Lab 6: Creating Figures in R
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Exercise 1
```
dc <- ods[ods$STATE == "DC",]
dc <- dc[order(dc$DATA_DATE),]

plot(dc$DATA_DATE, dc$NUMBER_NATURAL_OPIOD_DEATHS,
    type = "p",
    main = "Natural and Synthetic Opiod Deaths in Wasington DC \n (2015-2018)",
    xlab = "Year",
    ylim = c(0,300),
    ylab = "Number of Deaths",
    col  = "black")
points(dc$DATA_DATE, dc$NUMBER_SYNTHETIC_OPIOD_DEATHS, pch = 1, col = "red")

lines(dc$DATA_DATE, dc$NUMBER_NATURAL_OPIOD_DEATHS, col = "black")
lines(dc$DATA_DATE, dc$NUMBER_SYNTHETIC_OPIOD_DEATHS, col = "red")
legend(
     as.Date("03/01/2015", format="%m/%d/%Y"), 300,
    legend = c("Natural Opiods","Synthetic Opiod"),
    col=c("black","red"),
    lty=1:2
    )
```
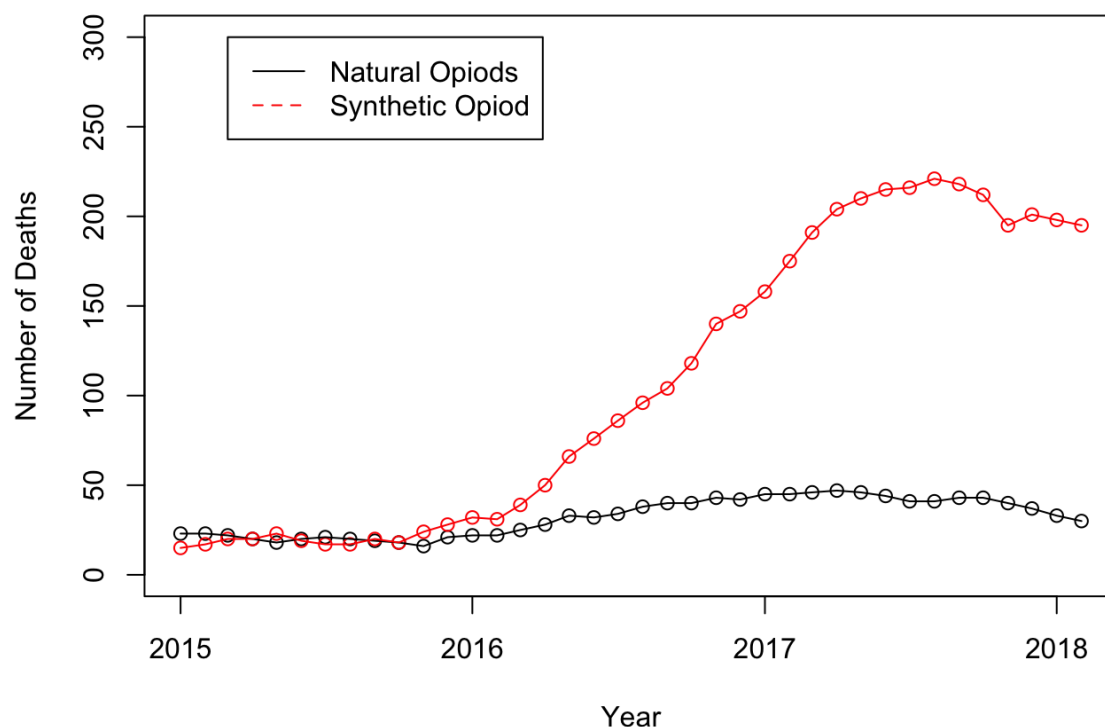
OUTPUT:
I made sure the washington was misspelled like in the picture

Natural and Synthetic Opiod Deaths in Wasington DC
(2015-2018)

Exercise 2
ods$Monthly_Proportion <- ods$NUMBER_DRUG_OVERDOSE_DEATHS /
ods$NUMBER_DEATHS

ods$Death_Proportion <- ods$NUMBER_COCAINE_DEATHS / ods$NUMBER_DEATHS

state_order <- c('VT', 'NH', 'ME', 'CT', 'RI')

neweng <- droplevels(ods[ods$STATE %in% state_order,])
neweng$STATE <- factor(neweng$STATE, levels = state_order)

median <- tapply(neweng$Monthly_Proportion,
        neweng$STATE,
   median, na.rm=T)
plot(median)
plot(median,
    type = "p",
    pch = 18,
    col= "red",

```
        cex = 2,
        axes = FALSE,
        ann = FALSE,
        ylim = c(0, 0.05))

axis(1, at=1:5, lab = names(median))
axis(2)

box()
title (main = "Median Overdose Death Proportion by State \n New England", col.lab = "black")
title (ylab = "Median Monthly Proportion of Overdose Deaths", col.lab = "blue")
title (xlab = "State", col.lab = "blue")
```

