




Statistics and Data Science for Engineers E178 / ME276DS

Lab 1: Configuring a programming environment

Note:

- This lab is not graded and attendance is optional.
- Warning: This slide deck is not printer-friendly.

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python™

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```
# Python 3: Simple arithmetic
>>> 1 / 2
0.5
>>> 2 ** 3
8
>>> 17 / 3 # classic division returns a float
5.666666666666667
>>> 17 // 3 # floor division
5
```

[1](#)[2](#)[3](#)[4](#)[5](#)

Intuitive Interpretation

Calculations are simple with Python, and expression syntax is straightforward: the operators `+`, `-`, `*` and `/` work as expected; parentheses `()` can be used for grouping. [More about simple math functions in Python 3.](#)

Python is a programming language that lets you work quickly and integrate systems more effectively. [>>> Learn More](#)

Get Started

Whether you're new to programming or an experienced developer, it's easy to learn and use Python.

[Start with our Beginner's Guide](#)

Download

Python source code and installers are available for download for all versions!

Latest: [Python 3.11.4](#)

Docs

Documentation for Python's standard library, along with tutorials and guides, are available online.

docs.python.org

Jobs

Looking for work or have a Python related position that you're trying to hire for? Our **relaunched community-run job board** is the place to go.

jobs.python.org

<https://www.python.org/>



[Help](#) [Sponsors](#) [Log in](#) [Register](#)

Find, install and publish Python packages with the Python Package Index



Or [browse projects](#)

472,612 projects

4,733,995 releases


8,802,774 files

727,874 users



The Python Package Index (PyPI) is a repository of software for the Python programming language.

PyPI helps you find and install software developed and shared by the Python community. [Learn about installing packages](#) .

Package authors use PyPI to distribute their software. [Learn how to package your Python code for PyPI](#) .

<https://pypi.org/>



NumPy

matplotlib



SciPy

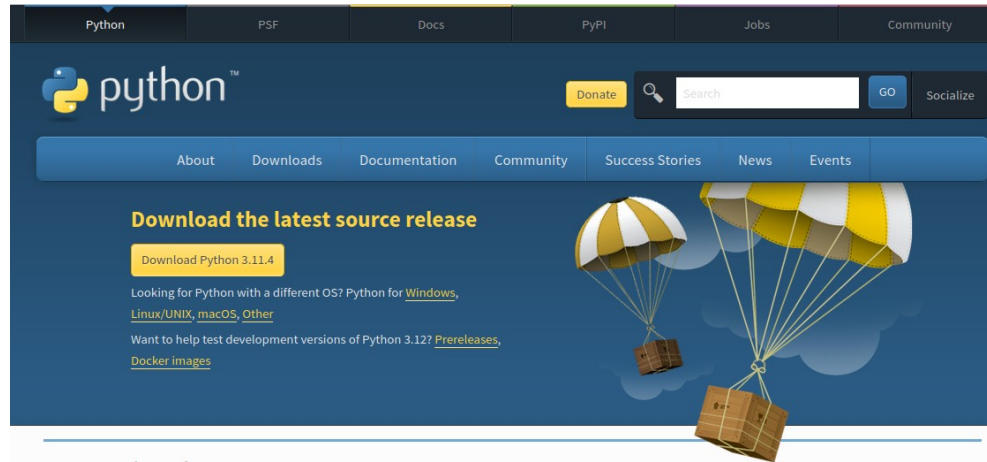


Install or update Python

Check whether you have Python already:

`python3 --version` (in the terminal or command line)

Update it if the version is 3.9 or less.



Your first Python program

```
>> print("Hello, World!")
```

- Execute from the Python interpreter.
- Execute a file from the command line.

