

Data Analysis in Biology

BIO144

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Dr Stefanie Muff

Dr Frank Pennekamp

Teaching Assistants

You All



TED

LOG IN



Arthur Benjamin:

Teach statistics before calculus!



The “**hottest skill**”
that got people
hired in 2014?

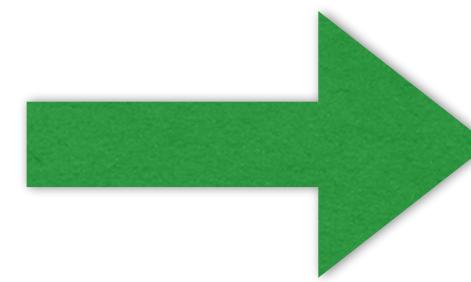
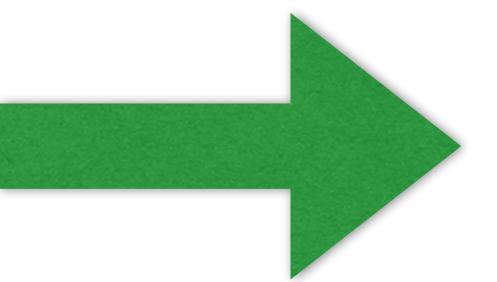
Statistical Analysis

Source: LinkedIn



0:06 / 3:00

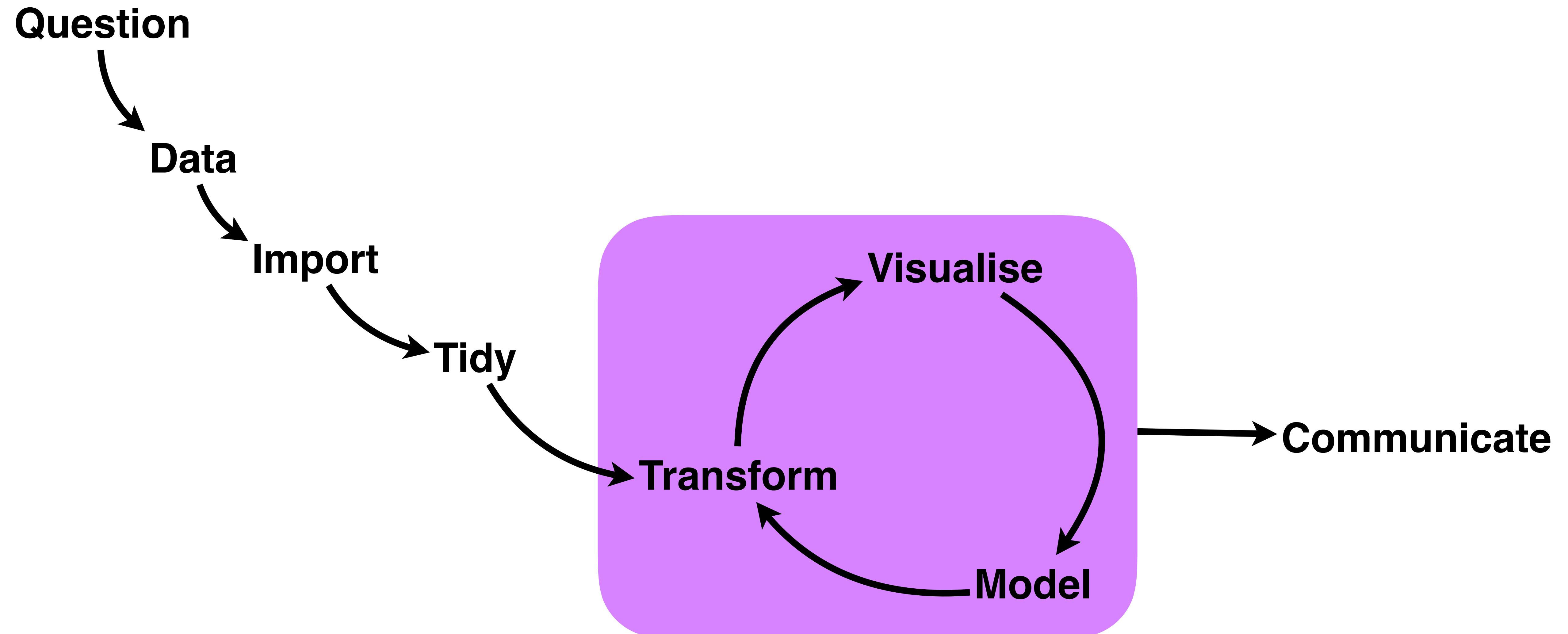




Question
Puzzle
Problem

Data
+
Analysis

Answer
Solution



Efficient
Consistent
Repeatable
Reliable
Readable
Robust
Persistent
Sharable
Scalable

