

Ghislain Fourny

# Big Data For Engineers Exercises

## 0. Introduction (Azure, Jupyter, Moodle)



# Exercise Format

Week Nr. X

- Lecture on X on Tuesday
- Exercises on Wednesday & Friday
  - Introduce exercise sheet for X-1
    - Get started with new technology
    - Discuss tips for exercises
  - Discuss solution of exercise sheet for X-2
- At home
  - Solve the rest of exercises for X-1
  - Read up on topics for X

## Graded exercises

- Up to 0.25 improvement of the exam grade
- Roughly 2 bonus questions à 0.01 per week
- Answer them on moodle
- Published at the same time as exercise sheets
- Deadline on Tuesday night one week later

# Plan for this week:

## Get Started with Azure, Jupyter, and Moodle

Moodle (for graded exercises):

<https://moodle-app2.let.ethz.ch/enrol/index.php?id=12414>

Online class room on Azure (with cloud credit):

- Enroll under <https://aka.ms/JoinEdu>, enter the code from moodle
- Access the course under <https://aka.ms/startedu>

Microsoft's notebook server:

<https://notebooks.azure.com/>

## Try to do it alone, come to the exercise for help

There will be one slot on Friday (check web site)

# Online class room on Azure

The screenshot shows the Moodle LMS interface for the course "252-3900-00L Big Data for Engineers FS2019". The sidebar on the left contains navigation links: Participants, Grades, Sections, Activities, Dashboard, Site home, My courses, Didaktische Ausbildung für Hilfsassistenten des Departements Informatik als Übungsleiter, 263-3010-00L Big Data HS2018, 252-3900-00L Big Data for Engineers FS2019, and Add a block. The main content area displays "Week 0: Setting up accounts" with a quiz titled "Get familiar with the Moodle quizzes system". A red arrow points from a text box to the quiz title.

252-3900-00L Big Data for Engineers FS2019

Dashboard / My courses / 252-3900-00L Big Data for Engineers FS2019 / Sections / General / Week 0: Setting up accounts

Week 0: Setting up accounts

Get familiar with the Moodle quizzes system. This quiz does NOT provide any bonus point.

