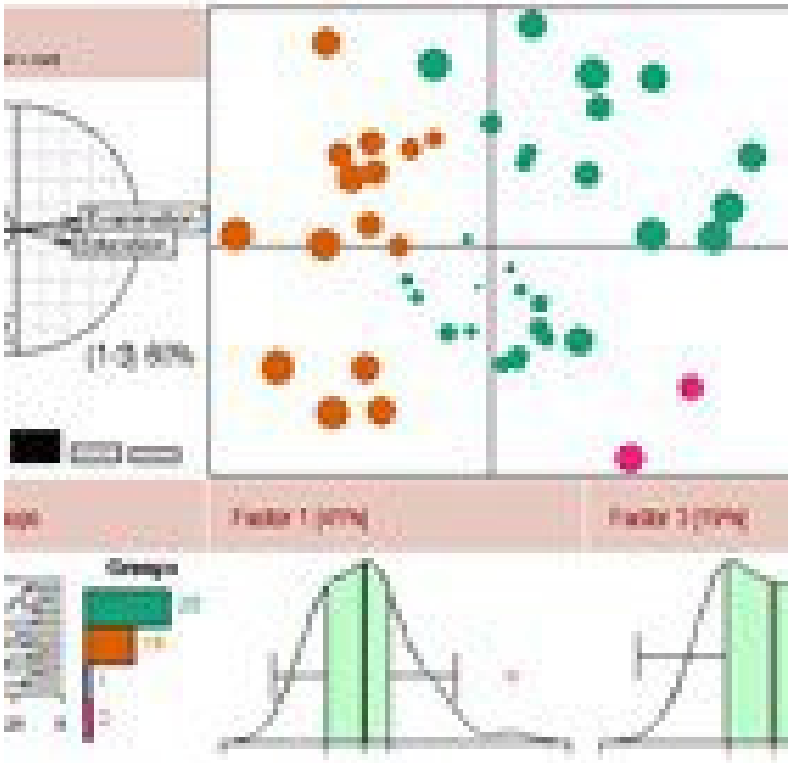
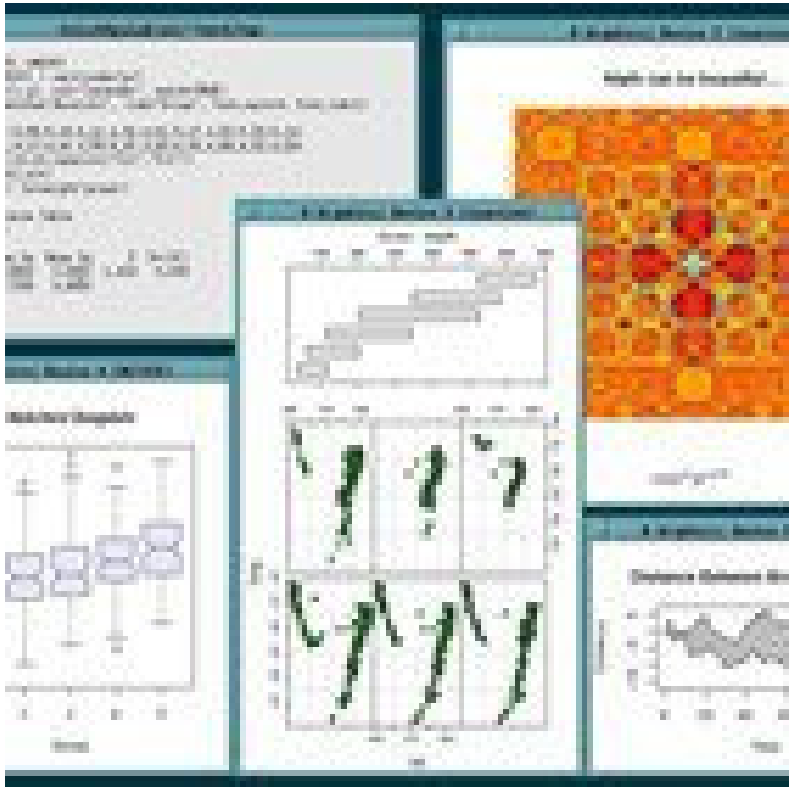
SCS2111 – Laboratory II

Overview

08.09.2016





SCS2111 – Laboratory II

- 1L + 1P (Compulsary)
- Lecturers :
  - Dr. C. H. Magalla (champa@stat.cmb.ac.lk)
  - Dr. Mindika Premachandra (amp@ucsc.cmb.ac.lk)

- Lectures : **1.00 – 2.00 pm Thursdays**
- Practicals : Based on lab sheets
  - 3.00 – 5.00 pm Wednesdays
  - 2.00 – 5.00 pm Thursdays