—
—





"Failure is an opportunity to grow"

GROWTH MINDSET

"I can learn to do anything I want"

"Challenges help me to grow"

"My effort and attitude determine my abilities"

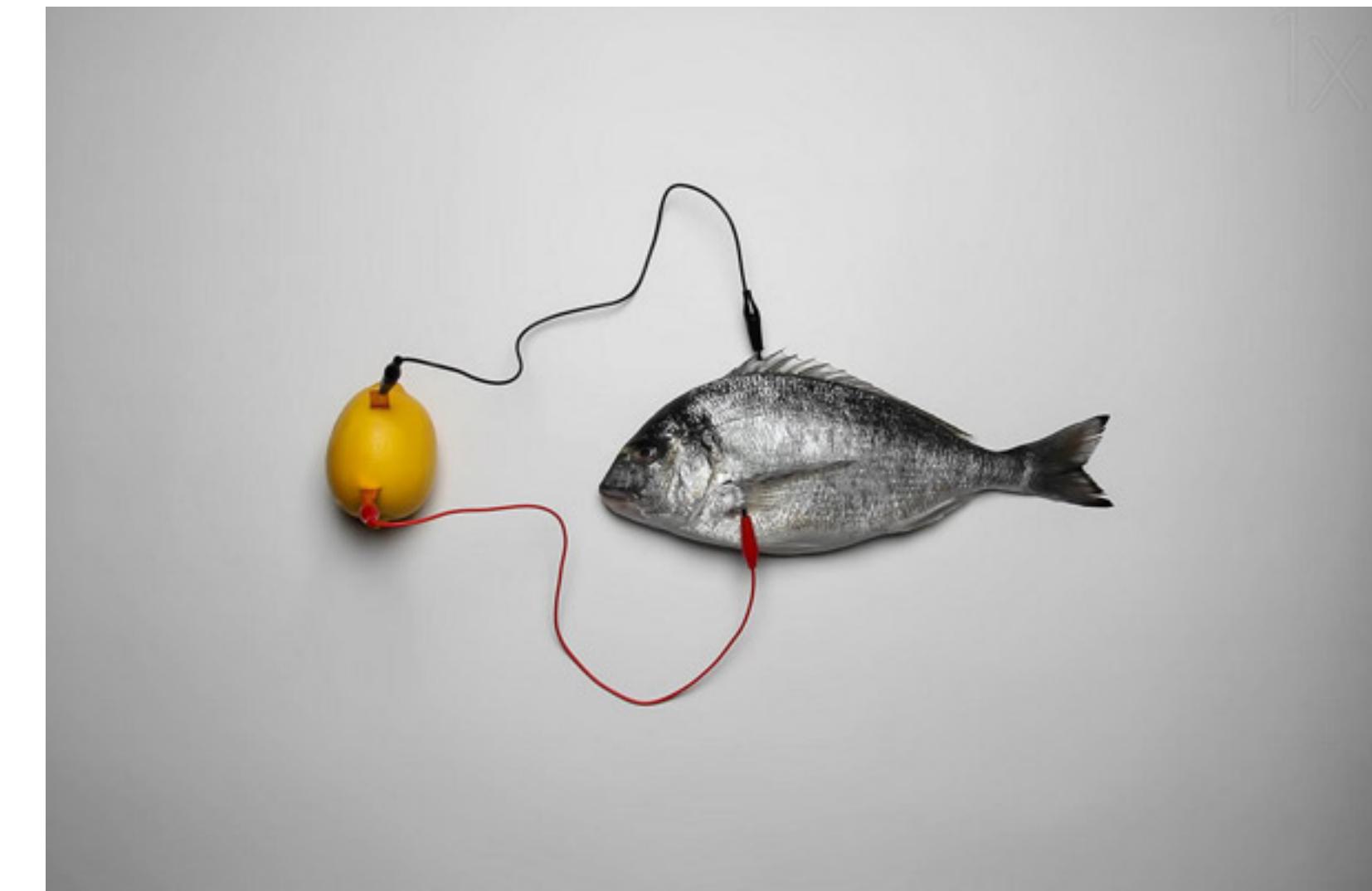
"Feedback is constructive"

