



CMPE 140 Introduction to Computing for Economics and Management

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CMPE 140 introduces basic concepts of computing with the R programming language. Course topics include an introduction into basic data structures (vector, matrix, lists, data frames, etc.), program control statements (conditional execution, for and while loops, etc.), data visualization and input/output. Course material is available from http://www.barnrich.ch/wiki/doku.php?id=pub:lectures:2016_introduction_to_computing_for_econ:sta_rt

Lecture Program

(1) Getting Started

- Course objectives and organization
- R Intro
- R Download and Installation
- Simple calculations
- R help and documentation
- R Programming Environment

(2) Vectors

- Variable name conventions
- Creating data vectors
- Data vector indexing
- Data vector filtering
- Data vector sorting
- Data vector operations
- Creating regular sequences
- Creating repeated values

(3) Matrices

- Matrix creation
- Matrix modification



- Matrix operations
- Matrix indexing
- Matrix filtering
- Matrix function apply()
- Programming own functions
- Higher-dimensional arrays

(4) Lists

- Creating lists
- List indexing
- Adding/deleting list elements
- Concatenate lists
- Vectors as list components
- Example: word list
- Accessing list components/values
- Example: sort word list alphabetically
- Applying functions to lists
- Example: sort word list by word frequency

(5) Data frames

- Creating data frames
- Accessing data frames
- Data frame indexing
- Data frame modifications
- Data import from file
- Data frame summary
- Scatter plot

(6) Loops

- The for-loop
- Print variable when iterating
- Compute length/norm of a vector
- Square elements of a vector
- Function findwords



- Read data from file
- if-else statement
- Plot word frequencies from Wikipedia
- Nested loops
- While loop
- Print vector elements when looping
- Compute length/norm of a vector
- While vs. for loop
- Break statement
- Quiz with the while loop
- Random numbers with the while loop
- Repeat loop
- Next statement

(7) Graphics

- Scatter plot
- Barplot
- Scatter plots of data frames
- Histograms
- Figure arrays
- Scatter plot vs. Histogram
- Boxplots
- Stripcharts
- Pie charts

(8) Input and Output

- Read data with scan
- Read from the keyboard
- Read into a matrix
- Reading text files
- Accessing files from the Internet
- The UCI Machine Learning Repository
- Iris flower data set
- Word frequencies from Project Gutenberg
- Export graphics
- Writing to files