Attempts allowed: 1

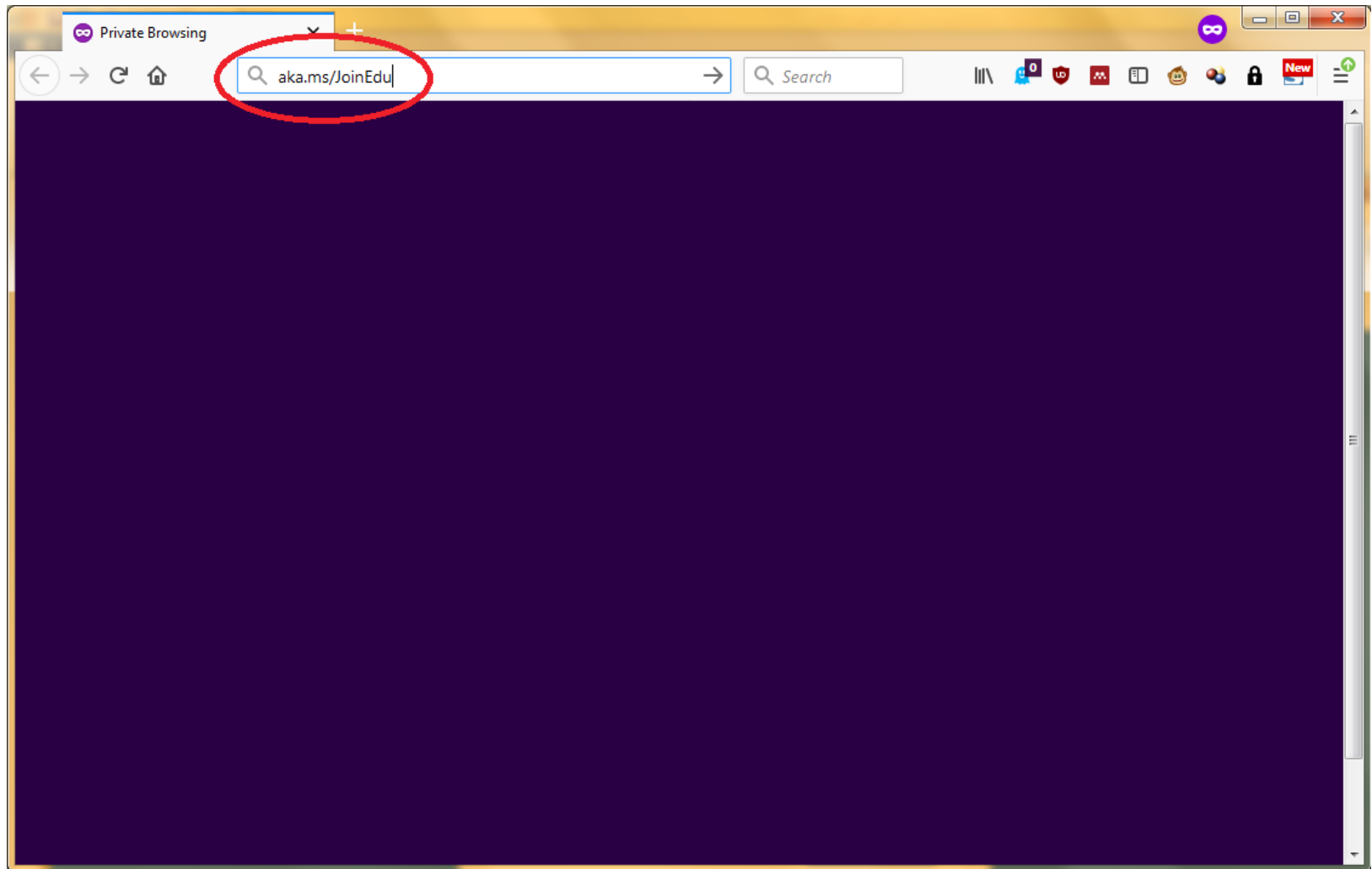
The quiz will not be available until Monday, 25 February 2019, 7:01 PM

This quiz will close at Tuesday, 5 March 2019, 7:01 PM

Exercise 1

Take the first test to get familiar with moodle.

# Online class room on Azure





# Online class room on Azure

The screenshot shows the Microsoft Azure login page in a web browser. The browser's address bar displays `https://login.microsoftonline.com/comm`. A cookie notice is visible at the top. The main content area has a blue background with the text "Microsoft Azure" and a white sign-in box. Inside the box, the Microsoft logo is followed by "Sign in to continue to Microsoft Azure". Below this is a text input field labeled "Email, phone, or Skype", which is circled in red. Underneath the input field are links for "Can't access your account?" and "No account? Create one!". A blue "Next" button is at the bottom right of the sign-in box, also circled in red. Three red speech bubble annotations are present: one pointing to the input field with the text "Use any Microsoft account you may already have.", one pointing to the "Create one!" link with the text "Create an account if you do not have one.", and one pointing to the footer with the text "ETH e-mail addresses do not seem to work. Use any other address or create one.".

Sign in to Microsoft Azure

<https://login.microsoftonline.com/comm>

This site uses cookies for analytics, personalized content and ads. By continuing to browse this site, you agree to this use. [Learn more](#)

Microsoft Azure

Microsoft

Sign in  
to continue to Microsoft Azure

Email, phone, or Skype

[Can't access your account?](#)

No account? [Create one!](#)

Next

Use any Microsoft account you may already have.

Create an account if you do not have one.

ETH e-mail addresses do not seem to work.  
Use any other address or create one.

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# Online class room on Azure

Join course - Microsoft / X

https://portal.azure.com

Microsoft Azure Search resources, services, and docs (G+)

Home > Join course

**Join course**  
Education

Welcome [redacted]@outlook.com!

