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Tutorial 2

Data Types and Structures in Python and R

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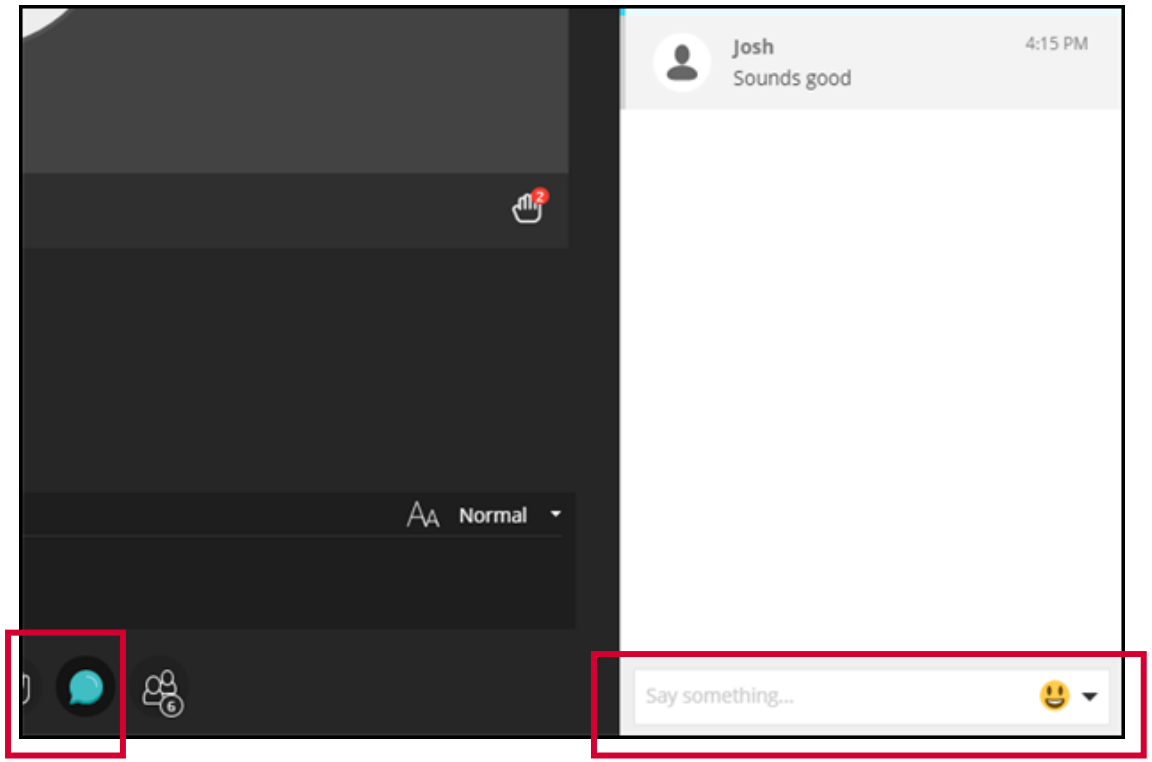

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Agenda

- Course update
- Error of the week
  - Understanding and navigating folder structures in code
- Data types overview
- Data types activity
- Any questions

Special guest lecture on date and time data: 26 April 1pm BST

- Nick Christofidis, Healthcare Analyst at Public Health Scotland
- See Data Dialogue Episode 3 in the Week 2 content folder

Error of the week

Understanding and navigating folder structures in code

How to find your current path

Python

- `OS` module to work with paths independent of operating systems
- `import os`

  `os.getcwd()`
  - to get the current working directory

R

- `getwd()`
  - base R function to get the current working directory
- When using R Projects, your current working directory automatically points to the root folder where that .Rproj file is saved

Navigating folder structures in code

File path = location of a file on a computer's file system structure

Absolute path = specified from the root directory (which is the first or topmost directory)

- AKA "full file paths"
- ~ commonly used to represent user's home directory
- e.g., `C:\Users\bblankin\Teaching\AY2023-24\Data Types and Structures in Python and R\Tutorial Slides` or `~\Teaching\AY2023-24\Data Types and Structures in Python and R\Tutorial Slides`

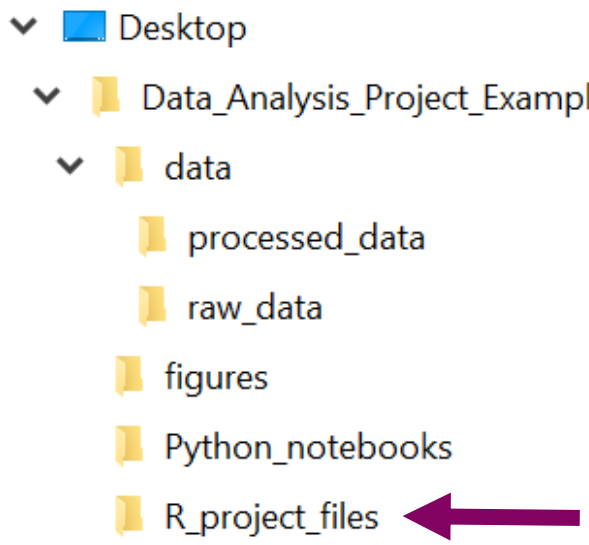
Relative path = path relative to the current directory

