VISUALIZING BIG DATA WITH TRELLISCOPE

Introduction

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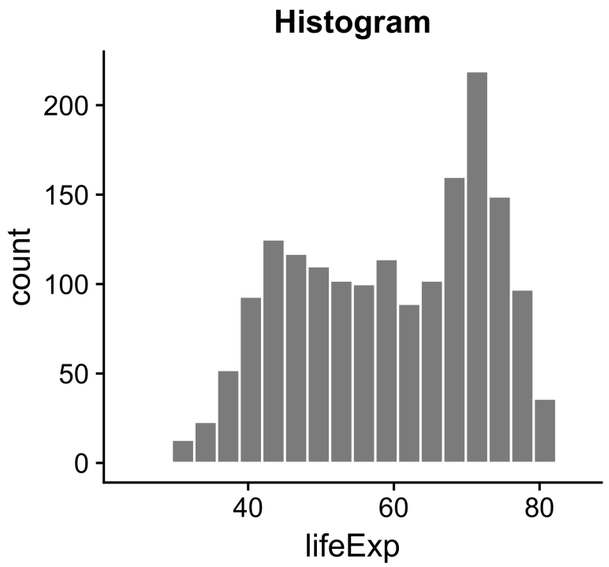
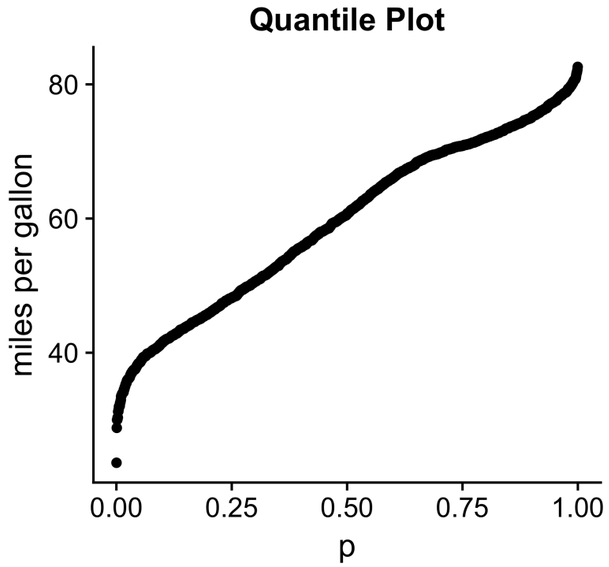
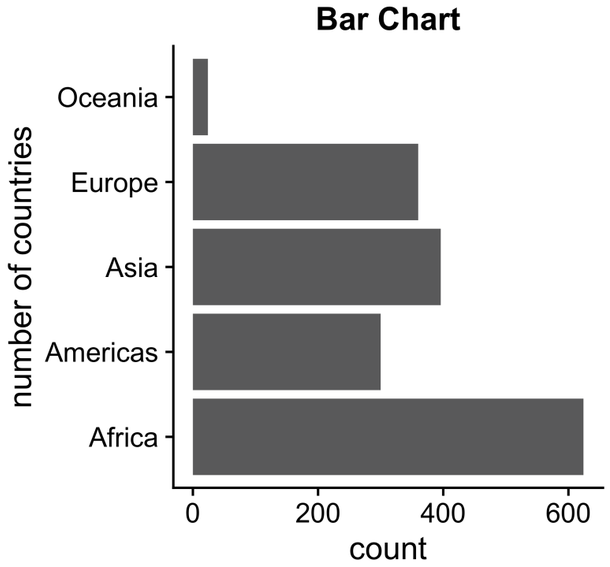
Overview


Histogram
count
200
150
100
50
0
40
60
80
lifeExp


Quantile Plot
miles per gallon
80
60
40
0.00
0.25
0.50
0.75
1.00
p


Bar Chart
number of countries
Oceania
Europe
Asia
Americas
Africa
0
200
400
600
count

Summaries of One Variable

- **Continuous variables**
- **Categorical variables**
- **Temporal variables**

Gapminder Data

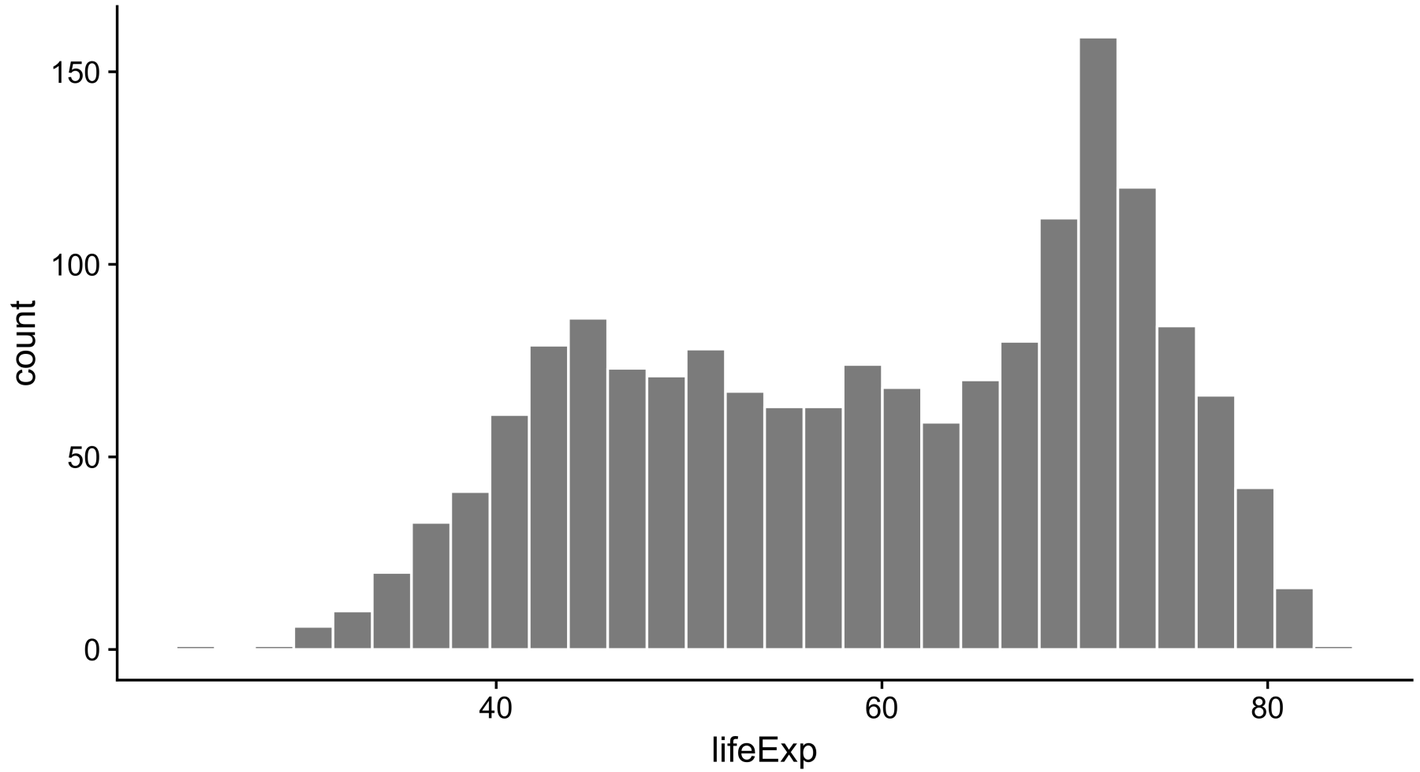
```
library(gapminder)

gapminder
```

```
# A tibble: 1,704 x 6
   country     continent  year lifeExp      pop gdpPercap
   <fct>       <fct>     <int>   <dbl>    <int>     <dbl>
 1 Afghanistan Asia       1952    28.8  8425333      779.
 2 Afghanistan Asia       1957    30.3  9240934      821.
 3 Afghanistan Asia       1962    32.0 10267083      853.
 4 Afghanistan Asia       1967    34.0 11537966      836.
 5 Afghanistan Asia       1972    36.1 13079460      740.
 6 Afghanistan Asia       1977    38.4 14880372      786.
 7 Afghanistan Asia       1982    39.9 12881816      978.
 8 Afghanistan Asia       1987    40.8 13867957      852.
 9 Afghanistan Asia       1992    41.7 16317921      649.
10 Afghanistan Asia       1997    41.8 22227415      635.
# ... with 1,694 more rows
```