Please enter your conference code to continue

[Join](#)

Find the code on moodle



# Online class room on Azure

Education - Overview - X

https://portal.azure.com/#blade/Microsoft\_Azure\_Education/Ed

Search resources, services, and docs (G+)

Home > Join course > Education - Overview

## Education - Overview

- Overview
- Get started
- Learning resources
  - Courses
  - Software
  - Learning
  - Templates
- Need help?
  - Student FAQ

Hello, [redacted]@outlook.com

### Course summary

|         |      |
|---------|------|
| Courses | Labs |
| 1       | 1    |

### Azure credits

Students are eligible for \$100 credit from Azure for Students. [Claim your free credit](#)

### Action needed

**Lab invite: Lab 1**

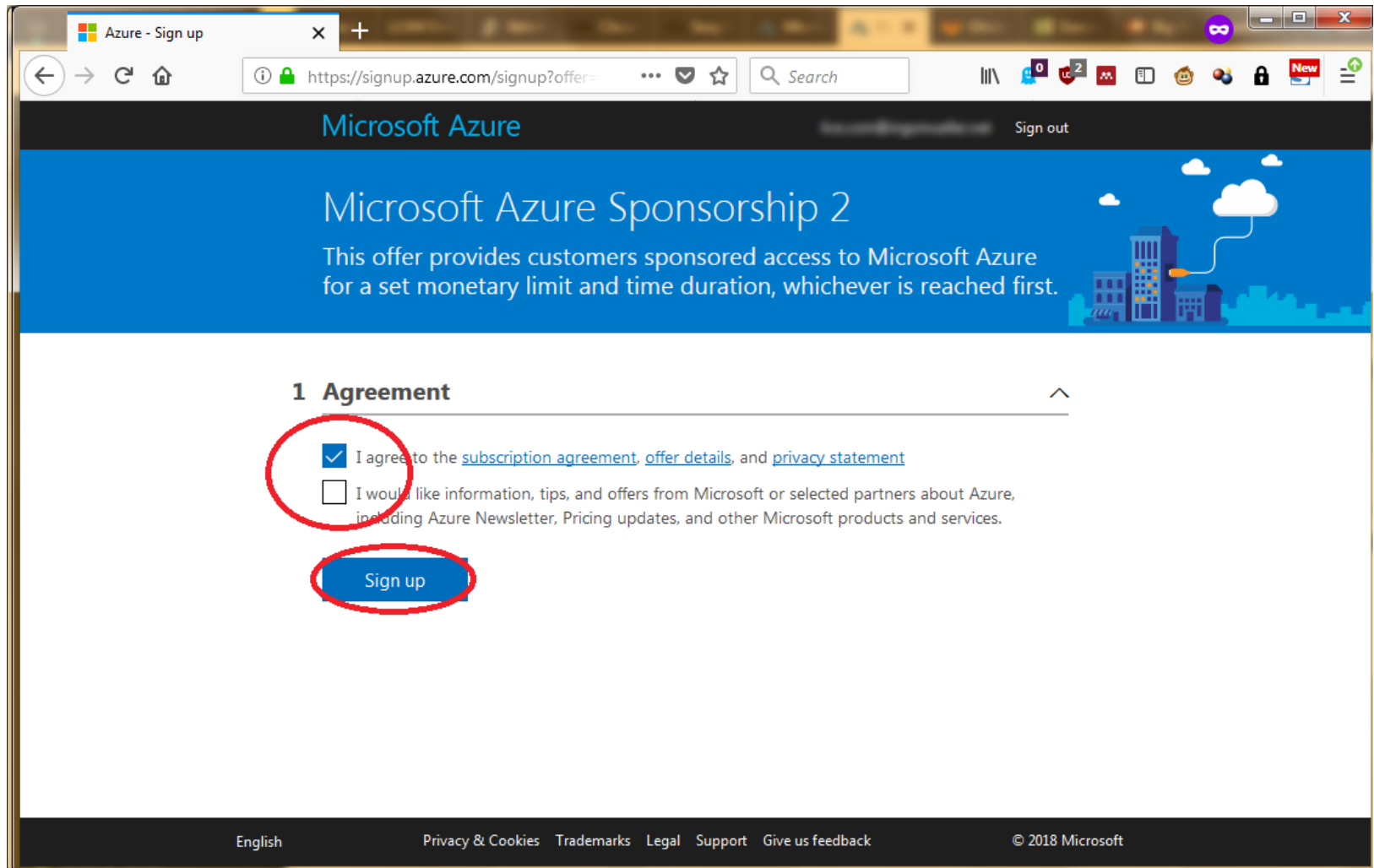
|            |                                      |
|------------|--------------------------------------|
| Course     | Big Data for Engineers - Spring 2020 |
| Instructor | admin@ethbigdata2017.onmicrosoft.com |
| Credit     | \$2                                  |

