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Tech Training Series

Exclusive for

HKU BUSINESS SCHOOL 港大經管學院

R Introduction Workshop

(2024/2025)

Basic syntax | Reading Data | Charts | Packages | Statistics Features

by

Sunny NG

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To download the slides

bit.ly/in-download

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Day 1 (3 hours)

- Hands on R Studio
- Basic R Syntax
- Variables
- Data Types
- Using Comments
- Operators
- Strings
- Vectors
- Lists
- Matrices
- Array
- Data Frames
- Condition
- Loops
- Functions

Day 2 (3 hours)

- Built-in sample datasets
- Reading Data
  - CSV
  - Excel
  - JSON
- Using Colors
- Data Visualization
- 3rd Party Packages
- Clean Up
- Handling Complex Codes
  - Piping Commands
- R Markdown
- Statistics Features
  - Mean, Median
  - Regression
- Useful Resources

R

- R is NOT a general-purpose programming language
  - Python is a general purpose programming language
- R is specialized for **statistical analysis**, **graphics representation** and **reporting**
- R are very popular among non-developer

Required Tools

- We need BOTH of these two software

1. R (https://www.r-project.org/)
2. R Studio (https://rstudio.com/)

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1. Download & Install R

- For Windows
  - https://cran.r-project.org/bin/windows/base/

- For Mac
  - https://cran.r-project.org/bin/macosx/

2. Download & Install R Studio

Make sure you download the FREE version of **R Studio Desktop**

- For Windows
  - https://posit.co/download/rstudio-desktop/

- For Mac
  - https://posit.co/download/rstudio-desktop/

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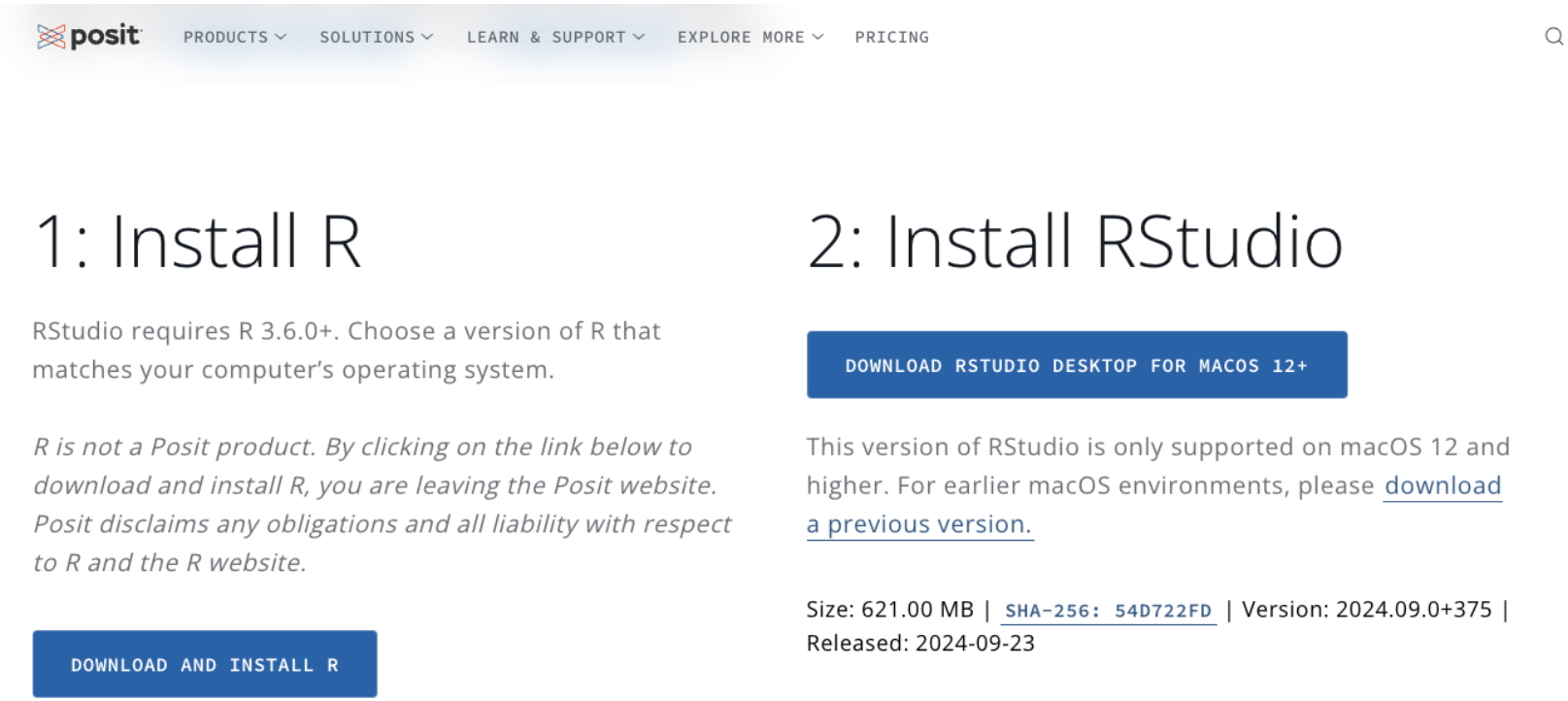
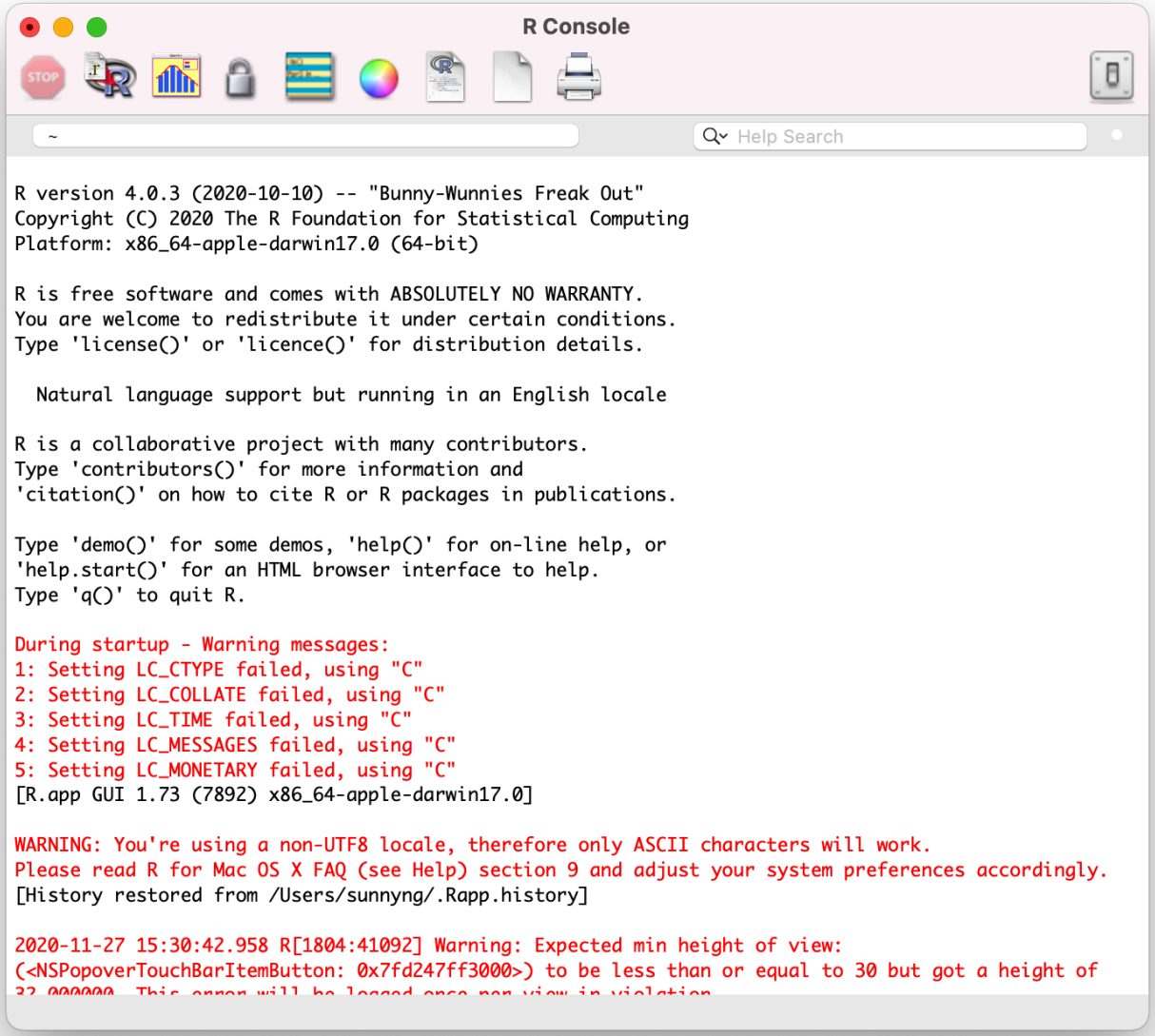
https://posit.co/download/rstudio-desktop/