"I am inspired by the success of others"

"I like to try new things"

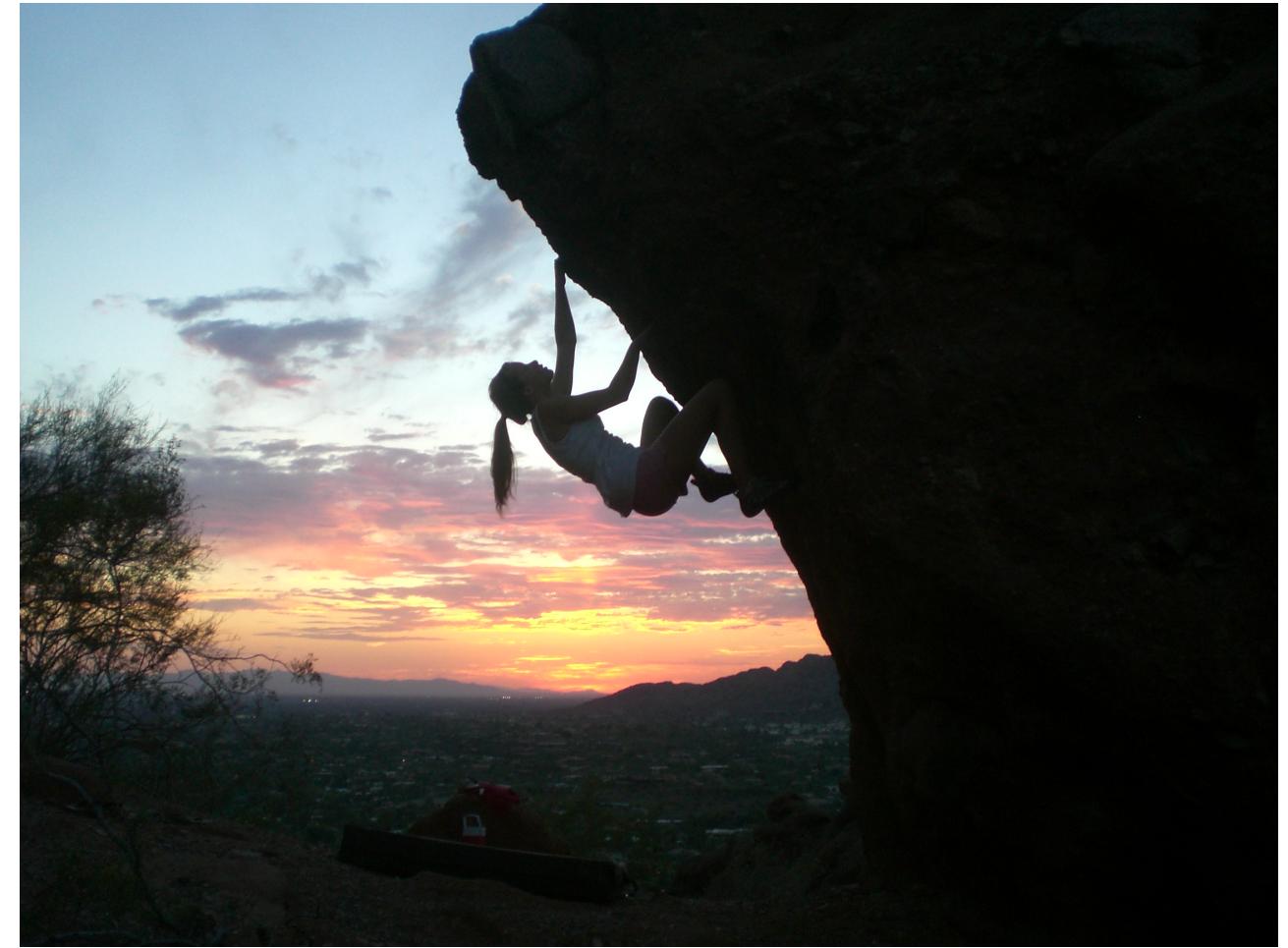
Equip you with the knowledge of how to learn more.
And the confidence that you can.

