

Interactive Systems (ISY)

Hörsaalübung 01

ORGANISATORISCHES

Personen

- Vorlesung
 - Michael Rohs
- Übungsleitung
 - Jan Feuchter



Präsenzübung

- Dienstag 09:45-11:15
- Vertiefung der Vorlesungsinhalte
- Beispiele
- Praktische Übungen
- Nachbesprechung Hausübungen

Ressourcen

- Kurs Homepage
 - Kursplan, Referenzen
 - <https://www.pi.uni-hannover.de/de/hci/lehre/sommer-2024/interaktive-systeme>
- Stud.IP
 - Foliensätze, Aufgaben, Ankündigungen, Diskussionen, Feedback
 - <https://studip.uni-hannover.de/>
- Upload Tool
 - Abgabe der Hausübung
 - <https://assignments.hci.uni-hannover.de>

Übungen und Scheinbedingungen

- **Übungen**
 - (meist) wöchentlich, Aufgaben lösen
 - Bearbeitung erfolgt einzeln (außer explizit erlaubt)
 - Abgabe per Submission-System
 - Bonuspunkte für Klausur (max. 20% auf erreichte Klausurpunkte)
 - Bonus gilt nur für das Semester, in dem der Bonus erarbeitet wurde
 - Bonus hilft nicht beim Bestehen
- **Klausur**
 - Schriftlich, 90 Minuten
- **Scheinbedingungen**
 - Bestehen der Klausur
 - Schein ist benotet

Abgabe der Übungen

- <https://assignments.hci.uni-hannover.de>

Submit your assignments



<p>Data Science Foundation</p> <p>Currently, it's not possible to submit any results.</p> <p>Previous Submissions</p>	<p>Interaktive Systeme</p> <p>You can currently submit your results to Assignment 1. So far, we received 0 submissions.</p> <p>Submit Previous Submissions</p>	<p>Grundlagen der Mensch-Computer-Interaktion</p> <p>Currently, it's not possible to submit any results.</p> <p>Previous Submissions</p>
<p>Datenstrukturen und Algorithmen</p> <p>Currently, it's not possible to submit any results.</p> <p>Previous Submissions</p>	<p>Grundlagen der Datenbanksysteme</p> <p>You can't submit any results at the moment, but Assignment 1 will be available soon.</p> <p>Previous Submissions</p>	

Abgabe der Übungen (2)

- Abgabe der Übung als .zip Archiv
 - Archiv enthält alle relevanten Dateien
- Deadline stets montags um 23:59
- Textaufgaben:
 - Nur PDF!
- Programmieraufgaben:
 - Jeweils in Aufgabe beschrieben
 - z.B. Export aus IntelliJ

Interaktive Systeme: Assignment 1

Firstname:

Jan

Lastname:

Wolff

E-Mail:

jan.wolff@hci.uni-hannover.de

Optional: Please fill out the survey to give **anonymous** feedback

	Strongly disagree		Neutral		Strongly agree		Undecided
The assignment was easy to solve.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I learned a lot while doing the assignment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
The assignment was fun to work on.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
The assignment went along nicely with the lecture.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

In total I spent about hours working on the assignment.

Anything else about the assignment you want to tell us about? (At most 250 characters)

no *.zip file selected

Choose File

Submit

Lectures

Session	Date	Topic	Details
1	2.4.	Introduction	human performance, empirical research, modeling
2	9.4.	Interaction elements	input devices, interaction elements, states, layouts
	16.4.	Event handling	events, bindings, reactive programming, scene graph
3	23.4.	Scene graphs	event delivery, coordinate systems, nodes, animation, concurrency
4	30.4.	Interaction techniques	alignment and pointing techniques
5	7.5.	Interaction techniques	
6	14.5.	Web-based user interfaces	document object model, client-server issues
	21.5.	Pfingstwoche	
7	28.5.	Web-based user interfaces	reactive Programming for the Web
8	4.6.	Experiments and data analysis	designing experiments, hypothesis testing
9	11.6.	Modeling interaction	descriptive and predictive models, keystroke-level model, regression
10	18.6.	Visualization	visual encodings, perceptual accuracy, treemaps, dynamic queries
11	25.6.	Human-Centered AI	introduction to human-centered AI, human control and automation, examples
12	2.7.	Deep learning in HCI	guidelines for human-AI interaction, neural networks
13	9.7.	Deep learning in HCI	convolutional and recurrent NNs, face recognition, gesture recognition

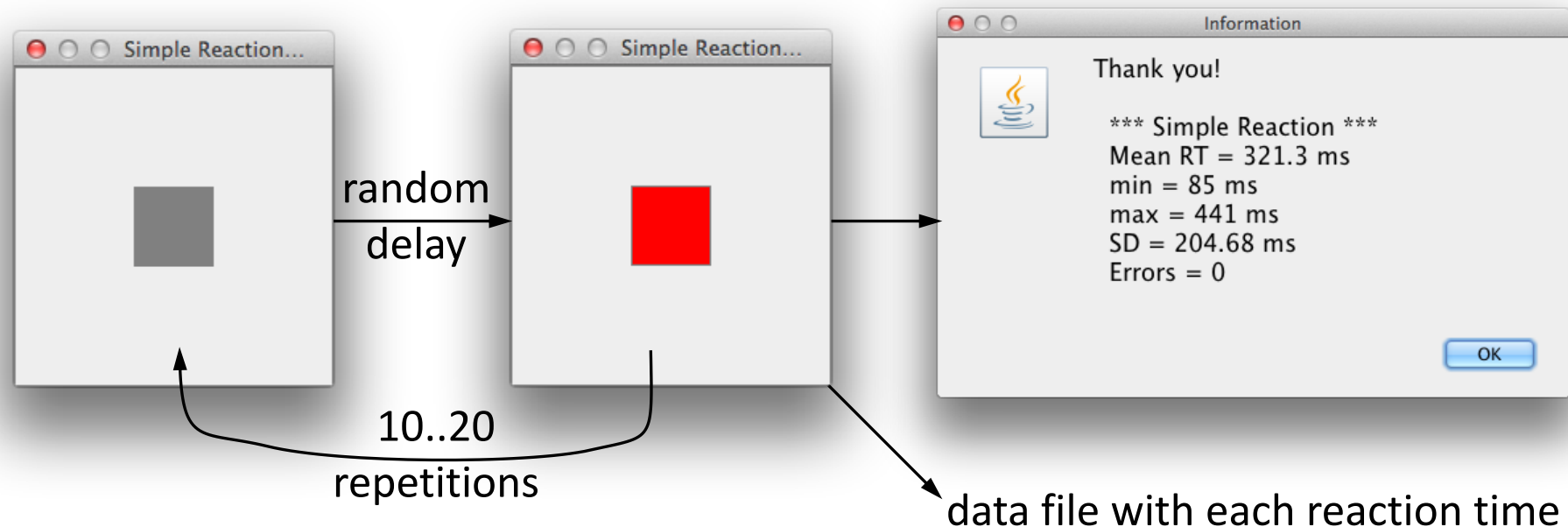
Exkurse

- Reactive Programming
 - JavaFX
 - HTML, CSS, JavaScript
 - Web Frameworks: Vue.js, Svelte
- Statistics and Evaluation of Experiments
 - Python
 - Jupyter Notebooks
 - Seaborn, Pandas, etc.
- Deep Learning
 - Python
 - TensorFlow (Keras)

