**Lab 2 - Graphical Display of Data**  
  
**Pie Chart and Bar Plot:** The networks for the top 20 television shows, as determined by the Nielsen Ratings for the week of April 18–24, 2005, are shown in the following table. Construct a frequency distribution and a relative-frequency distribution for these network data. Using the constructed frequency distribution, what do you learn about the data? Construct bar graph and pie chart.   
  
CBS Fox ABC Fox CBS CBS ABC Fox CBS ABC CBS CBS NBC CBS NBC NBC CBS CBS NBC NBC

**R-Code:**

x= c("CBS", "Fox", "ABC", "Fox", "CBS", "CBS", "ABC", "Fox", "CBS", "ABC", "CBS", "CBS", "NBC", "CBS", "NBC", "NBC", "CBS", "CBS", "NBC", "NBC")  
  
#### Pie Chart ####

# Simple Pie Chart

Ftable =table(x)

class = unique(x)

pie(Ftable, labels = class, main="Pie Chart of Top Broadcast shows")

# Pie Chart with Percentages

pct <- round(Ftable/sum(Ftable)\*100)

class <- paste(class, pct) # add percents to labels

class <- paste(class,"%",sep="") # ad % to labels

pie(Ftable,labels = class, col=rainbow(length(class)),

main="Pie Chart of Top Broadcast shows")  
  
# Help for Pie chart

?pie

**##** Bar Graph **#####**

# Simple Bar Plot   
  
barplot(Ftable, main="Top Broadcast shows", xlab="Type of Broadcast shows")

## If you set limits for the y-axis

barplot(Ftable, ylim = c(0,max(Ftable)+5), main="Top Broadcast shows", xlab="Type of Broadcast shows")

# Relative frequency bar plot

relF = Ftable/sum(Ftable)

barplot(relF, main="Top Broadcast shows", xlab="Type of Broadcast shows")

# If you set limits for the y-axis

barplot(relF, ylim = c(0, max(relF)+.05), main="Top Broadcast shows", xlab="Type of Broadcast shows”)

# Help for Bar plot

?barplot

**Histogram:** Construct a frequency distribution table for the following data values using 5 classes. Construct histogram also.

44, 32, 35, 38, 35, 39, 42, 36, 36, 40, 51, 58, 58, 62, 63, 72, 78, 81, 25, 84, 20.

**Rcode:**

xx = c( 44, 32, 35, 38, 35, 39, 42, 36, 36, 40, 51, 58, 58, 62, 63, 72, 78, 81, 25, 84, 20)

nclass = 5

Range = max(xx)-min(xx)  
cwidth = ceiling(Range/nclass)

# <https://cosmosweb.champlain.edu/people/stevens/webtech/r/chapter-3-r.pdf>

# creates a list of class boundaries  
  
bins = seq(min(xx)-0.5,max(xx)+0.5,by=cwidth)

# Group the data in bins

xxx = cut(xx,bins)

# Below produces the original table in bad format

freq\_table = table(xxx)

# Below produces the same table in better format: The transform function puts the tables into column format

transform(freq\_table)

# Below appends a relative frequency and cumulative frequency

cbind(freq\_table, Rel\_Freq=prop.table(table(xxx)),Cum\_Freq=cumsum(table(xxx)))

# Histogram

# Fast and dirty: it’s a R default histogram

hist(xx)

# Prettier: it’s a customized one

hist(xx,breaks=bins,main="sdsdsdsd",xlab="classes",col="red",ylim=c(0,15))

## Note: you can use different color for each bars.

**Steam and Leaf Plot:** The data represents the scores of a biology class on a midterm exam. Construct a stem and leaf plot  
75 85 90 80 87 67 82 88 95 91 73 80 83 92  
94 68 75 91 79 95 87 76 91 85

**Rcode:**

#### Stem and Leaf Plot ###

scores = c(75, 85, 90, 80,87,67,82,88,95, 91,73,80,83,92, 94,68,75, 91,79, 95,87, 76,91,85)

stem(scores)

**Dot Plot:** Robert, a sixth grader at Roosevelt Middle School, usually goes to bed around 10:00 p.m. and gets up around 6:00 a.m. to get ready for school. That means he gets about 𝟖 hours of sleep on a school night. He decided to investigate the statistical question: How many hours per night do sixth graders usually sleep when they have school the next day? Robert took a survey of 𝟐𝟗 sixth graders and collected the following data to answer the question.   
  
𝟕 𝟖 𝟓 𝟗 𝟗 𝟗 𝟕 𝟕 𝟏𝟎 𝟏𝟎 𝟏𝟏 𝟗 𝟖 𝟖 𝟖 𝟏𝟐 𝟔 𝟏𝟏 𝟏𝟎 𝟖 𝟖 𝟗 𝟗 𝟗 𝟖 𝟏𝟎 𝟗 𝟗 𝟖  
   
 Robert decided to make a dot plot of the data to help him answer his statistical question.

**Rcode:**

#### Dot Plot

sleepHr = c(7, 8, 5, 9, 9, 9, 7, 7, 10, 10, 11, 9, 8, 8, 8, 12, 6, 11, 10, 8, 8, 9, 9, 9, 8, 10, 9, 9, 8)

# Simple Dotplot

dotchart(sleepHr, cex=1, main="Hours sleeping for sixth graders when they have school", xlab="Number of Hrs sleep per night")

**Time Series Plot:** The percentages of voters voting in the last 5 Presidential elections are shown here. Construct a time series graph.

Year 1984 1988 1992 1996 2000

% of voters voting 74.63 72.48 78.01 65.97 67.50

**Rcode:**

### Time Series Plot

pctvote = c(74.63, 72.48, 78.01, 65.97, 67.50)

#Tseries = ts(pctvote, start=c(1987,1),end=c(2000,1),frequency=1)

year = c(1984,1988,1992,1996,2000)

plot(year,pctvote,type='l')

**Scatter Plot:** A researcher wishes to determine if there is a relationship between the number of days an employee missed a year and the person’s age. Draw a scatter plot and comment on the nature of the relationship.

Age, x 22 30 25 35 65 50 27 53 42 58

Days missed, y 0 4 1 2 14 7 3 8 6 4

**Rcode:**

### Scatter Plot

Age = c(22, 30, 25, 35, 65, 50, 27, 53, 42, 58)

DaysMiss = c(0, 4, 1, 2, 14, 7, 3, 8, 6, 4)

plot(Age,DaysMiss, main = "Scatter plot of Days Missed vs Age", xlab = "Age", ylab = "Days Missed", xlim = c(0,max(Age)+10), ylim = c(0,max(DaysMiss)+5), type = 'p')