NYPD Shooting Assignment

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Todo

- □ Clean up plots
- □ Do some more categorical plots
- □ Figure out a model and anlaysis

Import, tidy and analyze the NYPD Shooting Incident dataset obtained. Be sure your project is reproducible and contains some visualization and analysis. You may use the data to do any analysis that is of interest to you. You should include at least two visualizations and one model. Be sure to identify any bias possible in the data and in your analysis.

```
library(tidyverse)
library(lubridate)
```

```
-- Attaching core tidyverse packages ------------------------ tidyverse 2.0.0 --
v dplyr     1.1.4     v readr     2.1.5
v forcats   1.0.0     v stringr   1.5.1
v ggplot2   3.5.1     v tibble    3.2.1
v lubridate 1.9.3     v tidyr     1.3.1
v purrr     1.0.2
-- Conflicts ------------------------------------------ tidyverse_conflicts() --
x dplyr::filter() masks stats::filter()
x dplyr::lag()    masks stats::lag()
i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to becom
```

```
source_url <- "https://data.cityofnewyork.us/api/views/833y-fsy8/rows.csv?accessType=DOWNLOAD

incident_df <- read.csv(source_url)
```

```
glimpse(incident_df)
```

```
Rows: 28,562
Columns: 21
$ INCIDENT_KEY            <int> 244608249, 247542571, 84967535, 202853370, 270~
$ OCCUR_DATE              <chr> "05/05/2022", "07/04/2022", "05/27/2012", "09/~
$ OCCUR_TIME              <chr> "00:10:00", "22:20:00", "19:35:00", "21:00:00"~
$ BORO                    <chr> "MANHATTAN", "BRONX", "QUEENS", "BRONX", "BROO~
$ LOC_OF_OCCUR_DESC       <chr> "INSIDE", "OUTSIDE", "", "", "", "", "", "", "~
$ PRECINCT                <int> 14, 48, 103, 42, 83, 23, 113, 77, 48, 49, 73, ~
$ JURISDICTION_CODE       <int> 0, 0, 0, 0, 0, 2, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0~
$ LOC_CLASSFCTN_DESC      <chr> "COMMERCIAL", "STREET", "", "", "", "", "", ""~
$ LOCATION_DESC           <chr> "VIDEO STORE", "(null)", "", "", "", "MULTI DW~
$ STATISTICAL_MURDER_FLAG <chr> "true", "true", "false", "false", "false", "fa~
$ PERP_AGE_GROUP          <chr> "25-44", "(null)", "", "25-44", "25-44", "", "~
$ PERP_SEX                <chr> "M", "(null)", "", "M", "M", "", "", "", "", "~
$ PERP_RACE               <chr> "BLACK", "(null)", "", "UNKNOWN", "BLACK", "",~
$ VIC_AGE_GROUP           <chr> "25-44", "18-24", "18-24", "25-44", "25-44", "~
$ VIC_SEX                 <chr> "M", "M", "M", "M", "M", "M", "M", "M", "M", "~
$ VIC_RACE                <chr> "BLACK", "BLACK", "BLACK", "BLACK", "BLACK", "~
$ X_COORD_CD              <dbl> 986050, 1016802, 1048632, 1014493, 1009149, 99~
$ Y_COORD_CD              <dbl> 214231.0, 250581.0, 198262.0, 242565.0, 190104~
$ Latitude                <dbl> 40.75469, 40.85440, 40.71063, 40.83242, 40.688~
$ Longitude               <dbl> -73.99350, -73.88233, -73.76777, -73.89071, -7~
$ Lon_Lat                 <chr> "POINT (-73.9935 40.754692)", "POINT (-73.8823~
```

```
desc_counts <- lapply(incident_df[, c("LOC_CLASSFCTN_DESC", "LOCATION_DESC", "PERP_RACE", "VI

print(desc_counts)
```

```
$LOC_CLASSFCTN_DESC

                 (null)  COMMERCIAL    DWELLING     HOUSING       OTHER
      25596           2         208         243         460          59
PARKING LOT  PLAYGROUND      STREET     TRANSIT     VEHICLE
         15          41        1886          23          29

$LOCATION_DESC

                                             (null)                       ATM
                    14977                      1711                         1
```

```
                     BANK              BAR/NIGHT CLUB         BEAUTY/NAIL SALON
                        3                         668                       119
              CANDY STORE                 CHAIN STORE                CHECK CASH
                        7                           7                         1
        CLOTHING BOUTIQUE             COMMERCIAL BLDG                DEPT STORE
                       14                         304                         9
           DOCTOR/DENTIST                  DRUG STORE       DRY CLEANER/LAUNDRY
                        1                          14                        32