Subscription with \$2.00 in Azure credits included (expires Jun 29, 2020)

[Setup lab](#)

Download free software [See all software](#)

# Online class room on Azure



Azure - Sign up

https://signup.azure.com/signup?offer=

Microsoft Azure

Sign out

## Microsoft Azure Sponsorship 2

This offer provides customers sponsored access to Microsoft Azure for a set monetary limit and time duration, whichever is reached first.

### 1 Agreement

- ☒ I agree to the [subscription agreement](#), [offer details](#), and [privacy statement](#)
- ☐ I would like information, tips, and offers from Microsoft or selected partners about Azure, including Azure Newsletter, Pricing updates, and other Microsoft products and services.

Sign up

English Privacy & Cookies Trademarks Legal Support Give us feedback © 2018 Microsoft

# Online class room on Azure

Education - Overview - Overview

Home > Education - Overview

## Education - Overview

Overview

- Get started
- Learning resources
  - Courses
  - Software
  - Learning
  - Templates
- Need help?
  - Student FAQ

Hello, [REDACTED]

### Course summary

Courses 1 Labs 1

### Azure credits

Students are eligible for \$100 credit from Azure for Students. [Claim your free credit](#)

### Action needed

| Lab invite: Lab 1   |                                      |
|---|--------------------------------------|
| Course  | Big Data for Engineers - Spring 2020 |
| Instructor  | admin@ethbigdata2017.onmicrosoft.com |
| Credit  | \$2                                  |
| Subscription with \$2.00 in Azure credits included (expires Jun 30, 2020) |                                      |
| ✓ Lab setup completed successfully <a href="#">Go to lab</a>              |                                      |

# Online class room on Azure

The screenshot shows the Microsoft Azure portal interface for a lab titled "Big Data for Engineers - Spring 2020 - Lab 1". The browser address bar shows the URL: [https://portal.azure.com/#blade/Microsoft\\_Azure\\_Education/Ed](https://portal.azure.com/#blade/Microsoft_Azure_Education/Ed). The page header includes the Microsoft Azure logo and a search bar. The breadcrumb navigation shows: Home > Education - Overview > Big Data for Engineers - Spring 2020 - Lab 1.

The lab details are as follows:

| Students | Administrators | Project groups | Consumed   | Due date     |
|----------|----------------|----------------|------------|--------------|
| 1        | 0              | 0              | \$0.00 USD | JUN 29, 2020 |

