Introduction to SNA with R and statnet

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Roadmap for today

1. Introduce the R software and language
   - Demonstrate basic syntax
   - Overview of data types and structures
   - Demonstrate importing/writing data
2. SNA in R
   - Importing network data
   - Manipulating network data
   - Visualization of network data
   - Calculating network descriptives
   - Handling metadata for complex networks
   - Some classical network analytic techniques

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  2. a software platform

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- Its home on the web: `http://www.r-project.org/`

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  - Generally good at reading in/writing out other file formats
  - Everything in R is an object—data, functions, everything

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- When you type in commands at the prompt and hit Enter
  1. R tries to interpret what you've asked it to do (evaluation)
  2. If it understands what you've told it to do, no problem
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- If you type in an incomplete command, R will usually respond by changing the command prompt to the + character
  - This means you must either:
    - Type in the remainder of the command
    - Hit Esc (on a Mac) to cancel
    - Type in Ctrl + C (on Windows and Linux) to cancel

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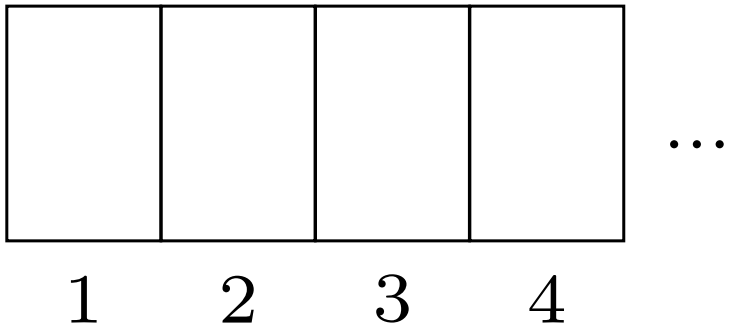
- Common data structures:
  1. One-dimensional:
     - Vectors
  2. Multi-dimensional:
     - Matrices
     - Data frames
     - `network` objects (demonstrated today)

Vectors in R



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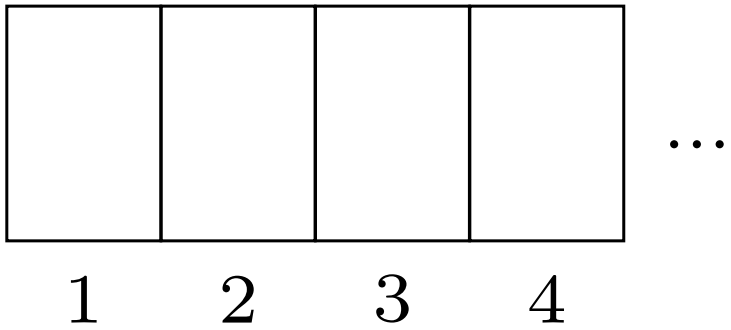

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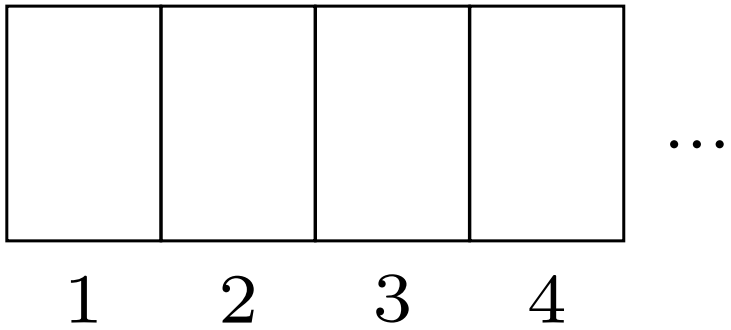

