Preparing the trip data

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We'll now combine our data file on station data with the station information

Dplyr and tidyr

Load the *dplyr* and *tidyr* packages which will help us wrangle the data:

```
library("dplyr")
```

```
##
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':
##
##     filter, lag

## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
library("tidyr")
```

Loading up the data

Load up our status data and station information:

```
trip_read  <- read.csv("201508_trip_data.csv")
trip_df    <- data.frame(trip_read)
trip       <- dplyr::tbl_df(trip_df)
glimpse(trip)
```

```
## Observations: 354,152
## Variables: 11
## $ Trip.ID         <int> 913460, 913459, 913455, 913454, 913453, 913452...
## $ Duration        <int> 765, 1036, 307, 409, 789, 293, 896, 255, 126, ...
## $ Start.Date      <fctr> 8/31/2015 23:26, 8/31/2015 23:11, 8/31/2015 2...
## $ Start.Station   <fctr> Harry Bridges Plaza (Ferry Building), San Ant...
## $ Start.Terminal  <int> 50, 31, 47, 10, 51, 68, 51, 60, 56, 47, 60, 67...
## $ End.Date        <fctr> 8/31/2015 23:39, 8/31/2015 23:28, 8/31/2015 2...
## $ End.Station     <fctr> San Francisco Caltrain (Townsend at 4th), Mou...
## $ End.Terminal    <int> 70, 27, 64, 8, 60, 70, 60, 74, 55, 66, 77, 70,...
## $ Bike..          <int> 288, 35, 468, 68, 487, 538, 363, 470, 439, 472...
## $ Subscriber.Type <fctr> Subscriber, Subscriber, Subscriber, Subscribe...
## $ Zip.Code        <fctr> 2139, 95032, 94107, 95113, 9069, 94118, 92562...
```

We note the following:

-Trip ID: numeric ID of bike trip -Duration: time of trip in seconds -Start Date: start date of trip with date and time, in PST -Start Station: station name of start station -Start Terminal: numeric reference for start station -End Date: end date of trip with date and time, in PST -End Station: station name for end station -End Terminal: numeric reference for end station -Bike #: ID of bike used -Subscription Type: Subscriber = annual or 30-day member; Customer = 24-hour or 3-day member -Zip Code: Home zip code of subscriber (customers can choose to manually enter zip at kiosk however data is unreliable)

Combine with the station location data and create a date column. First Combine with the station data to get the location of the start station and add with a join.

```
station_read  <- read.csv("station.csv")
station_df    <- data.frame(station_read)
station       <- dplyr::tbl_df(station_df)

station_short <-select(station, station_id, lat, long, landmark)

trip <- trip %>%
  mutate(Date = as.Date(Start.Date, format = "%m/%d/%Y")) %>%
  left_join(station_short, by = c("Start.Terminal" = "station_id")) %>%
  mutate(start_lat =lat, start_long = long) %>%
  select(-lat, -long)
```

Then get the location information for the end station and add it with a join

```
station_short <-select(station, station_id, lat, long)

trip <- trip %>%
  left_join(station_short, by = c("End.Terminal" = "station_id")) %>%
  mutate(end_lat =lat, end_long = long) %>%
  select(-lat, -long)
```

Then we separte the start date and end date columns into date and time.

```
trip <- trip %>%
  separate(Start.Date,  c("Start_Date", "Start_time"), sep = ' ', remove = TRUE) %>%
  separate(End.Date  ,  c("End_Date", "End_time")    , sep = ' ', remove = TRUE) %>%
  mutate(Start_Date = as.Date(Start_Date, format = "%m/%d/%Y")) %>%
  mutate(End_Date   = as.Date(End_Date, format = "%m/%d/%Y"))
glimpse(trip)
```

```
## Observations: 354,152
## Variables: 19
## $ Trip.ID         <int> 913460, 913459, 913455, 913454, 913453, 913452...
## $ Duration        <int> 765, 1036, 307, 409, 789, 293, 896, 255, 126, ...
## $ Start_Date      <date> 2015-08-31, 2015-08-31, 2015-08-31, 2015-08-3...
## $ Start_time      <chr> "23:26", "23:11", "23:13", "23:10", "23:09", "...
## $ Start.Station   <fctr> Harry Bridges Plaza (Ferry Building), San Ant...
## $ Start.Terminal  <int> 50, 31, 47, 10, 51, 68, 51, 60, 56, 47, 60, 67...
## $ End_Date        <date> 2015-08-31, 2015-08-31, 2015-08-31, 2015-08-3...
## $ End_time        <chr> "23:39", "23:28", "23:18", "23:17", "23:22", "...
## $ End.Station     <fctr> San Francisco Caltrain (Townsend at 4th), Mou...
## $ End.Terminal    <int> 70, 27, 64, 8, 60, 70, 60, 74, 55, 66, 77, 70,...
```

```
## $ Bike..          <int> 288, 35, 468, 68, 487, 538, 363, 470, 439, 472...
## $ Subscriber.Type <fctr> Subscriber, Subscriber, Subscriber, Subscribe...
## $ Zip.Code        <fctr> 2139, 95032, 94107, 95113, 9069, 94118, 92562...
## $ Date            <date> 2015-08-31, 2015-08-31, 2015-08-31, 2015-08-3...
## $ landmark        <fctr> San Francisco, Mountain View, San Francisco, ...
## $ start_lat       <dbl> 37.79539, 37.40044, 37.78898, 37.33739, 37.791...
## $ start_long      <dbl> -122.3942, -122.1083, -122.4035, -121.8870, -1...
## $ end_lat         <dbl> 37.77662, 37.38922, 37.78226, 37.33017, 37.804...
## $ end_long        <dbl> -122.3953, -122.0819, -122.3927, -121.8858, -1...
```

