COURSE OVERVIEW

(DSC10 Data Science Tools and Methods)

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Created: 2021-06-16 Mi 21:08

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    - Introduction to R programming
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    - Summary of course activities
- What do you have to do to pass?

    - DataCamp assignments (> 50%)
    - Team project (> 50%)
        - What is a team project?
        - Do you have project examples?
        - Can I do a project as an absolute beginner?
    - Final exam (> 50%)
- What's next?
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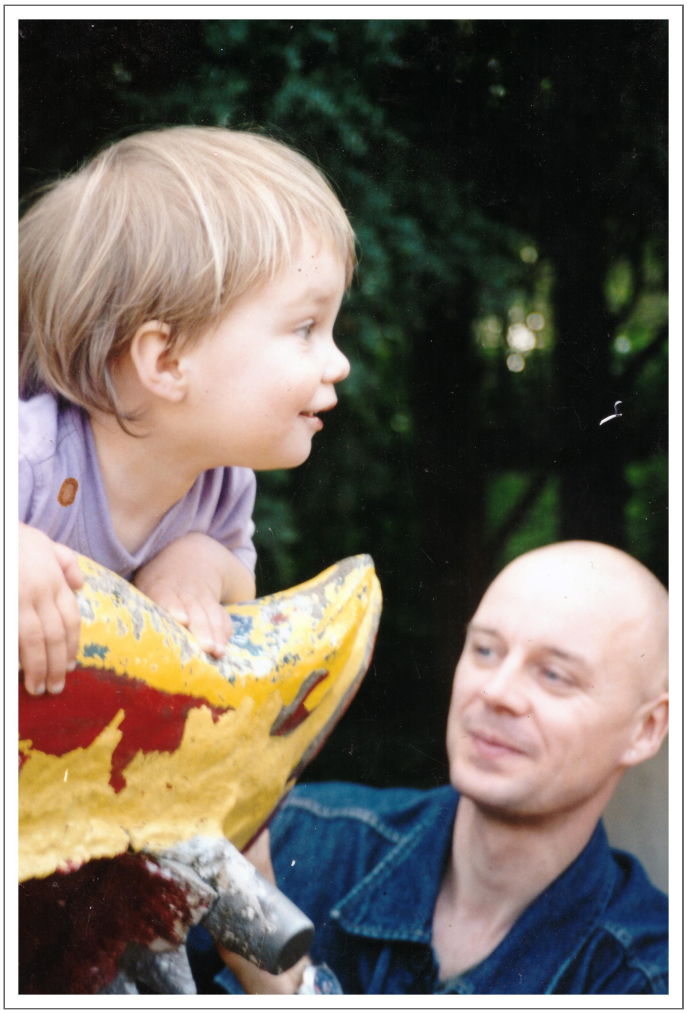
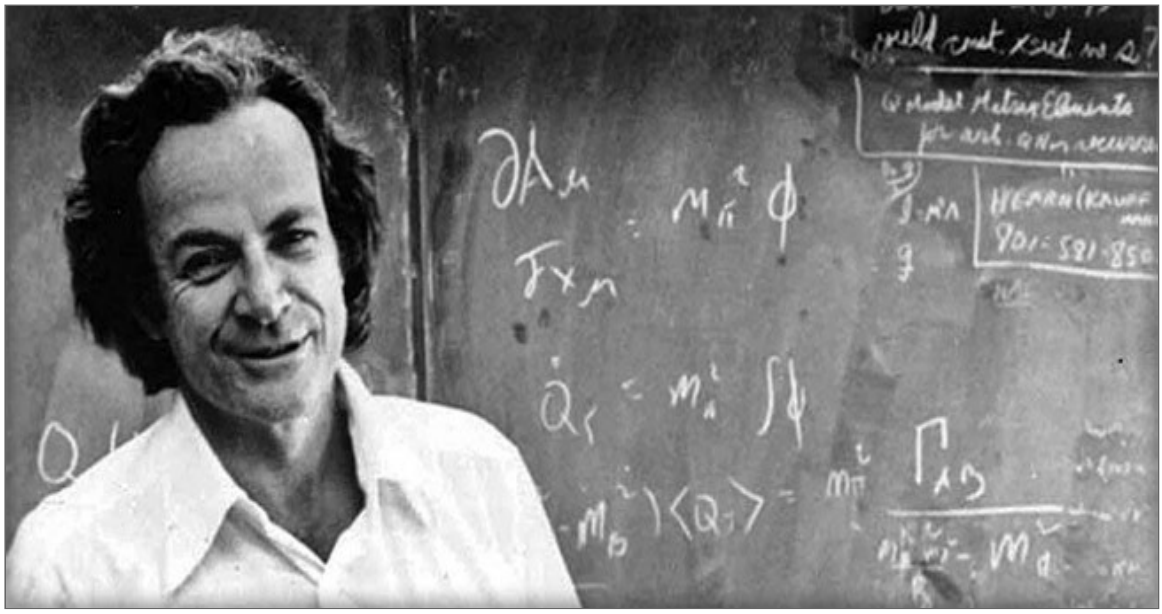
WHAT'RE YOU GOING TO LEARN TODAY?

- Who is your lecturer?
- Who are you and what do you want?
- Which topics will we cover?
- How will we do it?
- What do you have to do to pass?
- What's next?

WHO AM I?