- Reproducible if you share your code with someone who has the same file and folder set up!
- Single dot (.) indicates current directory & double dot (..) represents parent directory
- e.g., `.\Data Types and Structures in Python and R\Tutorial Slides`

Path separators formatting note: Mac & Linux use / whereas Windows uses \

- URLs follow a standard format always using forward slash / regardless of operating system

Navigating folder structures in code



In Noteable, your home directory (`\home\jovyan\` or `~\`) = Jupyter Notebook Dashboard (what you see when you open a Standard Notebook (Python 3) server

The absolute path to a RMD file in "R_project_files" is location:

```
~\Desktop\Data_Analysis_Project_Example\
R_project_files\R_file.RMD
```

To navigate **up** the folder tree, use the "`..`" prefix.
To navigate 2 levels up, repeat the up prefix twice "`..\..\`"
For example to go up to figures from R_project_files it would be:

```
..\figures\figure_1.png
```

To get to raw_data from within R_project_files:

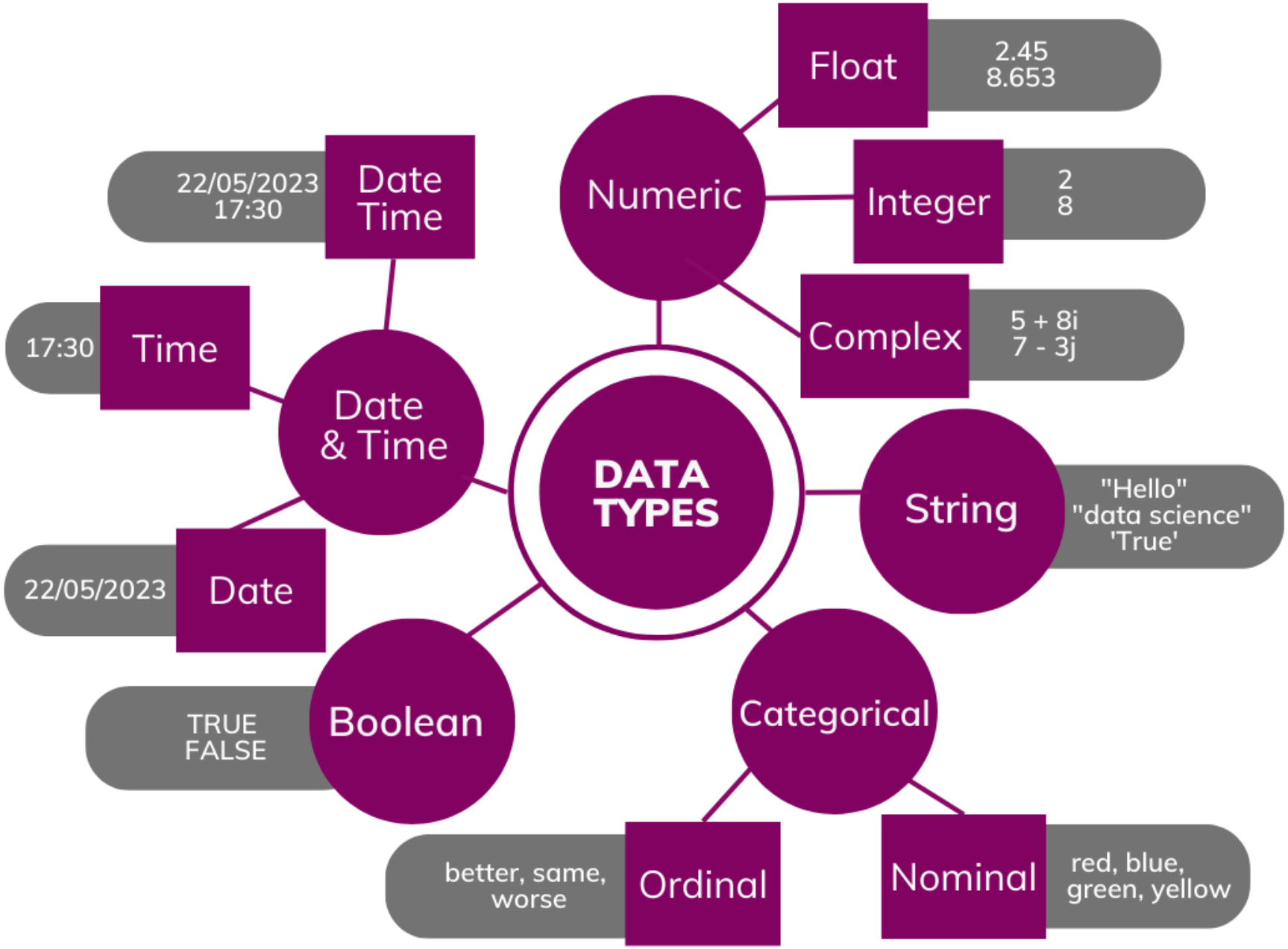
```
..\data\raw_data\raw_data.csv
```

What are data types

- Type of data or values an object contains
  - Internal construct that a programming language uses to understand how to store and manipulate data