Note we have only added the landmark once. We presume that start and end landamrks are the same. We'll now add the weather data.

```
weather_read  <- read.csv("weather.csv")
weather_df    <- data.frame(weather_read)
weather       <- dplyr::tbl_df(weather_df)
weather <- weather %>%
           select(-X) %>%
           mutate(Date = as.Date(Date))
glimpse(weather)
```

```
## Observations: 1,825
## Variables: 25
## $ Max.TemperatureF          <int> 83, 72, 76, 74, 72, 72, 72, 68, 72, ...
## $ Mean.TemperatureF         <int> 70, 66, 69, 68, 66, 66, 66, 64, 65, ...
## $ Min.TemperatureF          <int> 57, 60, 61, 61, 60, 60, 60, 59, 57, ...
## $ Max.Dew.PointF            <int> 58, 58, 57, 57, 57, 55, 54, 52, 56, ...
## $ MeanDew.PointF            <int> 56, 57, 56, 57, 56, 54, 53, 51, 53, ...
## $ Min.DewpointF             <int> 52, 55, 55, 56, 54, 52, 45, 50, 52, ...
## $ Max.Humidity              <int> 86, 84, 84, 84, 84, 84, 78, 72, 87, ...
## $ Mean.Humidity             <int> 64, 73, 69, 71, 71, 69, 66, 64, 72, ...
## $ Min.Humidity              <int> 42, 61, 53, 57, 57, 53, 53, 55, 57, ...
## $ Max.Sea.Level.PressureIn  <dbl> 29.86, 29.87, 29.81, 29.81, 29.92, 2...
## $ Mean.Sea.Level.PressureIn <dbl> 29.82, 29.82, 29.76, 29.76, 29.87, 2...
## $ Min.Sea.Level.PressureIn  <dbl> 29.76, 29.79, 29.72, 29.72, 29.81, 2...
## $ Max.VisibilityMiles       <int> 10, 10, 10, 10, 10, 10, 10, 10, 10, ...
## $ Mean.VisibilityMiles      <int> 10, 10, 10, 10, 9, 9, 10, 10, 10, 9,...
## $ Min.VisibilityMiles       <int> 8, 7, 10, 8, 7, 7, 10, 10, 10, 5, 2,...
## $ Max.Wind.SpeedMPH         <int> 16, 21, 21, 22, 18, 17, 18, 18, 17, ...
## $ Mean.Wind.SpeedMPH        <int> 7, 8, 8, 8, 8, 9, 10, 12, 7, 5, 7, 8...
## $ Max.Gust.SpeedMPH         <int> 20, NA, 24, 25, 32, 30, 28, 22, 21, ...
## $ PrecipitationIn           <fctr> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,...
## $ CloudCover                <int> 0, 5, 4, 5, 4, 4, 3, 4, 5, 1, 2, 1, ...
## $ Events                    <fctr> , , , , , , , , , , , , , , , Rai...
## $ WindDirDegrees            <int> 290, 290, 276, 301, 309, 290, 293, 2...
## $ Zip                       <int> 94107, 94107, 94107, 94107, 94107, 9...
## $ landmark                  <fctr> San Francisco, San Francisco, San F...
## $ Date                      <date> 2014-09-01, 2014-09-02, 2014-09-03,...
```

```
trip <- left_join(trip,weather, by = c("landmark"="landmark", "Date"="Date"))
glimpse(trip)
```

```
## Observations: 354,152
```

```