Two types of Python files

Raw Python files

- Extension **.py**
- Human editable
- Contain only code

Jupyter notebooks

- Extension **.ipynb**
- Not human editable
- Contains code and state

Integrated Development Environments (IDEs)

Text editors



Simple IDEs



IDLE



Project Jupyter



Jupyter Lab
Jupyter Notebook
Jupyter Hub

Cloud-based IDEs



Google
Colab



GitHub
Codespaces

Advanced IDEs

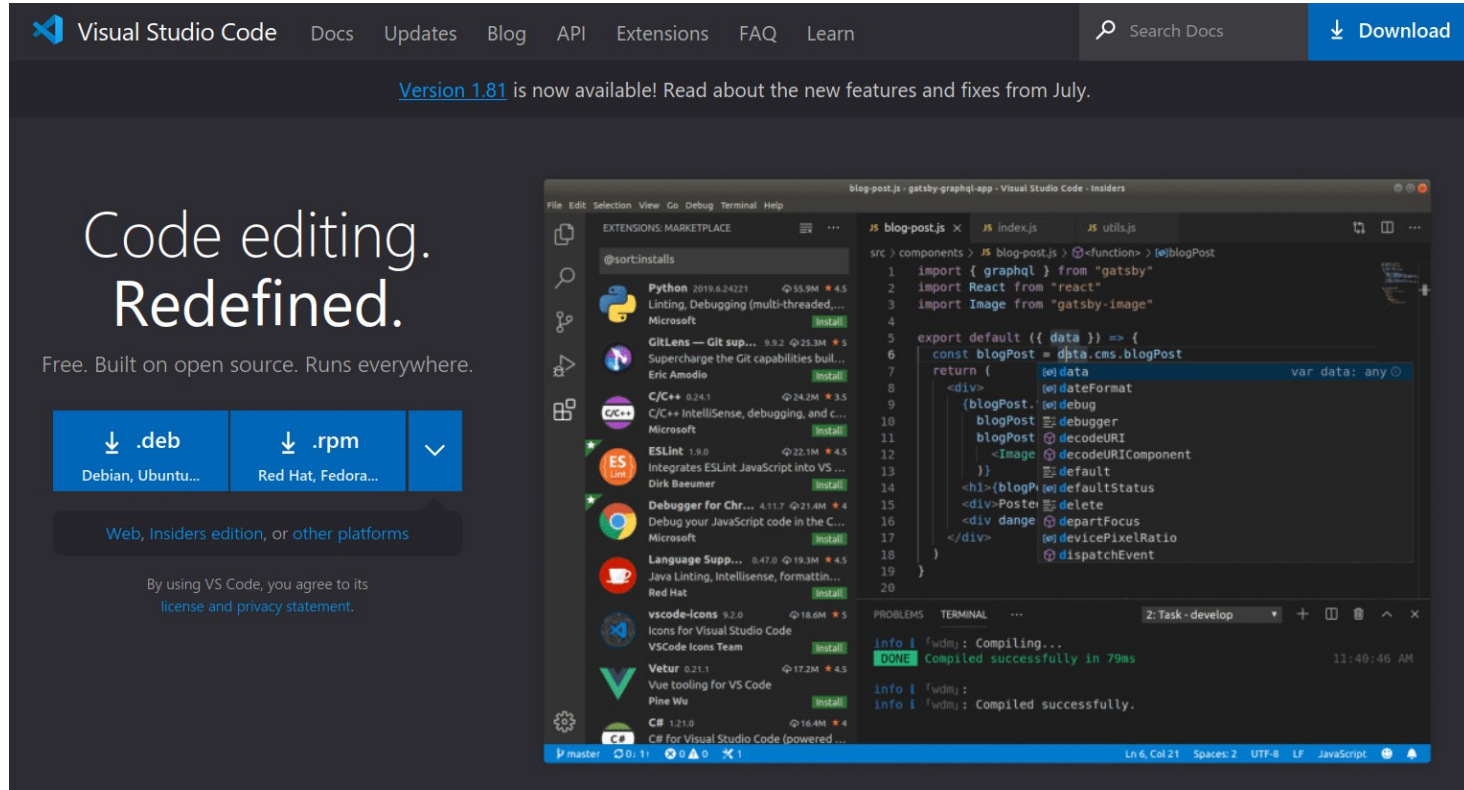


PyCharm



VSCode

Install VSCode



Visual Studio Code Docs Updates Blog API Extensions FAQ Learn

Search Docs Download

Version 1.81 is now available! Read about the new features and fixes from July.

Code editing. Redefined.

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Download .deb (Debian, Ubuntu...) or .rpm (Red Hat, Fedora...)

Web, Insiders edition, or other platforms

By using VS Code, you agree to its [license and privacy statement](#).

The screenshot of the VS Code editor shows the 'EXTENSIONS: MARKETPLACE' sidebar with a list of extensions including Python, GitLens, C/C++, ESLint, Debugger for Chrome, Language Support for Java, and Vetur. The main editor area displays a JavaScript file named 'blog-post.js' with the following code:

```
1 import { graphql } from "gatsby"
2 import React from "react"
3 import Image from "gatsby-image"
4
5 export default ({ data }) => {
6   const blogPost = data.cms.blogPost
7   return (
8     <div>
9       {blogPost} {blogPost} {blogPost}
10      <div>
11        {blogPost} {blogPost} {blogPost}
12      </div>
13    </div>
14  )
15 }
16
17 <div>
18   {blogPost} {blogPost} {blogPost}
19 </div>
20
```

The bottom status bar shows the current file is 'blog-post.js' at line 6, column 21, with 2 spaces, UTF-8 encoding, and LF line endings. The terminal output shows successful compilation of the file.