The conceptual side



8.00(8.15?) - 10am

The practical side



1 - 3pm

<https://openedx.uzh.ch>

<https://mnf.openedx.uzh.ch>

The screenshot shows the homepage of the OpenEdX platform at <https://openedx.uzh.ch>. The header features the University of Zurich logo and a "REGISTER NOW" button. A "Sign in" button is located in the top right corner. The main banner is teal and displays the University of Zurich seal, the text "WELCOME TO OPENEDX @ UZH!", and categories for Chemie, Geographie, Mathematik, and Biologie, each represented by a hexagonal icon. Below the banner, four course cards are listed:

- UZH BIO144 DATA ANALYSIS IN BIOLOGY**
Starts: Jul 27, 2016
- UZH BIO134 PROGRAMMING IN BIOLOGY**
Starts: Sep 01, 2016
- UZH MULTI_MODULE INTRODUCTION TO R**
Starts: Sep 11, 2016
- UZH AST241 INTRODUCTION TO ASTROPHYSICS**
Starts: Sep 12, 2016

At the bottom of the page, there are three additional course cards and a decorative image of a stream.

The details



Are all on openedX

Learning objectives

Schedule

Weekly structure / activities

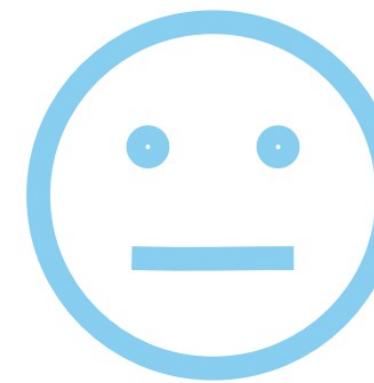
Assessment

Getting help

Giving feedback

Attendance

Email and matriculation number



FEEDBACK

Learning Objectives.

Some variation in amount and type of BC material.

Consistency among instructors / TAs.

Lectures from 3-5pm tough.

Graded assessment questions



Hyperlink



switch

Live data analysis demonstration

BIO144
Week 1

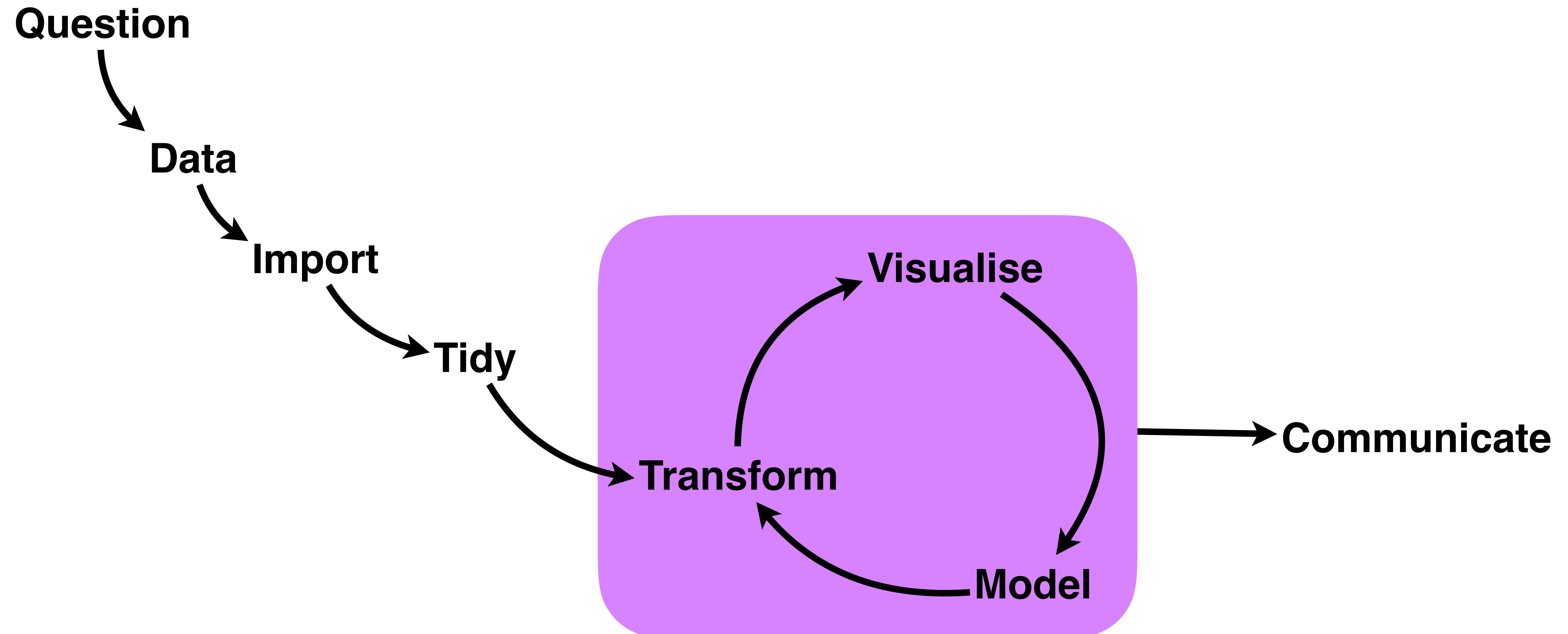
Its a demonstration...