SCIENCE



- Development of WWW
- PhD theoretical particle physics
- 60 research publications
- Assoc. Ed. Int. J. of Data Science
- Ed. Board Int. J. of Big Data Mgmt.
- Scientific member **d-cube@Berlin**

INDUSTRY

- Executive at Accenture & Shell
- Coach and consultant
- Certified psychotherapist
- Startup mentor

TEACHING

- Business informatics @**HWR Berlin**
- Visiting professor of data science @Lyon
- Adviser for **CPU @LA**
- Internship supervision

PLEASURE

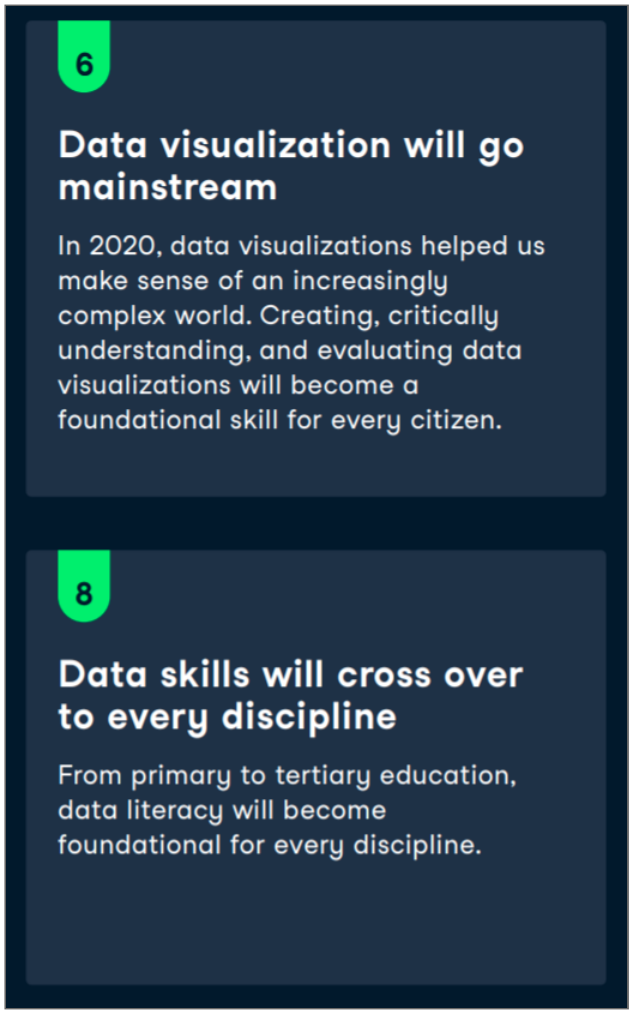
- Playing: Assassin's Creed Valhalla
- Reading: Bernard Cornwell, The Burning Land
- Watching: Person of Interest

WHAT ARE YOUR EXPECTATIONS?

- What do you want to learn here?
- What would you like to avoid?
- What did you take away from another course?
- What did you really not like in another course?

WHICH TOPICS WILL WE COVER?

INTRODUCTION TO DATA SCIENCE



Source: **datacamp.com**

INTRODUCTION TO R PROGRAMMING

Source: **RStudio**

VISUALIZATION USING R

Source: **Thomas Lin Pedersen**

FASTER APPROACH

- Focus on data exploration (EDA)
- Stay close to base R
- Use real data sets
- Compute interactively
- Prepare for DSC201 (ML)

SCHEDULE

No	Date	Lectures[1]	DataCamp[2]	Tests/Quiz[3]	fasteR[4]
1	17-Aug	Overview	Introduction to R:		Overview and Getting Started
2	19-Aug	On the R Shell	- Intro to basics	Test 1	Installing R and first steps
3	24-Aug	Vectors in R	- Vectors	Test 2	More on Vectors
4	26-Aug	Data frames in R	- Matrices	Test 3	On to Data Frames!
5	31-Aug	Factors in R	- Factors	Test 4	R Factor Class
6	2-Sep	`apply` functions	- Data		The `tapply` Function
7	7-Sep	Cleaning data	- Lists		Data Cleaning
8	9-Sep	Lists in R	Intermediate R:	Test 7	R List Class
9	14-Sep	`Nile` exploration	- Conditionals	Test 8	Another Look at the Nile Data
10	16-Sep	Visualization	- Loops	Test 9	Introduction to Base R Graphics
11	21-Sep	Base R graphics	- Functions	Test 10	More on Base Graphics
12	23-Sep	Writing functions	- The `apply` family	Test 11	Writing Your Own Functions
13	28-Sep	Iteration I	- Utilities	Test 12	`for` Loops
14	30-Sep	Fibonacci series		Test 13	Functions with Blocks
15	5-Oct	Literate Programming	Data Visualization:	Test 14	IDEs: Text Editing, Saving, Executing
16	7-Oct	Conditions	- Base R graphics	Test 15	`If`, `Else`, `Ifelse`: Conditions
17	12-Oct	EDA example I	- Different plot types	Test 16	Do Pro Athletes Keep Fit?
18	14-Oct	Linear regression			Regression Analysis, I
19	19-Oct	Object-orientation			isses
20	21-Oct	EDA example II	- Plot customization	Test 19	Baseball Player Analysis (cont'd)
21	26-Oct	Packages		Test 20	R Packages, CRAN, Etc.
22	28-Oct	Grammar of Graphics	Regression in R:	Test 21	A First Look at `ggplot2`
23	2-Nov	Functional Programming	- Simple linear regression	Test 22	Should You Use Functional Programming?
24	4-Nov	Text mining I	- Predictions and models	Test 23	Simple Text Processing I
25	9-Nov	Text mining II	- Assessing model fit	Test 24	Simple Text Processing II
26	11-Nov	Linear regression II			r Regression Analysis, II
27	16-Nov	Dates and times			ng with the R Date Class
28	18-Nov	Coding style	Text mining (Bag-of-Words)	Test 27	Tips on R Coding Style and Strategy
29	23-Nov	Logistic regression	- Basics of Bag-of-Words	Test 28	The Logistic Model
30	25-Nov	Version control	- Word clouds and visuals	Test 29	Files and Directories
31	30-Nov	Iteration II	- Text mining techniques	Test 30	R `while` loops
32	2-Dec	Summary and outlook	- Text mining case study		Summary and Outlook
33	TBD			Final exam	

