ECON20003 QM2

Tutorial 1 Semester 1, 2022

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Welcome

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Zoom Consultations

- Richard Hayes: Mondays 1-2pm
- Chin Quek: Wednesdays 1-2pm
- Dr László Kónya: Fridays 2.15-3.15pm

Ed Discussion Board

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Assessment

- 3 assignments (5% each): Individual/Pair
- 1 Mid-semester exam (5%)
- Tutorial HW and Participation (10%)
- Final exam (hurdle) (70%)

Flux polls

https://flux.qa/7W9MCB

Tutorial Format and Weekly Homework Submission

1. Read the tutorial handout, watch the corresponding R video and try to complete the tutorial exercises *before* the tutorial.
2. My tutorials are aimed to be hands-on and discussion-based. The more you participate in class, the more you will learn.
3. Tutorial participation and homework: Answers to the Homework exercises must be submitted in the Canvas Quizzes by Wednesday 10am of the following week + participating in tutorial in order to get the tutorial mark.
4. For each assessment exercise type your answer in the corresponding box available in the Quiz (NO file uploads of any sort). If the exercise requires you to use `R`, insert the relevant *R/RStudio* script and printout in the same Quiz box below your answer. You may wish to copy the `R` code in the Quiz box as well.

   First two tutorials serve as an introduction to R (programming language) and RStudio (IDE).

R basics

- We can think of the **global environment** as our workspace. During a programming session in R, any variables we define or data we import and save in a dataframe are stored in our global environment.

  *In RStudio, we can see the objects in our global environment in the **Environment tab** at the top right of the interface.*

Set working directory

Before you begin working in RStudio, a **working directory must be set up**. It is just a folder, the default location for all project files (input data-sets, plots and other objects) read into R and saved out of R.

- Session > Set Working Directory
- Locate the folder in the Files panel > More > Set As Working Directory

To check the current working directory, in the Console type:

```
getwd()
```

Creating a new R project and new R script

An RStudio project is a working directory designated with a `RProj` file that stores the workspace, command history and source documents in one place together.

Projects are **NOT mandatory** for working in RStudio BUT they are useful as

- they make it straightforward to divide your work into multiple contexts, and
- to separate them from each other.

You should also create a new R script and save it under a unique name.

In QM2, the tutorial handouts - we name `.RProj` and `.R` files using the following convention `tXeY` where `X` is the tutorial number and `Y` is the exercise number.

Data types and Measurement scales

Identify the data type and the measurement scale

a) The number of daily global deaths due to the COVID-19 pandemic during 2021.

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a) The number of daily global deaths due to the COVID-19 pandemic during 2021.

- Quantitative data: Data arises from simple counting and the basic arithmetic operations make sense on them
- Discrete quantitative: The possible values are non-negative integers that can be listed and counted
- Ratio scale: Unit of measurement is 'one death' and there is a genuine zero point (no COVID related death)

b) The department in which each of a sample of university professors teaches.

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- Qualitative data, nominal measurement scale

c) The weekly closing price of gold throughout 2021.

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- Discrete quantitative data, ratio measurement scale

d) The size of soft drink (large, medium or small) ordered by each of a sample of customers in a restaurant.

b) The department in which each of a sample of university professors teaches.

- Qualitative data, nominal measurement scale

c) The weekly closing price of gold throughout 2021.

- Discrete quantitative data, ratio measurement scale

d) The size of soft drink (large, medium or small) ordered by each of a sample of customers in a restaurant.

- Qualitative data, ordinal measurement scale

e) The number of Toyota cars sold each month in Auckland during 2021.

b) The department in which each of a sample of university professors teaches.

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- Discrete quantitative data, ratio measurement scale

d) The size of soft drink (large, medium or small) ordered by each of a sample of customers in a restaurant.

- Qualitative data, ordinal measurement scale

e) The number of Toyota cars sold each month in Auckland during 2021.

- Discrete quantitative data, ratio measurement scale

Exercise 2

Consider the table below. It displays the name, gender, age (year), height (cm) and weight (kg) of six teenagers. Each row is a case and each column is a variable. Age, Height and Weight are quantitative variables, while Name and Gender are qualitative variables as they are not made up of meaningful numbers but letters.
Enter this data into *RStudio*.