The idea is to give you a feel of what is involved in data analysis.

You will understand some of the demonstration.

You will not understand some of it.

Keep notes about what you don't understand.



Live data analysis demonstration

The whole data analysis workflow in one hour!!!

Question

Expectation

Planned presentation & analysis

Selection of subjects

How will data be collected?

Ethics / permissions

Data collection

Data wrangling

Visualise

Statistical test

Critical thinking

Report / communicate

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The question

- What should be our question?
- As always, there are some influences and some constraints.
- We should ask a question of interest to us, and of some importance.
- And we should be able to collect the data, within our current constraints, necessary to answer the question.
- The question we will address is "***do male and female reaction times of students at the University of Zurich differ?***".
- Why this question? Reaction times are important, safety, sport...

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Expectation

- Quite a lot of work on this already.
- Generally, males tend to have faster reaction times than females. So we expect that to be the same for students at the University of Zurich.
- Given that you know this pattern, and you are the subjects, its interesting to see if you women can buck the trend, perhaps by trying especially hard. Though now the men know you might do this, it probably won't work!

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What graph?

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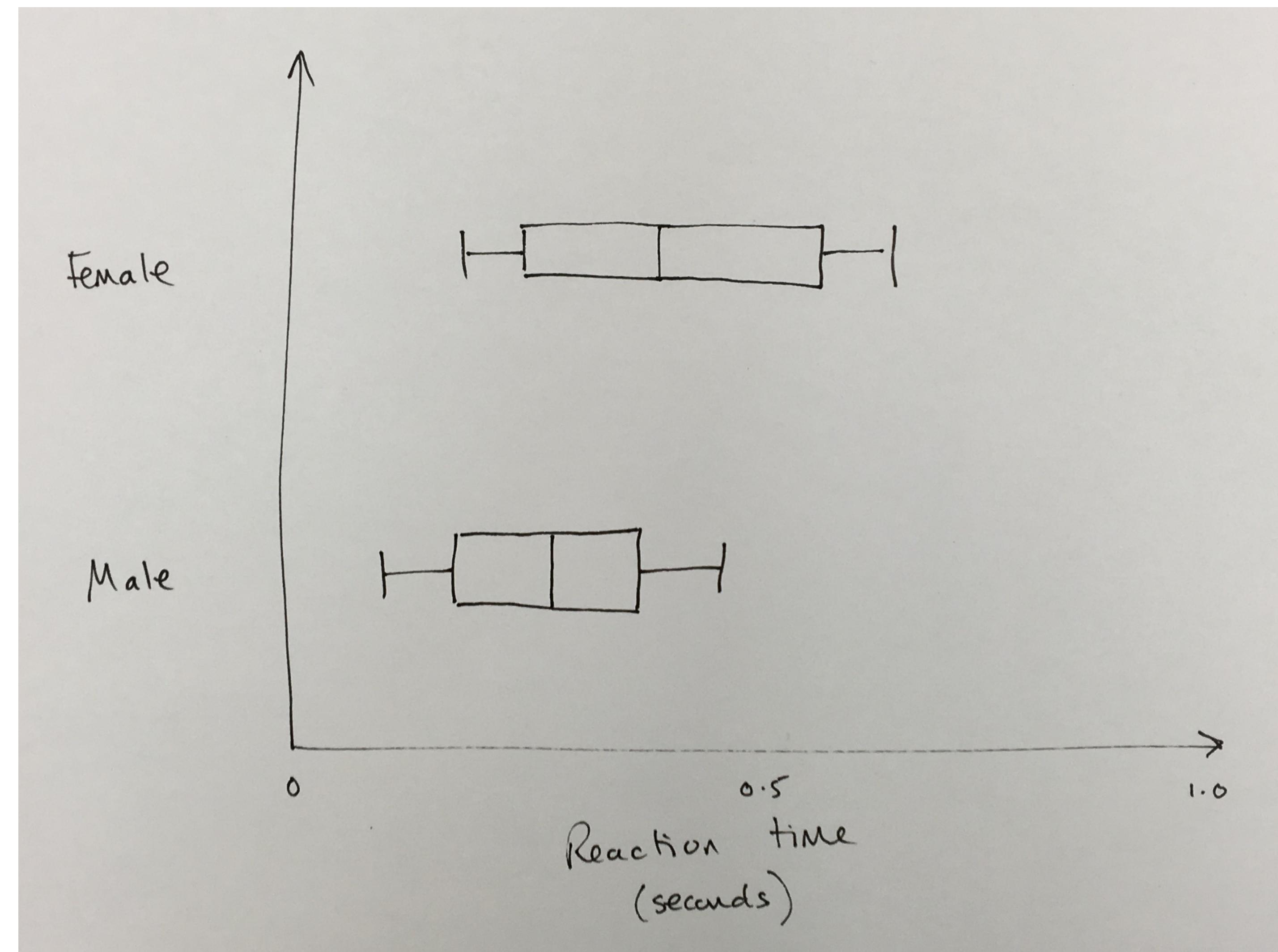
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What statistical test?