        FACTORY/WAREHOUSE                   FAST FOOD               GAS STATION
                        8                         130                        74
           GROCERY/BODEGA        GYM/FITNESS FACILITY                  HOSPITAL
                      750                           4                        77
              HOTEL/MOTEL               JEWELRY STORE              LIQUOR STORE
                       35                          14                        42
             LOAN COMPANY   MULTI DWELL - APT BUILD MULTI DWELL - PUBLIC HOUS
                        1                        2964                      5007
                     NONE            PHOTO/COPY STORE                 PVT HOUSE
                      175                           1                       983
         RESTAURANT/DINER                      SCHOOL                SHOE STORE
                      212                           1                        10
           SMALL MERCHANT SOCIAL CLUB/POLICY LOCATI          STORAGE FACILITY
                       44                          73                         1
       STORE UNCLASSIFIED                 SUPERMARKET           TELECOMM. STORE
                       37                          21                        11
            VARIETY STORE                 VIDEO STORE
                       11                           8

$PERP_RACE

                                                         (null)
                          9310                             1141
AMERICAN INDIAN/ALASKAN NATIVE       ASIAN / PACIFIC ISLANDER
                             2                              169
                         BLACK                   BLACK HISPANIC
                         11903                             1392
                       UNKNOWN                            WHITE
                          1837                              298
                WHITE HISPANIC
                          2510

$VIC_RACE

AMERICAN INDIAN/ALASKAN NATIVE       ASIAN / PACIFIC ISLANDER
```

```
                            11                            440
                         BLACK                 BLACK HISPANIC
                         20235                           2795
                       UNKNOWN                          WHITE
                            70                            728
                WHITE HISPANIC
                          4283

$LOC_OF_OCCUR_DESC

         INSIDE OUTSIDE
  25596     460    2506
```

```r
# Modify, reorder, and select columns in a pipeline
cleaned_df <- df %>%
  # Rename 'category' to 'type' and 'value' to 'score'
  rename(type = category, score = value) %>%

  # Reorder columns: put 'type' first, followed by 'id', and 'date' and 'score'
  select(type, id, date, score) %>%

  # Remove rows where 'score' is less than 15
  select(score >= 15)

  # remove completely
  select(-bad_column)
```

```r
# make a nicer datetime column
clean_incident_df <- incident_df %>%
  mutate(Date = as.POSIXct(paste(OCCUR_DATE, OCCUR_TIME), format="%m/%d/%Y %H:%M:%S")) %>%
  rename(In_Out = LOC_OF_OCCUR_DESC, Location_Category = LOC_CLASSFCTN_DESC, Location_details
  select(Date, BORO, Location_Category, Location_details, In_Out, OCCUR_DATE, OCCUR_TIME, -JU

glimpse(clean_incident_df)
summary(clean_incident_df)
```

```
Rows: 28,562
Columns: 22
$ Date                    <dttm> 2022-05-05 00:10:00, 2022-07-04 22:20:00, 201~
$ BORO                    <chr> "MANHATTAN", "BRONX", "QUEENS", "BRONX", "BROO~
$ Location_Category       <chr> "COMMERCIAL", "STREET", "", "", "", "", "", ""~
$ Location_details        <chr> "VIDEO STORE", "(null)", "", "", "", "MULTI DW~
$ In_Out                  <chr> "INSIDE", "OUTSIDE", "", "", "", "", "", "", "~
$ OCCUR_DATE              <chr> "05/05/2022", "07/04/2022", "05/27/2012", "09/~
$ OCCUR_TIME              <chr> "00:10:00", "22:20:00", "19:35:00", "21:00:00"~
$ INCIDENT_KEY            <int> 244608249, 247542571, 84967535, 202853370, 270~
$ PRECINCT                <int> 14, 48, 103, 42, 83, 23, 113, 77, 48, 49, 73, ~
$ JURISDICTION_CODE       <int> 0, 0, 0, 0, 0, 2, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0~
