

Introduction to R

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Data Analysis
Support Hub

Sherman
Centre
for Digital Scholarship

Library

McMaster
University 

October 17, 2024 | 1:30 pm
Virtual Workshop

Introduction to R Programming

Vivek Jadon, Data Specialist

October 16, 2025





Land Acknowledgement

McMaster University is located on the traditional Territories of the Mississauga and Haudenosaunee Nations, and within the lands protected by the “Dish With One Spoon” wampum agreement.

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Book an Appointment with the DASH Team

Receive help from a member of the DASH team! DASH can assist with the following topics:

- Creating data visualizations, including charts, graphs, and scatter plots
- Figuring out which statistical tests to run (e.g., t-test, chi-square, etc.).
- Analyzing data with software including SPSS, Python, R, SAS, ArcGIS, MATLAB, and Excel
- Choosing which software package to use, including free and open-source software
- Troubleshooting problems related to file formats, data retrieval, and download
- Selecting methodology and type of data analysis to use in a thesis project

Book an appointment: <https://library.mcmaster.ca/services/dash>

Certificate Programs

The Sherman Centre for Digital Scholarship Certificate of Attendance

The Sherman Centre's certificate program recognizes attendance at our workshops. It complements degree training, supports the development of critical competencies in data analysis, research data management, and digital scholarship, and formalizes core skills fostered by our workshops.

Participants are invited to attend seven workshops and receive a certificate of attendance. To verify your participation in today's workshop, we will provide a code and additional instructions at the end of the session.

You can learn more about the certificate program at scds.ca/certificate-program

The Canadian Certificate for Digital Humanities

This workshop is also eligible for the Canadian Certificate for Digital Humanities. To learn more about the certificate, visit ccdhhn.ca. You can also contact local liaison Alexis-Carlota Cochrane at scds@mcmaster.ca

Fall 2024: Upcoming Workshops

Data Analysis Support Hub

October 16: Introduction to R

October 30: Introduction to Data Analysis with SPSS

Digital Research

October 21: Establishing and Maintaining Researcher Profiles

Research Data Management

October 30: Open Science Challenges: Research Data Management Community of Practice

November 19: Data Management Plan Bootcamp (Virtual)

Do More with Digital Scholarship

October 23: Visualizing Networks with Gephi

October 23: Creating High-Quality Documents with LaTeX

November 6: Creating Interactive Data Visualizations with Power BI

Register for Upcoming Workshops: <https://u.mcmaster.ca/scds-workshops>

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Learning Objectives

By the end of this workshop, you will:

- Understand what R is and why it is widely used for data analysis
- Learn basic R syntax and data structures (vectors, data frames, lists)
- Perform basic data manipulation and visualization
- Write simple R scripts and use functions/packages
- Gain confidence to explore R further on your own

What is R?

- R is a Data Analysis Software
- R is a programming language
- R is an Environment for Statistical Analysis
- R is Open-Source Software Project
- R is a community: <https://www.r-bloggers.com/>



Why learn R?