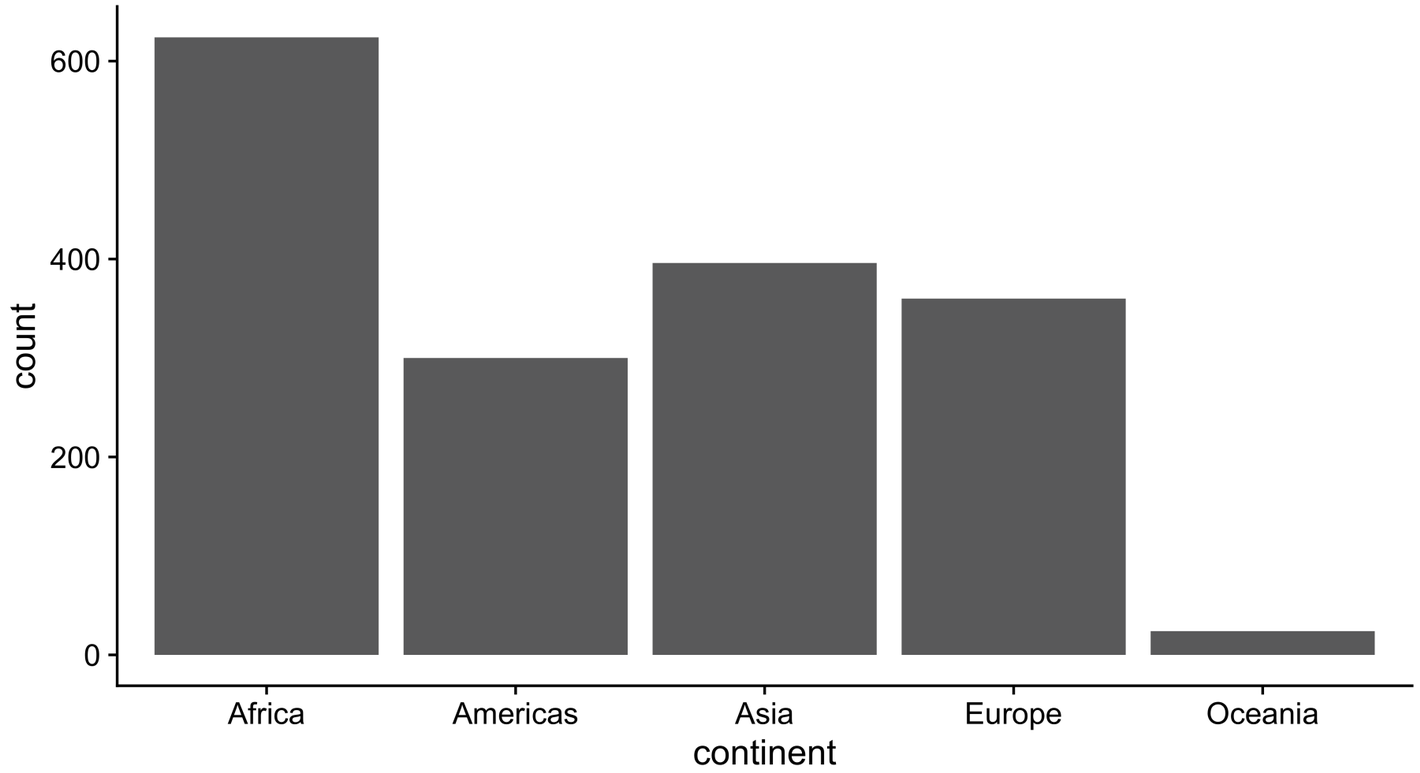
Summaries of One Variable: Continuous

```
ggplot(gapminder, aes(lifeExp)) +
  geom_histogram()
```



Summaries of One Variable: Discrete

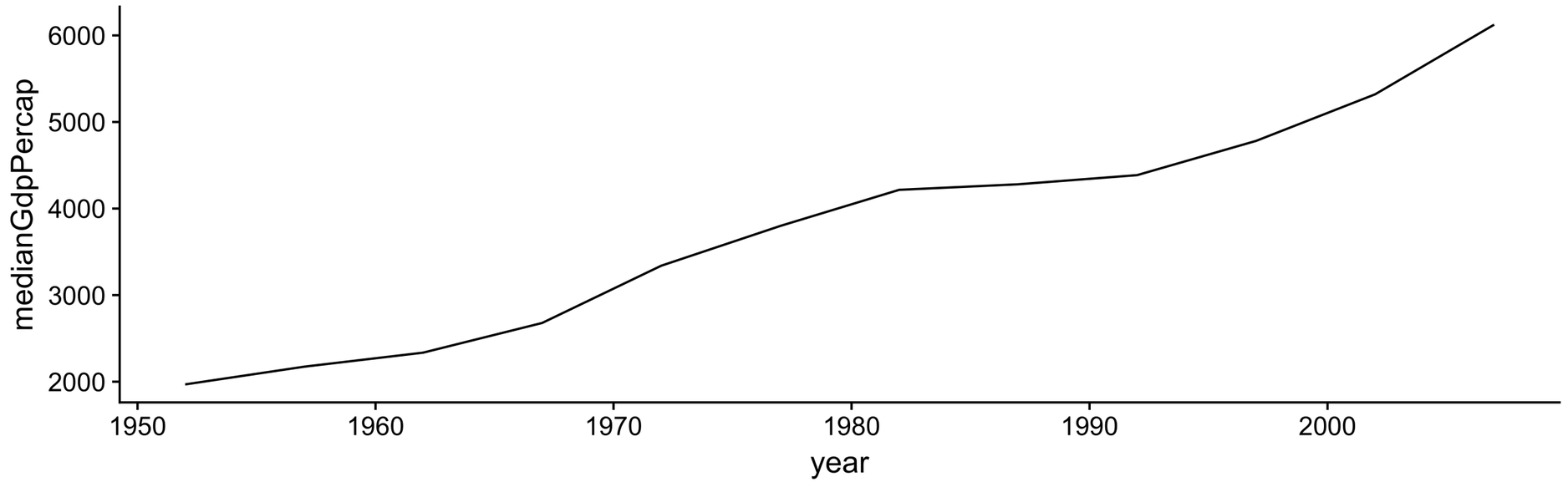
```
ggplot(gapminder, aes(continent)) +
  geom_bar()
```