KURZE WIEDERHOLUNG

Simple Reaction Time

- Java ReactionTimeExperiment
 - modified from MacKenzie: <http://www.yorku.ca/mack/HCIbook/>

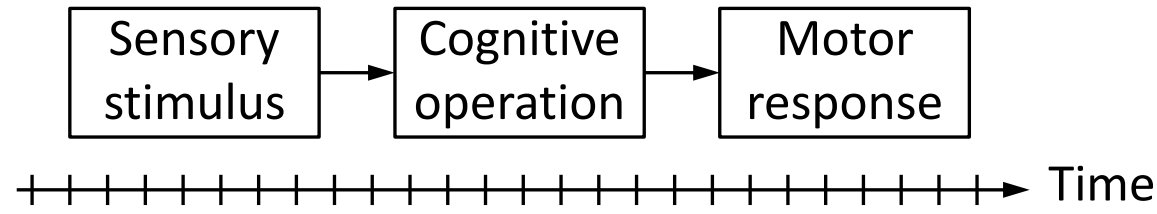


- Press key as quickly as possible after red box appears

Fragen

- Sie fahren auf eine Ampel zu und diese springt von grün auf gelb.
- Ist dies ein Beispiel für einen Simple Reaction Task?

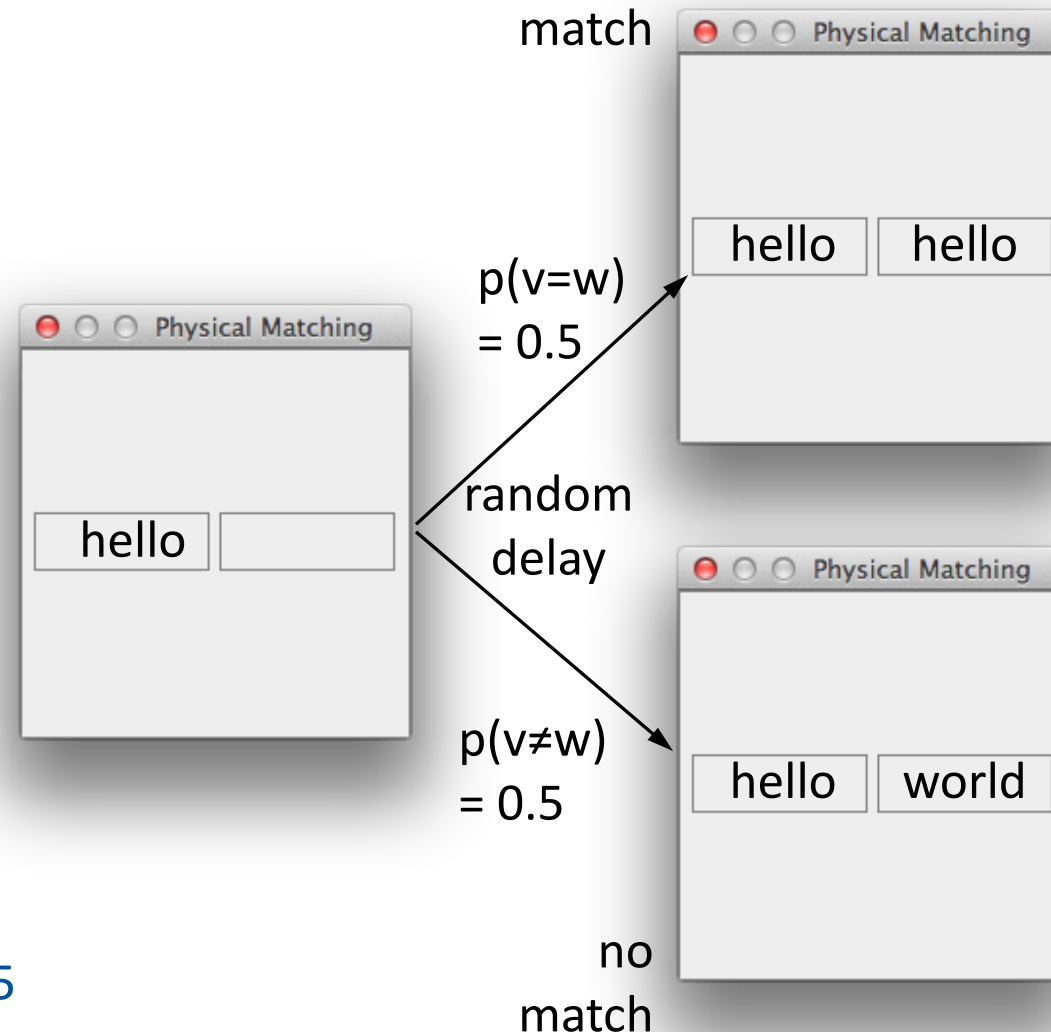
Cognitive Operation in a Reaction Time Task



- Example: visual stimulus, button press as response
 - Retina converts light to nerve impulses
 - Transmitted to brain for perceptual processing
 - Neural activations in motor cortex
 - Nerve signals transmitted to hand
 - Muscle transforms nerve signal to physical movement
- Sensory stimuli and motor responses exist in outside world
 - Relatively easy to measure
- Cognitive operations within human brain
 - Difficult to measure

Physical Matching

- Stimulus 1: five-letter word w
- Random delay
- Stimulus 2: either w or v ($v \neq w$)

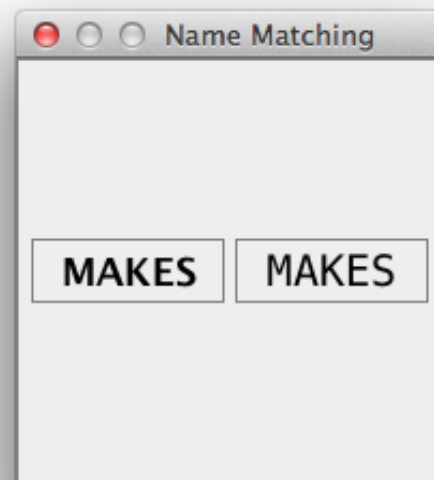


- User presses key_1 if $S_1 = S_2$, else presses key_2
- Probability $p(v=w) = p(v \neq w) = 0.5$