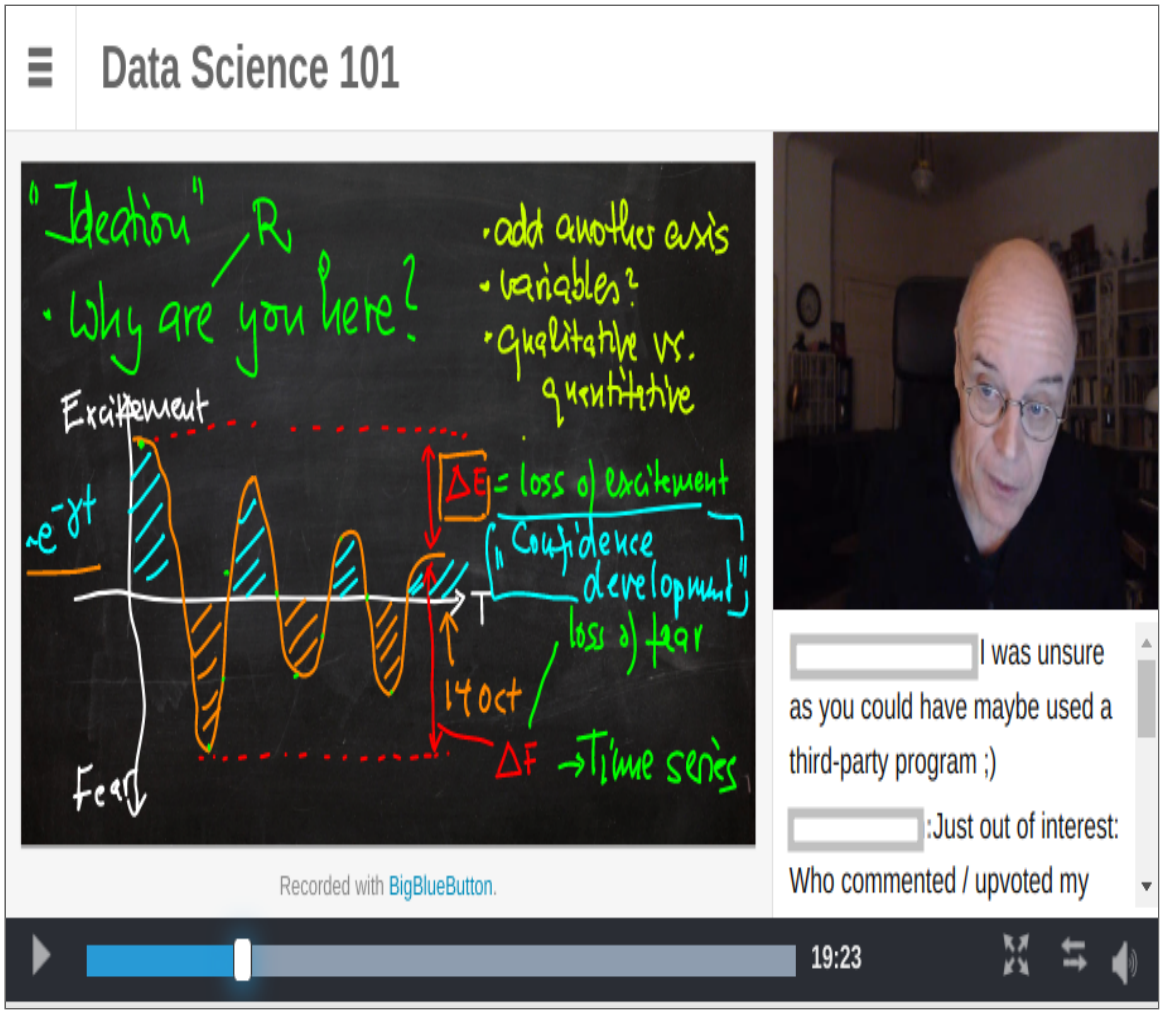
BASICS

VISUALIZATION

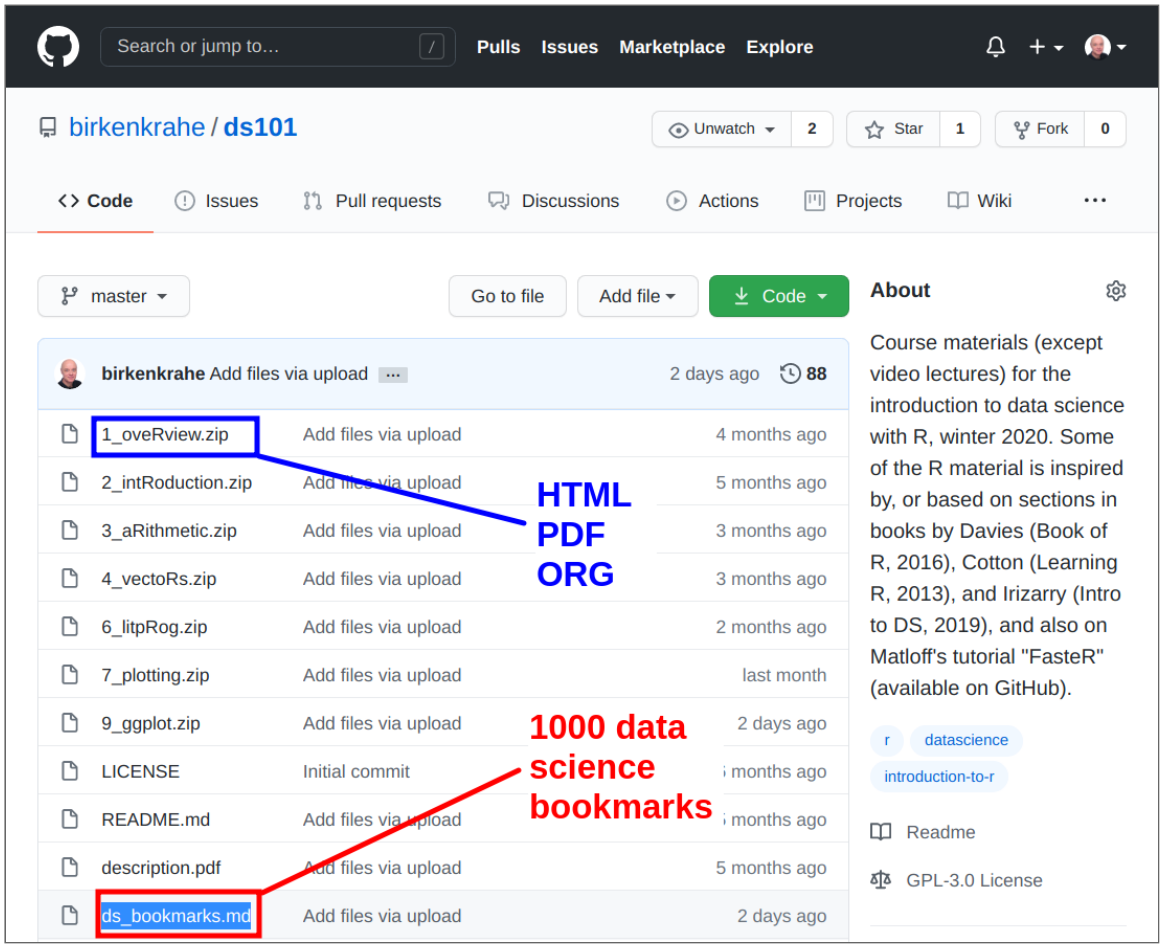
APPLICATIONS