$ STATISTICAL_MURDER_FLAG <chr> "true", "true", "false", "false", "false", "fa~
$ PERP_AGE_GROUP          <chr> "25-44", "(null)", "", "25-44", "25-44", "", "~
$ PERP_SEX                <chr> "M", "(null)", "", "M", "M", "", "", "", "", "~
$ PERP_RACE               <chr> "BLACK", "(null)", "", "UNKNOWN", "BLACK", "",~
$ VIC_AGE_GROUP           <chr> "25-44", "18-24", "18-24", "25-44", "25-44", "~
$ VIC_SEX                 <chr> "M", "M", "M", "M", "M", "M", "M", "M", "M", "~
$ VIC_RACE                <chr> "BLACK", "BLACK", "BLACK", "BLACK", "BLACK", "~
$ X_COORD_CD              <dbl> 986050, 1016802, 1048632, 1014493, 1009149, 99~
$ Y_COORD_CD              <dbl> 214231.0, 250581.0, 198262.0, 242565.0, 190104~
$ Latitude                <dbl> 40.75469, 40.85440, 40.71063, 40.83242, 40.688~
$ Longitude               <dbl> -73.99350, -73.88233, -73.76777, -73.89071, -7~
$ Lon_Lat                 <chr> "POINT (-73.9935 40.754692)", "POINT (-73.8823~
```

```
      Date                           BORO           Location_Category 
 Min.   :2006-01-01 02:00:00.0   Length:28562       Length:28562      
 1st Qu.:2009-09-04 07:15:00.0   Class :character   Class :character  
 Median :2013-09-20 17:56:00.0   Mode  :character   Mode  :character  
 Mean   :2014-06-07 20:04:22.2                                        
 3rd Qu.:2019-09-30 10:10:30.0                                        
 Max.   :2023-12-29 21:22:00.0                                        
```

```
 Location_details      In_Out           OCCUR_DATE         OCCUR_TIME       
 Length:28562       Length:28562       Length:28562       Length:28562      
 Class :character   Class :character   Class :character   Class :character  
 Mode  :character   Mode  :character   Mode  :character   Mode  :character  
```

```
  INCIDENT_KEY           PRECINCT     JURISDICTION_CODE STATISTICAL_MURDER_FLAG
 Min.   :  9953245   Min.   :  1.0   Min.   :0.0000    Length:28562           
 1st Qu.: 65439914   1st Qu.: 44.0   1st Qu.:0.0000    Class :character       
 Median : 92711254   Median : 67.0   Median :0.0000    Mode  :character       
 Mean   :127405824   Mean   : 65.5   Mean   :0.3219                           
 3rd Qu.:203131993   3rd Qu.: 81.0   3rd Qu.:0.0000                           
 Max.   :279758069   Max.   :123.0   Max.   :2.0000                           
```

```
                                     NA's   :2
 PERP_AGE_GROUP       PERP_SEX          PERP_RACE         VIC_AGE_GROUP
 Length:28562       Length:28562       Length:28562       Length:28562
 Class :character   Class :character   Class :character   Class :character
 Mode  :character   Mode  :character   Mode  :character   Mode  :character




   VIC_SEX            VIC_RACE           X_COORD_CD        Y_COORD_CD
 Length:28562       Length:28562       Min.   : 914928   Min.   :125757
 Class :character   Class :character   1st Qu.:1000068   1st Qu.:182912
 Mode  :character   Mode  :character   Median :1007772   Median :194901
                                       Mean   :1009424   Mean   :208380
                                       3rd Qu.:1016807   3rd Qu.:239814
                                       Max.   :1066815   Max.   :271128

    Latitude       Longitude         Lon_Lat
 Min.   :40.51   Min.   :-74.25   Length:28562
 1st Qu.:40.67   1st Qu.:-73.94   Class :character
 Median :40.70   Median :-73.92   Mode  :character
 Mean   :40.74   Mean   :-73.91
 3rd Qu.:40.82   3rd Qu.:-73.88
 Max.   :40.91   Max.   :-73.70
 NA's   :59      NA's   :59
```

```r
time_series_df <- clean_incident_df %>%
    mutate(simple_date = as.Date(OCCUR_DATE, format = "%m/%d/%Y")) %>%
    group_by(simple_date) %>%
    # Add a new column that represents only the month and year
    summarise(total_by_day = n()) %>%
    mutate(month_year = floor_date(simple_date, "month"))

df_aggregated <- time_series_df %>%
  mutate(year = format(simple_date, "%Y"),  # Extract year
         month = format(simple_date, "%m")) %>%  # Extract month
  group_by(year, month) %>%
  summarise(total_by_day = sum(total_by_day)) %>%
  ungroup()

tail(time_series_df)
tail(df_aggregated)
```

```
`summarise()` has grouped output by 'year'. You can override using the
`.groups` argument.
```