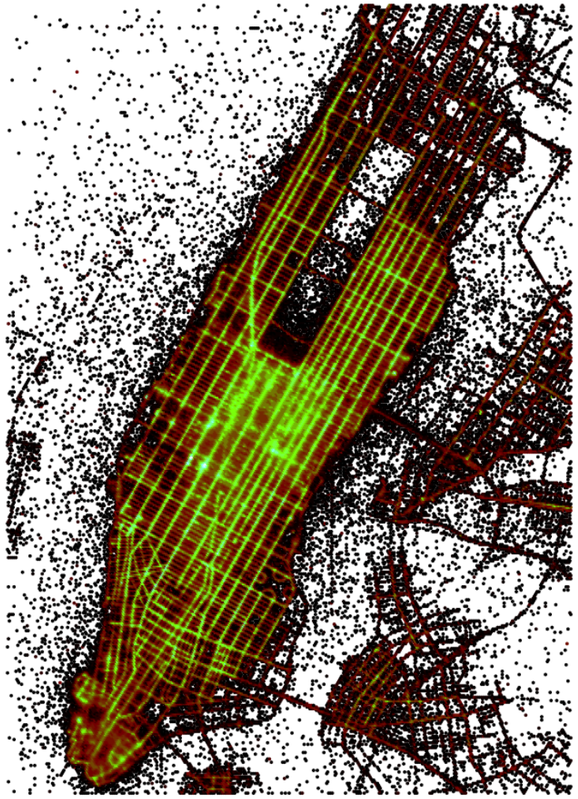
Summaries of One Variable: Temporal

```
by_year <- gapminder %>%
  group_by(year) %>%
  summarise(medianGdpPercap = median(gdpPercap, na.rm = TRUE))

ggplot(by_year, aes(year, medianGdpPercap)) +
  geom_line()
```



1 Million NYC Taxi Rides



Random sample of rides from July to December 2016

Taxi Data

```
> tx
# A tibble: 1,000,000 x 7
     pick_day pick_dow total_amount tip_amount payment_type trip_duration
       <date>   <fctr>        <dbl>      <dbl>       <fctr>         <dbl>
 1 2016-07-09      Sat        47.60      23.80         Card     26.116667
 2 2016-07-28      Thu         9.96       1.66         Card      5.866667
 3 2016-07-20      Wed         6.80       1.00         Card      4.916667
 4 2016-07-30      Sat        11.75       1.95         Card     10.350000
 5 2016-07-19      Tue         7.30       0.00         Cash      6.866667
 6 2016-07-07      Thu        12.05       2.75         Card      7.050000
 7 2016-07-29      Fri        13.80       0.00         Cash     13.700000
 8 2016-07-17      Sun        14.16       2.36         Card     13.233333
 9 2016-07-18      Mon        13.30       0.00         Cash     13.666667
10 2016-07-14      Thu        21.80       2.00         Card     29.316667
# ... with 999,990 more rows, and 1 more variables: pick_wkday <lgl>
```

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Let's practice!

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Adding More Detail to Summaries

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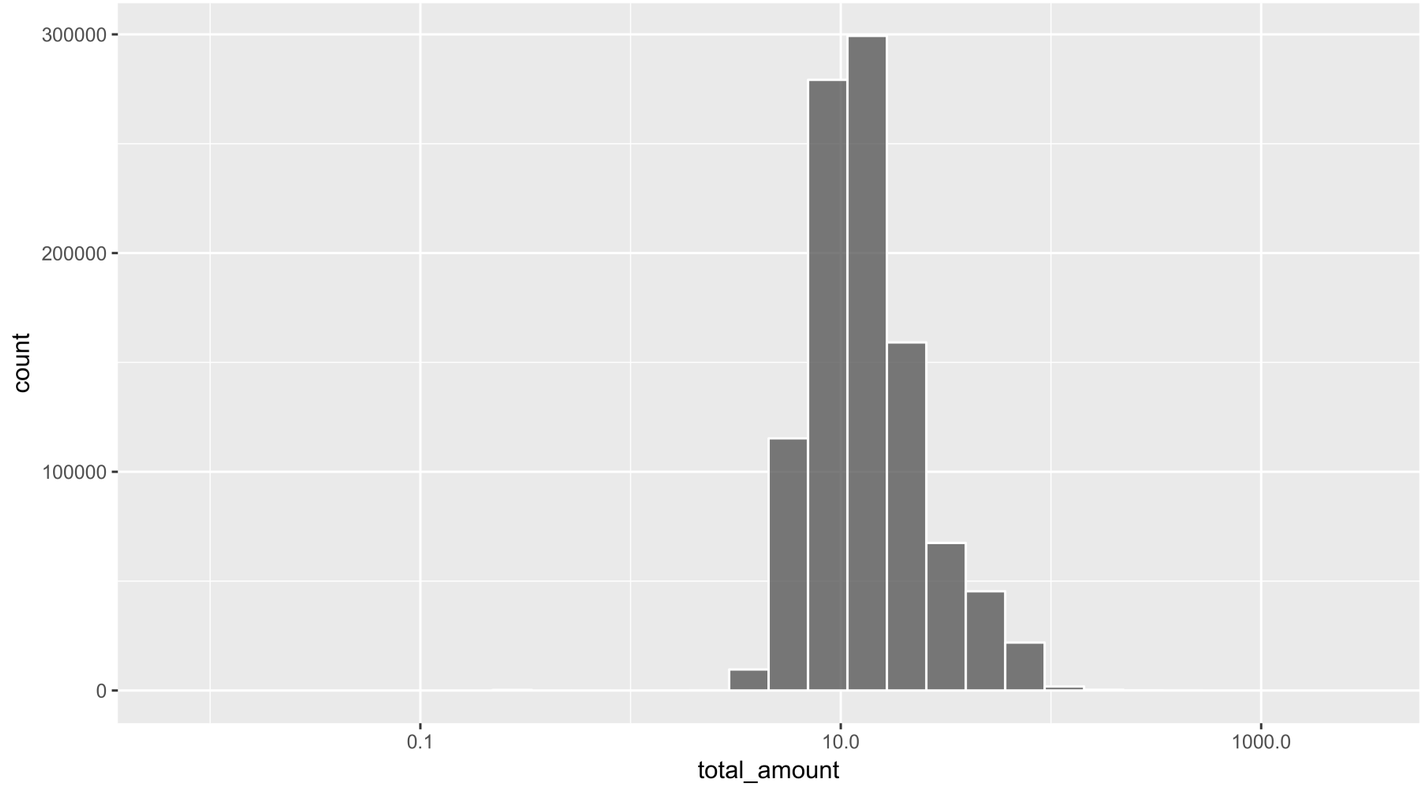
Distribution of Total Fare Amount