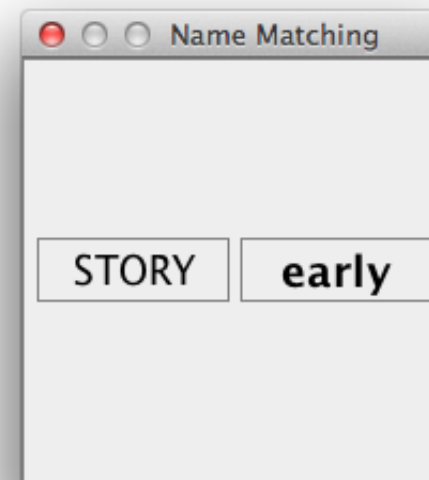
Name Matching

- Same as physical matching (match if $v = w$), except that appearance of second stimulus is different
 - UPPERCASE or lowercase, plain or **bold**, 18 or 20 point, etc.
- Cognitive demand is higher, because of appearance differences need to be decoded before symbolic comparison

match



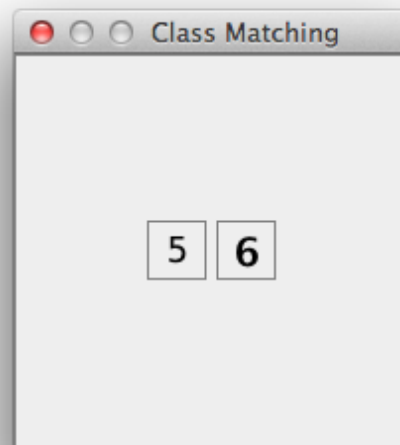
no
match



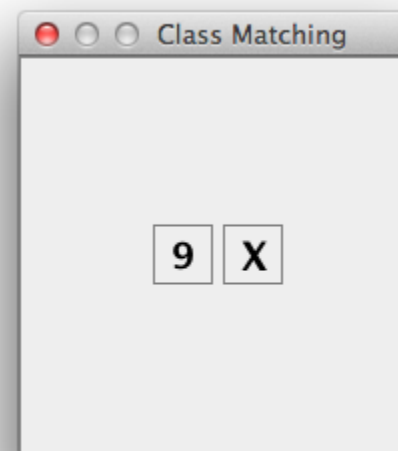
Class Matching

- Stimulus 1: letter or digit (exclude 'O', '0', 'l', '1')
- Stimulus 2: letter or digit (exclude 'O', '0', 'l', '1')
- As in name matching there may be appearance differences
- Match if both stimuli are letters or if both are digits
- Cognitive demand is higher than for name matching, because consultations of long-term memory required

match



no
match



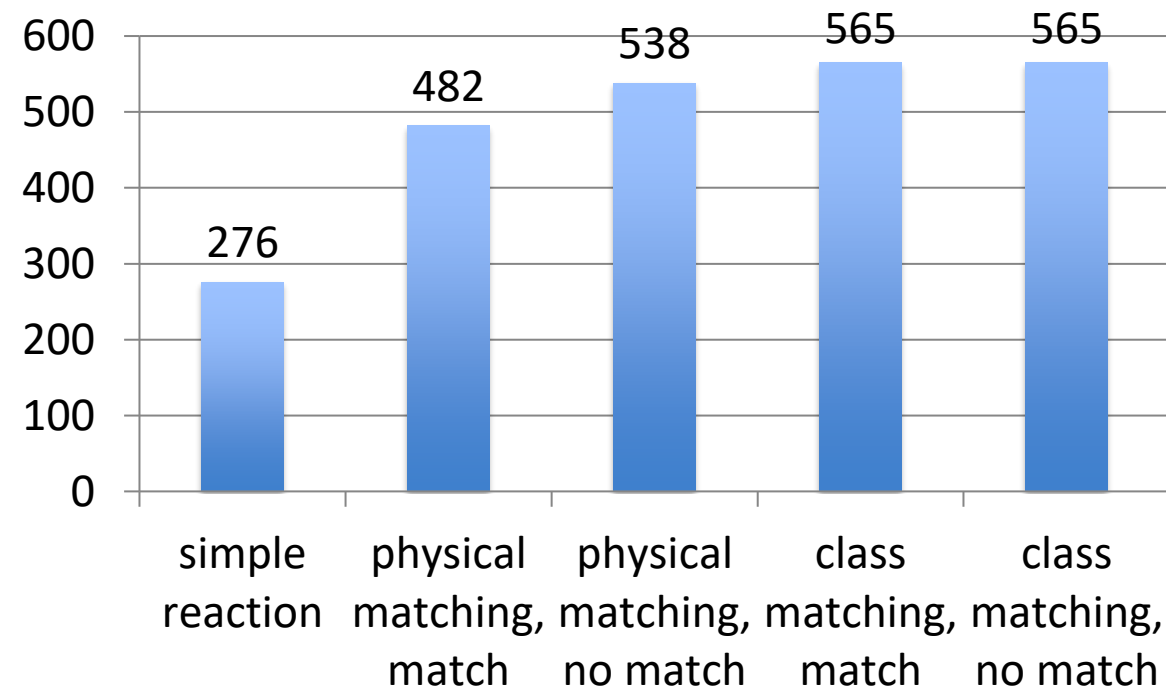
Fragen

- Wodurch wird die Schwierigkeit von "class matching" bestimmt?
- Beispiel für schwierigeres class matching als Ziffern vs. Buchstaben?

Results of Experiment on Reaction Tasks (MacKenzie)