HOW WILL WE DO IT?

CLASSROOM SESSIONS



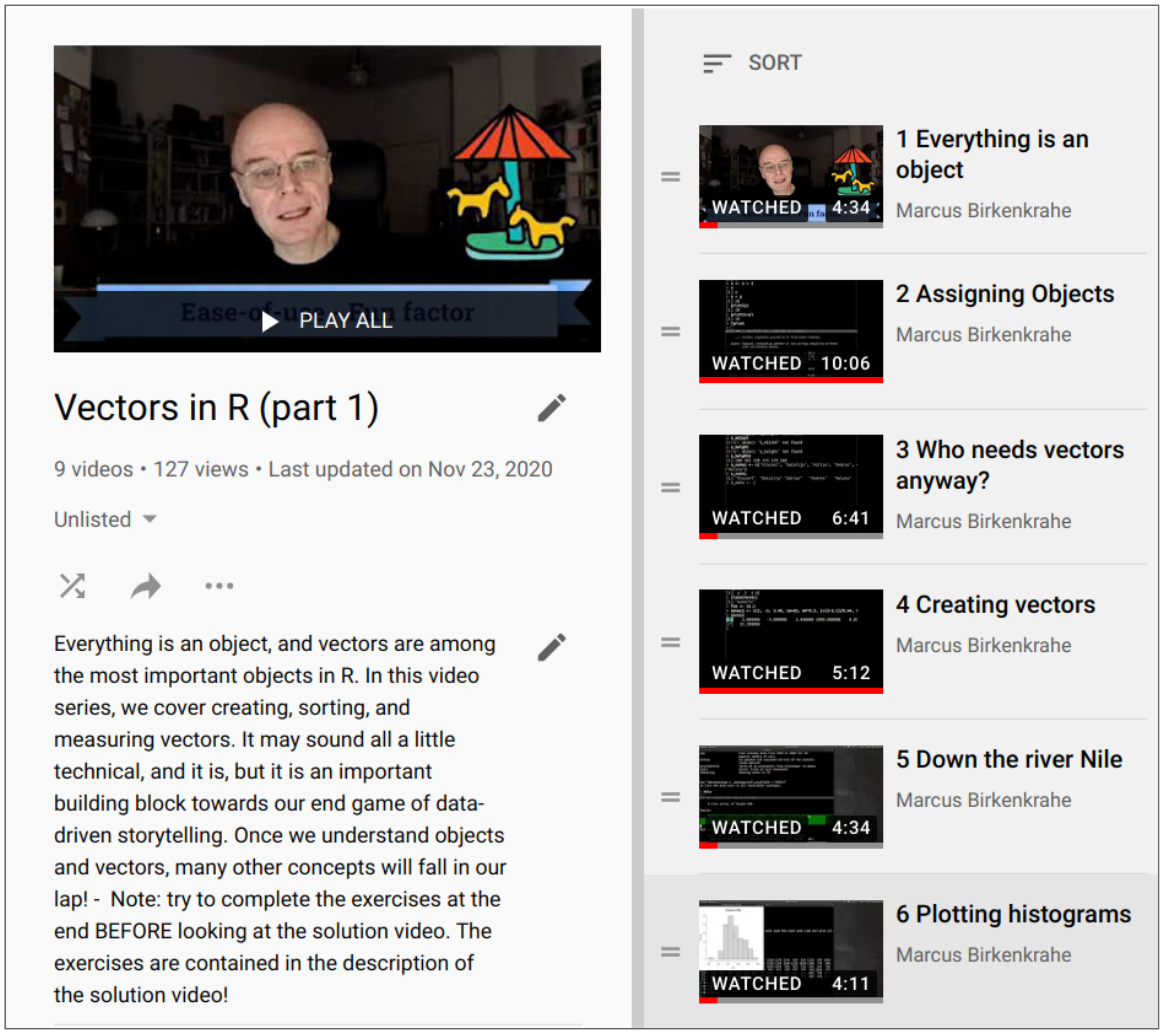
LECTURE SCRIPTS WITH EXERCISES (GITHUB)