Adding more detail to summaries

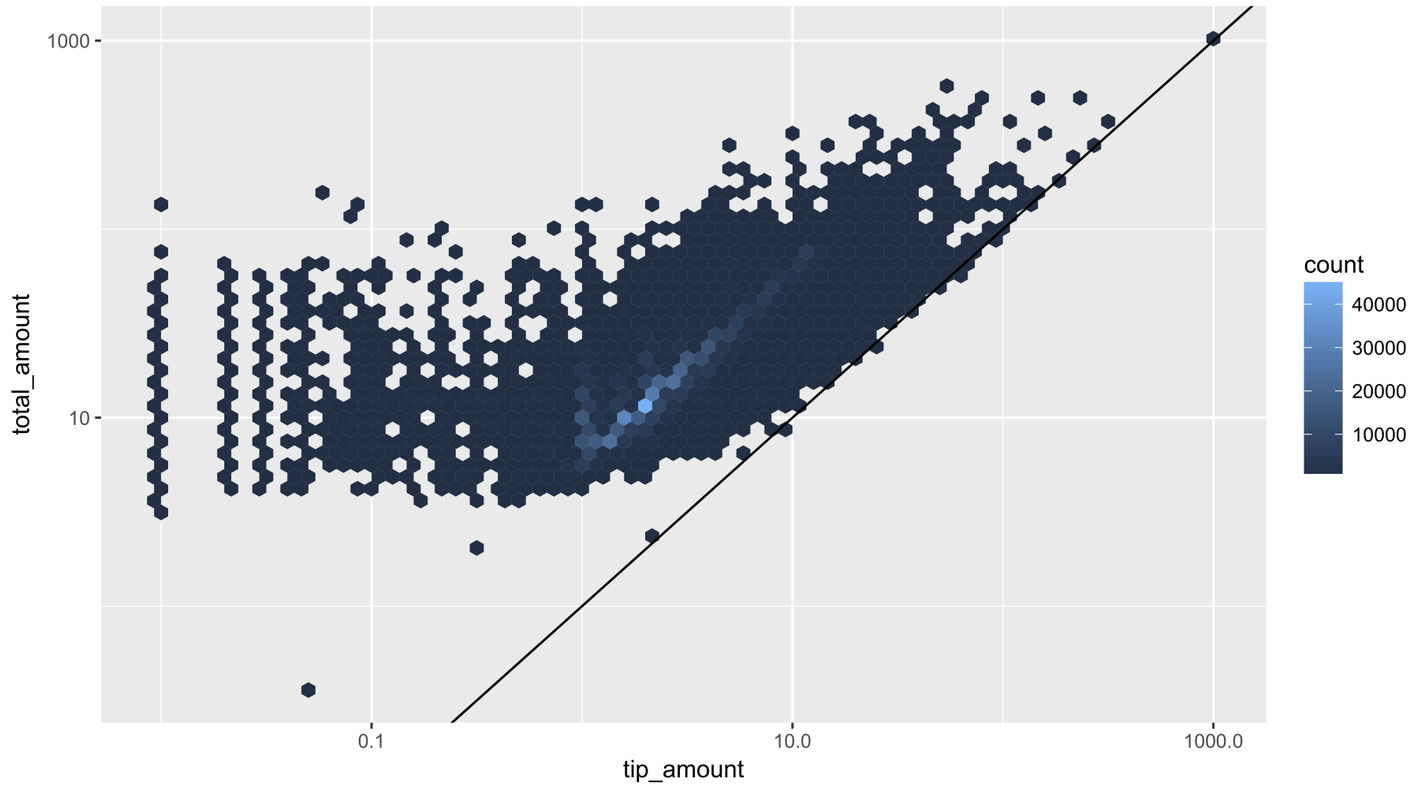
Introduce more variables into the summary computations

- **Binning** two or more continuous variables to visualize joint distribution
- **Grouping** or **faceting** summary computations by additional variables

Binning Continuous Variables using geom_hex()

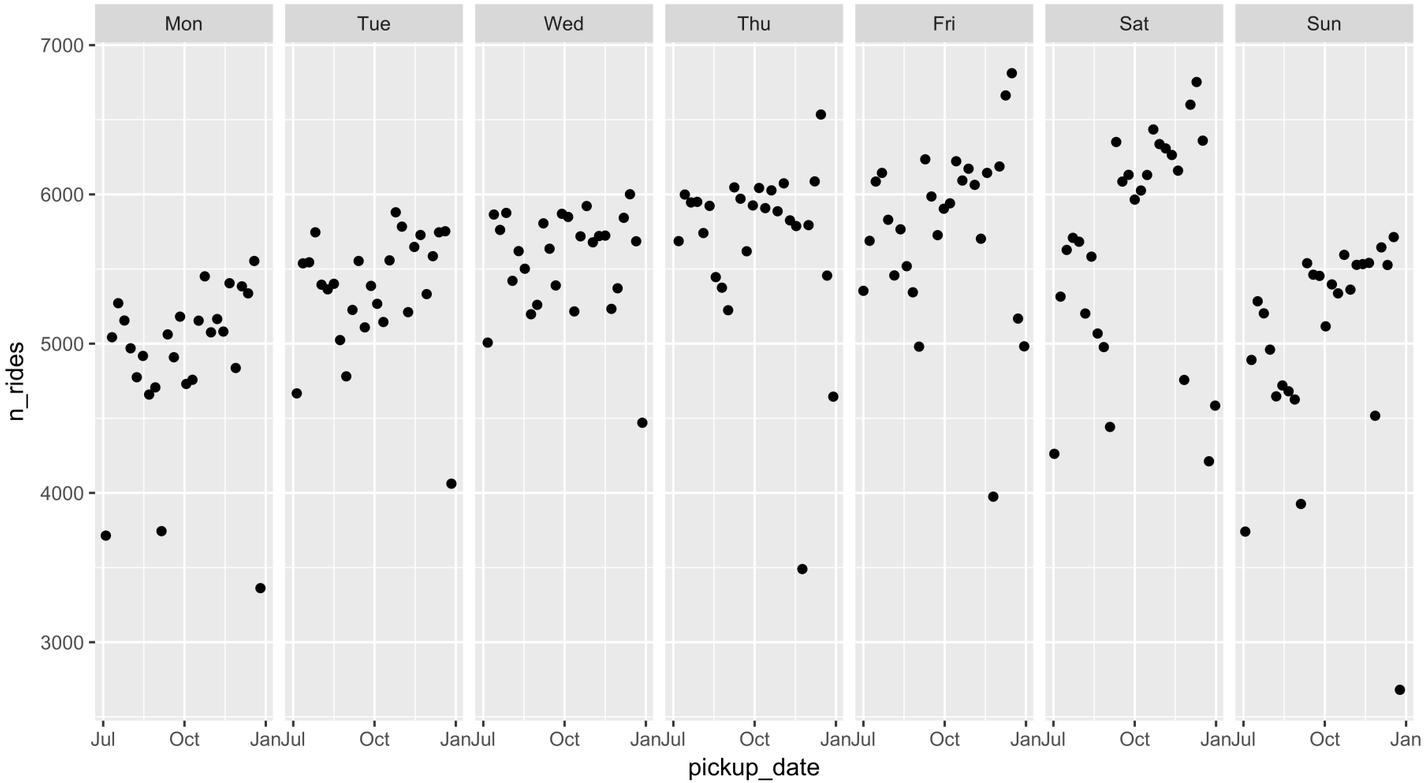
```
ggplot(tx, aes(tip_amount, total_amount)) +

  geom_hex(bins = 75) +
  scale_x_log10() + scale_y_log10() +
  geom_abline(slope = 1, intercept = 0)
```



