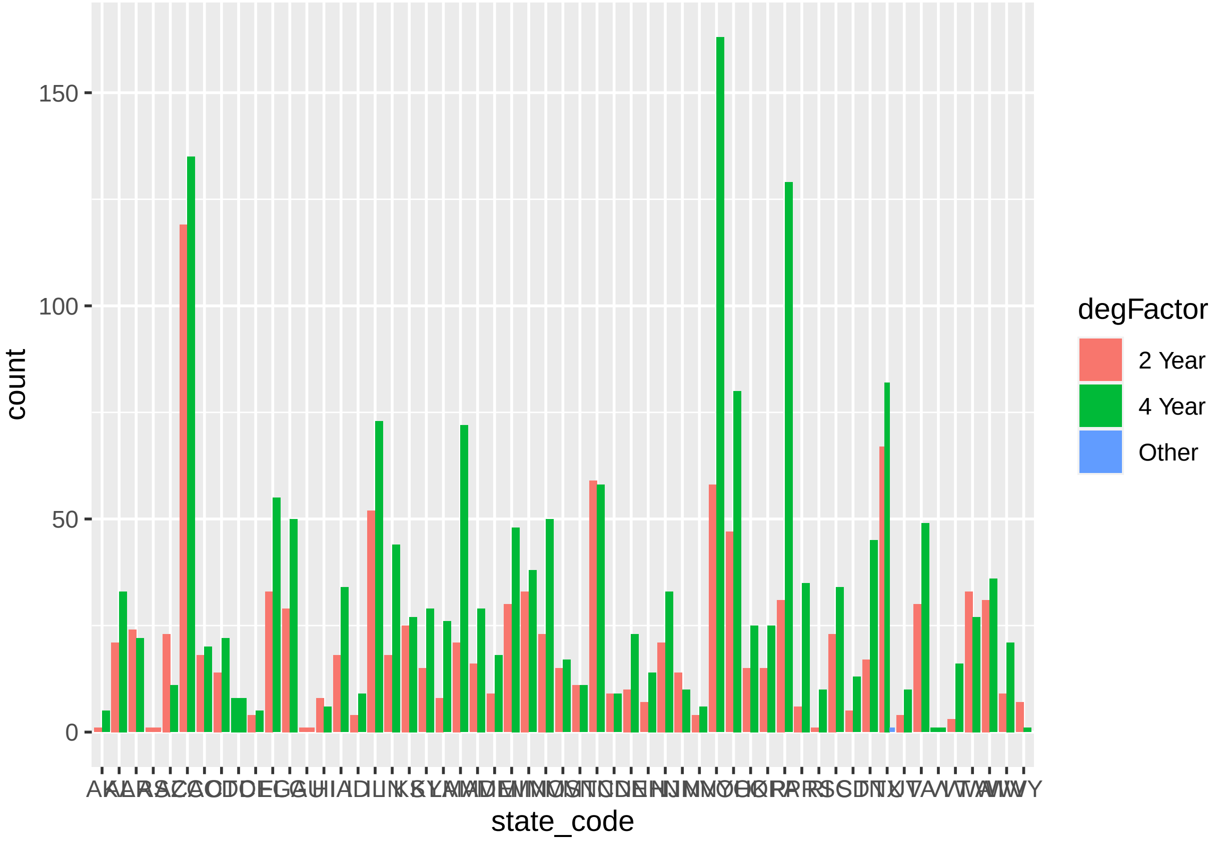
```
## # A tibble: 2,973 x 12
## # Groups:   state_code [55]
##    name      state state~1 type  degre~2 room_~3 in_st~4 in_st~5 out_o~6 out_o~7
##    <chr>     <chr> <chr>   <chr> <chr>     <dbl>   <dbl>   <dbl>   <dbl>   <dbl>
##  1 Aaniiih ~ Mont~ MT      Publ~ 2 Year       NA    2380    2380    2380    2380
##  2 Abilene ~ Texas TX      Priv~ 4 Year    10350   34850   45200   34850   45200
##  3 Abraham ~ Geor~ GA      Publ~ 2 Year     8474    4128   12602   12550   21024
##  4 Academy ~ Minn~ MN      For ~ 2 Year       NA   17661   17661   17661   17661
##  5 Academy ~ Cali~ CA      For ~ 4 Year    16648   27810   44458   27810   44458
##  6 Adams St~ Colo~ CO      Publ~ 4 Year     8782    9440   18222   20456   29238
##  7 Adelphi ~ New ~ NY      Priv~ 4 Year    16030   38660   54690   38660   54690
##  8 Adironda~ New ~ NY      Publ~ 2 Year    11660    5375   17035    9935   21595
##  9 Adrian C~ Mich~ MI      Priv~ 4 Year    11318   37087   48405   37087   48405
## 10 Advanced~ Virg~ VA      For ~ 2 Year       NA   13680   13680   13680   13680
## # ... with 2,963 more rows, 2 more variables: index <int>, school_count <int>,
## #   and abbreviated variable names 1: state_code, 2: degree_length,
## #   3: room_and_board, 4: in_state_tuition, 5: in_state_total,
## #   6: out_of_state_tuition, 7: out_of_state_total
```

```
tcFactored = tc %>%
  mutate(degFactor = as.factor(degree_length))