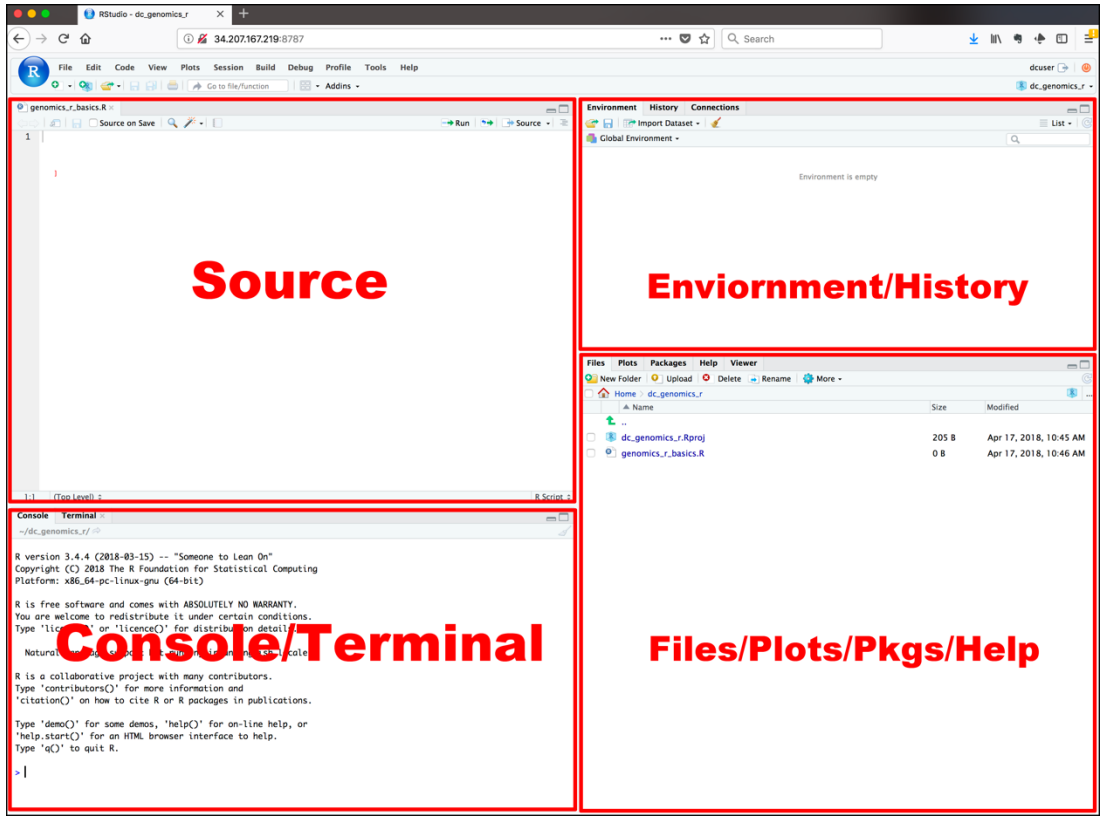
R interface


R Console
~
Help Search
R version 4.0.3 (2020-10-10) -- "Bunny-Wunnies Freak Out"
Copyright (C) 2020 The R Foundation for Statistical Computing
Platform: x86_64-apple-darwin17.0 (64-bit)
R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.
Natural language support but running in an English locale
R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.
Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.
During startup - Warning messages:
1: Setting LC_CTYPE failed, using "C"
2: Setting LC_COLLATE failed, using "C"
3: Setting LC_TIME failed, using "C"
4: Setting LC_MESSAGES failed, using "C"
5: Setting LC_MONETARY failed, using "C"
[R.app GUI 1.73 (7892) x86_64-apple-darwin17.0]
WARNING: You're using a non-UTF8 locale, therefore only ASCII characters will work.
Please read R for Mac OS X FAQ (see Help) section 9 and adjust your system preferences accordingly.
[History restored from /Users/sunnyng/.Rapp.history]
2020-11-27 15:30:42.958 R[1804:41092] Warning: Expected min height of view:
(<NSPopoverTouchBarItemButton: 0x7fd247ff3000>) to be less than or equal to 30 but got a height of

R Studio

- Running on top of R
- RStudio is an Integrated Development Environment (IDE) for R.
- It includes a console, syntax-highlighting editor that supports direct code execution, as well as tools for plotting, history, debugging and workspace management.

R Studio interface



Built-in library

- Come with default R installation
- A core part of R
- Often referred as R Base
- E.g.
  - datasets
  - By default it's not loaded. It consumes memory when you load it.
  - To load, type command `library(datasets)`