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Make up a unique ID code for yourself.
It should not be anything that could identify you.
Keep it safe.

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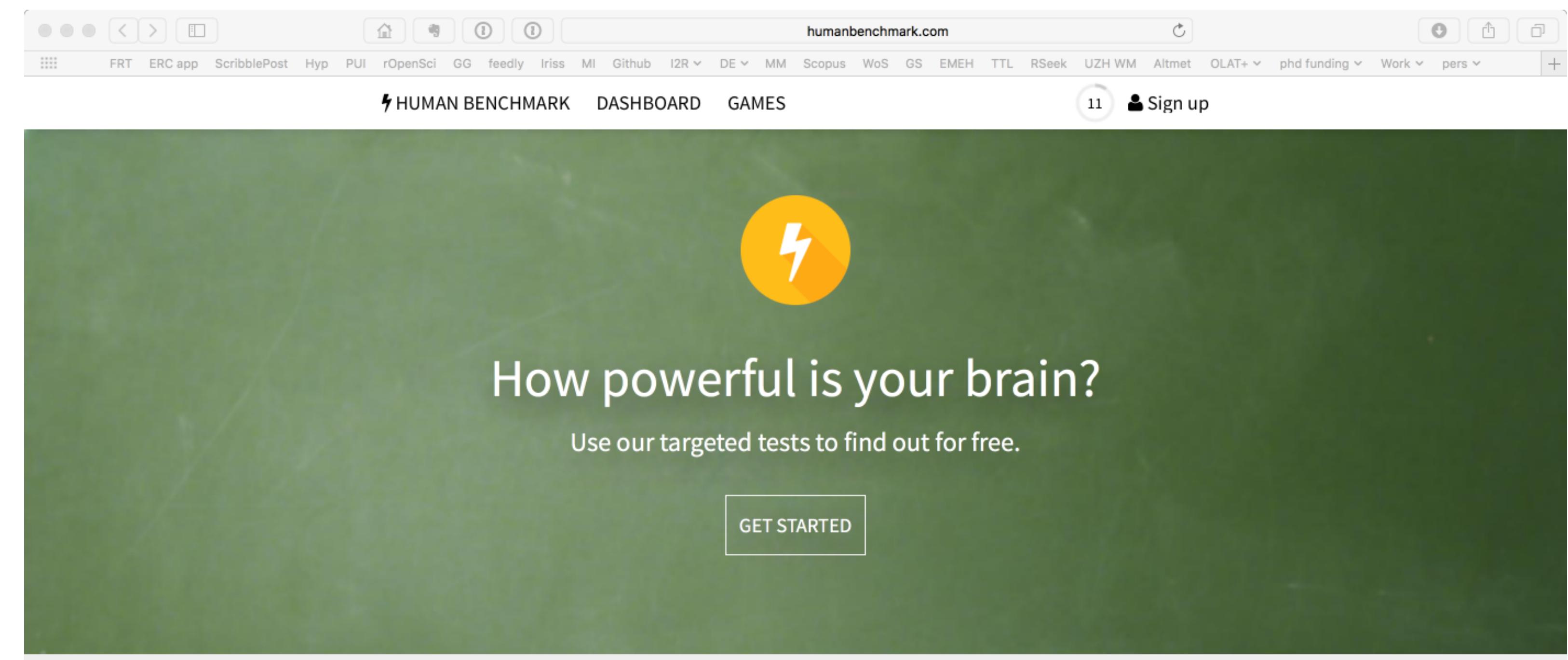
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humanbenchmark.com



Number Memory

Remember the
longest number you
can.