tcFactored
```

```
## # A tibble: 2,973 x 12
##    name      state state~1 type  degre~2 room_~3 in_st~4 in_st~5 out_o~6 out_o~7
##    <chr>     <chr> <chr>   <chr> <chr>     <dbl>   <dbl>   <dbl>   <dbl>   <dbl>
##  1 Aaniiih ~ Mont~ MT      Publ~ 2 Year       NA    2380    2380    2380    2380
##  2 Abilene ~ Texas TX      Priv~ 4 Year    10350   34850   45200   34850   45200
##  3 Abraham ~ Geor~ GA      Publ~ 2 Year     8474    4128   12602   12550   21024
##  4 Academy ~ Minn~ MN      For ~ 2 Year       NA   17661   17661   17661   17661
##  5 Academy ~ Cali~ CA      For ~ 4 Year    16648   27810   44458   27810   44458
##  6 Adams St~ Colo~ CO      Publ~ 4 Year     8782    9440   18222   20456   29238
##  7 Adelphi ~ New ~ NY      Priv~ 4 Year    16030   38660   54690   38660   54690
##  8 Adironda~ New ~ NY      Publ~ 2 Year    11660    5375   17035    9935   21595
##  9 Adrian C~ Mich~ MI      Priv~ 4 Year    11318   37087   48405   37087   48405
## 10 Advanced~ Virg~ VA      For ~ 2 Year       NA   13680   13680   13680   13680
## # ... with 2,963 more rows, 2 more variables: index <int>, degFactor <fct>, and
## #   abbreviated variable names 1: state_code, 2: degree_length,
## #   3: room_and_board, 4: in_state_tuition, 5: in_state_total,
## #   6: out_of_state_tuition, 7: out_of_state_total
```

```
ggplot(tcFactored, aes(x=state_code,fill=degFactor))+
  geom_bar(position="dodge")
```



Numeric Summaries

```