<https://code.visualstudio.com/>

A) Create the Python environment

A.1) Create a folder on your computer for everything related to this course.

We will refer to that folder as `<sdse>`

A.2) Configure the Python environment

A.2.1) Launch VScode

A.2.2) Open folder: `<sdse>`

A.2.3) Terminal → New Terminal

A.2.4) In the terminal, find your python command using "`which python3`".

If there is no return value, try "`which python`".

If still there is no return value, consult with a GSI.

A) Create the Python environment

A.2.5) Upgrade pip, venv. Type the following two lines into the terminal (use “python” in place of “python3” if that’s what works in step 4).

```
python3 -m pip install --user --upgrade pip
python3 -m pip install --user virtualenv
```

A.2.6) Create the environment. The next line will create the python environment for the class and store it in `<sdse>/sdseenv`. (again use “python” in place of “python3” if that’s what works in the step A.2.4)

```
python3 -m venv sdseenv
```

B) Configure VSCode

- B.1) File → New File → firstfile.py. You can place this file in the `<sdse>` folder or any of its subfolders, but not in the environment folder `<sdse>/sdseenv`.
- B.2) You should get a popup window asking whether you want to install the Python extension (if you do not already have it). Install it.
- B.3) Install Jupyter extensions. Open the command palette, type "Python: Install the Jupyter Extension", press Enter.