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21414 contributed packages

- Packages let you add more data processing power to your R programming
- Make your programming easier
- Go to
  - https://cran.r-project.org/
  - Choose “Packages” from the left menu

Wide range of contributed package

https://cran.r-project.org/web/views/

Topics

Bayesian	Bayesian Inference
ChemPhys	Chemometrics and Computational Physics
ClinicalTrials	Clinical Trial Design, Monitoring, and Analysis
Cluster	Cluster Analysis & Finite Mixture Models
Databases	Databases with R
DifferentialEquations	Differential Equations
Distributions	Probability Distributions
Econometrics	Econometrics
Environmetrics	Analysis of Ecological and Environmental Data
ExperimentalDesign	Design of Experiments (DoE) & Analysis of Experimental Data
ExtremeValue	Extreme Value Analysis
Finance	Empirical Finance
FunctionalData	Functional Data Analysis
Genetics	Statistical Genetics
Graphics	Graphic Displays & Dynamic Graphics & Graphic Devices & Visualization
HighPerformanceComputing	High-Performance and Parallel Computing with R
Hydrology	Hydrological Data and Modeling
MachineLearning	Machine Learning & Statistical Learning

Some popular packages

- pacman (package manager)
- rio (R Input/Output)
- tidyverse (for tidying data)

Source Codes Download

bit.ly/3huBmGo

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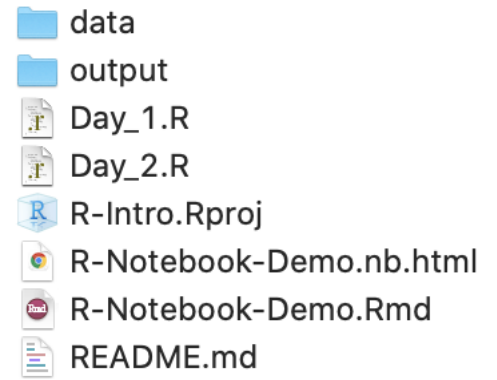
Download R Project to Start

- `https://bit.ly/3huBmGo`
- Download and unzip the file
- Open RStudio (NOT R)
- Choose File -> Open Project
  - Reach out to the unzip folder
  - You will find both two day's source codes in the project