Assessment

- Assignments – 50%
- Final Examination – 50%

Learning Outcomes

- Be able to do basic mathematics and simple manipulations with Matlab and R
- Learn scripting with Matlab and R
- Be able to do basic statistical operations with R
- Use Matlab and R for basic plotting
- Use different data analysis techniques in Matlab and R

Course Contents :
Matlab/Octave (Basic Skills)

- Manipulating Variables
- Basic Mathematics using Matlab
  - E.g.: Linear Algebra, basic statistics, differentiation and integrals, Fourier transforms
- Basic plotting and curve fitting
- Programming Scripts and Functions
- Data structures and File Management

Course Contents:

R (Basic Skills)

- Introduction to R environment, Getting Help, R Commands, Case sensitivity, Recall and correction of previous commands, R scripting and executing
- Simple manipulations: objects, vector arithmetic, arrays and matrices, lists and data frames
- Reading data from file

Course Contents :

R (Statistical Analysis)

- Descriptive Statistics: Graphical procedures for Qualitative and Quantitative data, Numerical measures.
- Estimation and testing hypothesis
- Simple linear regression and correlation
- Multivariate data display, Cluster Analysis: K means clustering, K nearest neighbours clustering

What is R?

- R is a free software environment for statistical computing and graphics
- R was created by Ross Ihaka and Robert Gentleman at the University of Auckland
- A GNU project which is similar to the **S** language,
  - developed at Bell Laboratories by John Chambers and colleagues.
  - **R** can be considered as a different implementation of **S**.
- The source code for the R software environment is written primarily in C, Fortran, and R.
- Pre-compiled binary versions are provided for various OS
- http://www.r-project.org/index.html

Why learn R?

- R is FREE, easy to use, and open source.
  - Commercial options: SAS, SPSS
- The R language is widely used among statisticians and data miners for developing statistical software and data analysis
- The "de facto" standard for data analysis and data mining

- A complete programming language
- Comes with a large library of pre-defined functions
- Better suited for advanced users who want all the power in their hands
  - R supports matrix arithmetic
  - R's data structures include vectors, matrices, arrays, data frames (similar to tables in a relational database) and lists.
  - R's extensible object system includes objects for (among others): regression models, time-series and geo-spatial coordinates.

The 2015 Top Ten **Programming Languages**

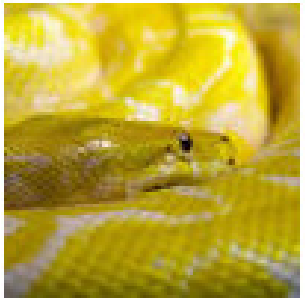
IEEE Spectrum - Jul 20, 2015

What are the most popular **programming languages**? ... The big mover is **R**, a statistical computing language that's handy for analyzing and ...

R Rises in IEEE Ranking of Top **Programming Languages**

ADT Magazine - Jul 21, 2015

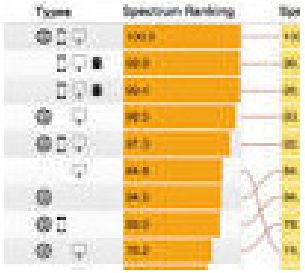
IEEE Spectrum has followed up last year's report on the top **programming languages** with a new study that sees **R** making a big jump in the ...



In data science, **the R language** is swallowing Python

InfoWorld - Jul 24, 2015

It's always precarious to compare **programming languages**, given their ... While **R** is a language developed by and for statisticians, Python has ...

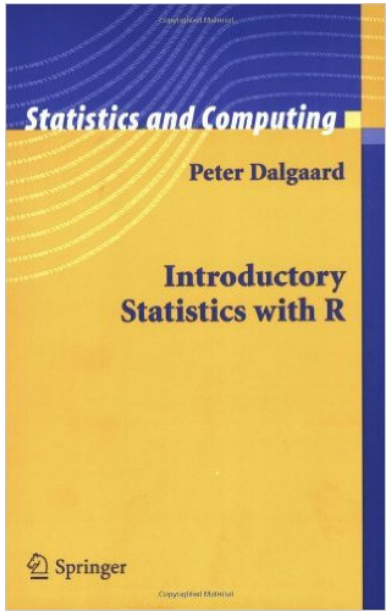


The Most Popular **Programming Languages** of 2015

ProgrammableWeb - Aug 4, 2015

While the top 5 remain unchanged, C has moved within touching distance of Java, and statistical **programming language R** has jumped from ...

Learning Resources



- "Introductory Statistics with R", by Peter Dalgaard, Springer (2002)
- *An Introduction to R. Notes on R: A Programming Environment for Data Analysis and Graphics*, by W. N. Venables, D. M. Smith.
  - http://math.arizona.edu/~hzhang/math574m/R-intro.pdf
- An Introduction R: Introduction and examples, by Deepayan Sarkar
  - http://www.isid.ac.in/~deepayan/R-tutorials/labs/01_introduction_lab.pdf