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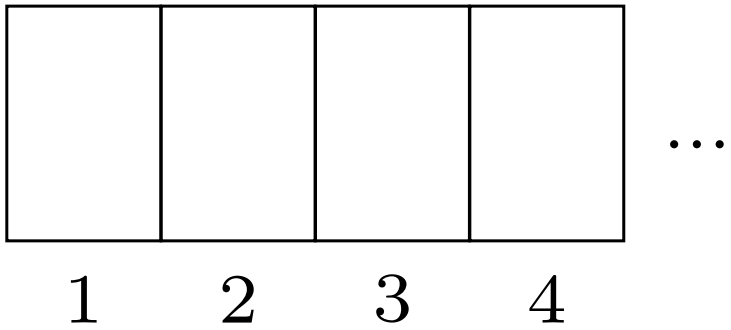

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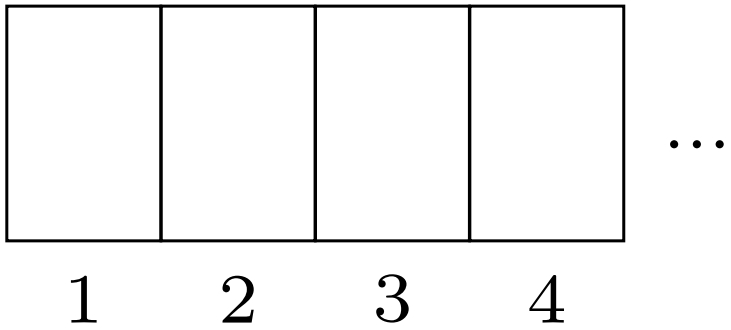

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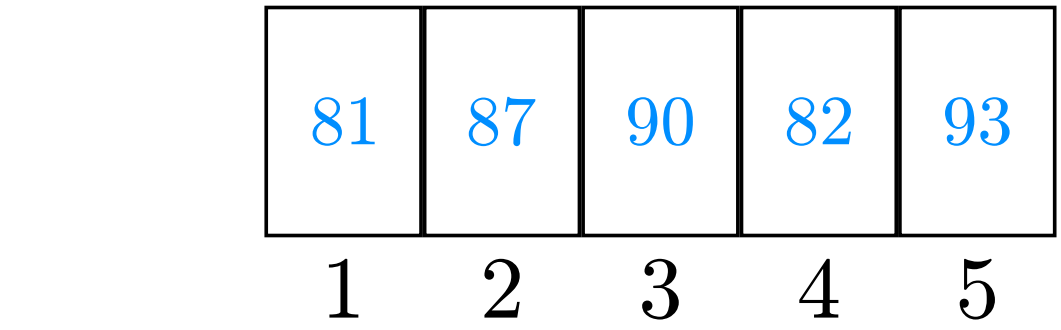
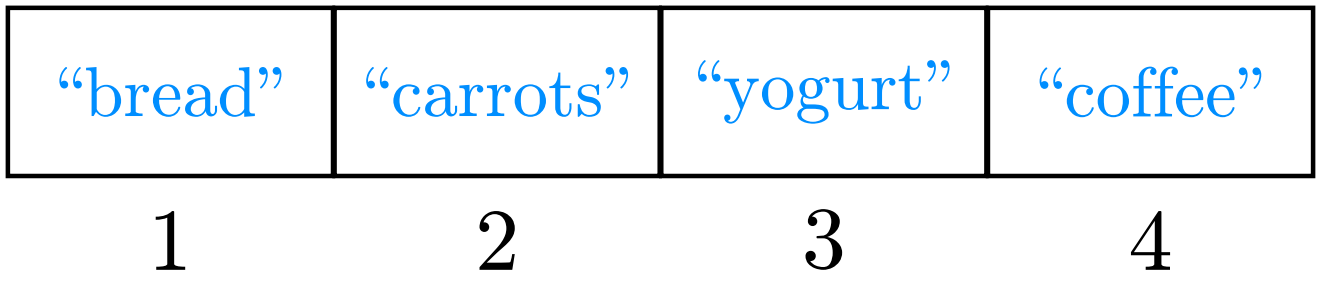
  - A vector of length *n* has *n* cells
  - Each cell can hold a single value, like a numeric or string value
  - Vectors can only store data of the same type
    - Either all strings, or all numerics, but not both!