A tibble: 6 x 3

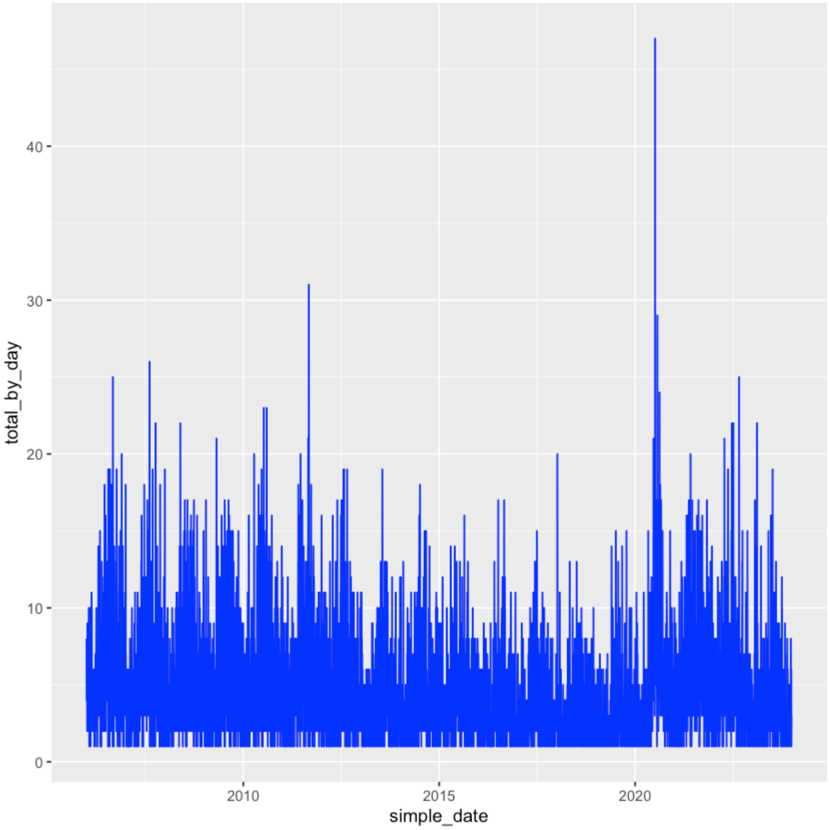
simple_date <date>	total_by_day <int>	month_year <date>
2023-12-22	8	2023-12-01
2023-12-23	4	2023-12-01
2023-12-24	5	2023-12-01
2023-12-26	6	2023-12-01
2023-12-27	1	2023-12-01
2023-12-29	3	2023-12-01