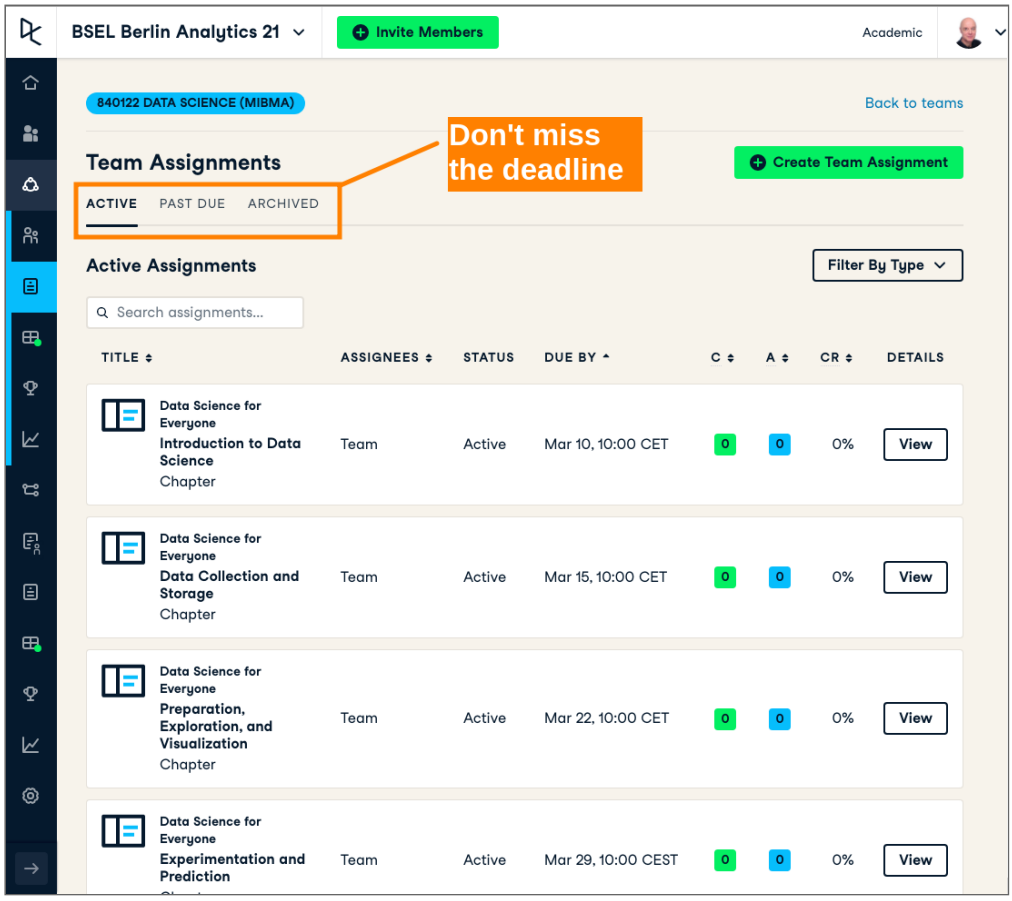
READING ASSIGNMENTS

Norman Matloff (2020):
fasteR: Fast Lane to Learning R!

VIDEO LECTURES (YOUTUBE)