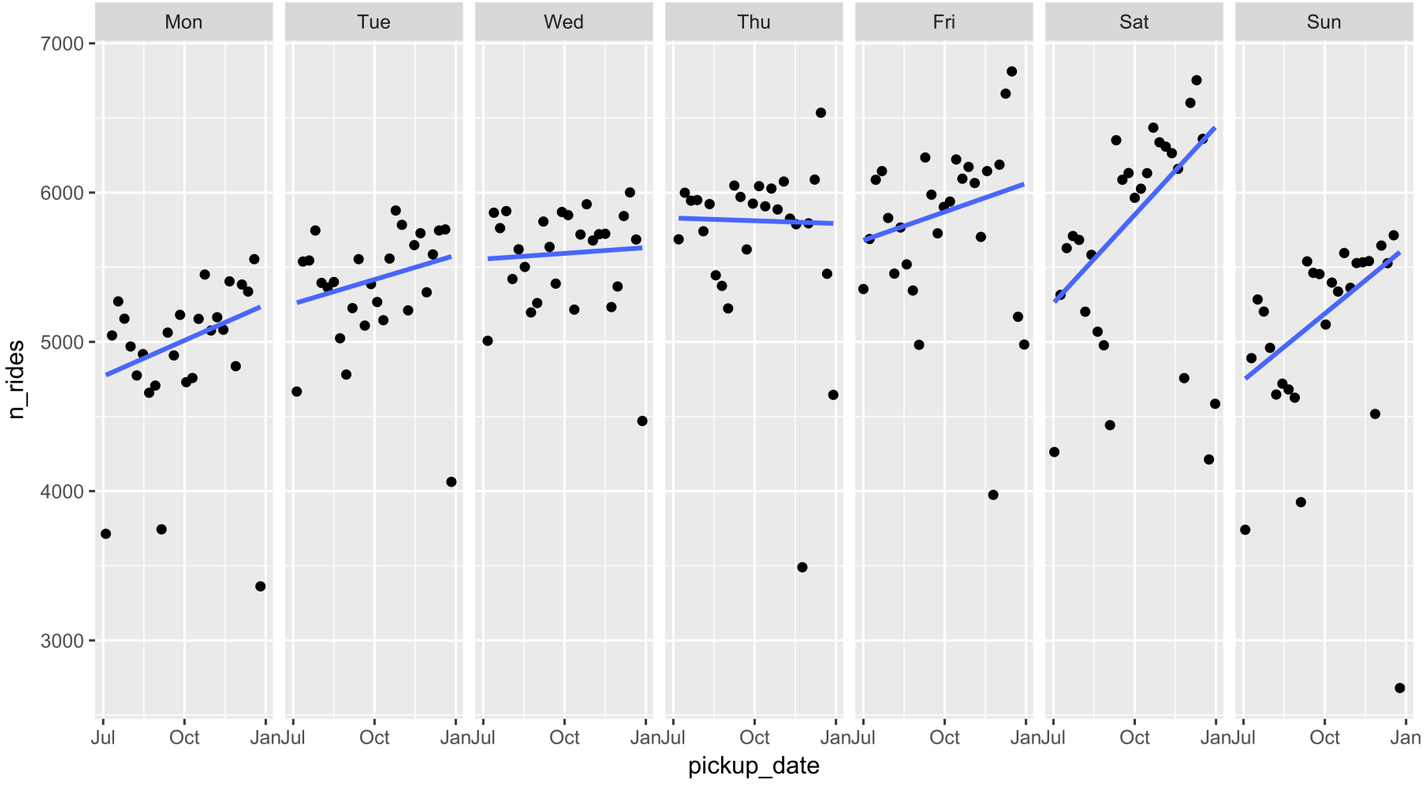
Faceting using facet_wrap()

```
ggplot(daily_count, aes(pickup_date, n_rides)) +
  geom_point() +
  facet_wrap(~ pickup_dow)
```



Faceting

```
ggplot(daily_count, aes(pickup_date, n_rides)) +
  geom_point() +
  facet_grid(~ pickup_dow) +
  geom_smooth(method = "rlm", se = FALSE)
```



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Let's practice!

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Visualizing Subsets

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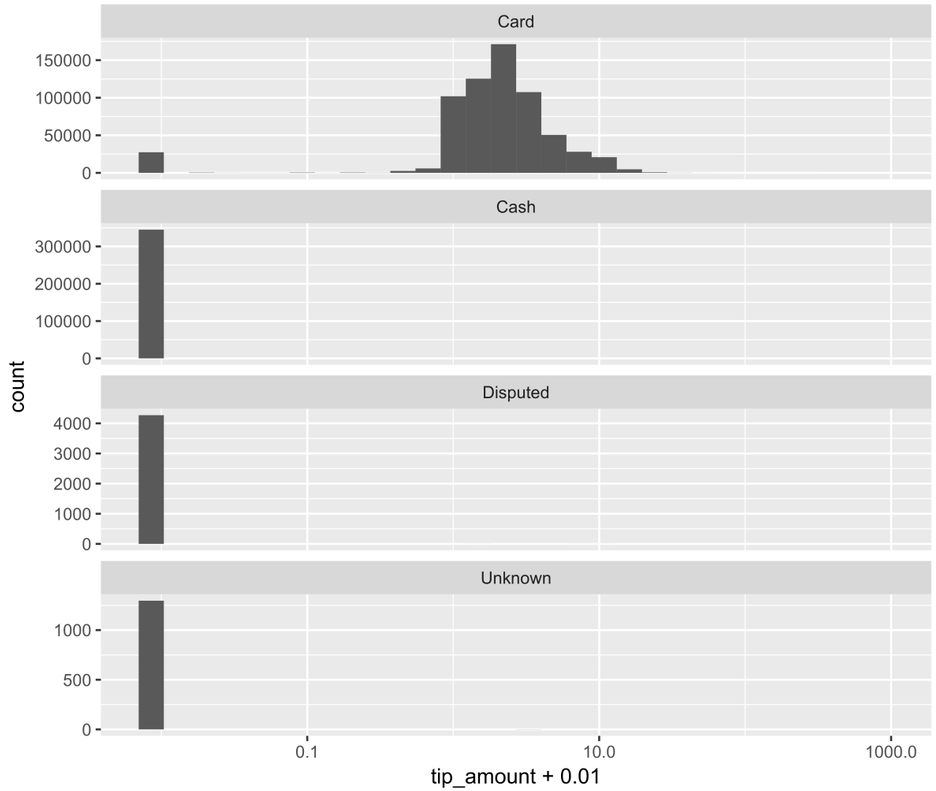
Investigating the Tip Amount Distribution

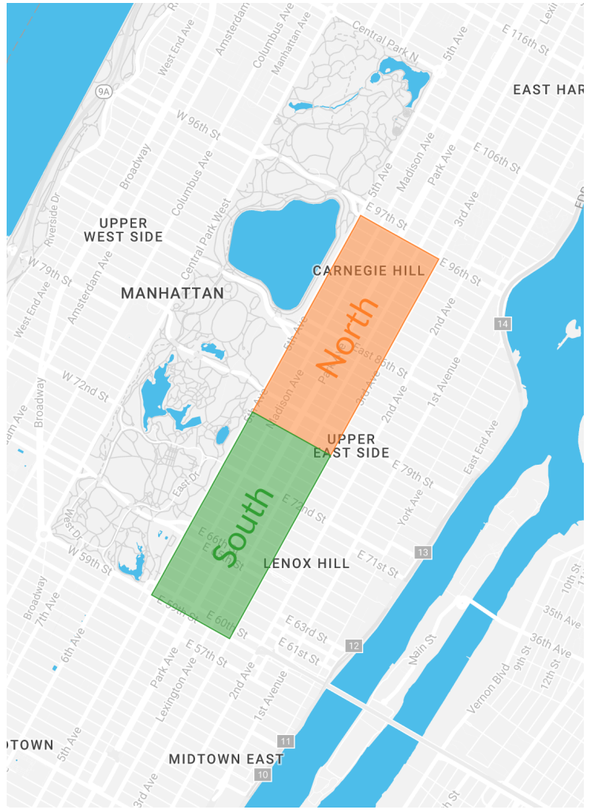


Question: Do cash payments have tips?