- B.4) Select the Python interpreter
 - B.4.1) In the Status Bar, click on "Select Interpreter"
 - B.4.2) Click on "Enter Interpreter Path". Choose `<sdse>/sdseenv/bin/python3`

Configure VSCode

B.6) Add some code to firstfile.py

```
print("Hello, World!")
```

B.6) Click on the run button (sideways triangle) in the upper right-hand corner. You should get "Hello, World!" in the terminal.

B.7) Create a jupyter notebook: File→New File→firstnb.ipynb

B.8) Put `print("Hello, World!")` in the first cell and run it with "Shift-Enter". It will ask you to choose a Python kernel. Select the sdseenv kernel we just created. It may also ask you to install the ipykernel extension. You should do that. After that, you should see "Hello, World" below the cell upon hitting "Shift-Enter".



Welcome x



Visual Studio Code

Editing evolved

Start

- New File...
- Open File...
- Open Folder...
- Clone Git Repository...
- Connect to...

Recent

You have no recent folders, [open a folder](#) to start.

Recommended



GitHub Copilot

Supercharge your coding experience for as little as \$10/month with cutting edge AI code generation.

Walkthroughs



Get Started with VS Code

Discover the best customizations to make VS Code yours.



Learn the Fundamentals



Boost your Productivity

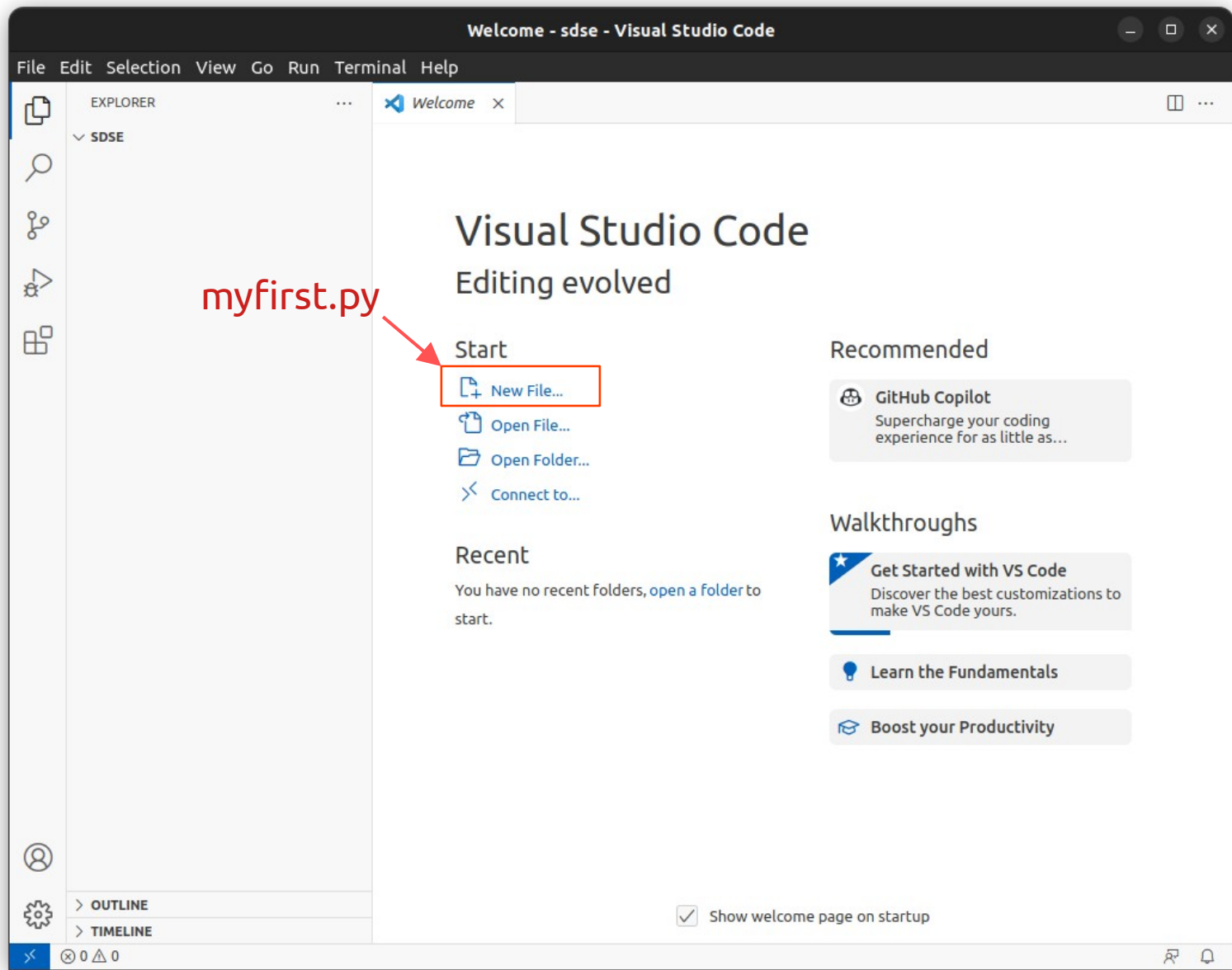


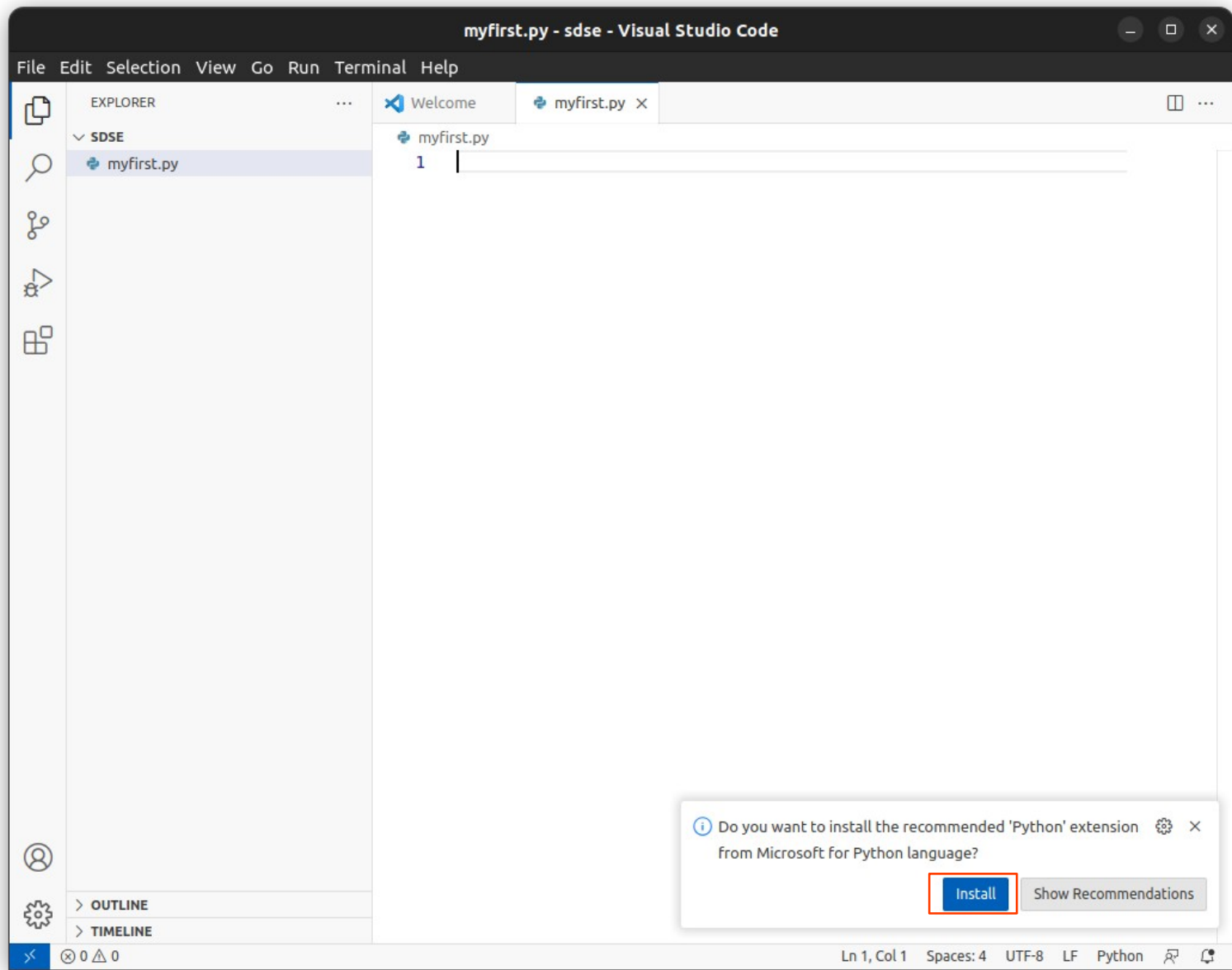
Show welcome page on startup



0 0 0







EXTENSIONS: MARK...    ...