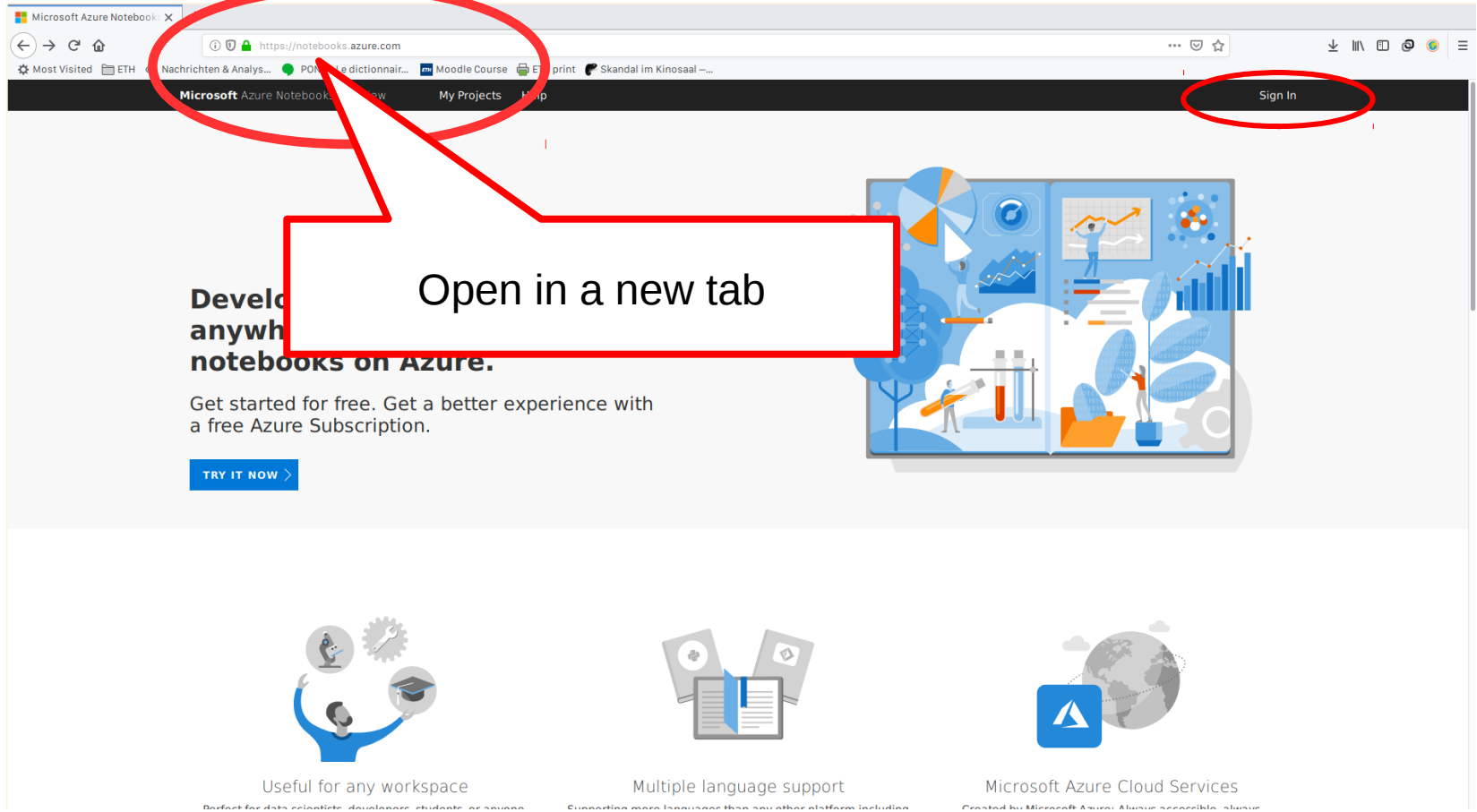
The page contains two main sections for editing the lab:

- Description:** A text area with the placeholder "Add a description for this lab by clicking the change link at the top of this widget".
- Instructions:** A text area with the placeholder "Add detailed instructions for this Lab by clicking the change link at the top of this widget".

The right sidebar shows the lab's resources and status:

- Resources:** A green checkmark and the word "Done" indicate that resources are provisioned.
- Lab 1:** A yellow key icon and the email address "@outlook.com" are displayed.
- Status:** A green checkmark and the word "Active" indicate the lab's status.
- Expires on:** The date "JUN 29, 2020" is shown.
- Usage:** A progress bar shows "0 out of \$2.00 used".
- Users:** A list of users is shown, including "@out... Student".