## Variables: 42
## $ Trip.ID                   <int> 913460, 913459, 913455, 913454, 9134...
## $ Duration                  <int> 765, 1036, 307, 409, 789, 293, 896, ...
## $ Start_Date                <date> 2015-08-31, 2015-08-31, 2015-08-31,...
## $ Start_time                <chr> "23:26", "23:11", "23:13", "23:10", ...
## $ Start.Station             <fctr> Harry Bridges Plaza (Ferry Building...
## $ Start.Terminal            <int> 50, 31, 47, 10, 51, 68, 51, 60, 56, ...
## $ End_Date                  <date> 2015-08-31, 2015-08-31, 2015-08-31,...
## $ End_time                  <chr> "23:39", "23:28", "23:18", "23:17", ...
## $ End.Station               <fctr> San Francisco Caltrain (Townsend at...
## $ End.Terminal              <int> 70, 27, 64, 8, 60, 70, 60, 74, 55, 6...
## $ Bike..                    <int> 288, 35, 468, 68, 487, 538, 363, 470...
## $ Subscriber.Type           <fctr> Subscriber, Subscriber, Subscriber,...
## $ Zip.Code                  <fctr> 2139, 95032, 94107, 95113, 9069, 94...
## $ Date                      <date> 2015-08-31, 2015-08-31, 2015-08-31,...
## $ landmark                  <fctr> San Francisco, Mountain View, San F...
## $ start_lat                 <dbl> 37.79539, 37.40044, 37.78898, 37.337...
## $ start_long                <dbl> -122.3942, -122.1083, -122.4035, -12...
## $ end_lat                   <dbl> 37.77662, 37.38922, 37.78226, 37.330...
## $ end_long                  <dbl> -122.3953, -122.0819, -122.3927, -12...
## $ Max.TemperatureF          <int> 78, 82, 78, 85, 78, 78, 78, 78, 78, ...
## $ Mean.TemperatureF         <int> 69, 72, 69, 72, 69, 69, 69, 69, 69, ...
## $ Min.TemperatureF          <int> 60, 61, 60, 59, 60, 60, 60, 60, 60, ...
## $ Max.Dew.PointF            <int> 58, 62, 58, 59, 58, 58, 58, 58, 58, ...
## $ MeanDew.PointF            <int> 57, 56, 57, 55, 57, 57, 57, 57, 57, ...
## $ Min.DewpointF             <int> 54, 52, 54, 51, 54, 54, 54, 54, 54, ...
## $ Max.Humidity              <int> 84, 84, 84, 84, 84, 84, 84, 84, 84, ...
## $ Mean.Humidity             <int> 67, 63, 67, 58, 67, 67, 67, 67, 67, ...
## $ Min.Humidity              <int> 50, 42, 50, 32, 50, 50, 50, 50, 50, ...
## $ Max.Sea.Level.PressureIn  <dbl> 29.95, 29.97, 29.95, 29.95, 29.95, 2...
## $ Mean.Sea.Level.PressureIn <dbl> 29.91, 29.92, 29.91, 29.90, 29.91, 2...
## $ Min.Sea.Level.PressureIn  <dbl> 29.87, 29.86, 29.87, 29.85, 29.87, 2...
## $ Max.VisibilityMiles       <int> 10, 10, 10, 10, 10, 10, 10, 10, 10, ...
## $ Mean.VisibilityMiles      <int> 10, 10, 10, 10, 10, 10, 10, 10, 10, ...
## $ Min.VisibilityMiles       <int> 9, 10, 9, 10, 9, 9, 9, 9, 9, 9, 9, 9...
## $ Max.Wind.SpeedMPH         <int> 18, 22, 18, 20, 18, 18, 18, 18, 18, ...
## $ Mean.Wind.SpeedMPH        <int> 9, 6, 9, 6, 9, 9, 9, 9, 9, 9, 9, 9, ...
## $ Max.Gust.SpeedMPH         <int> 21, 25, 21, 24, 21, 21, 21, 21, 21, ...
## $ PrecipitationIn           <fctr> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,...
## $ CloudCover                <int> 1, 0, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, ...
## $ Events                    <fctr> , , , , , , , , , , , , , , , , , ,...
## $ WindDirDegrees            <int> 246, 6, 246, 308, 246, 246, 246, 246...
## $ Zip                       <int> 94107, 94041, 94107, 95113, 94107, 9...
```

```
write.csv(trip, file="trip_full.csv")
```