Reaction Time

Test your visual
reflexes.



Verbal Memory

Keep as many words
in short term
memory as possible.



Visual Memory

Remember an
increasingly large
board of squares.

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<https://bit.ly/2Educmy>

The screenshot shows a Google Forms survey titled "My Human Benchmark results". The survey is for a live data analysis demonstration, BIO144, Data Analysis in Biology. It includes fields for entering a unique ID code, gender (Female, Male, Other), average reaction time in seconds, verbal memory score, and number memory score.

My Human Benchmark results

For live data analysis demonstration, BIO144, Data Analysis in Biology

*Required

Please enter the unique ID code you gave yourself. *

Your answer

What is your gender? *

Female

Male

Other: _____

Please enter your average reaction time in seconds (e.g., 0.326). *

Your answer

Please enter your score on the Verbal Memory test. *

Your answer

Please enter your score on the Number Memory test

Your answer

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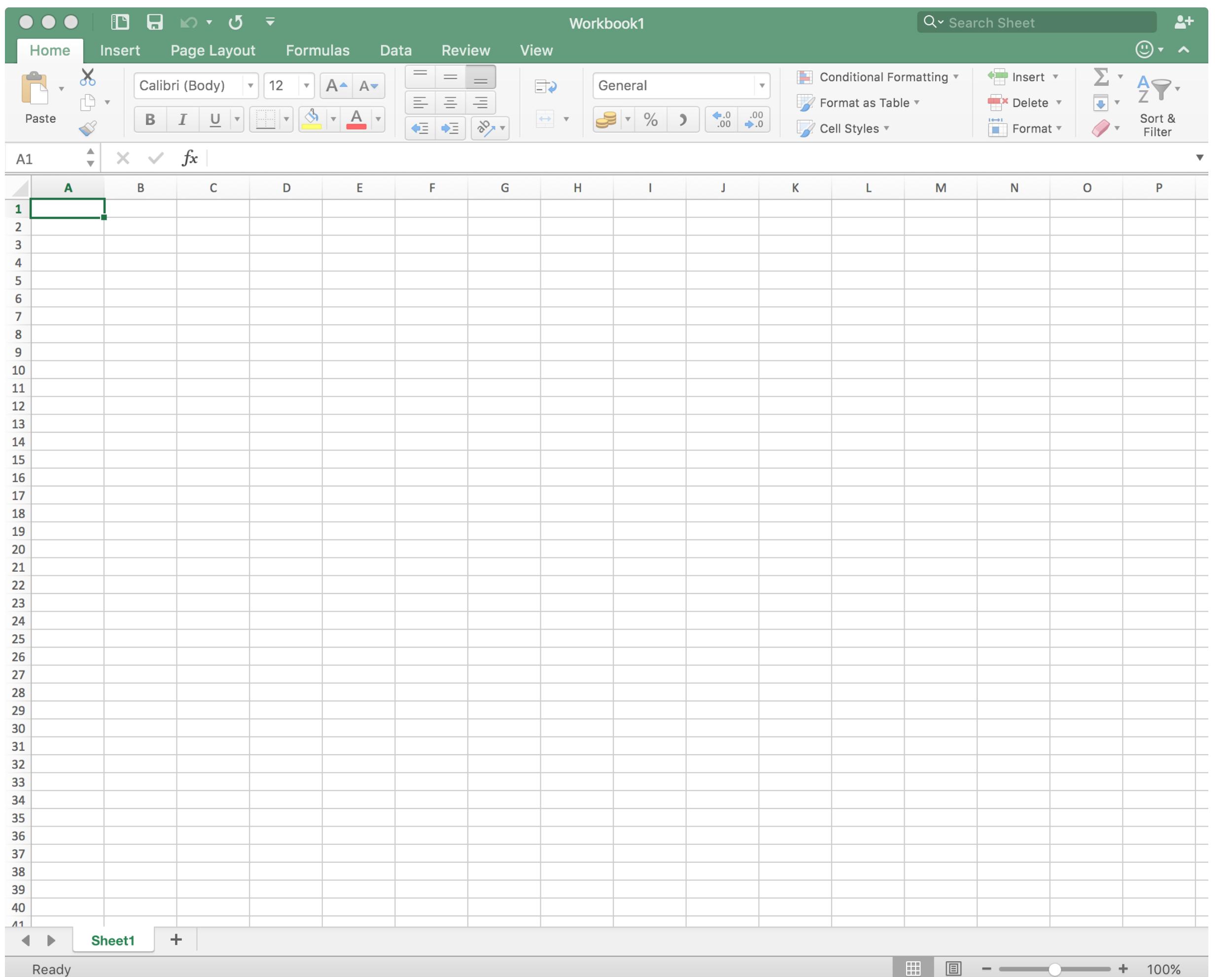
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Check the data in the spreadsheet