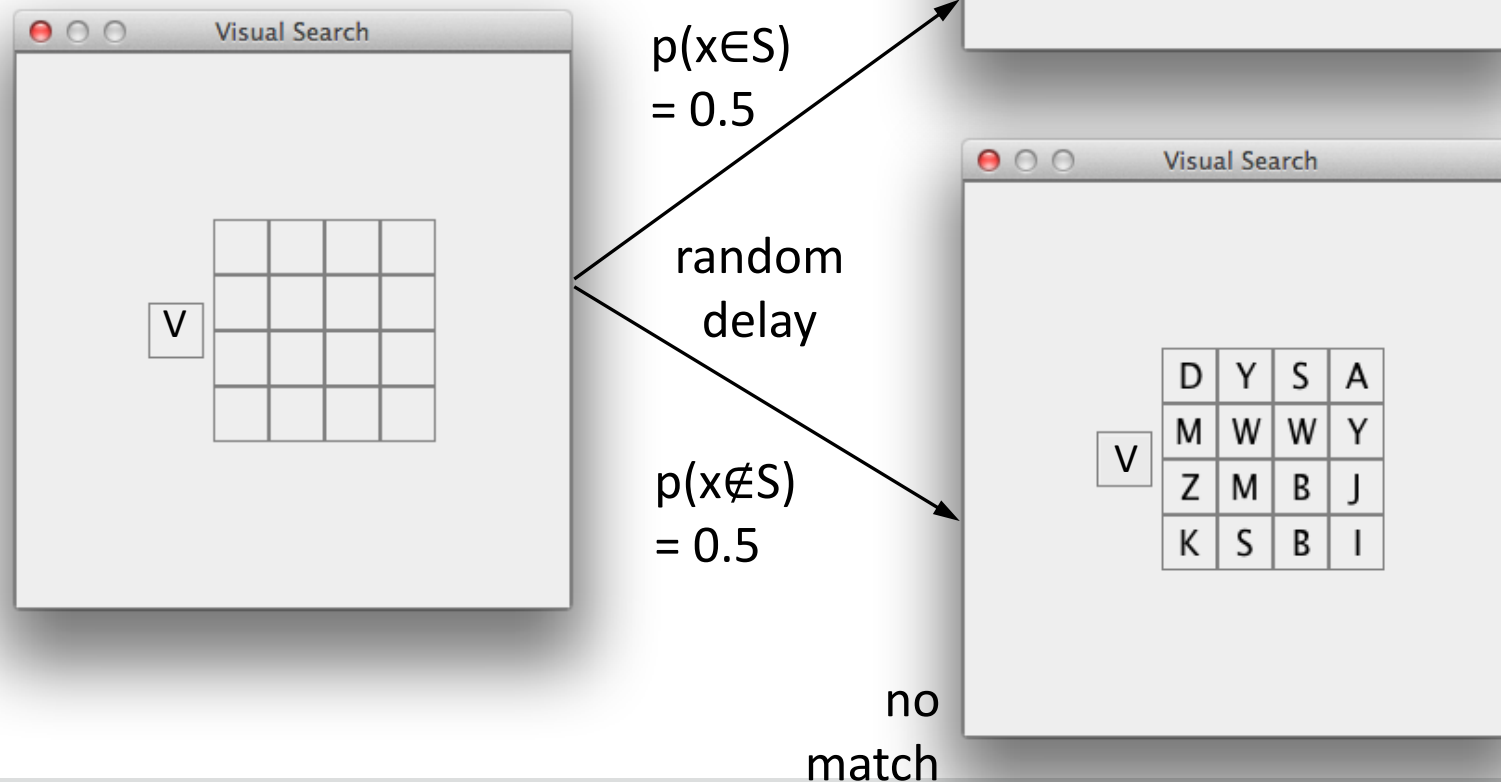
- 14 students
- 3 blocks of 10 trials each (1st block practice)
- 2 orders (simple, physical, name, class)
- Mean times

- Simple reaction:
276 ms
- Physical matching:
482 ms (match)
538 ms (no match)
- Class matching:
565 ms (mach)
565 ms (no match)



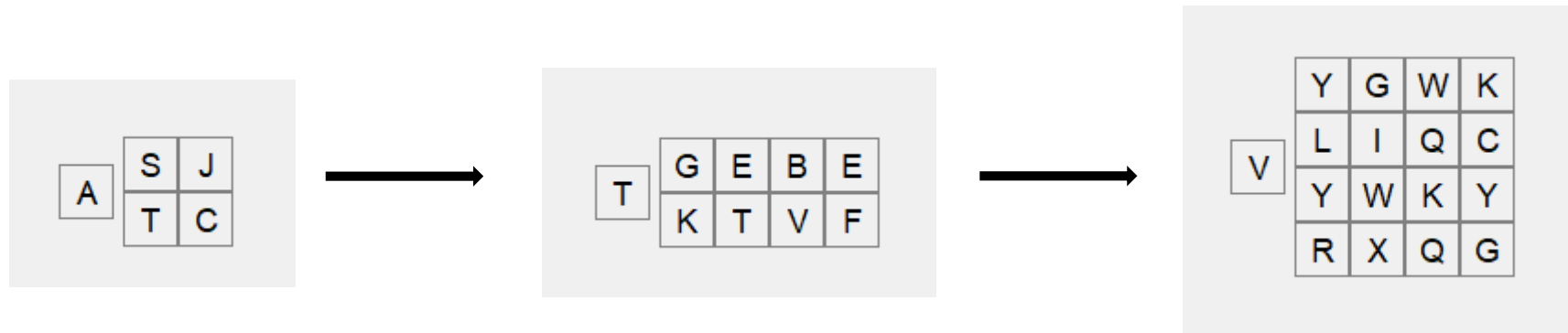
Visual Search

- Search for target item in a set of items
- Search time depends on set size



Visual search time is ... the size of the search set.

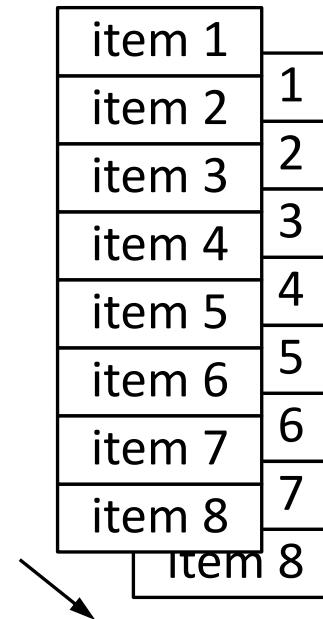
- A. is independent of
- B. is a linear function of
- C. is a quadratic function of
- D. is a ... function of
- E. has an unknown relationship to



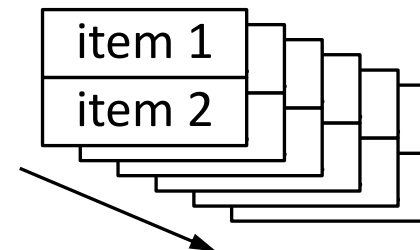
Which menu design is better?