Output:

**Median Overdose Death Proportion by State**
New England
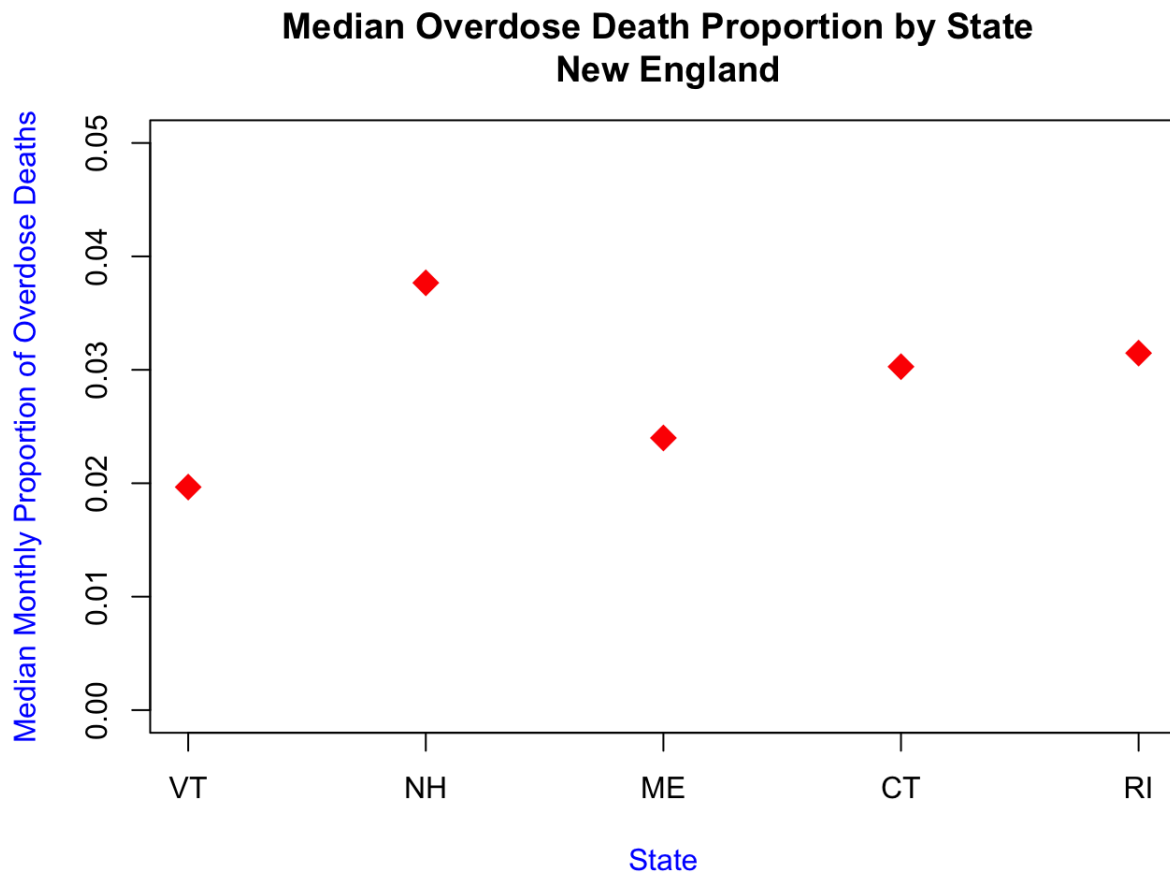
Exercise 3: NUMBER_COCAINE_DEATHS

```
ods$Death_Proportion <- ods$NUMBER_COCAINE_DEATHS / ods$NUMBER_DEATHS
state <- c('DC','MD','VA')
```

```
barplot1<- droplevels(ods[ods$STATE %in% state,])
barplot1$STATE <- factor(barplot1$STATE, levels = state)

mean2 <- tapply(barplot1$Death_Proportion,
          barplot1$STATE,
           mean, na.rm=T)
barplot(mean2,
     main = "Proportion of Cocaine Deaths by State",
     ylab="State",
     xlab= "Proportion of Cocaine Deaths",
     col = "forestgreen",
     xlim = c(0,0.015),
     horiz = TRUE)
box()
```

Output:

Proportion of Cocaine Deaths by State

Proportion of Cocaine Deaths
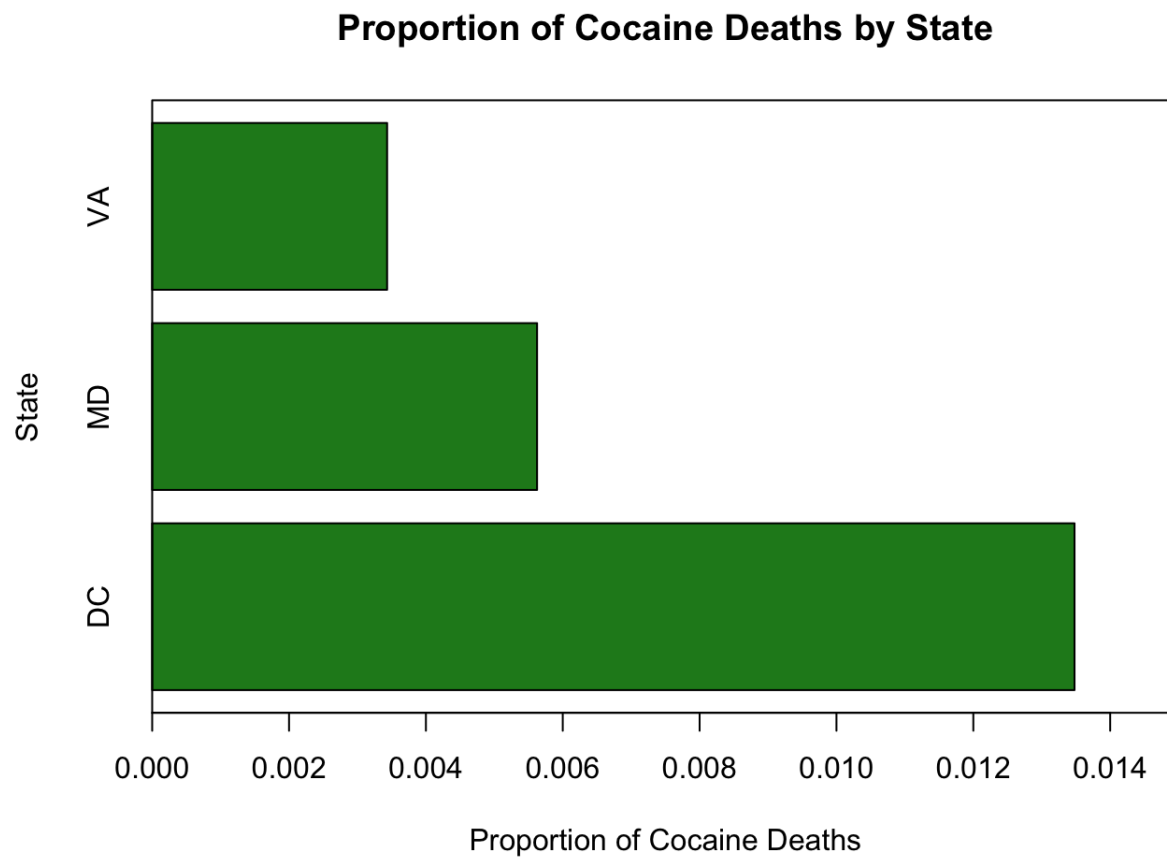
Exercise 4:

```r
north <- c('CT', 'DC', 'MD', 'ME', 'NH', 'NY', 'OR', 'RI', 'VT', 'WA')
south <- c('NC', 'NM', 'NV', 'OK', 'SC', 'UT', 'VA', 'WV')
fall   <- c('September', 'October', 'November')
spring <- c('March', 'April', 'May')
winter <- c('December', 'January', 'February')
summer <- c('June', 'July', 'August')
first <- ods %>%
  mutate(LOCATION = 1*(STATE %in% north)
                + 2*(STATE %in% south),
      SEASON = 1*(MONTH %in% spring) + 2*(MONTH %in% summer)
      + 3*(MONTH %in% fall) + 4*(MONTH %in% winter),
      PROP_OVERDOSE_DEATHS
=NUMBER_DRUG_OVERDOSE_DEATHS/NUMBER_DEATHS)%>%
  group_by(SEASON,LOCATION) %>%
  summarize(AVGMETH = mean(PROP_OVERDOSE_DEATHS))
first
second <- matrix(as.matrix(first[,3]),nrow = 2,ncol = 4, byrow = FALSE)

colnames(second) <- c("Spring","Summer","Fall","Winter")
row.names(second) <- c("Northern States", "Southern States")
second

barplot(second,
      beside = TRUE,
      main = "Mean Proportion Drug Overdose Deaths \n by Region and Season",
      xlab = "Season",
      ylab = "Mean Proportion Drug Overdose Deaths",
      col = c("blue","yellow"),
      ylim = c(0.020,0.030),
      xpd = FALSE
      )
box()
legend("topleft", legend=c("Northern States","Southern States"),
      bty="n",
      title = c("Region"),
      fill=c(
```

Output:

Mean Proportion Drug Overdose Deaths by Region and Season
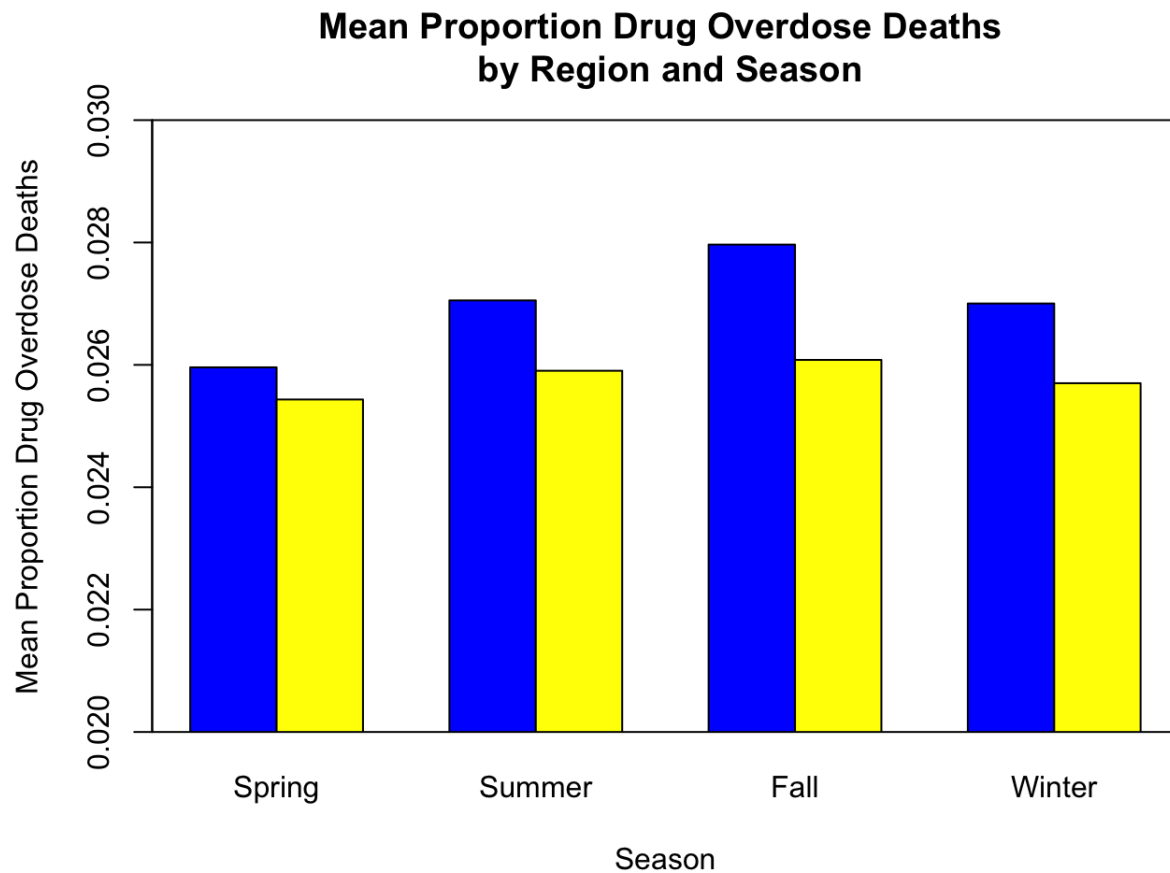
Exercise 5

```
uno <- ods %>%
  filter(YEAR %in% c(2015,2016,2017), STATE %in% c('NC')) %>%
  group_by(STATE,YEAR) %>%
  summarize(SUMMETH = sum(NUMBER_NATURAL_OPIOD_DEATHS))
dos <- ods %>%
  filter(YEAR %in% c(2015,2016,2017), STATE %in% c('NC')) %>%
  group_by(STATE,YEAR) %>%
  summarize(SUMMETH = sum(NUMBER_SYNTHETIC_OPIOD_DEATHS))

tres <- matrix(c(uno$SUMMETH, dos$SUMMETH), nrow = 2, ncol = 3, byrow = TRUE)
tres
colnames(tres) <- c("2015","2016","2017")
row.names(tres) <- c("Natural","Synthetic")
barplot(tres,
        main = "Count of Opiod Overdose Deaths by Year and Opiod Type \n North Carolina",
        xlab = "Year",
        ylab = "Count of Opiod Overdose Deaths",
```

```
        col = c("blue","grey"),
        ylim = c(0,20000),
        xlim = c(0,2),
        width = 0.4,
        space = 0.5)
box()
legend("topleft", c("Natural","Synthetic"),
      bty="n",
      title = "Opiod Type",
      fill=c("blue","grey"))
```

Output:

**Count of Opiod Overdose Deaths by Year and Opiod Type
North Carolina**