After unzip



Further Learning

Datasets, Tools & Suggested Books

Open / Free Dataset

- HK Gov Open Data
  - https://data.gov.hk/en/

- HKMA Open API
  - https://apidocs.hkma.gov.hk/

- Free Datasets
  - https://r-dir.com/reference/datasets.html

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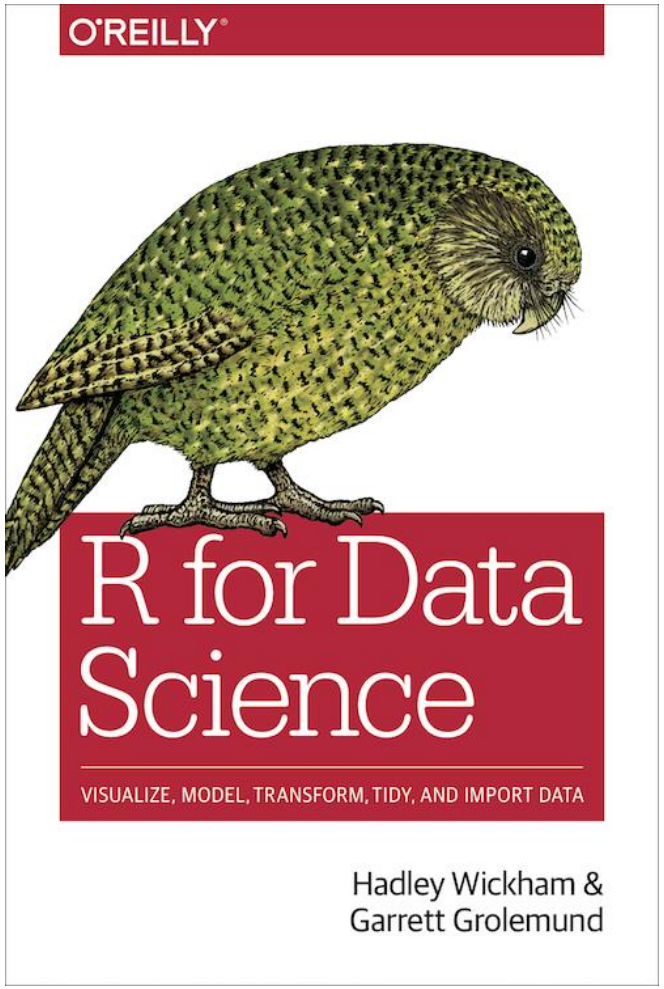
Book - 1

Contributed R Package: Tidyverse

- R for Data Science
- https://r4ds.had.co.nz/



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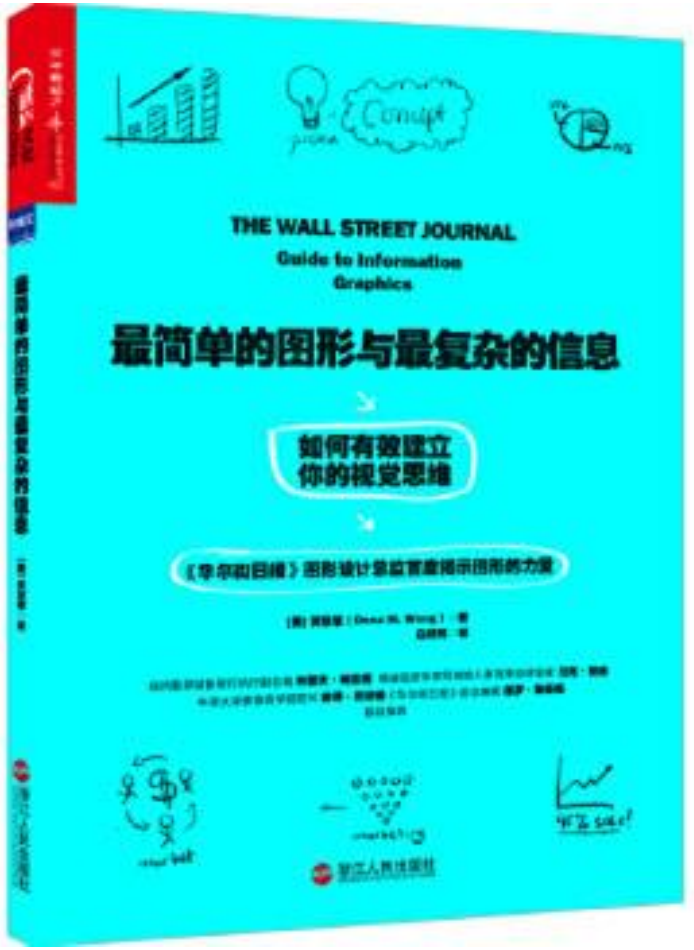
Book - 2