64 menu items

- A. 8 items on each menu, 2 levels deep

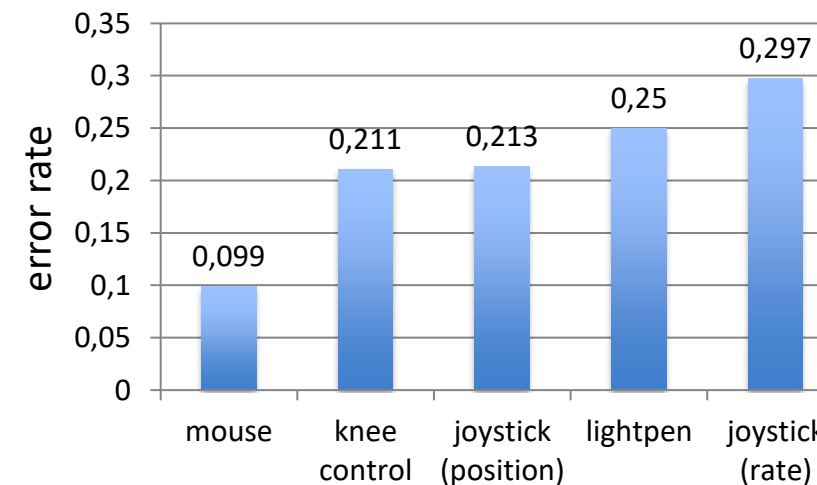
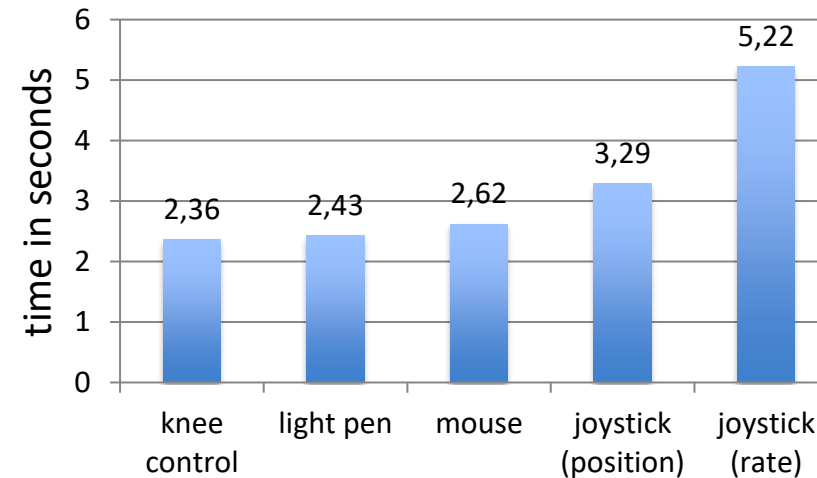


- B. 2 items on each menu, 6 levels deep



Which of those is the best input device? Why?

- Task completion time
 - seconds
- Error rate
 - ratio of missed selections to all selections

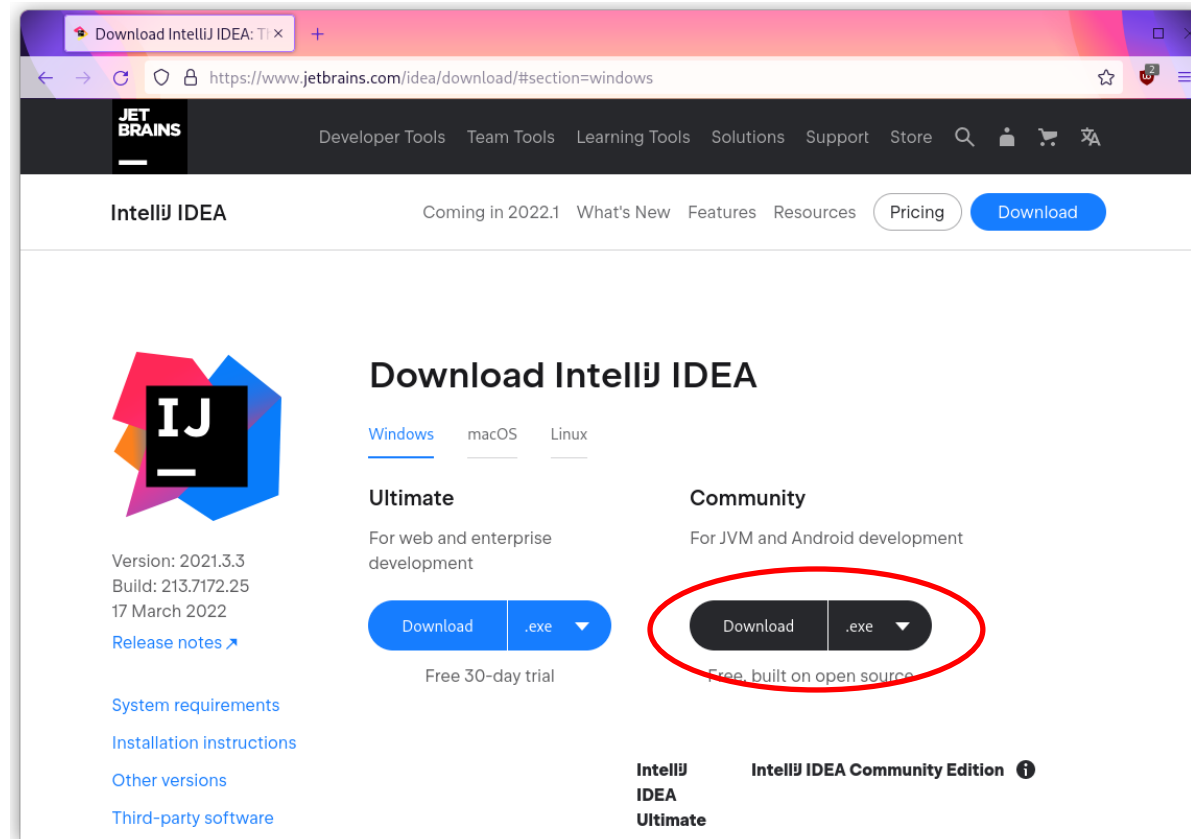


Data is from the first study on input devices:
 English, Engelbart, Berman. Display selection techniques for Text Manipulation. IEEE Trans. on Human Factors in Electronics. 1967.