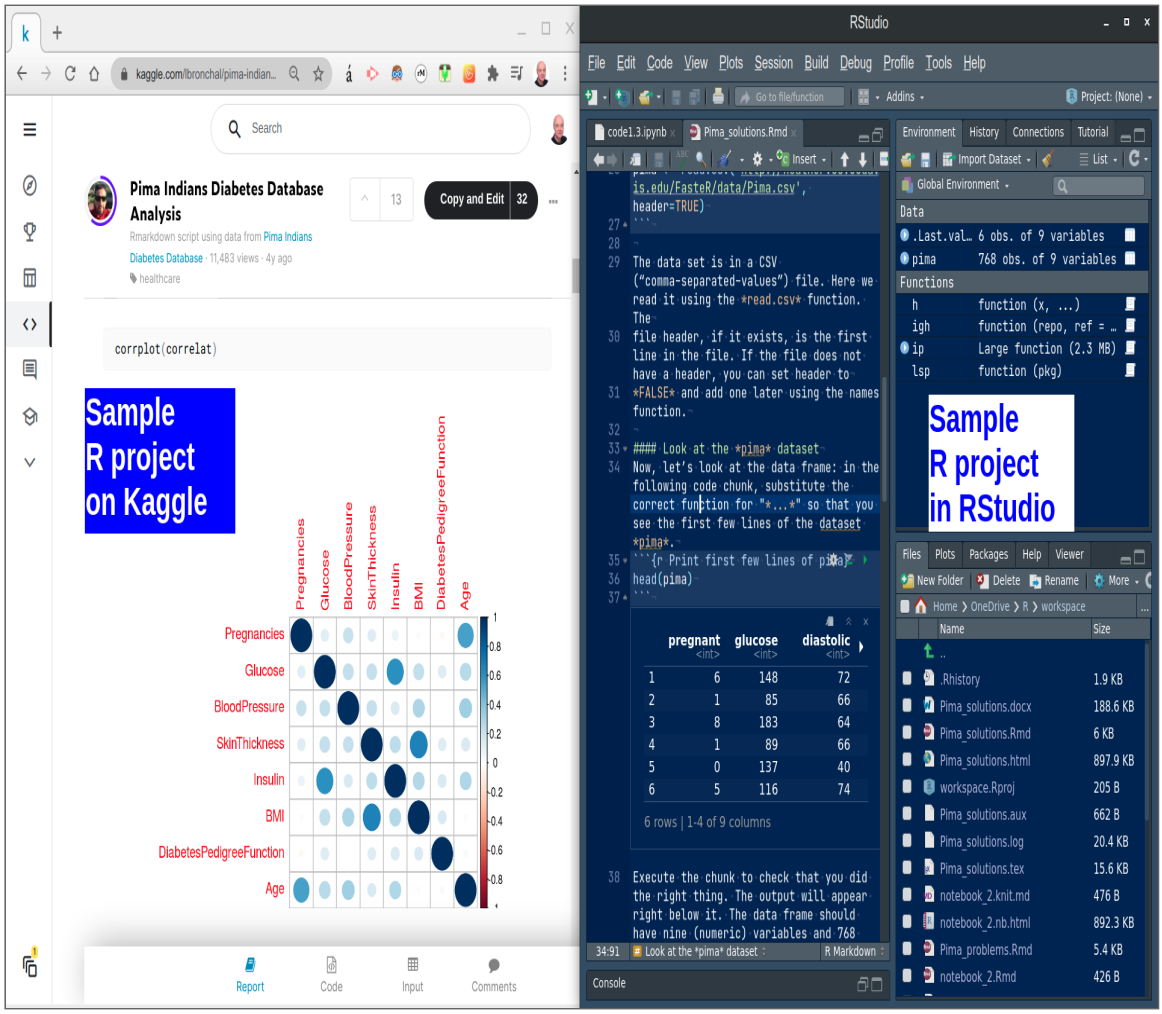


ONLINE ASSIGNMENTS (DATACAMP)