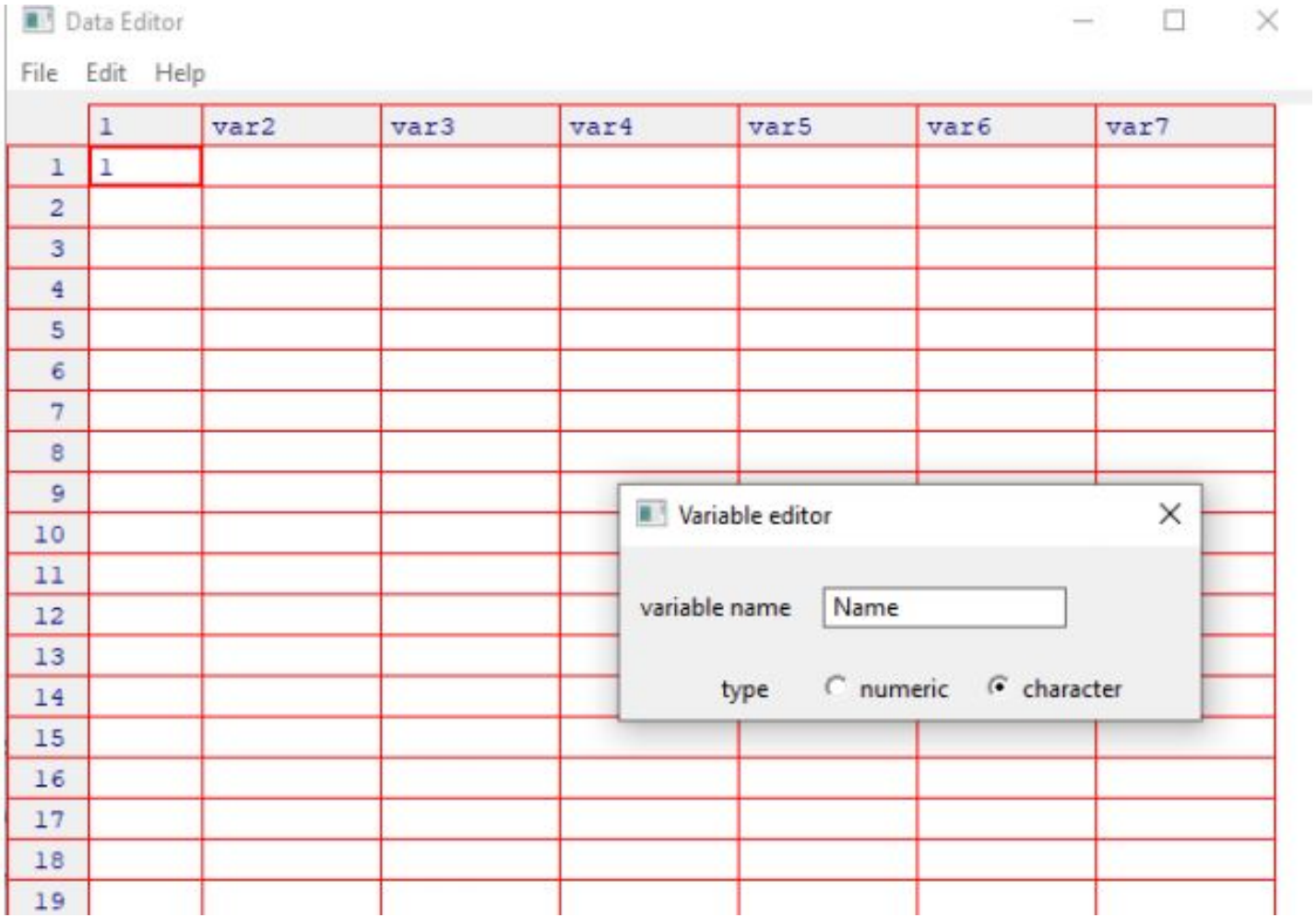
Name	Gender	Age	Height	Weight
	(year)	(cm)	(kg)	
Alfred	M	14	175	51
Alice	F	13	142	38
Barbara	F	14	157	46
Henry	M	15	170	61
John	M	16	178	75
Sally	F	16	160	54

To enter our data from the keyboard to an RStudio spreadsheet, type `data.entry(1)` in the Source panel and click on the Run button in the menu bar of the Source panel.

```
data.entry(1)
```

Notice how RStudio echoes the command in the Console and opens the Data Editor window.

As you can see, at this stage both the first variable and its first value are "1".



Rules on naming an R object

When naming an R object, do keep in mind the following rules:

(i) a name can be a combination of letters, numbers and a few special characters, but it cannot start with a number;

(ii) a name can contain neither the ^, !, $, @, +, -, ?, * special characters nor spaces;

(iii) R is a **case sensitive** language, so variable 'A' and variable 'a' are treated as two different variables in R;

(iv) If you name a new object with the name of an existing object, R overwrites any previous information stored in the existing object without warning or asking for permission

After entering the data in the table, your data editor should look like this:

Data Editor

File Edit Help

	Name	Gender	Age	Height	Weight	var6
1	Alfred	M	14	175	51	
2	Alice	F	13	142	38	
3	Barbara	F	14	157	46	
4	Henry	M	15	170	61	
5	John	M	16	178	75	
6	Sally	F	16	160	54	
7						
8						

Now look at the **Environment tab**.

- It shows you the names of the variables, but also the type (num or chr), the length ([1:6]) and the elements of the atomic vectors.

When relaunching RStudio, by default, RStudio returns to the latest project, in this case `t1e1.Rproj`.

Exercise for Assessment

Exercise 3

One of the major measures of the quality of service provided by any organisation is the speed with which the organisation responds to customer complaints. Last year the flooring department of a large family-owned department store received 50 complaints about carpet installation. The following data represent the number of days between the receipt and resolution of these complaints.

Days				
54	35	29	2	1
11	126	4	35	26
12	165	27	26	74
13	5	29	22	26
33	137	28	123	14
5	110	52	94	20
19	32	152	25	27
4	27	61	36	5
10	31	29	81	13
68	110	30	31	23

a) Is the variable *Days* qualitative or quantitative? If it is quantitative, is it discrete or continuous?
In addition, determine its level of measurement. Explain your answers in the box provided in the Tutorial 1 Homework Canvas Quiz.

b) Launch *RStudio* and close the *Script* tab, if it is open. Create a new *RStudio* project and script, and name both *t1e2*.

c) Enter the observations from your keyboard to an *RStudio* spreadsheet and save them in an *RData* file. Quit RStudio. When prompted, save only the *t1e2.R* file.

d) Take a screenshot of your *Files* tab with the *Windows Snipping Tool* or *Snip & Sketch*, save the image as a jpg file and then insert the saved image in the Quiz box.

Level of measurement

`Canvas > ECON20003_2022_SM1 > Modules > Lectures > Review Slides (Pre-requisite knowledge) > Review 1 (pp 5-8)`

- Nominal scale
- Ordinal scale
- Interval scale
- Ratio scale

Revision (if time permits)

More Flux polls

https://flux.qa/7W9MCB