@id:ms-python.python

**Python**IntelliSense (Pylance), Linti...
Microsoft 

102ms


**Python**

v2023.14.0

Microsoft  microsoft.com 95,273,593

★★★★★

IntelliSense (Pylance), Linting, Debugging (multi-threaded, ...)

Disable Uninstall 

Switch to Pre-Release Version



This extension is enabled globally.

DETAILS

FEATURE CONTRIBUTIONS

CHANGELOG

EXTENSION PACK

RUNTIME STATUS

Python extension for Visual Studio Code

A [Visual Studio Code extension](#) with rich support for the [Python language](#) (for all [actively supported versions](#) of the language: ≥ 3.7), including features such as IntelliSense (Pylance), linting, debugging, code navigation, code formatting, refactoring, variable explorer, test explorer, and more!

Support for vscode.dev

The Python extension does offer [some support](#) when running on vscode.dev (which includes github.dev). This includes partial IntelliSense for open files in the editor.

Installed extensions

The Python extension will automatically install the [Pylance](#) extension to give you the best experience when working

Categories

Programming
Languages

Linters

Debuggers

Formatters

Data Science

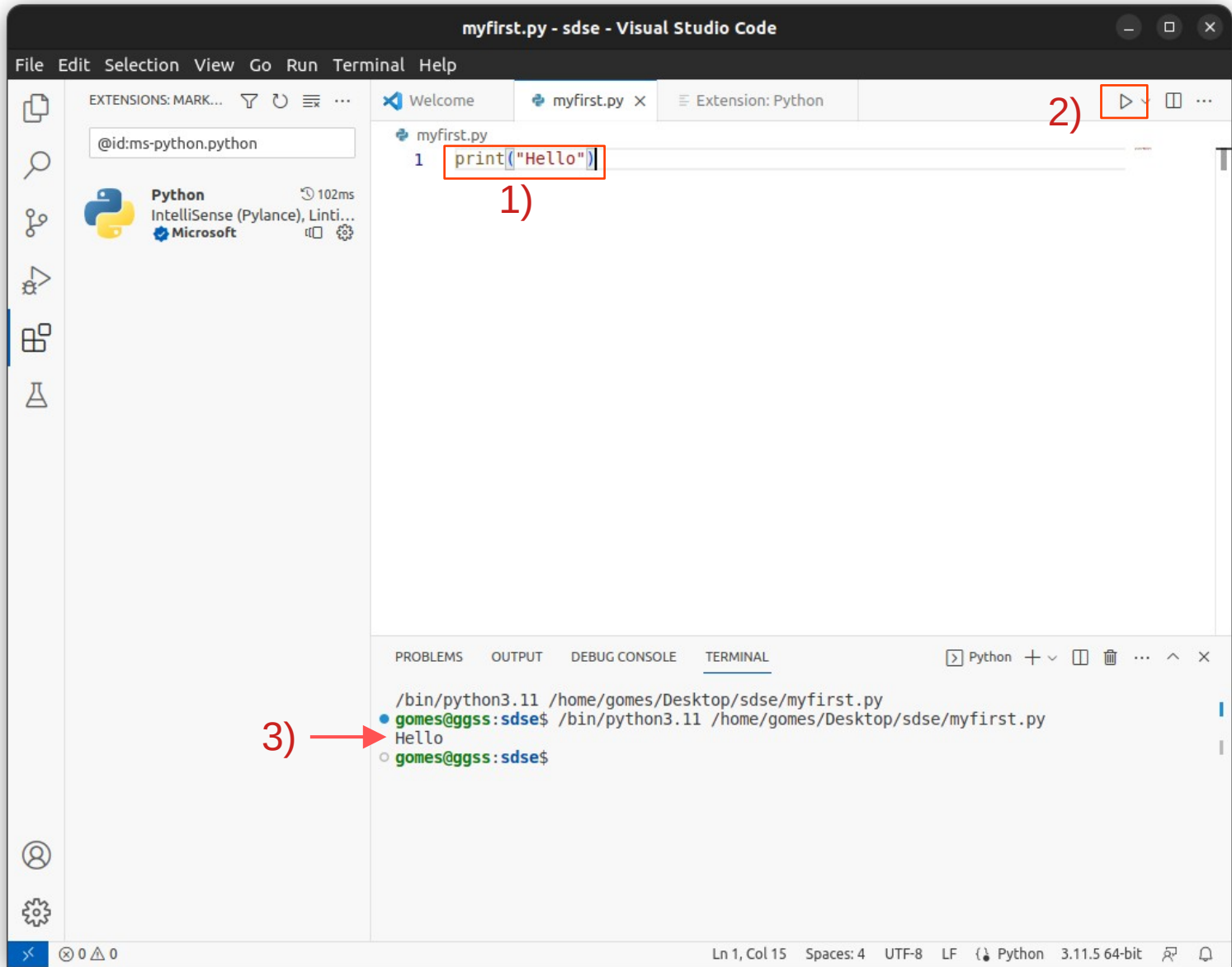
Machine Learning

Extension Resources

[Marketplace
Repository](#)
[License](#)
[Microsoft](#)

More Info

Published 2016-1-19,
07:03:11



File Edit Selection View Go Run Terminal Help

1)

EXTENSIONS: MARKETPLACE

2)

jupyter

Jupyter

Jupyter notebook support, interactive programming and data science

Microsoft

281ms

Jupyter Keymap

Jupyter keymaps for notebooks

Microsoft

5ms

Jupyter Cell Tags

Jupyter Cell Tags support for VS Code

Microsoft

1ms

Jupyter Notebook Renderers