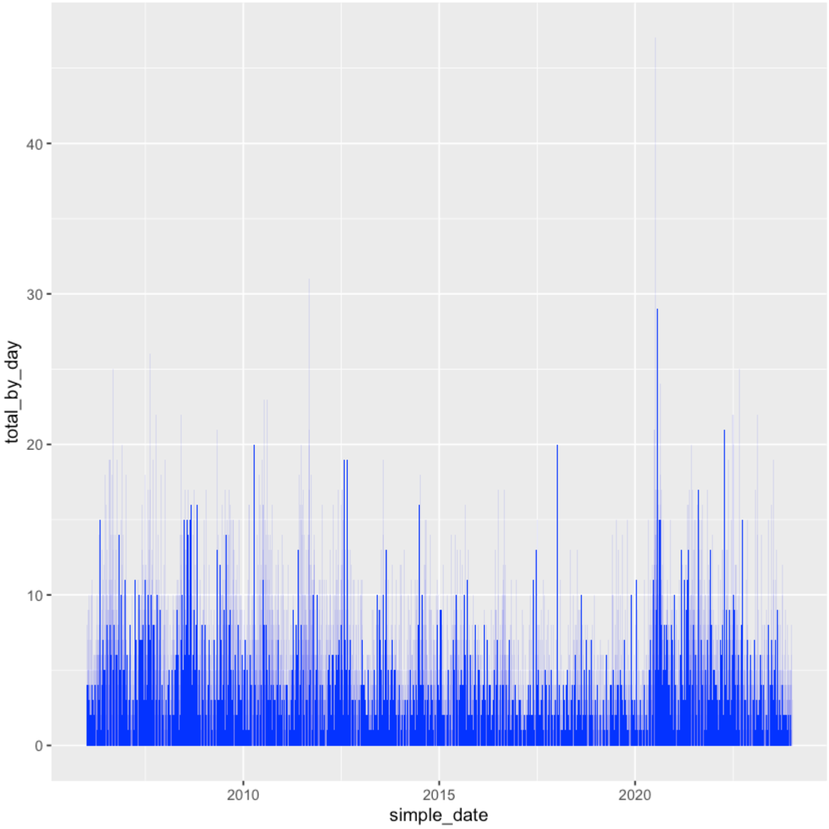
A tibble: 6 x 3

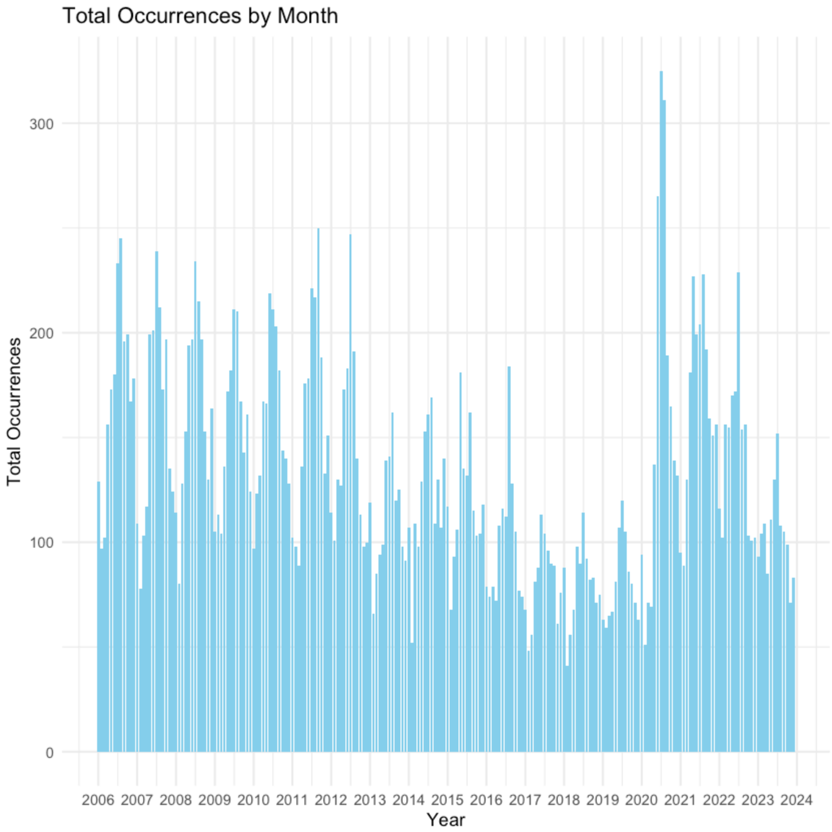
year <chr>	month <chr>	total_by_day <int>
2023	07	152
2023	08	108
2023	09	105
2023	10	99
2023	11	71
2023	12	83

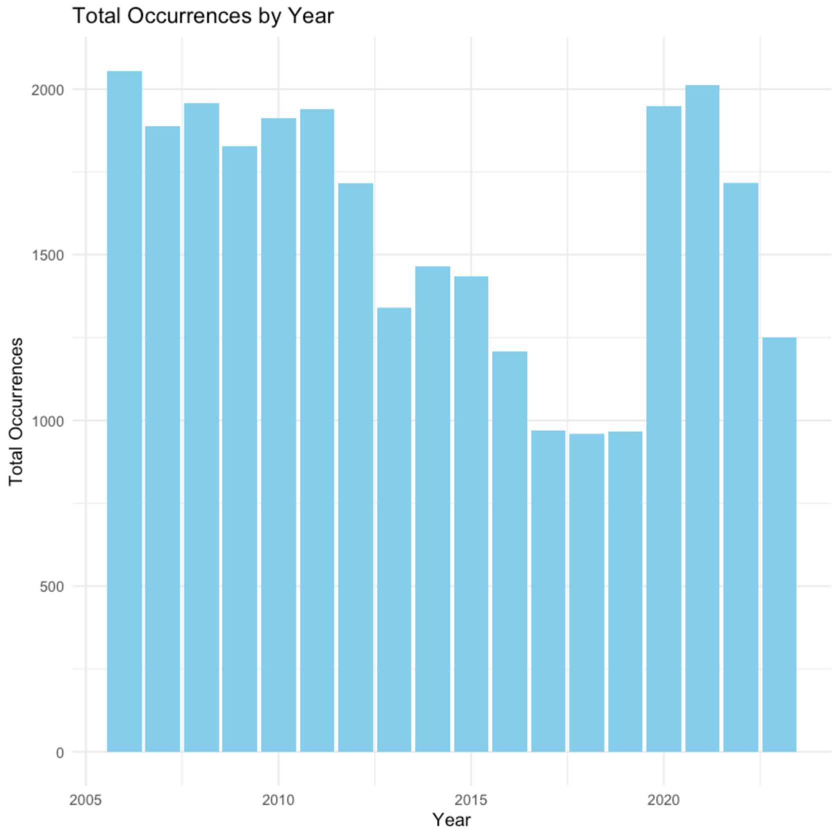
```r
ggplot(time_series_df, aes(x = simple_date, y = total_by_day)) +
geom_line(color = "blue")

ggplot(time_series_df, aes(x = simple_date, y = total_by_day)) +
geom_bar(stat = "identity", fill = "blue")

ggplot(time_series_df, aes(x = month_year, y = total_by_day)) +
  geom_bar(stat = "identity", fill = "skyblue") +
  labs(title = "Total Occurrences by Month", x = "Year", y = "Total Occurrences") +
  theme_minimal() +
  scale_x_date(date_labels = "%Y", date_breaks = "1 year")

ggplot(time_series_df, aes(x = year(simple_date), y = total_by_day)) +
  geom_bar(stat = "identity", fill = "skyblue") +
  labs(title = "Total Occurrences by Year", x = "Year", y = "Total Occurrences") +
  theme_minimal()
```