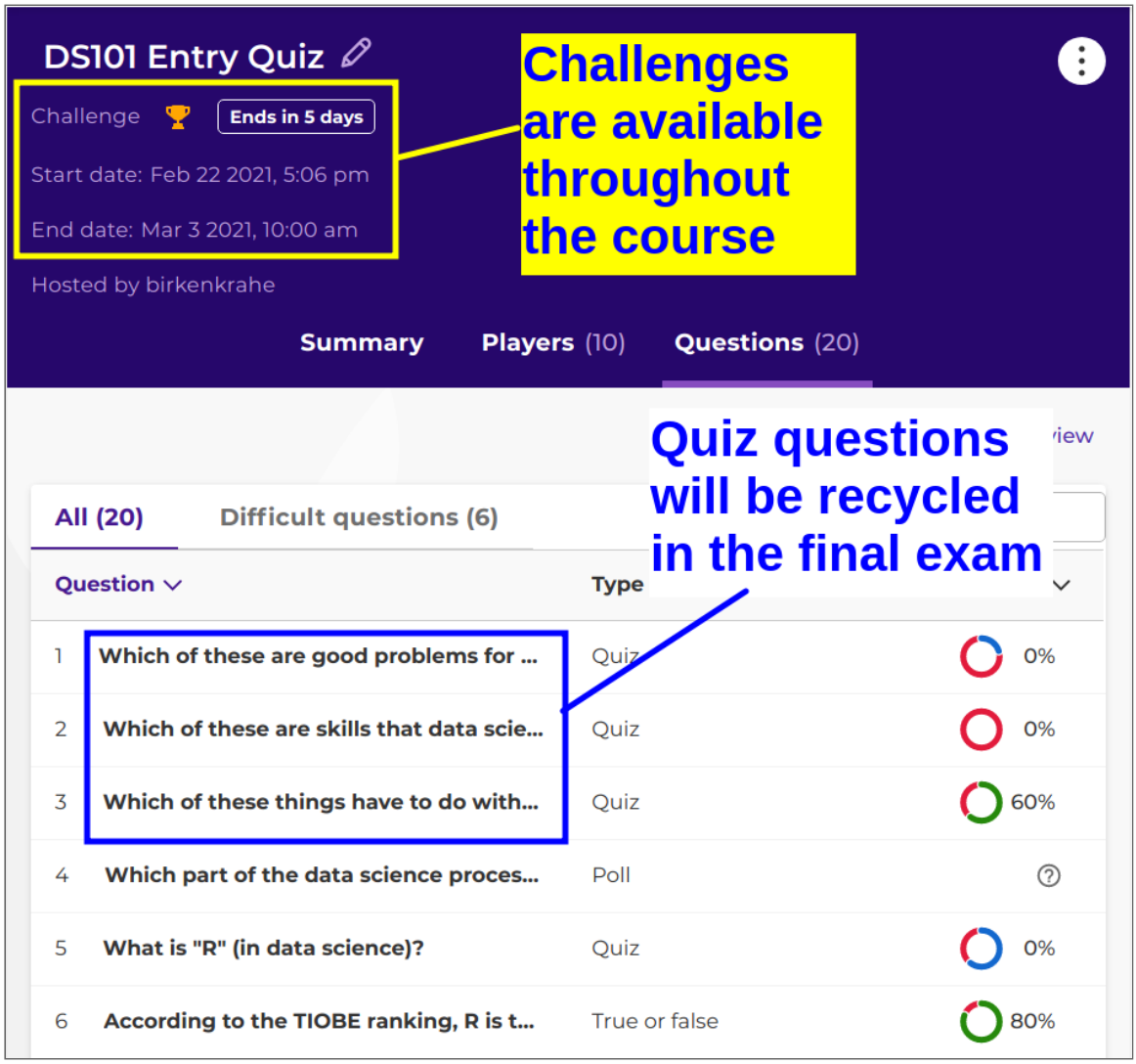
- **Register at DataCamp**

TEAM EDA PROJECT

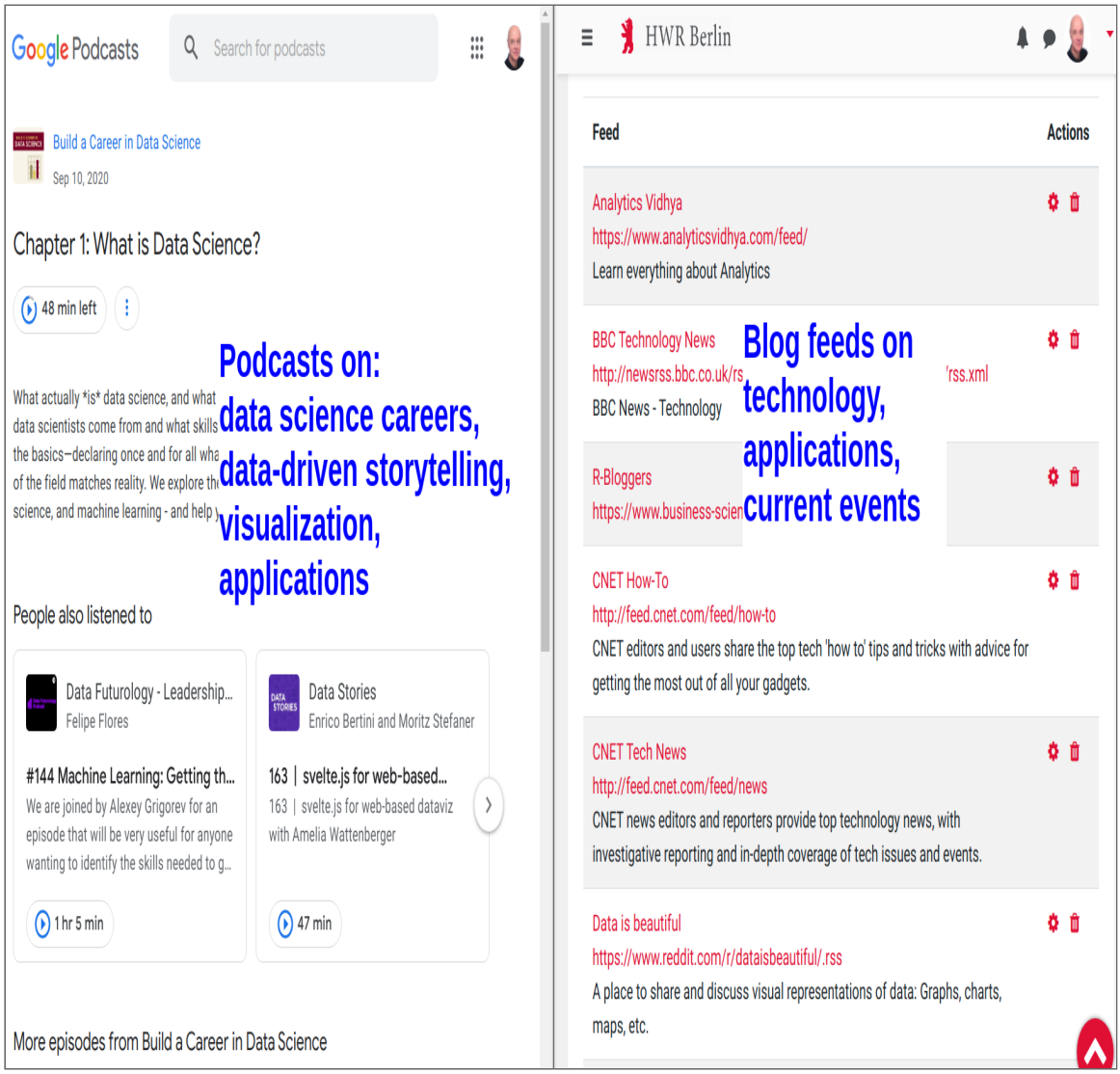


AGILE PROJECT MANAGEMENT

TESTS AND FINAL EXAM



PODCASTS AND FEEDS



SUMMARY OF COURSE ACTIVITIES

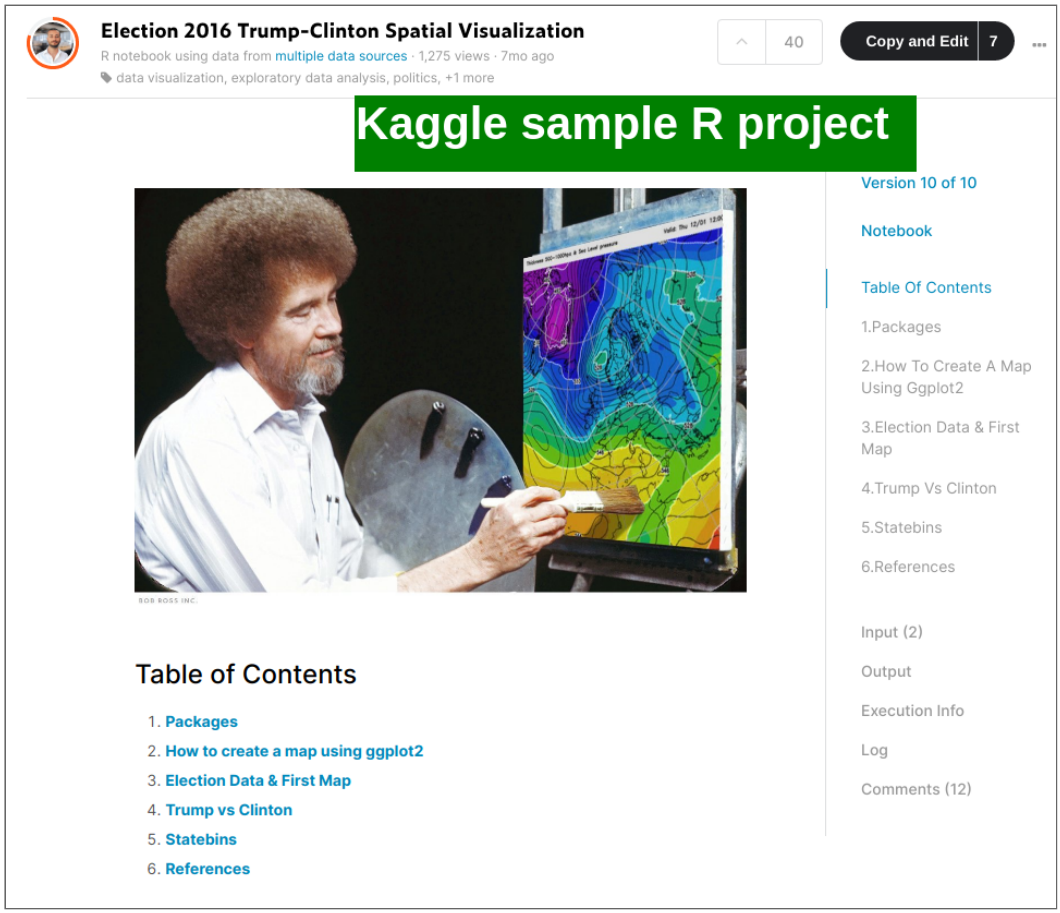
- Weekly classroom meetings
- Lecture scripts (GitHub)
- Reading assignments (Online)
- Video lectures (YouTube)
- Online assignments (DataCamp)
- Team EDA projects (Sprints)
- Tests and final exam
- Podcasts and feeds