# Jupyter notebooks



The screenshot shows the Microsoft Azure Notebooks website. A red circle highlights the browser's address bar, which contains the URL `https://notebooks.azure.com`. Another red circle highlights the 'Sign In' button in the top right corner of the page. A red callout box with the text 'Open in a new tab' points to the address bar. The main content area features the heading 'Develop anywhere. Jupyter notebooks on Azure.' and a 'TRY IT NOW >' button. Below this, there are three icons representing different use cases: 'Useful for any workspace', 'Multiple language support', and 'Microsoft Azure Cloud Services'.

Microsoft Azure Notebooks

https://notebooks.azure.com

Sign In

Develop anywhere. Jupyter notebooks on Azure.

Get started for free. Get a better experience with a free Azure Subscription.

TRY IT NOW >

Useful for any workspace

Multiple language support

Microsoft Azure Cloud Services

# Jupyter notebooks

The screenshot shows the Microsoft Azure Notebooks interface for a user named 'emilientestuser'. The browser address bar shows the URL 'https://notebooks.azure.com/emilientestuser'. The page has a dark navigation bar with 'Microsoft Azure Notebooks', 'Preview', 'My Projects', and 'Help'. The user's name 'emilientestuser' is in the top right corner. Below the navigation bar, the page is divided into sections. The 'My Profile' section has a blue button 'Edit Profile Information'. The 'My Projects' section shows a message: 'You have no projects. Would you like to create one now?' with a red circle around the text and a link 'create one now?'. The 'My Starred Projects' section shows: 'You have no starred projects. To add starred projects, click the star button on any project card or page.' The footer contains three columns of links: 'Product' (What's new, Status, Help), 'Communication' (FAQ, Contact us, Jupyter.org), and 'Legal' (Privacy and cookies, Terms of use, Trademarks). The copyright notice '© 2019 Microsoft' is at the bottom left.

emilientestuser - Microsoft X +

https://notebooks.azure.com/emilientestuser

Most Visited: ETH, Nachrichten & Analys..., PONS - Le dictionnair..., Moodle Course, ETH print, Skandal im Kinosaal ~...

Microsoft Azure Notebooks Preview My Projects Help emilientestuser

Users > emilientestuser

My Profile [Edit Profile Information](#)

My Projects

**You have no projects.**  
Would you like to [create one now?](#)

My Starred Projects

**You have no starred projects.**  
To add starred projects, click the star button on any project card or page.

emilientestuser [Complete your profile](#)

**Product**

- What's new
- Status
- Help

**Communication**

- FAQ
- Contact us
- Jupyter.org

**Legal**

- Privacy and cookies
- Terms of use
- Trademarks

© 2019 Microsoft

emilientestuser - Microsoft X

https://notebooks.azure.com/emilientestuser


Most Visited ETH Nachrichten & Analys... PONS - Le dictionnair... Moodle Course ETH print Skandal im Kinosaal

Microsoft Azure Notebooks Preview My Projects Help emilientestuser

Users > emilientestuser

## My Profile

[Edit Profile Information](#)



emilientestuser

[Complete your profile](#)

## My Projects

**You have no projects.**  
Would you like to [create one now?](#)

## My Starred Projects

### Create New Project

You can create a blank project where your notebooks and files will be placed

**Project Name**

BigData

**Project ID**

emilientestuser/projects/ bigdata

☒ Public

☒ Initialize this project with a README

[Create](#) [Cancel](#)

Product

What's new

Status

Help

© 2019 Microsoft

Computer Charging (97%, 9 minutes)



# Jupyter notebooks

The screenshot shows the Microsoft Azure Notebooks web interface. The browser address bar displays `https://notebooks.azure.com/emilientestuser/projects/bigdata`. The page header includes the Microsoft Azure Notebooks logo and navigation links for 'Preview', 'My Projects', and 'Help'. The user's name 'emilientestuser' is visible in the top right corner.