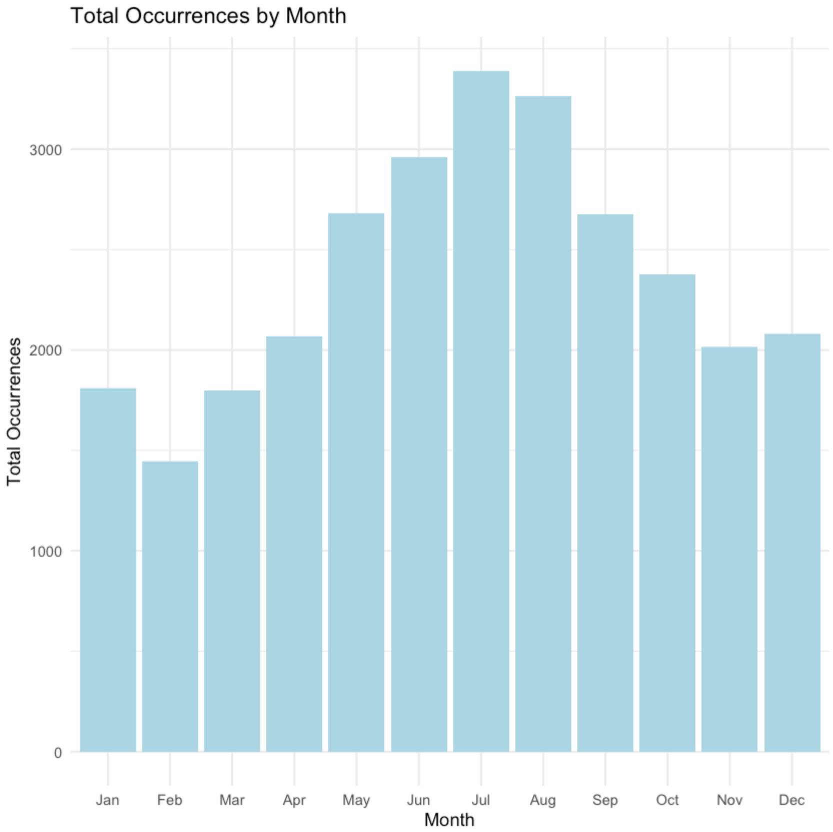
```
# Plot occurrences by month (across all years)
ggplot(time_series_df, aes(x = month(simple_date, label = TRUE), y = total_by_day)) +
  geom_bar(stat = "identity", fill = "lightblue") +
  labs(title = "Total Occurrences by Month", x = "Month", y = "Total Occurrences") +
  theme_minimal()
```




total_by_day
40
30
20
10
0
2010
2015
2020
simple_date


Total Occurrences by Month
Total Occurrences
0
100
200
300
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
Year


Total Occurrences by Year
Total Occurrences
2000
1500
1000
500
0
2005
2010
2015
2020
Year



```
[1] 10
```

```
name <- 'cody'

paste('The name is',name)
```

'The name is cody'