## Input/Output in R

**Input** - R is able to accept input from the keyboard or from files.

- I. Keyboard input
  - a. readline(): this takes user input from the keyboard as a single string variable
    - i. Key arguments
      - -prompt: any text to prompt user for keyboard input
  - b. scan(): this function generates a vector of values entered using the keyboard
    - i. Key arguments
      - -what: mode of data expected from user entry; default is numeric
- II. File input
  - a. scan(): this function can also read from files
    - i. Key arguments
      - -what: mode of data expected from user entry; default is numeric
      - -sep: delimiter for elements of vector; default is any whitespace
  - b. read.csv(): this function specializes in reading comma delimited files into R's workspace as a data frame
    - i. Key arguments
      - -file: what file to read from
      - -header: are there column names: defaults to FALSE
      - -row.names: what column holds the row names; defaults to none
      - -stringsAsFactors: should strings be treated as factors; defaults to TRUE
  - c. read.table(): this function is very similar to read.csv(), but can read a matrix-shaped file with any character as delimiter; to read a text file into R as a matrix you must use read.table() and then convert the data frame to a matrix with as.matrix().
    - i. Key arguments
      - -file: what file to read from
      - -header: are there column names; defaults to FALSE
      - -row.names: what column holds the row names: defaults to none
      - -sep: specifies the file delimiter; defaults to space delimited
      - -stringsAsFactors: should strings be treated as factors; defaults to TRUE

**Output** - R is also capable of outputting information to the screen or file.

- I. Screen output
  - a. print(): This is a general function that refers to a print function specific to whatever object type you include as an argument
    - -outside of a function, users can print an object simply by typing the variable name
    - -line numbers are printed along with the variable contents
  - b. *cat()*: this function prints to the screen, but without line numbers
    - -this function only prints the variable contents and therefore requires the inclusion of a newline character in the function call
    - > x=c(1,2,3)
    - $> cat(x,"4,5,6","\n")$
    - 1 2 3 4 5 6

- i. Key arguments
  - -sep: what should each argument be separated by when printing; default is a space
- II. File output
  - a. *cat()*: this function can also write to files

-dir() or list.files(): lists files present in working directory

- i. Key arguments
  - -sep: what should each argument be separated by when printing; default is a space
  - -file: specifies file name to write to
- b. write.table(): this function writes a matrix or data frame to a delimited text file
  - i. Key arguments
    - -row.names: include row names in file; defaults to TRUE
    - -col.names: include column names in file; defaults to TRUE
    - -sep: delimiter for text file; defaults to space delimited
    - -append: append to the file if it exists or overwrite; defaults to FALSE

**File directory navigation** – A number of functions in R allow for interaction with the operating system's file directories.

- -file.info(): provides information about a file, including file size
  -getwd(): provides path of working directory
  -setwd(): sets path for working directory
  -file.exists(): logical test for the presence of a given file in the working directory
- -file.choose() OR choose.files(): opens a graphical user interface file dialogue box \*this allows for visual navigation of the file system and selection of a file
  - \*file.choose() works for Macs and choose.files() is R in Windows command