The main content area is titled 'BigData' and shows the project status as 'Stopped'. It includes buttons for 'Clone', 'Star', 'Project Settings', 'Download Project', and 'Share'. A red circle highlights the 'New' button, which is used to create new notebooks or files. Below this, there is a search bar and a table of files.

| Name      | File Type | Modified On  | Created On |
|-----------|-----------|--------------|------------|
| README.md | Markdown  | Feb 23, 2019 |            |

The footer contains links for 'Product', 'Communication', and 'Legal', along with the copyright notice '© 2019 Microsoft'.

# Jupyter notebooks

The screenshot shows the Microsoft Azure Notebooks web interface. A modal dialog titled "Upload files from computer" is open in the center. The dialog contains the text "Choose files from your computer. There can be more than one file at a time. Maximum size of one file is 10 mb." Below this is a dashed box with the text "Drag files here or" and a blue "Choose files" button. At the bottom of the dialog, a file named "Exercise00\_Jupyter\_Basics\_SQL\_Example.ipynb" is listed with a close button (X). The "Upload" button at the bottom right of the dialog is circled in red. The background interface shows the "BigData" project, a "Status: Stopped" indicator, and a "Run on Free C..." button. The footer contains links for Product, Communication, and Legal.

bigdata (emilientestuser) - x

https://notebooks.azure.com/emilientestuser/projects/bigdata

Most Visited ETH Nachrichten & Analys... PONS - Le dictionnair... Moodle Course ETH print Skandal im Kinosaal -...

Microsoft Azure Notebooks Preview My Projects Help emilientestuser

> My Projects > **BigData**

BigData

Status: **Stopped**

Run on Free C...

✓ Name

README.md

Showing 1 file

Clone 0 Star 0

Project Settings Download Project Share

show hidden items Terminal + New Upload

File Type Modified On Created On

Markdown Feb 23, 2019

Exercise00\_Jupyter\_Basics\_SQL\_Example.ipynb

Upload Cancel

**Product**

What's new

Status

Help

© 2019 Microsoft

**Communication**

FAQ

Contact us

Jupyter.org

**Legal**

Privacy and cookies

Terms of use

Trademarks

# Jupyter notebooks

bigdata (emilientestuser) X Exercise00\_Jupyter\_Basic X +

Computer Charging (98%, 7 minutes)

Microsoft Azure Notebooks Preview My Projects Help emilientestuser

Powered by Jupyter Exercise00\_Jupyter\_Basics\_SQL\_Example (autosaved)

File Edit View Insert Cell Kernel Help Not Trusted Python 2

## Big Data For Engineers – Exercises

### Spring 2019 – Week 0 – ETH Zurich

#### 1. Jupyter Basics

Welcome to this Jupyter notebook. Jupyter is a web-based open-source tool based on Python that lets you create and share documents that contain live code, equations, visualizations and explanatory text. We use the notebook server on Microsoft Azure, but you can also install your own. A notebook is a document that contains a series of cells, each containing a code block or a text block.

```
In [ ]: print("Hello World")
```

By default, the last expression is printed. Like this:

```
In [ ]: maxX = 10
[x * x for x in range(maxX)]
```

You can also edit the text. Just double-click on a cell. It's made with markdown code. After you are done editing, press ctrl+enter

We will do about half of the exercises with Jupyter. You will learn most things as we go. The notebook you are seeing is your copy stored on your account (including the output of the cells). Write your answers inline and save regularly. (Also save a copy somewhere else from time to time – this service is still beta.)

**Read more:**

- [Jupyter](#)
- [Learn Python](#)
- [Python documentation](#)

#### 2. Bash Scripts

Code blocks by default are executed using a python interpreter (for a python notebook, such as this one).

If you see „Not Trusted“ here, click on it and change it to trusted

# Jupyter

- Execute cells with ctrl+enter (shift+enter also works)
- Service is in beta phase
  - Might be buggy
  - In cases of problems → kernel and clear output, or close and reopen notebook