Chapter 1

library(datasets)  
library(tidyverse)

## -- Attaching core tidyverse packages ------------------------ tidyverse 2.0.0 --  
## v dplyr 1.1.2 v readr 2.1.4  
## v forcats 1.0.0 v stringr 1.5.0  
## v ggplot2 3.4.2 v tibble 3.2.1  
## v lubridate 1.9.2 v tidyr 1.3.0  
## v purrr 1.0.1   
## -- 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 become errors

## Notes on vectors

x <- c(3,2,4,6)   
x

## [1] 3 2 4 6

sum(x) #sum

## [1] 15

mean(x) #mean

## [1] 3.75

var(x) #variance

## [1] 2.916667

y<- seq(2,10,2) #vector with sequence between 2 and 10 by increments of 2  
y

## [1] 2 4 6 8 10

y <- 2:10 #vector between 2 and 10  
y

## [1] 2 3 4 5 6 7 8 9 10

y\_rep <- rep(y,3) #repeat vector 3 times  
y\_rep

## [1] 2 3 4 5 6 7 8 9 10 2 3 4 5 6 7 8 9 10 2 3 4 5 6 7 8  
## [26] 9 10

v\_rep <- c(1,2,3,5,2,2,2,2,3)   
y\_rep <- rep(y, v\_rep) #repeat element of a vector based on correlating value of a vector (v\_rep)  
y\_rep

## [1] 2 3 3 4 4 4 5 5 5 5 5 6 6 7 7 8 8 9 9 10 10 10

length(y) #length of vector

## [1] 9

y <- append(y,4) #append value  
y <- append(y,10,after=0) #append value at 0th position  
y

## [1] 10 2 3 4 5 6 7 8 9 10 4

length(y)

## [1] 11

## Matrix

y <- 2:10  
dim(y) <- c(3,3) #creation of matrix  
y

## [,1] [,2] [,3]  
## [1,] 2 5 8  
## [2,] 3 6 9  
## [3,] 4 7 10

t(y) #transpose

## [,1] [,2] [,3]  
## [1,] 2 3 4  
## [2,] 5 6 7  
## [3,] 8 9 10

x <- matrix(seq(6,30,3), nrow = 3) #matrix 3x3  
x

## [,1] [,2] [,3]  
## [1,] 6 15 24  
## [2,] 9 18 27  
## [3,] 12 21 30

num\_matrix <- matrix(1:9, nrow = 3, byrow=T) #input matrix horizontally  
num\_matrix

## [,1] [,2] [,3]  
## [1,] 1 2 3  
## [2,] 4 5 6  
## [3,] 7 8 9

num\_matrix[2,2] #specific value

## [1] 5

num\_matrix[3,] #specific row

## [1] 7 8 9

num\_matrix[,2] #specific column

## [1] 2 5 8

x\*num\_matrix #multiply matrix

## [,1] [,2] [,3]  
## [1,] 6 30 72  
## [2,] 36 90 162  
## [3,] 84 168 270

x+num\_matrix #add matrix

## [,1] [,2] [,3]  
## [1,] 7 17 27  
## [2,] 13 23 33  
## [3,] 19 29 39

## List

candy <- c("Kit Kat", "Hershy", "Mounds")  
YearE <- c(2014, 2012, 2017)  
  
candyI <- list(types = candy, ageEx = YearE) #create list  
candyI

## $types  
## [1] "Kit Kat" "Hershy" "Mounds"   
##   
## $ageEx  
## [1] 2014 2012 2017

candyI$types #print candy type

## [1] "Kit Kat" "Hershy" "Mounds"

candyI$ageEx #print expiration of candy

## [1] 2014 2012 2017

candyI$types[candyI$ageEx > 2013] #print candy if expiration greater than 2013

## [1] "Kit Kat" "Mounds"

candyI$types[1] #print first candy type

## [1] "Kit Kat"

## Data frames

species <- c("Giraffe", "Aligator", "Racoon")  
weight <- c(400, 300, 40)  
gender <- c("F","M","M")  
  
genderf <- factor(gender) #convert to factor  
set1 <- data.frame(species, weight, genderf) #put vectors in a data frame  
set1

## species weight genderf  
## 1 Giraffe 400 F  
## 2 Aligator 300 M  
## 3 Racoon 40 M

set1[1,2] #specific value in data frame

## [1] 400

set1[2,] #specific row of data frame

## species weight genderf  
## 2 Aligator 300 M

mean(set1$weight) #average of animal weight

## [1] 246.6667

mean(set1$weight[set1$genderf == "M"]) #average of animal weight if male

## [1] 170

with(set1, mean(weight[genderf == "M"])) #same as line 102

## [1] 170

nrow(set1) #number of row

## [1] 3

ncol(set1) #number of column

## [1] 3

animalk <- c("Mammal", "Reptile", "Mammal")  
set1.add <- cbind(set1, animalk) #add column  
set1

## species weight genderf  
## 1 Giraffe 400 F  
## 2 Aligator 300 M  
## 3 Racoon 40 M