A Subset of the Taxi Data

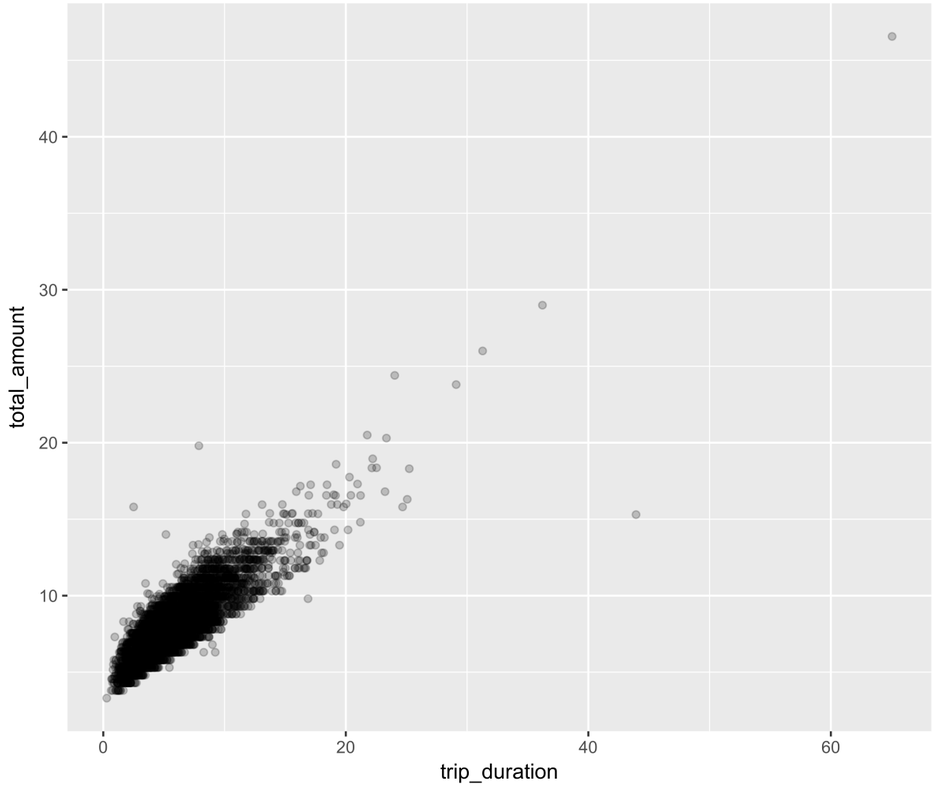
Rides of the same nature should have similar fare and tip amounts.

- **Most popular route:** Upper East Side South to the Upper East Side North of Manhattan
- Only include cash and credit transactions
- 5,187 observations



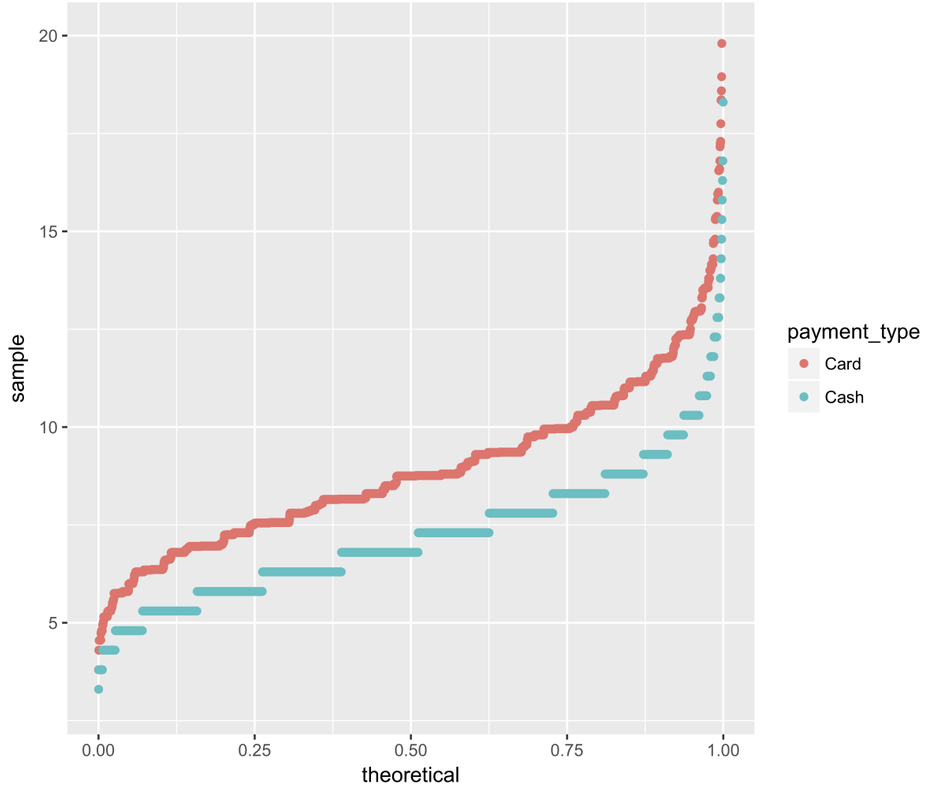
Total Fare vs. Trip Duration

```
ggplot(tx_pop, aes(trip_duration, total_amount)) +
  geom_point(alpha = 0.2)
```



Cash / Card Distribution Comparison Using a Quantile Plot

```
ggplot(tx_pop, aes(sample = total_amount, color = payment_type)) +
  geom_qq(distribution = stats::qunif) +
  ylim(c(3, 20))
```