- Determines:
  - What kind of mathematical, relational, or logical operation can be applied
  - Which operations can be performed to create, transform, and use the variable in further computation


DATA
TYPES

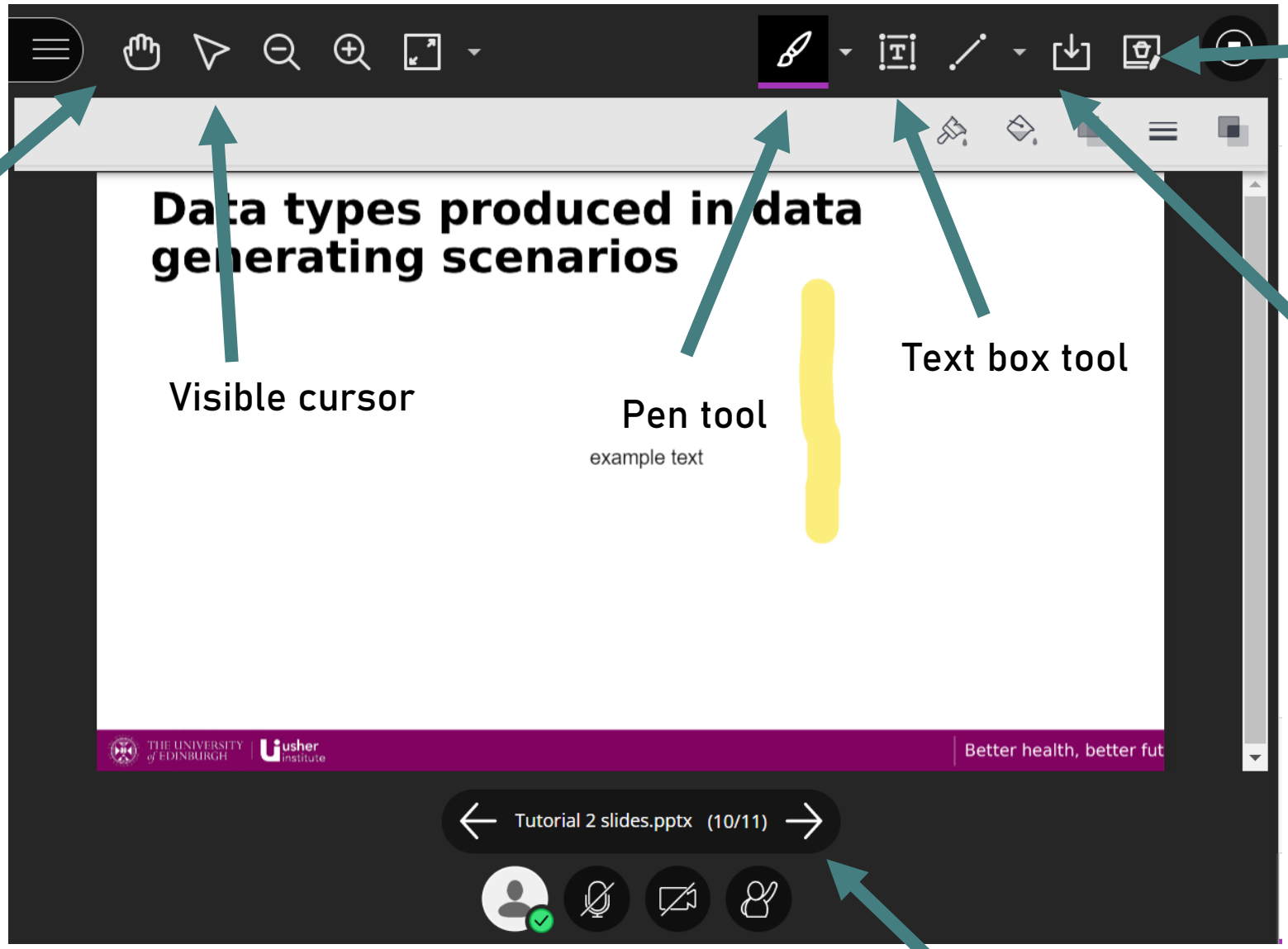

DATA TYPES
Numeric
Float
2.45
8.653
Integer
2
8
Complex
5 + 8i
7 - 3j
String
"Hello"
"data science"
'True'
Categorical
Nominal
red, blue, green, yellow
Ordinal
better, same, worse
Boolean
TRUE
FALSE
Date & Time
Date Time
22/05/2023 17:30
Time
17:30
Date
22/05/2023

Data types produced in data generating scenarios

- Emergency service call outs and transfers (e.g., ambulance)
- Hospital waiting times for non-elective surgeries
- Smoking behaviours in the community
- At-home carers in a local council area (local region)
- Any other health and social care situation you can think of!

Data types produced in data generating scenarios

- 35 min: Discuss the data generated in your selected scenario
  - What types of data they are
  - What are the possible range of values
  - Could the data type vary depending on your analytic use case? If so, how?
- Share with everyone what you spoke about in your groups
- Be sure to save your document so you can post it on the discussion boards after!



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