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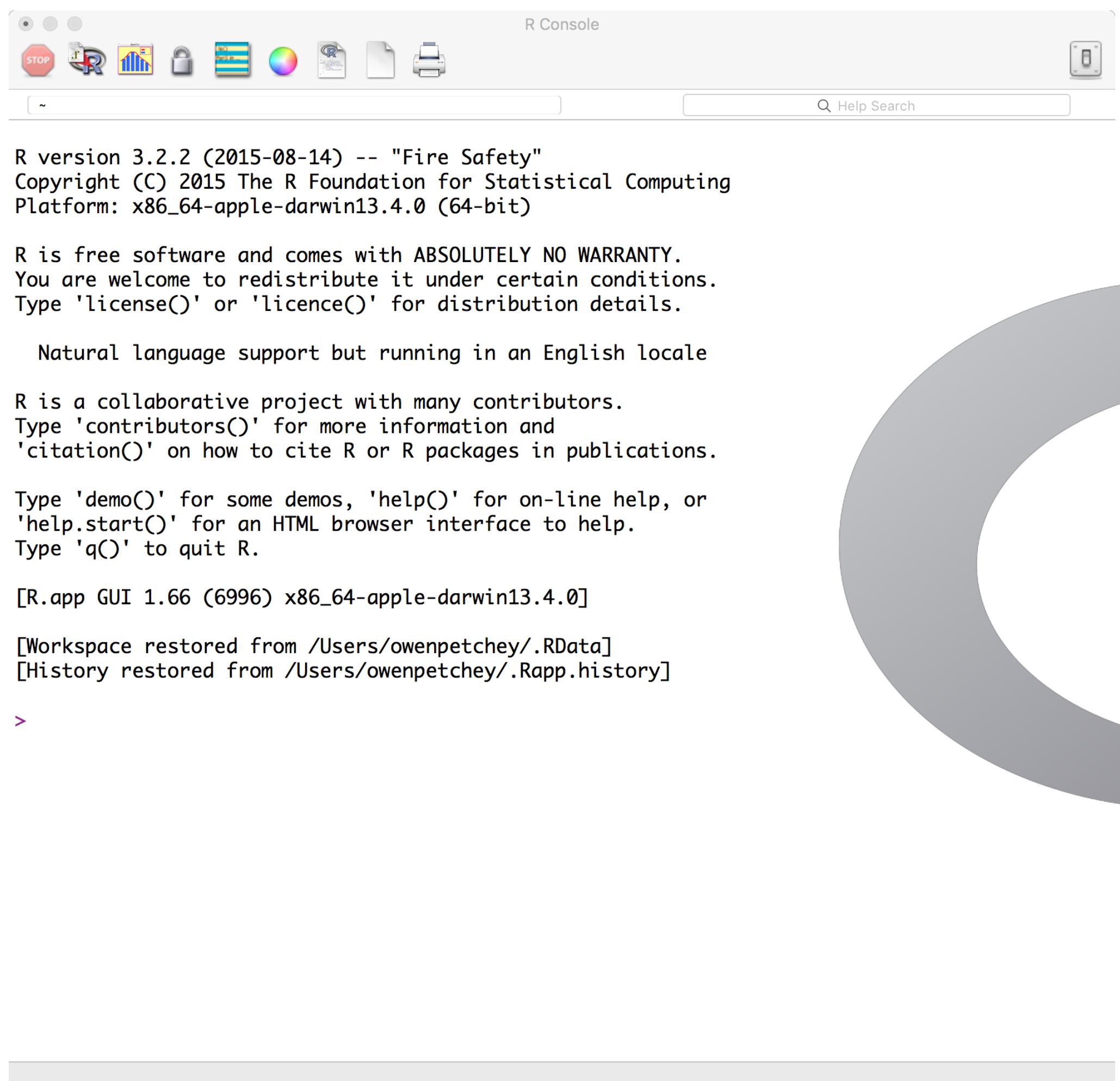
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Live in RStudio

Live data analysis demonstration

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