WHAT DO YOU HAVE TO DO TO PASS?

DATACAMP ASSIGNMENTS (> 50%)

Complete 12 of 24 assignments

TEAM PROJECT (> 50%)



Present on Nov 30 or Dec 2

WHAT IS A TEAM PROJECT?

- Description of the dataset
- Introduction of the problem statement
- Description of the methods used
- Visualization of the data (plots!)
- Analysis of the plots
- Limitations of own analysis
- References

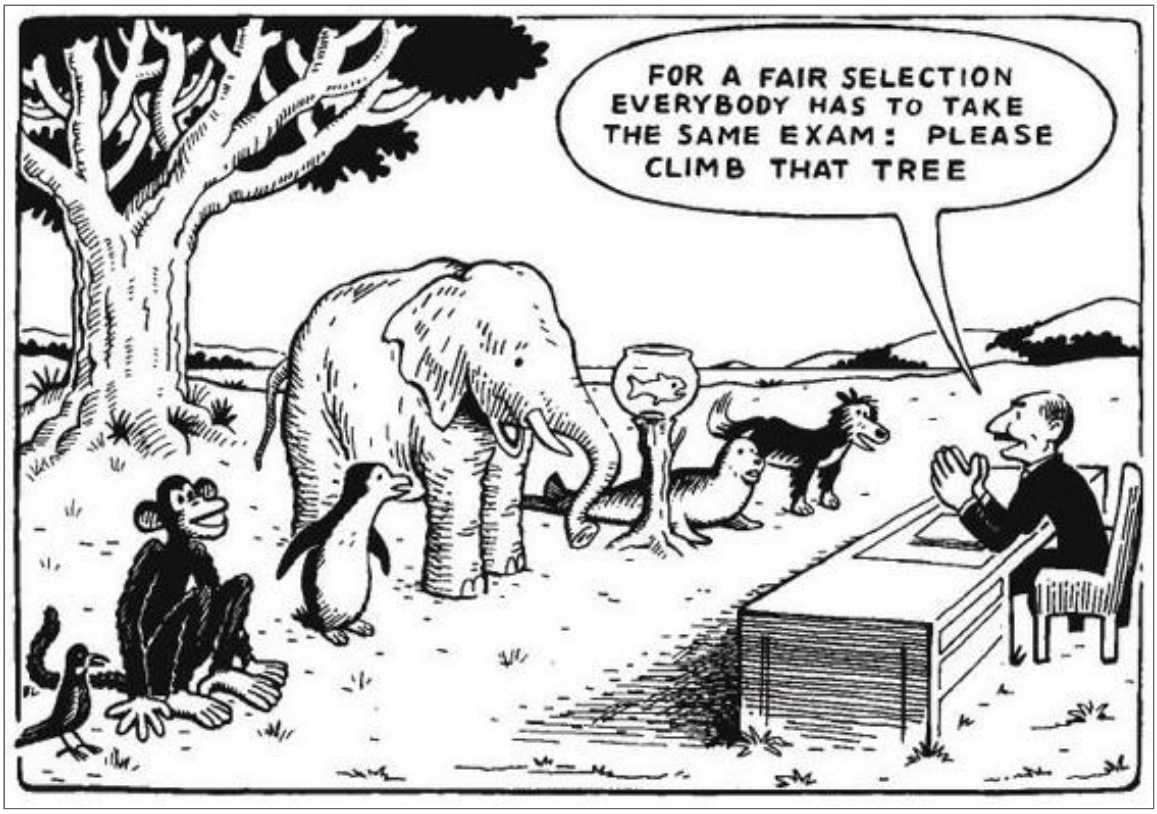
DO YOU HAVE PROJECT EXAMPLES?

- Examples on Kaggle (**example**)
- Examples on data science blogs (**example**)
- Translate from Python to R (**example**)
- Extend someone else's EDA (**example**)
- Document an R package (**example**)
- Use your own data (**example**)

CAN I DO A PROJECT AS AN ABSOLUTE BEGINNER?

- Keep It Simply Scientific (IMRaD)
- Look at examples (e.g. **bookmarks**)
- Create data set (e.g. productivity)
- Researchers are beginners

FINAL EXAM (> 50%)



Final exam: date TBD

WHAT'S NEXT?

YOUR CHALLENGES

What?	When?
Register with DataCamp	Today
Complete test challenge*	Aug 19
Complete DataCamp assignment*	Aug 24
Set up **project** (2-3 ppl)*	Sep 2
Check FAQs	n.d.
Ask questions (class/**forum**)	n.d.

**) do this every week until December*

ANY QUESTIONS?

A PDF of this presentation is available.