tcFactored = tc %>%
  mutate(degFactor = as.factor(degree_length))

tcFactored
```

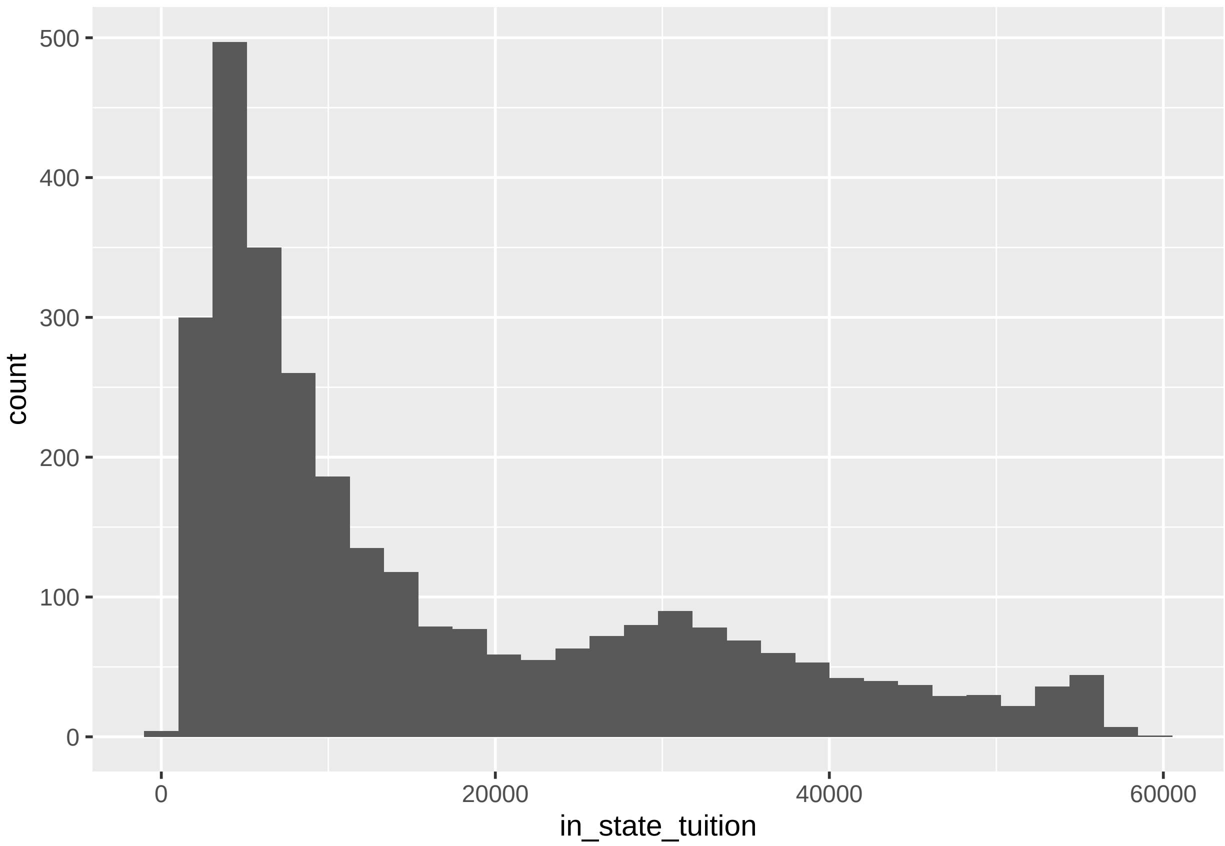
```
## # A tibble: 2,973 x 12
##    name      state state~1 type  degre~2 room_~3 in_st~4 in_st~5 out_o~6 out_o~7
##    <chr>     <chr> <chr>   <chr> <chr>     <dbl>   <dbl>   <dbl>   <dbl>   <dbl>
##  1 Aaniiih ~ Mont~ MT      Publ~ 2 Year       NA    2380    2380    2380    2380
##  2 Abilene ~ Texas TX      Priv~ 4 Year    10350   34850   45200   34850   45200
##  3 Abraham ~ Geor~ GA      Publ~ 2 Year     8474    4128   12602   12550   21024
##  4 Academy ~ Minn~ MN      For ~ 2 Year       NA   17661   17661   17661   17661
##  5 Academy ~ Cali~ CA      For ~ 4 Year    16648   27810   44458   27810   44458
##  6 Adams St~ Colo~ CO      Publ~ 4 Year     8782    9440   18222   20456   29238
##  7 Adelphi ~ New ~ NY      Priv~ 4 Year    16030   38660   54690   38660   54690
##  8 Adironda~ New ~ NY      Publ~ 2 Year    11660    5375   17035    9935   21595
##  9 Adrian C~ Mich~ MI      Priv~ 4 Year    11318   37087   48405   37087   48405
## 10 Advanced~ Virg~ VA      For ~ 2 Year       NA   13680   13680   13680   13680
## # ... with 2,963 more rows, 2 more variables: index <int>, degFactor <fct>, and
## #   abbreviated variable names 1: state_code, 2: degree_length,
## #   3: room_and_board, 4: in_state_tuition, 5: in_state_total,
## #   6: out_of_state_tuition, 7: out_of_state_total
```

```
str(tcFactored)
```