Renderers for Jupyter Notebooks (with plotly, vega, gif, png, ...)

Microsoft

4ms

Jupyter Slide Show

Jupyter Slide Show support for VS Code

Microsoft

798K 3.5

jupyter (deprecated)

Data Science with Jupyter on Visual Studio Code

Don Jayamanne

469K 3.5

VS Code Jupyter Notebook Previewer

An easy to use extension for previewing Jupyter Notebooks ...

jithurjacob

144K 5

Jupyter PowerToys

Experimental features for Jupyter notebook support in VS Co...

Microsoft

99K 1

jupyter-notebook-vscode

Runs jupyter notebooks in vscode

Sam Helms

Welcome x myfirst.py Extension: Jupyter

Get Started with Jupyter Notebooks

Your first steps to set up a Jupyter project with all the powerful tools and features that the Jupyter Extension has to offer!

Create or open a Jupyter Notebook

Right click in the file explorer and create a new file with an .ipynb extension. Or, open the Command Palette and run the command

Create: New Jupyter Notebook.

Create New Jupyter Notebook

PROBLEMS OUTPUT TERMINAL Python + -

```
/bin/python3.11 /home/gomes/Desktop/sdse/myfirst.py
gomes@ggss:sdse$ /bin/python3.11 /home/gomes/Desktop/sdse/m
yfirst.py
Hello
gomes@ggss:sdse$
```

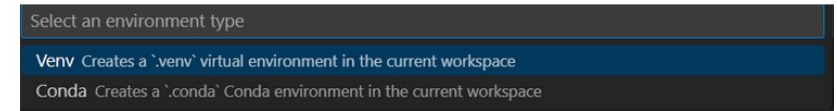
Follow: <https://code.visualstudio.com/docs/python/environments>
"Creating environments"
Create a venv environment
select python 3.10 or above

Creating environments

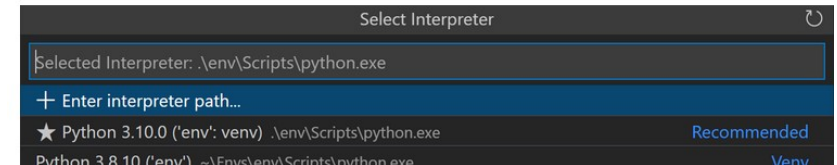
Using the Create Environment command

To create local environments in VS Code using virtual environments or Anaconda, you can follow these steps: open the Command Palette (**Ctrl+Shift+P**), search for the **Python: Create Environment** command, and select it.