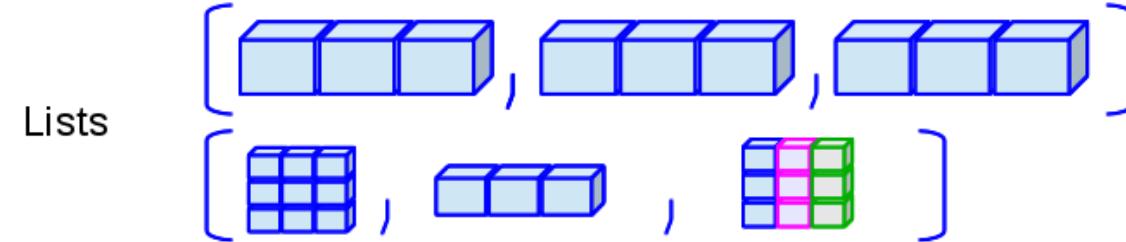
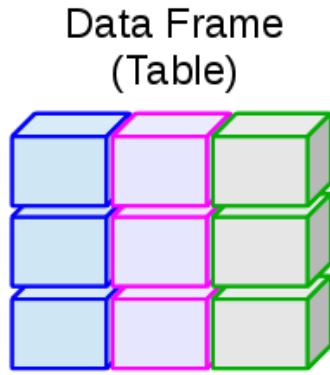
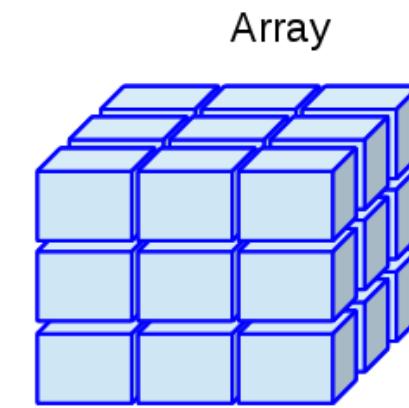
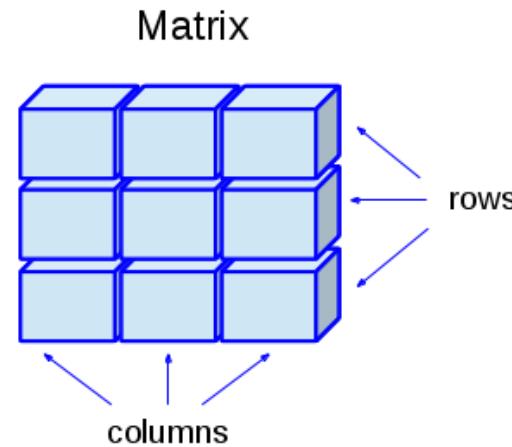
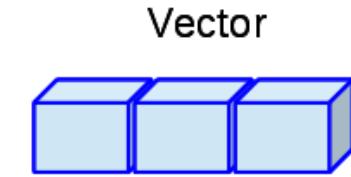
- R does not involve lots of pointing and clicking
- R code is great for reproducibility
- R is interdisciplinary and extensible
- R works on data of all shapes and sizes
- R produces high-quality graphics
- R has a large, welcoming and growing community
- Not only R is free but it is also open-source and cross-platform

What is RStudio?

- Most popular IDE (Integrated Development Interface) for R
 - An IDE is a piece of software that provides tools to make programming easier
- [RStudio](#) is not only a popular way to write your R scripts but also makes it easier to interact with R
 - We will use RStudio IDE to write code, navigate the files on our system, inspect variables we create, visualize plots we generate.
 - RStudio can also be used for other things such as version controls, developing packages, writing Shiny apps – which are out of scope of this session.
- To function properly, [RStudio](#) needs [R](#) and hence both need to be installed on the system

Data Type: Summary

Data Type	Description
Vector	It's a collection of numbers OR text
Lists	A list is a collection of various objects under same name
Matrix	A matrix is a 2D data structure to bind vectors of same length. The elements of matrix must be of same type.
Data Frames	The elements of Data Frames can be of a different type.



Vector: One column or row of data -- One type (Numeric or Text)

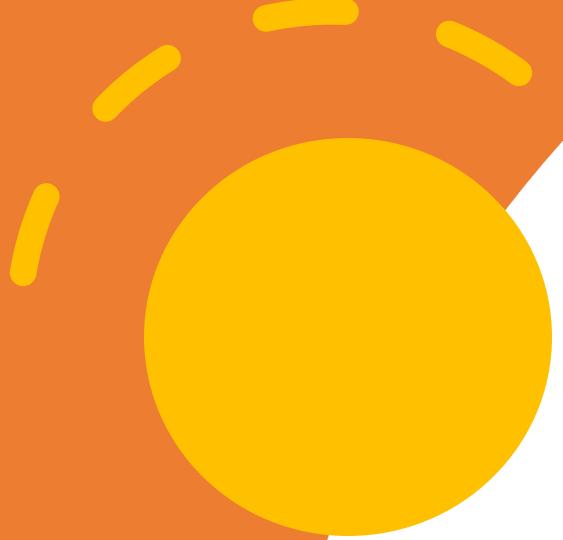
Matrix: Multiple columns and/or rows of data -- One type (Numeric or Text)

Data Frame: Multiple columns and/or rows of data -- Multiple inputs

Download Data Files

<http://bit.ly/2MVaTmv>



A yellow circular icon resembling a bomb or a button, positioned on the left side of the slide. It has a yellow outline and a yellow fill. Four short yellow lines radiate from the top edge of the circle.

Tour of RStudio

Exercise -- Write a simple code

- Install [R](#) and [R studio](#)
- Create a program to :
 1. Input three values a=22, b=34 and c=102
 2. Calculate the average of a, b, c values
 3. Store the average in the variable 'avg' and print its value.

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