```
## tibble [2,973 x 12] (S3: tbl_df/tbl/data.frame)
##  $ name                : chr [1:2973] "Aaniiih Nakoda College" "Abilene Christian University" "Abraha
##  $ state               : chr [1:2973] "Montana" "Texas" "Georgia" "Minnesota" ...
##  $ state_code          : chr [1:2973] "MT" "TX" "GA" "MN" ...
##  $ type                : chr [1:2973] "Public" "Private" "Public" "For Profit" ...
##  $ degree_length       : chr [1:2973] "2 Year" "4 Year" "2 Year" "2 Year" ...
##  $ room_and_board      : num [1:2973] NA 10350 8474 NA 16648 ...
##  $ in_state_tuition    : num [1:2973] 2380 34850 4128 17661 27810 ...
##  $ in_state_total      : num [1:2973] 2380 45200 12602 17661 44458 ...
##  $ out_of_state_tuition: num [1:2973] 2380 34850 12550 17661 27810 ...
##  $ out_of_state_total  : num [1:2973] 2380 45200 21024 17661 44458 ...
##  $ index               : int [1:2973] 1 2 3 4 5 6 7 8 9 10 ...
##  $ degFactor           : Factor w/ 3 levels "2 Year","4 Year",..: 1 2 1 1 2 2 2 1 2 1 ...
```

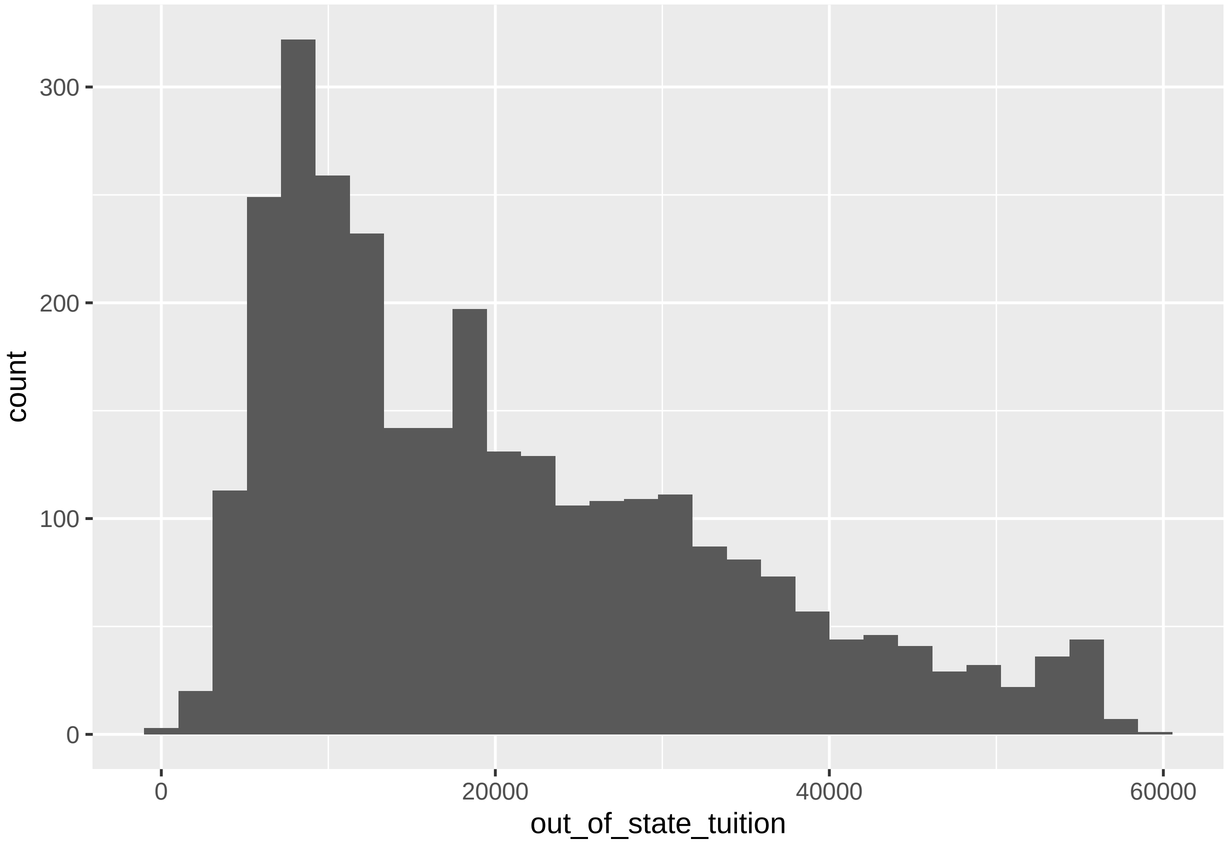
```
ggplot(tcFactored, aes(x=in_state_tuition)) + geom_histogram()
```

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



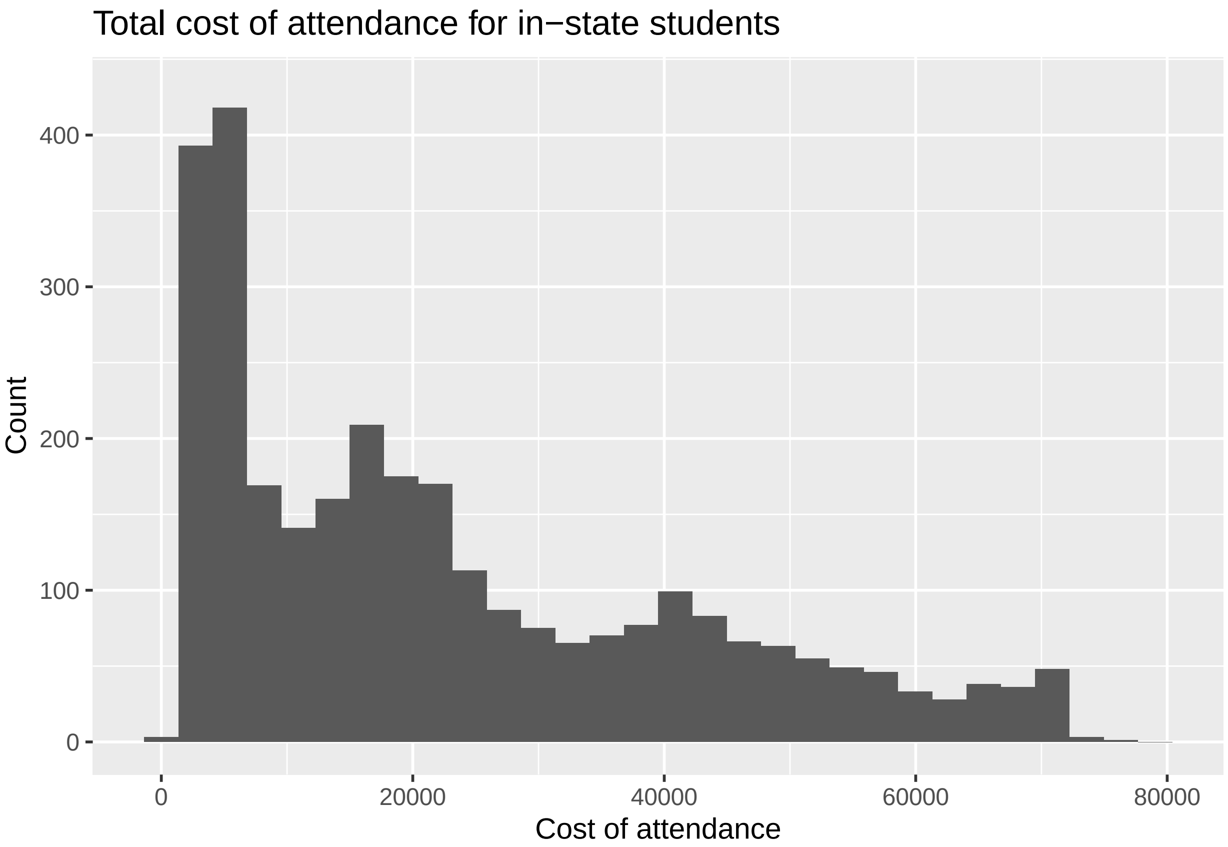
```
ggplot(tcFactored, aes(x=out_of_state_tuition))+geom_histogram()
```

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



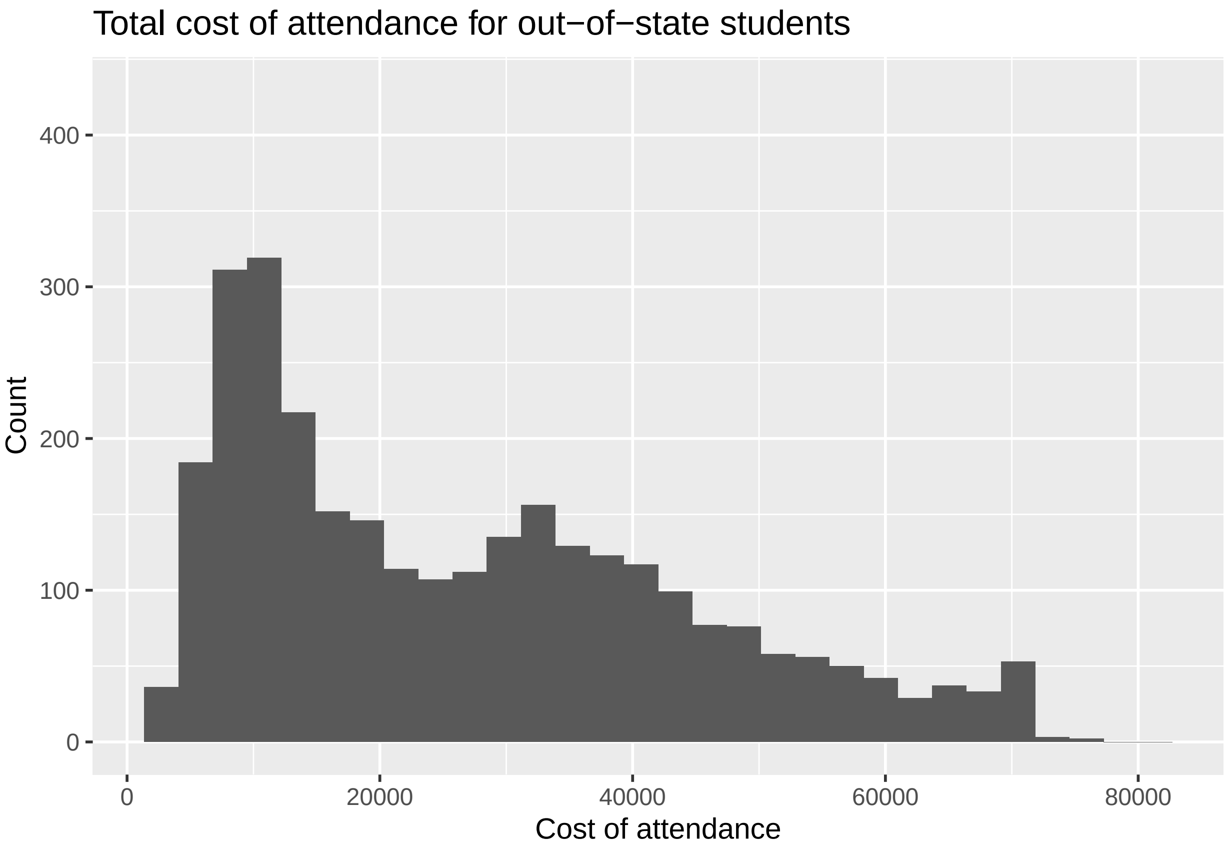
```
ggplot(tcFactored, aes(x=in_state_total))+geom_histogram()+expand_limits(x=80000,y=430) +
  ggtitle("Total cost of attendance for in-state students")+ # for the main title
  xlab("Cost of attendance")+ # for the x axis label
  ylab("Count") # for the y axis label
```

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



```
ggplot(tcFactored, aes(x=out_of_state_total))+geom_histogram()+expand_limits(x=80000,y=430) +
  ggtitle("Total cost of attendance for out-of-state students")+ # for the main title
  xlab("Cost of attendance")+ # for the x axis label
  ylab("Count") # for the y axis label
```

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



```
#ggtitle(label) # for the main title
#xlab(label) # for the x axis label
#ylab(label) # for the y axis label
#labs(...) # for the main title, axis labels and legend titles
```