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Visualizing All Subsets

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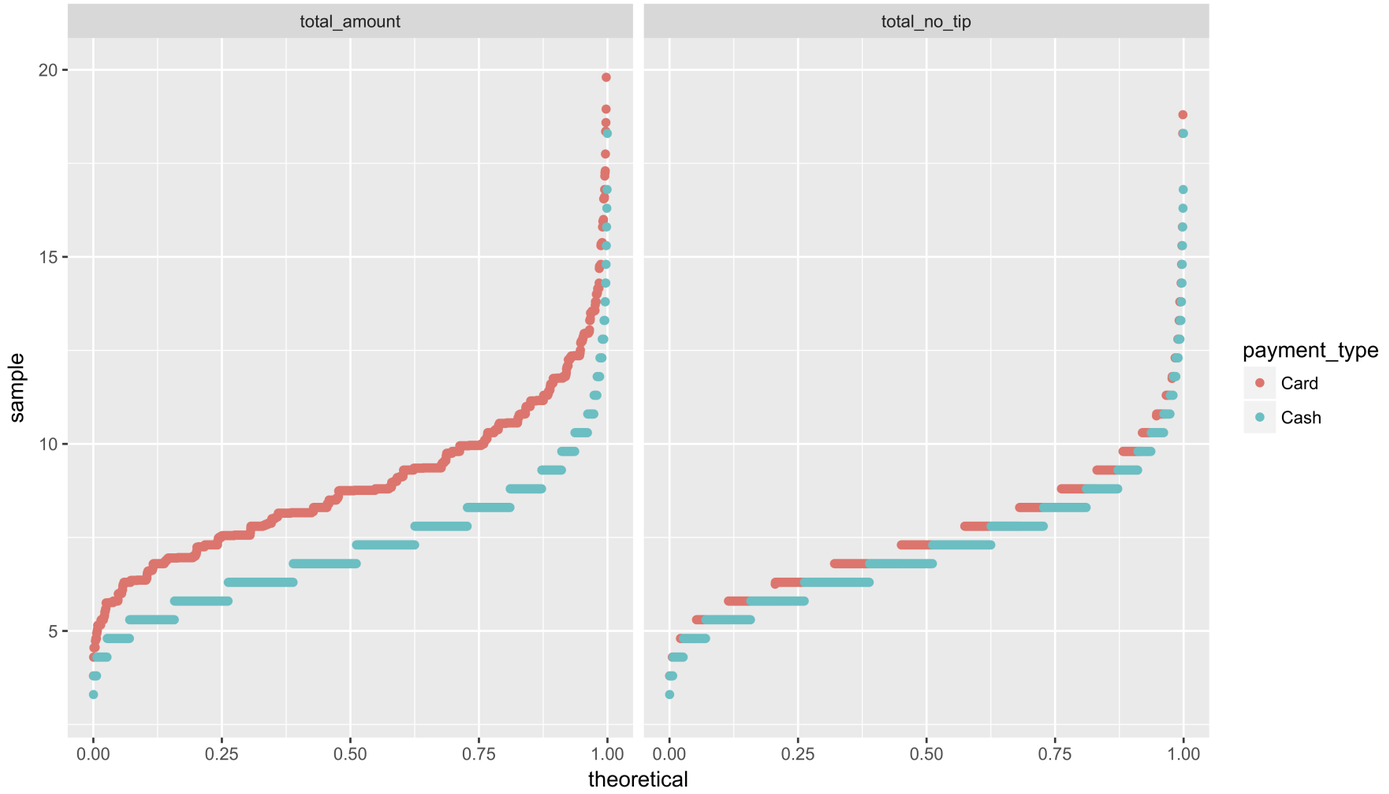
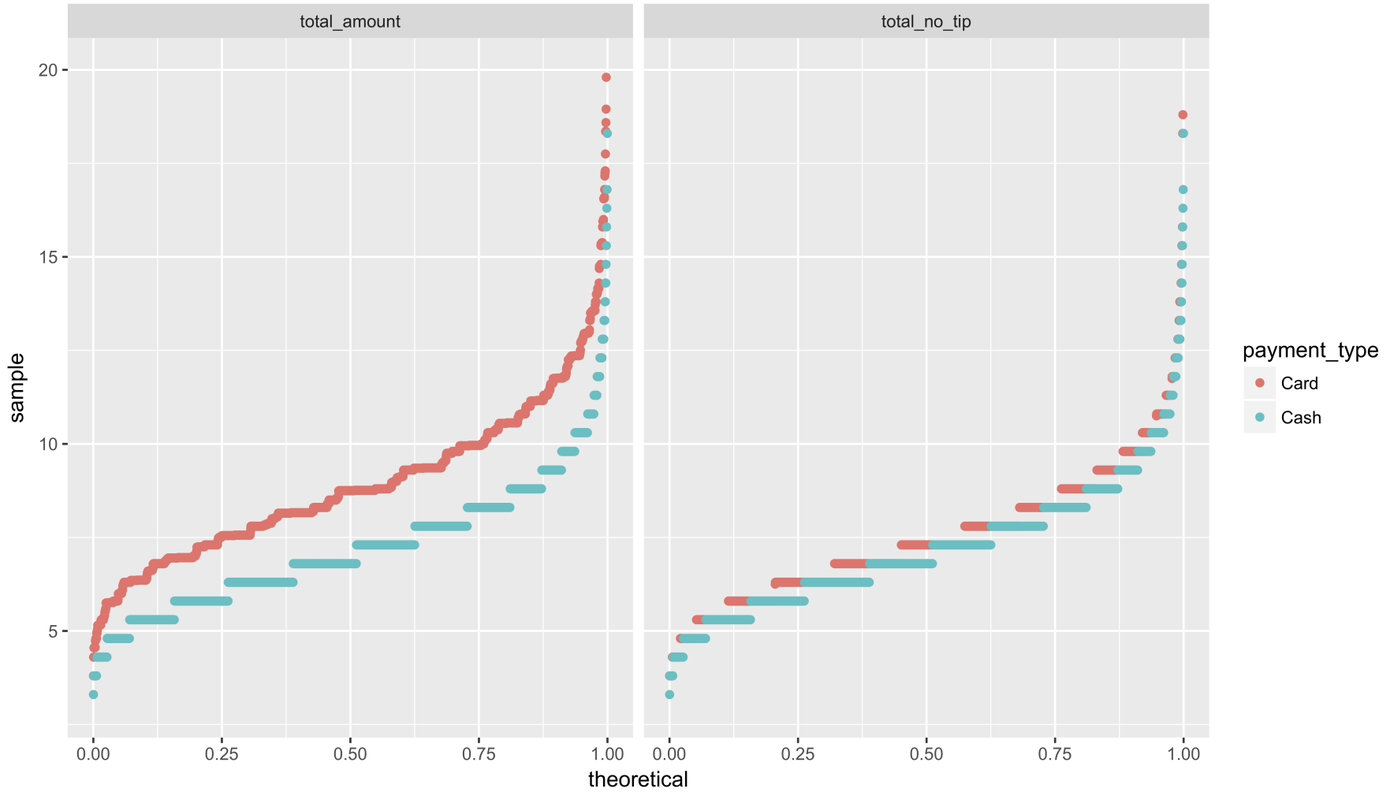
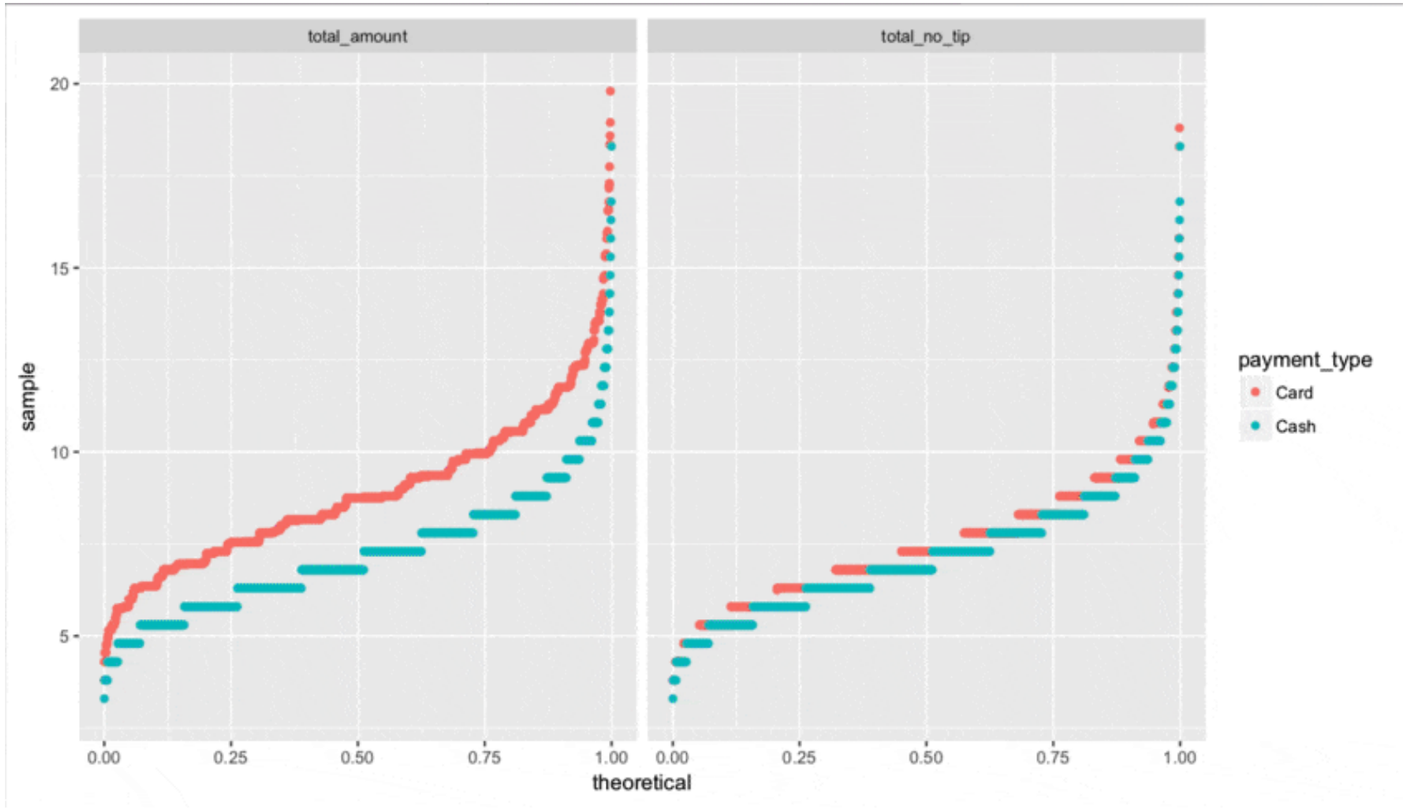
Insight From Subset Exploration