Some examples of vectors in R





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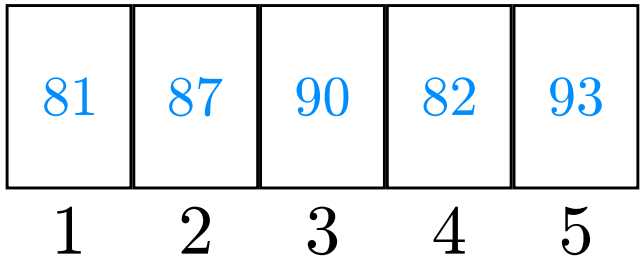

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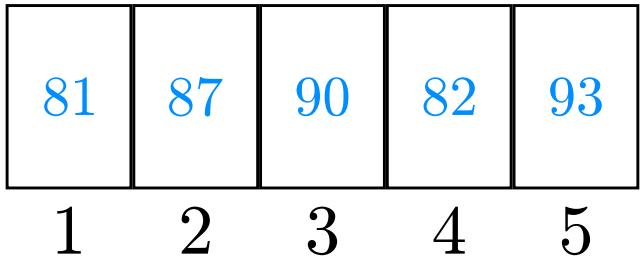

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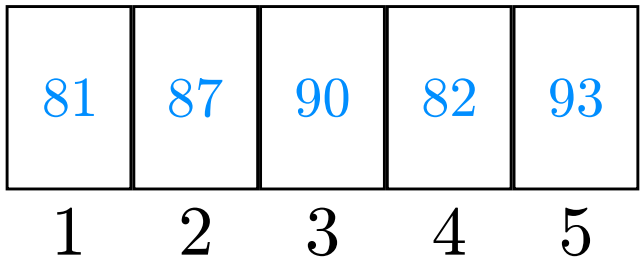

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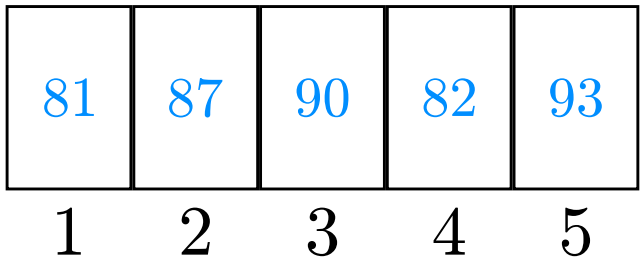

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  - To retrieve all BUT the third value:

```
testScores[-3]
```

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- However, matrix-like data (spreadsheet data) can be thought of as collections of vectors
  - Each row of a matrix is a vector
  - Each column of a matrix is a vector
- More about vectors in `R` in a few minutes...

Two-dimensional data in R

- Most (all?) of us are familiar with two-dimensional data
  - Spreadsheet-style data
- The dimensions are the *rows* and *columns*
- Here, 9 rows and 6 columns: a 9×6 data matrix

id	name	age	sex	handed	lastDocVisit
5012	Danielle	44	F	R	2012
2331	Josh	44	M	R	2008
1989	Mark	40	M	R	2010
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- In many instances, they behave the same
- Some R functions expect either a matrix or a data frame
- What's the difference between the two?

Matrices versus data frames in R

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  - if you try to give it multipe types, it converts everything to string format
- Data frames can store data of multiple types
  - Ideal for classical data analysis, where you might have a mix of numeric and string values
  - E.g., a mix of peoples' ages, favorite colors, BMI scores, names

Working with matrices and data frames in R

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- Examples:
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  - To retrieve Sarah's age (6th row, 3rd column):

```
friendSurvey[6,3]
```

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- To retrieve all of the data from the 2nd row:

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friendSurvey[2,]
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```
friendSurvey[2,]
```

- To retrieve all of the data from the 4th column:

```
friendSurvey[,4]
```

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- Square bracket notation works for both matrix and data frame objects in R
- Data frames provide you another option: "dollar sign notation"
  - Only works for retrieving specific columns

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  - To retrieve the the 4th person's age:

```
friendSurvey$age[4]
```