SOFTWARE

Java: IntelliJ IDEA

- <https://www.jetbrains.com/idea/download>

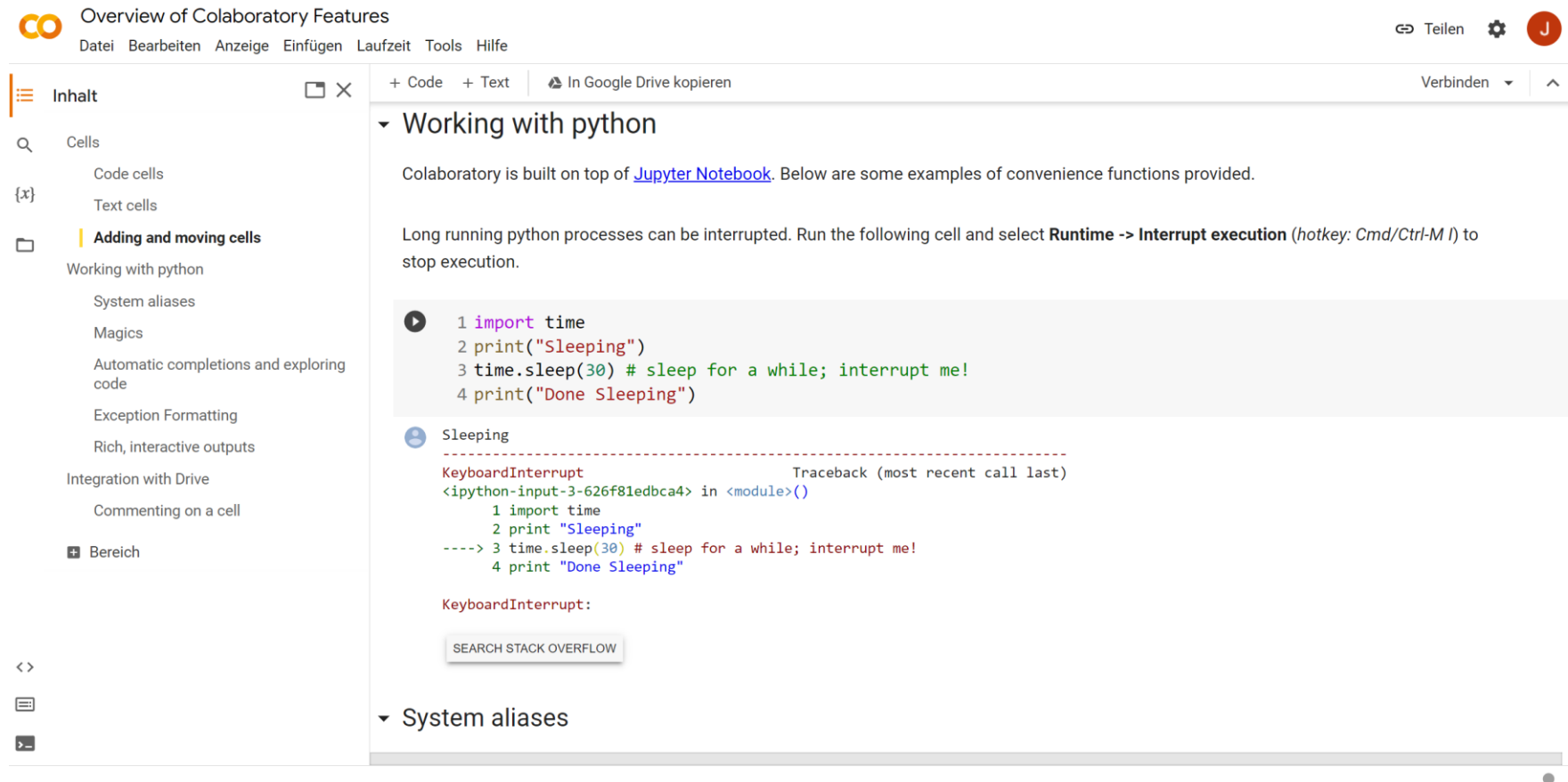


Java: OpenJDK und JavaFX

- OpenJDK 11
 - Installation provided by IntelliJ
 - Or via Oracle
 - <https://www.oracle.com/java/technologies/downloads/#java11>
 - Or via third parties
 - <https://www.microsoft.com/openjdk#11>
 - <https://docs.aws.amazon.com/corretto/latest/corretto-11-ug/downloads-list.html>
- OpenJFX 11 (JavaFX)
 - <https://gluonhq.com/products/javafx/>

Jupyter Notebook & Python

- <https://colab.research.google.com/>



Overview of Colaboratory Features

Teilen

Inhalt

Cells

Code cells

Text cells

Adding and moving cells

Working with python

System aliases

Magics

Automatic completions and exploring code

Exception Formatting

Rich, interactive outputs

Integration with Drive

Commenting on a cell

Bereich

Working with python

Colaboratory is built on top of [Jupyter Notebook](#). Below are some examples of convenience functions provided.

Long running python processes can be interrupted. Run the following cell and select **Runtime -> Interrupt execution** (hotkey: *Cmd/Ctrl-M I*) to stop execution.

```
1 import time
2 print("Sleeping")
3 time.sleep(30) # sleep for a while; interrupt me!
4 print("Done Sleeping")
```

Sleeping

```
KeyboardInterrupt
Traceback (most recent call last)
<ipython-input-3-626f81edbca4> in <module>()
      1 import time
      2 print "Sleeping"
----> 3 time.sleep(30) # sleep for a while; interrupt me!
      4 print "Done Sleeping"
```

KeyboardInterrupt:

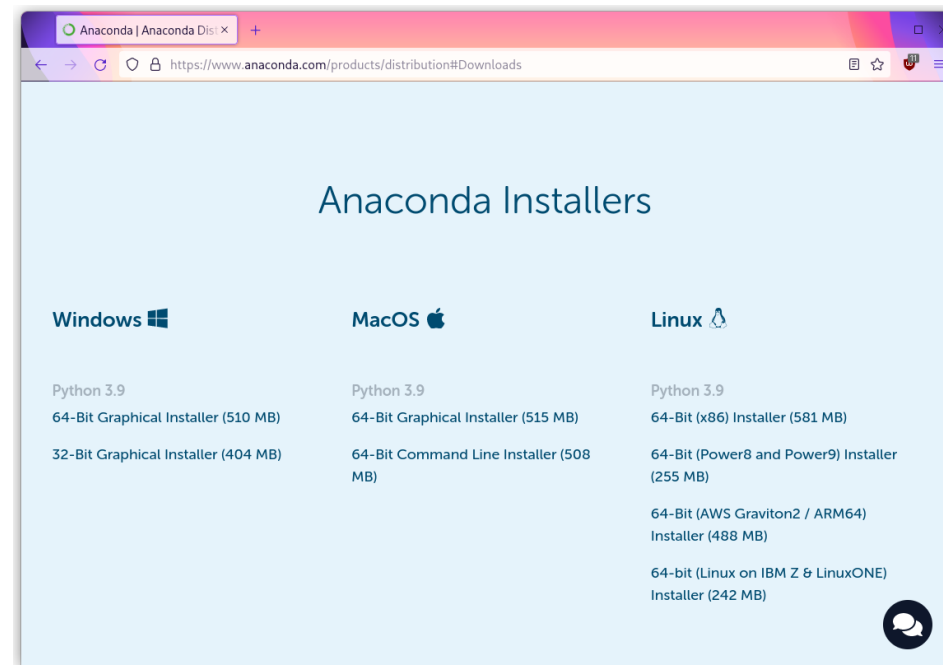
SEARCH STACK OVERFLOW

System aliases

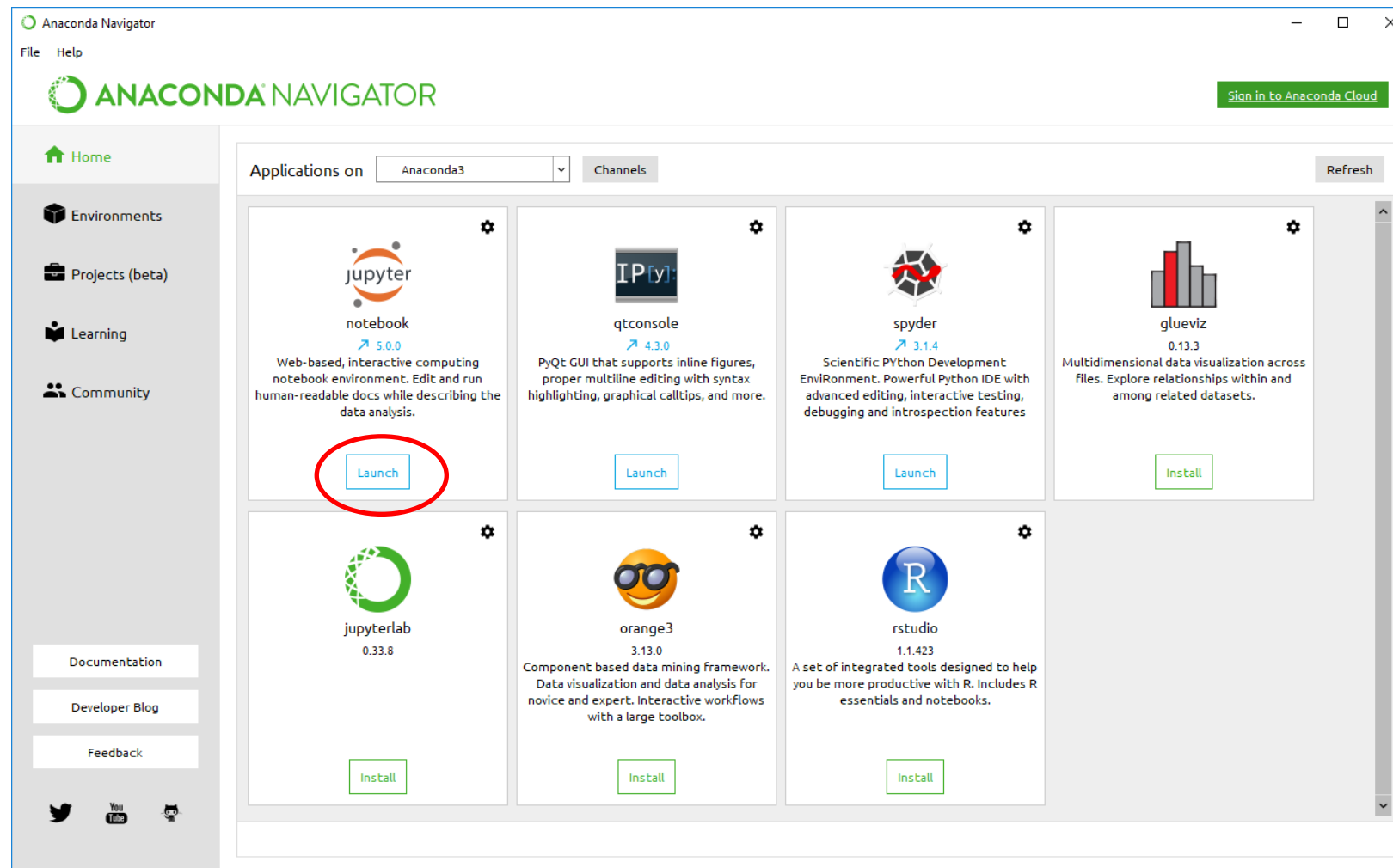
Jupyter Notebook & Python (lokale Alternative)

Anaconda:

<https://www.anaconda.com/products/distribution#Downloads>



Jupyter Notebook



Jupyter Notebook

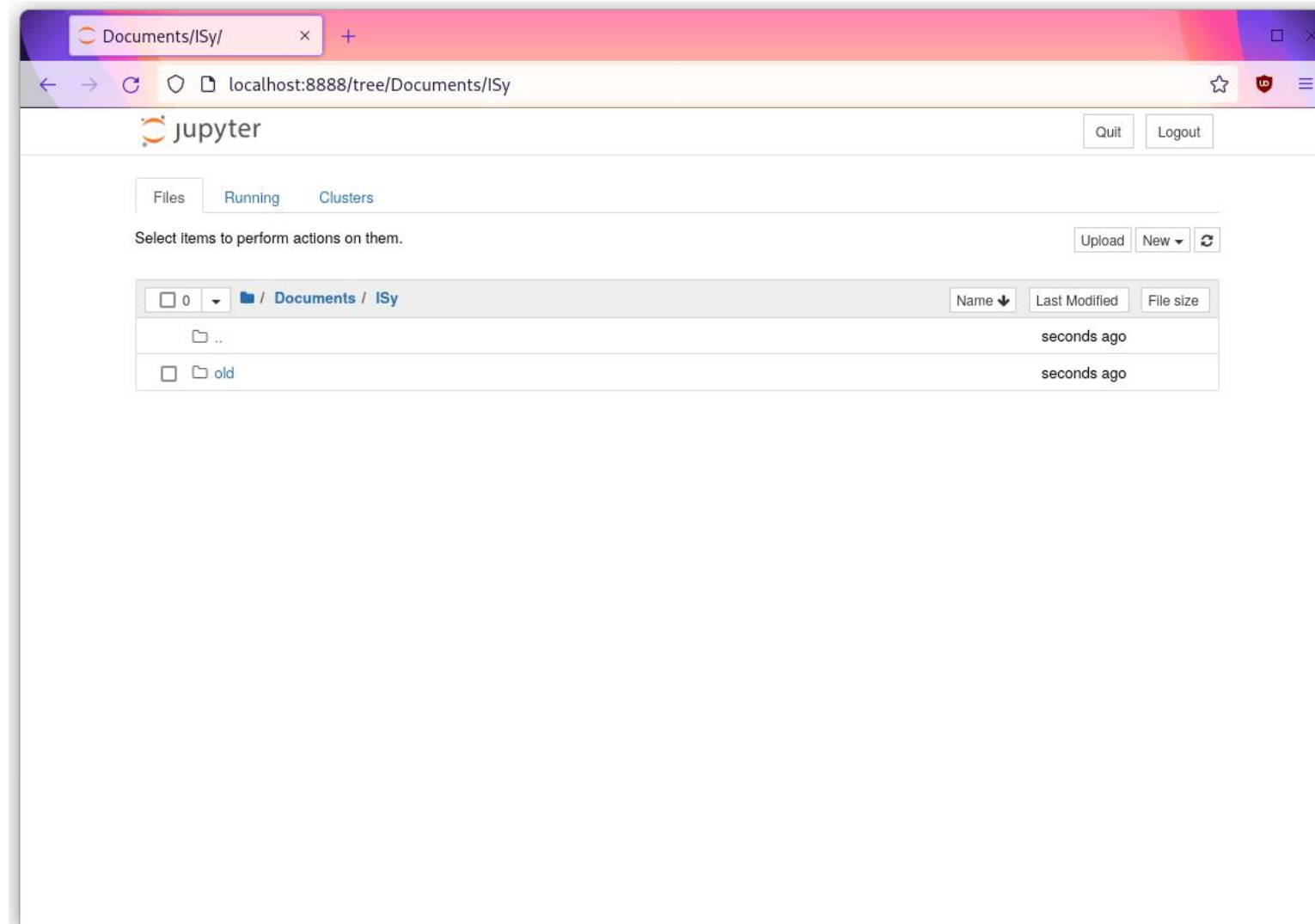
```

Auswählen Jupyter Notebook

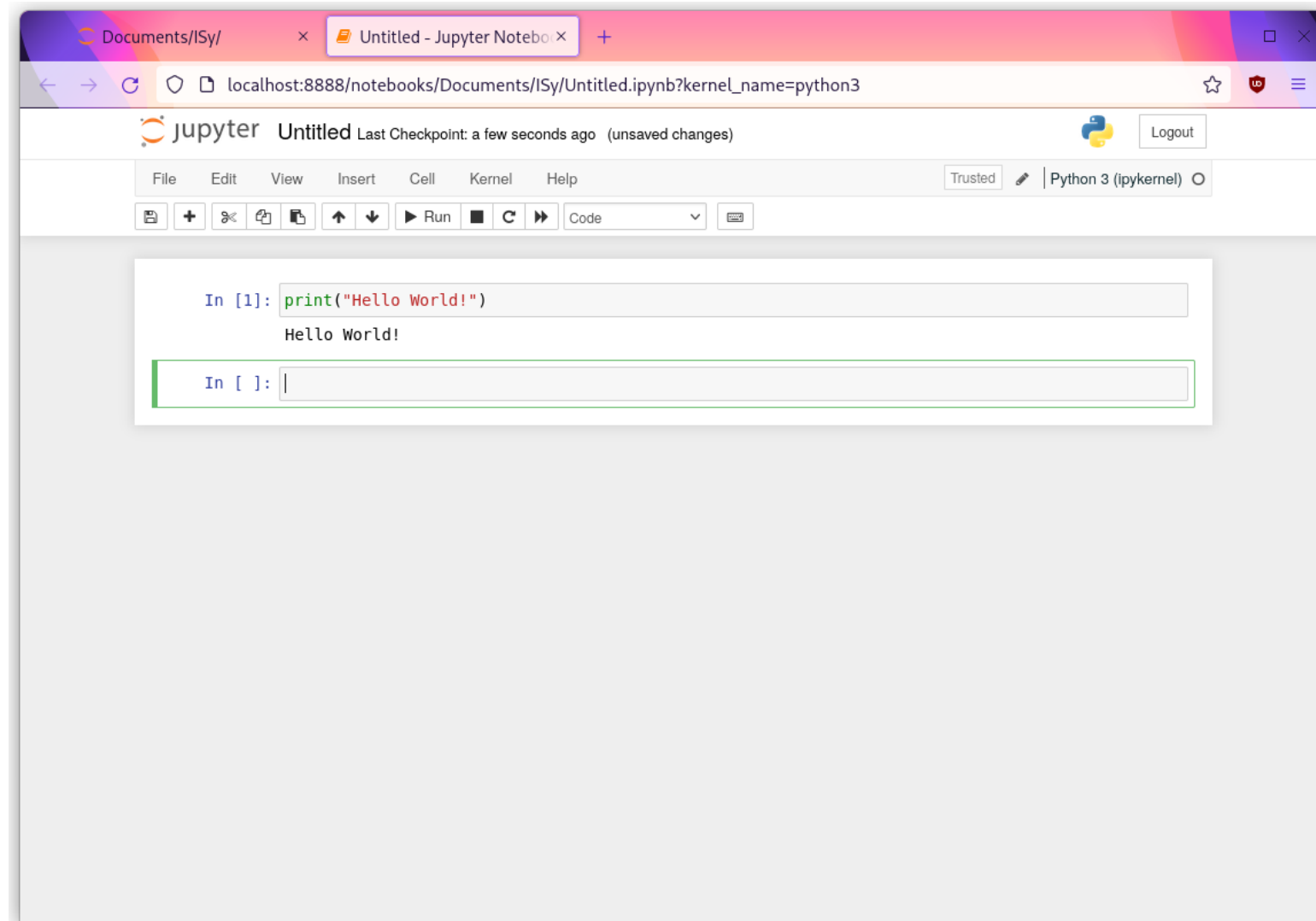
[I 14:06:45.713 NotebookApp] [nb_conda_kernels] enabled, 4 kernels found
[I 14:06:45.713 NotebookApp] Writing notebook server cookie secret to C:\Users\tim\AppData\Roaming\jupyter\runtime\notebook_cookie_secret
[I 14:06:46.665 NotebookApp] [nb_anacondacloud] enabled
[I 14:06:46.681 NotebookApp] [nb_conda] enabled
[I 14:06:46.744 NotebookApp] \u2713 nbpresent HTML export ENABLED
[W 14:06:46.744 NotebookApp] \u2717 nbpresent PDF export DISABLED: No module named 'nbbrowserpdf'
[I 14:06:46.978 NotebookApp] Serving notebooks from local directory: C:\Users\tim
[I 14:06:46.978 NotebookApp] 0 active kernels
[I 14:06:46.978 NotebookApp] The Jupyter Notebook is running at: http://localhost:8888/?token=0964e99c762f005458435a5c3021776130229731e18d4e3c
[I 14:06:46.978 NotebookApp] Use Control-C to stop this server and shut down all kernels (twice to skip confirmation).
[C 14:06:46.993 NotebookApp]

Copy/paste this URL into your browser when you connect for the first time,
to login with a token:
http://localhost:8888/?token=0964e99c762f005458435a5c3021776130229731e18d4e3c
[I 14:06:47.165 NotebookApp] Accepting one-time-token-authenticated connection from ::1
  
```

Jupyter Notebook



Jupyter Notebook



Tutorial: Pandas, Seaborn, Numpy

- <http://pandas.pydata.org/pandas-docs/stable/>
- <https://seaborn.pydata.org/examples/index.html>
- <https://www.numpy.org/devdocs/>

NÄCHSTES ASSIGNMENT

Assignment 01

- Durchführen vom *Reaction Time Experiment* an Ihnen selbst
- Auswertung und Plotten der Messdaten via Python
- Teilen der Messwerte (anonym) in gemeinsames Google Spreadsheet
 - Nächste Woche: Arbeiten mit gemeinsam erfassten Messwerten

Assignment 01

- Abgabe bis Montag, 08.04., 23:59 Uhr
via <https://assignments.hci.uni-hannover.de/>
- Abgabe besteht aus folgendem:
 - Eintragen der Daten in das Online Spreadsheet
 - Abgabe der aufgenommenen sowie angepassten CSV-Dateien
 - Abgabe der Jupyter Notebook Dateien für die einzelnen Aufgaben

Ab kommender Woche

- Interaktive Übungen während Hörsaalübung
 - Durchführung/Auswertung von Experimenten
 - Vertiefung von Konzepten durch Beispiele
 - Lösen und Vorstellen von kleineren Aufgaben
- Hilfreich für Bearbeitung der Assignments

- Bestenfalls Laptop mit eingerichteter Entwicklungsumgebung mitnehmen