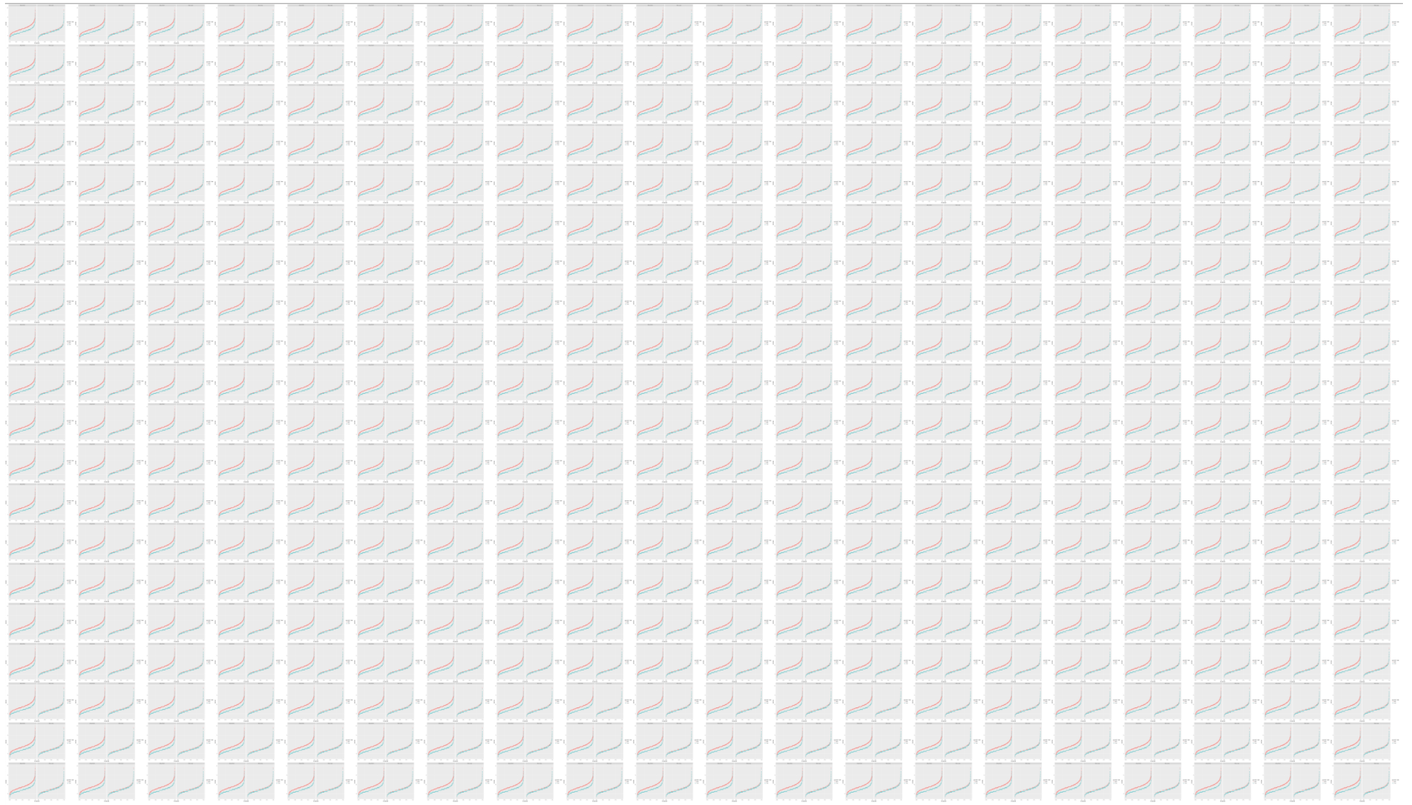
Visualizing All Subsets



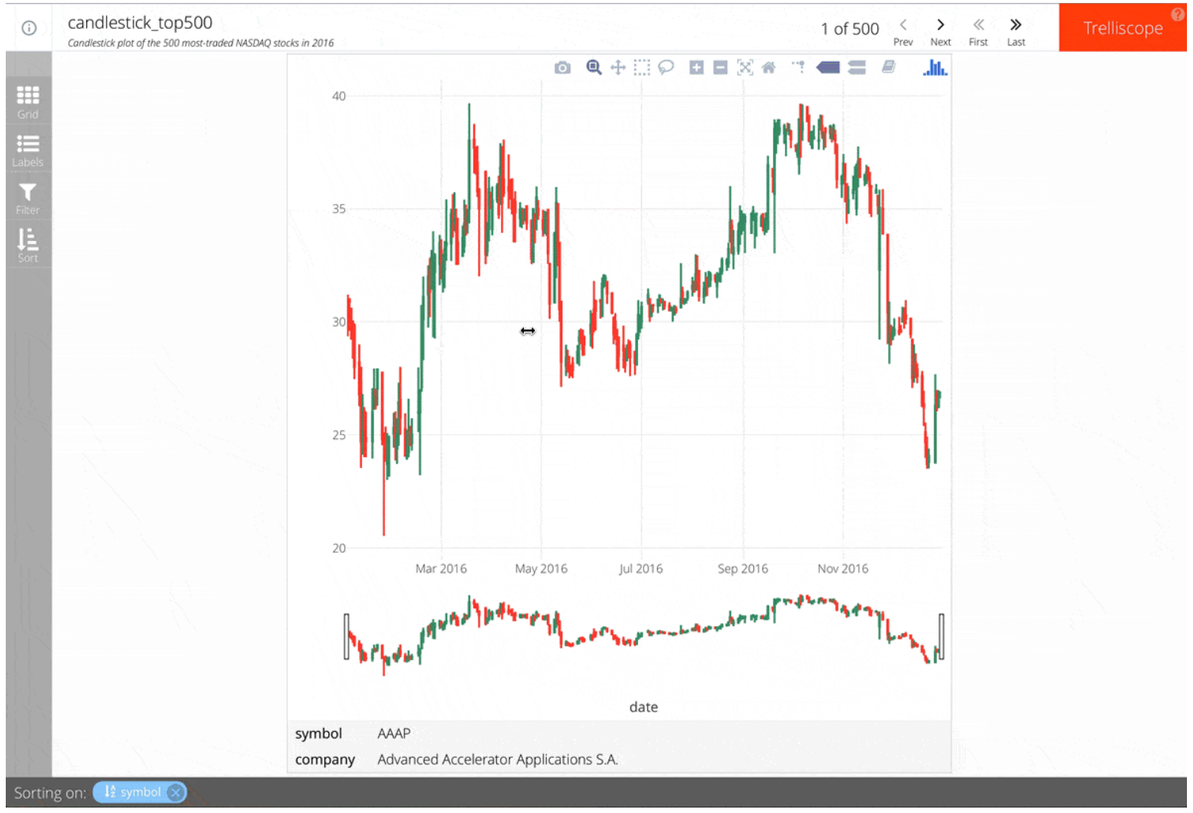
Visualizing All Subsets



Visualizing All Subsets with Trelliscope



Visualizing All Subsets with Trelliscope



VISUALIZING BIG DATA WITH TRELLISCOPE

See you in Chapter 2!