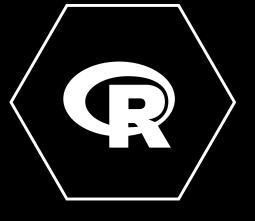
13 odm <- od %>% 14 spread(end_station_id, ntrips, fill=0) 15	① trips② trips_data	31904 obs. of 8 variables 31904 obs. of 14 variables	
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<pre>sole ~/ ∅</pre> <- trips %>% filter(start_station_id%in%sf_stations\$station_id, filter(start_station_id%in%sf_stations\$station_id) %>%	37.80		400000 15 18 21 24

Statistical Computing R Programming

Course information sheet 2022-23

Full course, 11 weeks



The course introduces learners to data visualisation, data management and programming in the statistical software environment R.

Prerequisite Knowledge

Learners require a basic understanding of matrix algebra. experience in programming should expect a larger time The course is suitable for learners with no prior experience of programming, however learners with no prior

Intended Learning Outcomes

By the end of this course learners will be able to:

- recognise and make appropriate use of different types of data structures;
- manipulate data sets in R;
- use R to create figures and graphs;
- identify and implement appropriate control structures to solve a particular programming problem;
- design and write functions in R and implement simple iterative algorithms;

commitment in order to fully benefit from the course.

- structure complex programming problems into functional units and implement these;
- carry out extended programming tasks and produceclearly annotated listing of their code;
- author reports with embedded code using technologies such as Sweave or knitr;
- develop and deploy R Shiny apps. •

Syllabus

Week 1

- Installing R and RStudio
- Accessing R in the cloud
- Basics of scientific computing
- Variables and R as a calculator. Week 2
- Logical operators
- Vectors, lists and matrices
- Other common data types

Week 3

- Data frames
- Transforming, merging data frames
- Reading/writing data from/to
 Debugging files

Week 4

- Efficient data management using tidyverse
- tibbles
- Transforming, subsetting and Week 10
- Reshaping data using tidyr

Week 5

- R graphics
- Data visualisation in R

Mid-term week break

Week 6 (sample material)

 Advanced graphics using ggplot2

Week 7

- if statements and ifelse
- Using loops (for and while) for iterative and repeated computations

Week 8

- Writing R functions
- subsetting and Structuring your code efficiently using functions

Week 9

- Basics of object-oriented programming
- Creating classes ("S3") in R
- Creating R6 classes

- merging data frames using dplyr Authoring data-driven interactive webapps using shiny Week 11
 - Authoring automatic reports using knitr and rmarkdown
 - Reproducible data science

"I really enjoyed the course and believe that the content goes into the perfect amount of detail with examples and everything is clearly explained. I like the videos that show the code in practice."

Online Learning

- Weekly live sessions with tutor(s)
- Weekly learning material material. videos, (reading exercises with model answers)
- Bookable one-to-one sessions with tutor(s)

Textbooks

G. Grolemund, H. Wickham. R for Data Science. O'Reilly Media.

H. Wickham. Advanced R. CRC Press.

W. J. Brown, D. J. Murdoch. A First Course in Statistical Programming with R. Cambridge University Press. P. Daalgard. Introductory Statistics with R. Springer

Assessment

(for credit only)

This will typically be made up of 5 pieces of assessment, including progamming assignments, an individual project.

DATA ANALYTICS 📠 GLASGOV

School of Mathematics and Statistics University of Glasgow http://gla.ac.uk/ mdatagov http://gla.ai Email: maths-stats-analyticscpd@ glasgow.ac.uk

Software

To take our courses please use an up-to-date version of a standard browser (such as Google Chrome, Firefox, Safari, Internet Explorer or Microsoft Edge) and a PDF reader (such as Acrobat Reader). Learning material will be distributed through Moodle. We encourage all learners to install R and RStudio and we provide detailed installation instructions, but learners can also use free cloud-based services (RStudio Cloud), Learners need to install Zoom for participating in video conferencing sessions. We recommend the use of a head set for video conferencing sessions.