Data Visualization | Chart Design | Infographics Design

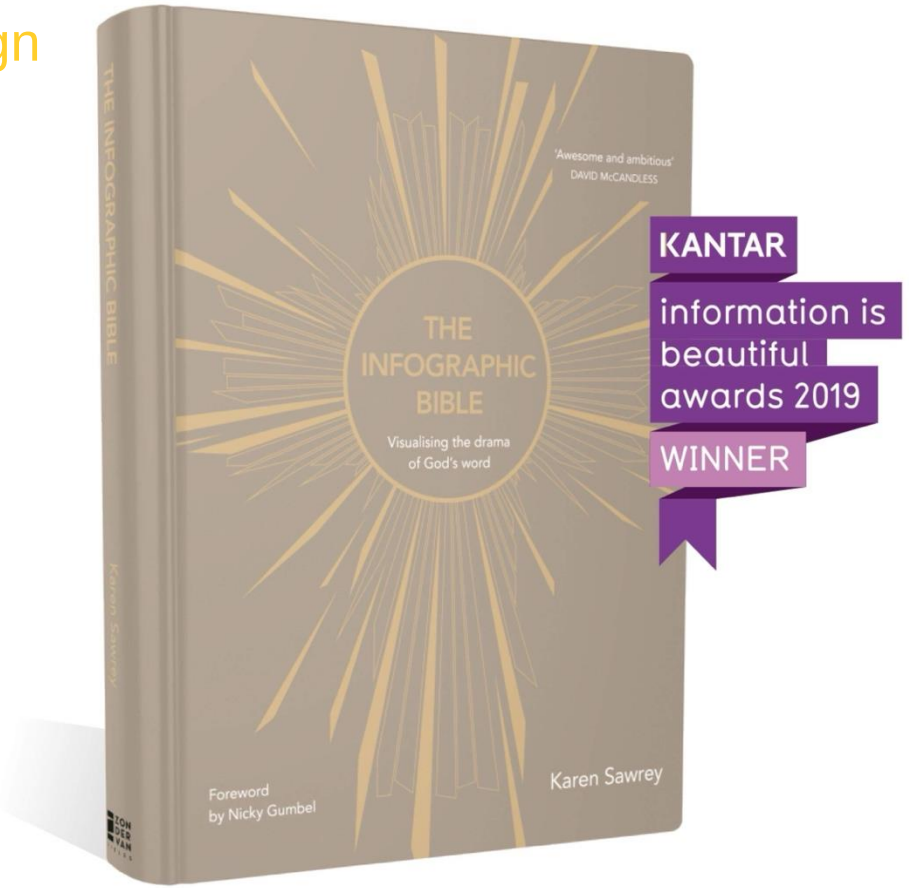
- The Wall Street Journal – Guide to Information Graphics
- 最简单的图形与最复杂的信息
- http://search.dangdang.com/?key=%D7%EE%BC%F2%B5%A5%B5%C4%CD%BC%D0%CE%D3%EB%D7%EE%B8%B4%D4%D3%B5%C4%D0%C5%CF%A2&act=input



Book - 3

Data Visualization | Chart Design | Infographics Design

- The Infographic Bible
- https://www.amazon.com/Infographic-Bible-Cloth-over-Board/dp/0310453984/ref=sr_1_1?crid=FYDZ0VP3WTZG&dchild=1&keywords=infographic+bible&qid=1606572025&sprefix=infogra%2Caps%2C415&sr=8-1



Thank You!