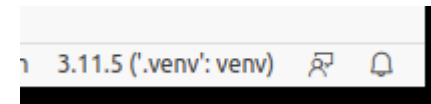
The command presents a list of environment types: **Venv** or **Conda**.



If you are creating an environment using **Venv**, the command presents a list of interpreters that can be used as a base for the new virtual environment.



In the end you should have `(.venv':venv)` in the status bar:



File Edit Selection View Go Run Terminal Help

New File...
Select File Type or Enter File Name...

Text File Built-In

Ctrl + N

File

Python File Python

Jupyter Notebook .ipynb Support

Notebook

1 print("Hello")

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

Python + -

```
/bin/python3.11 /home/gomes/Desktop/sdse/myfirst.py
gomes@ggss:sdse$ /bin/python3.11 /home/gomes/Desktop/sdse/myfirst.py
Hello
gomes@ggss:sdse$
```


File Edit Selection View Go Run Terminal Help

Welcome myfirst.py **Untitled-1.ipynb** Extension: Python

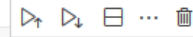
+ Code + Markdown ...

Select Kernel



2)  `print("Hello")`

1)

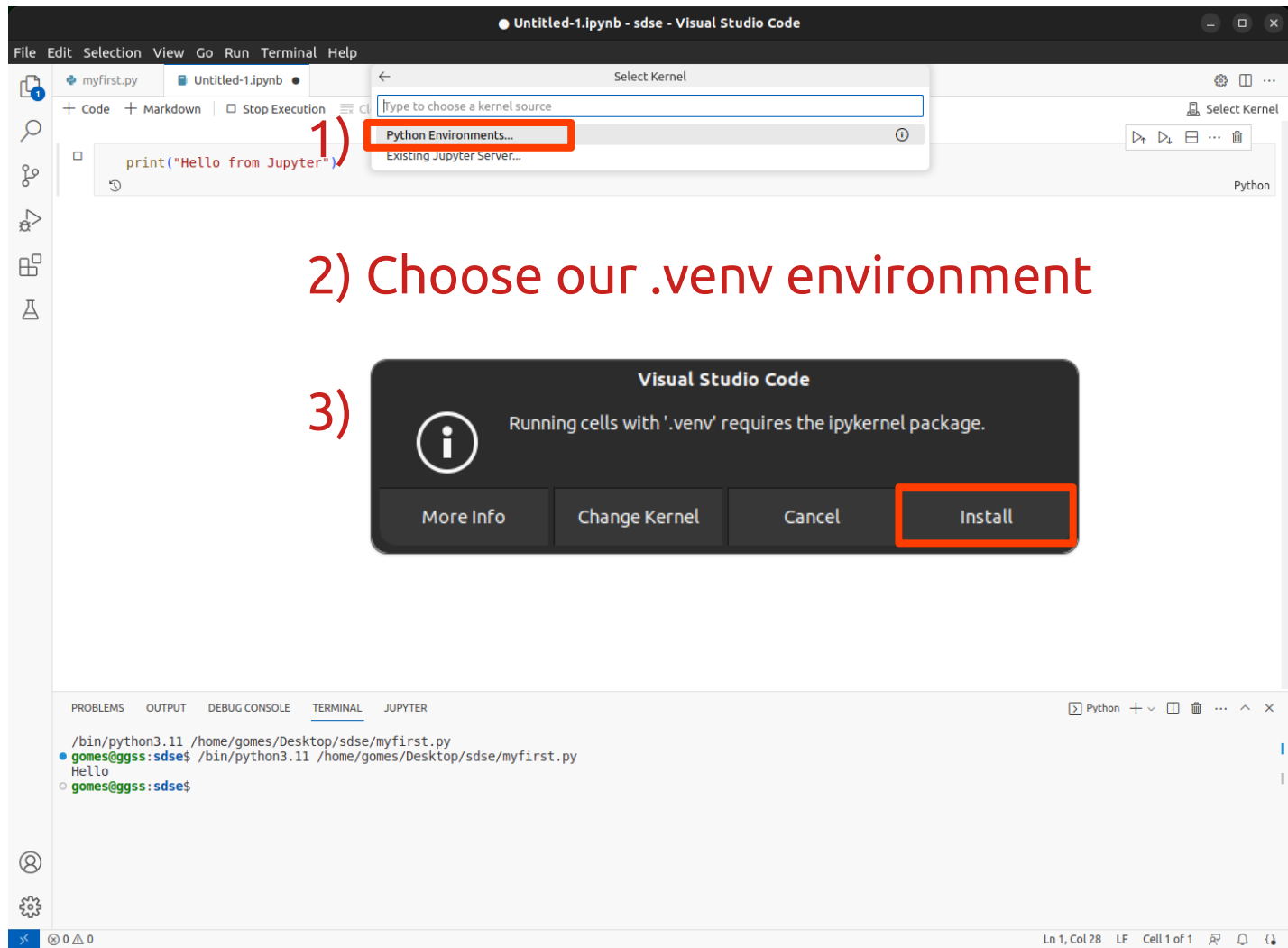


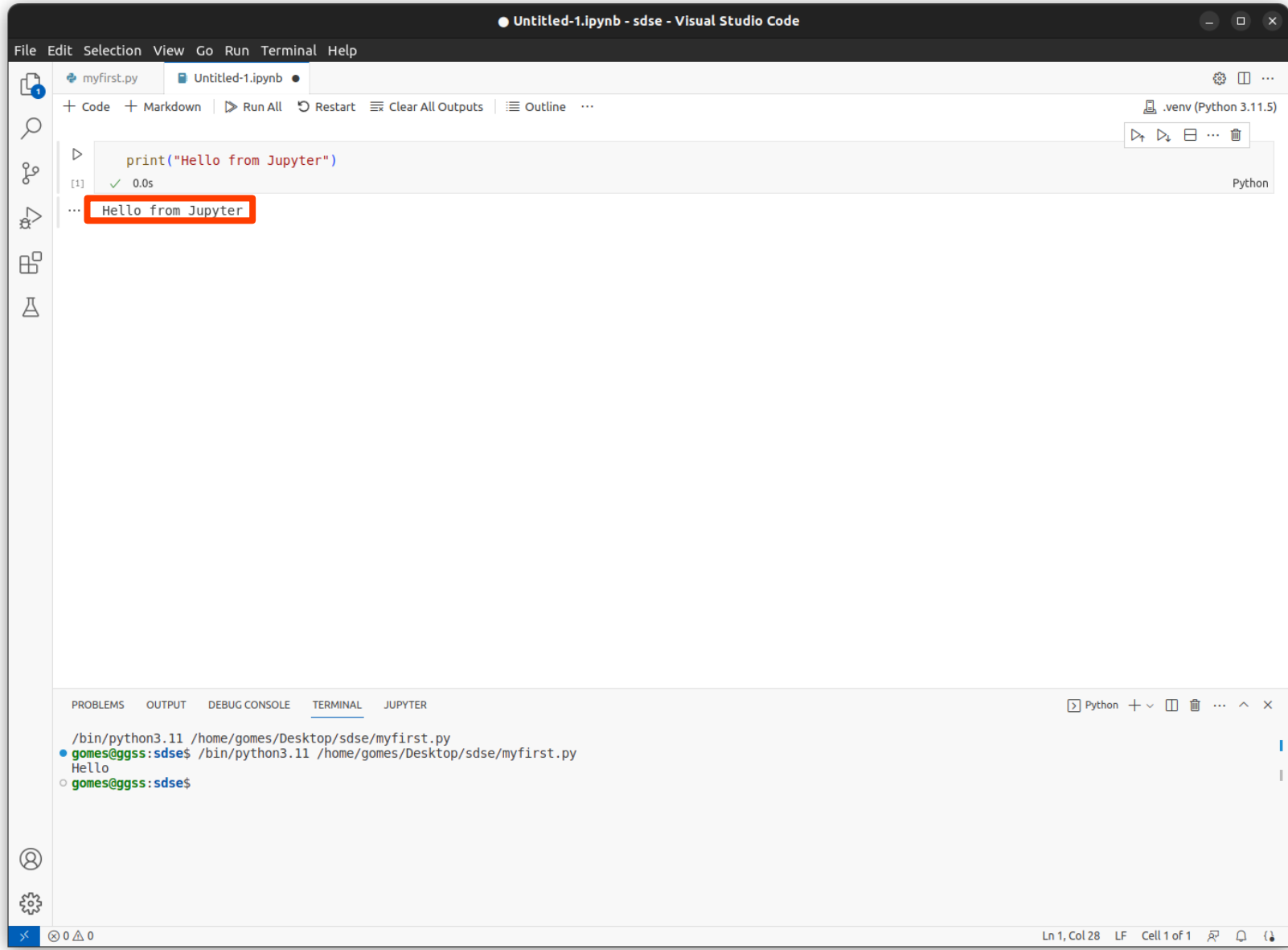
Python

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

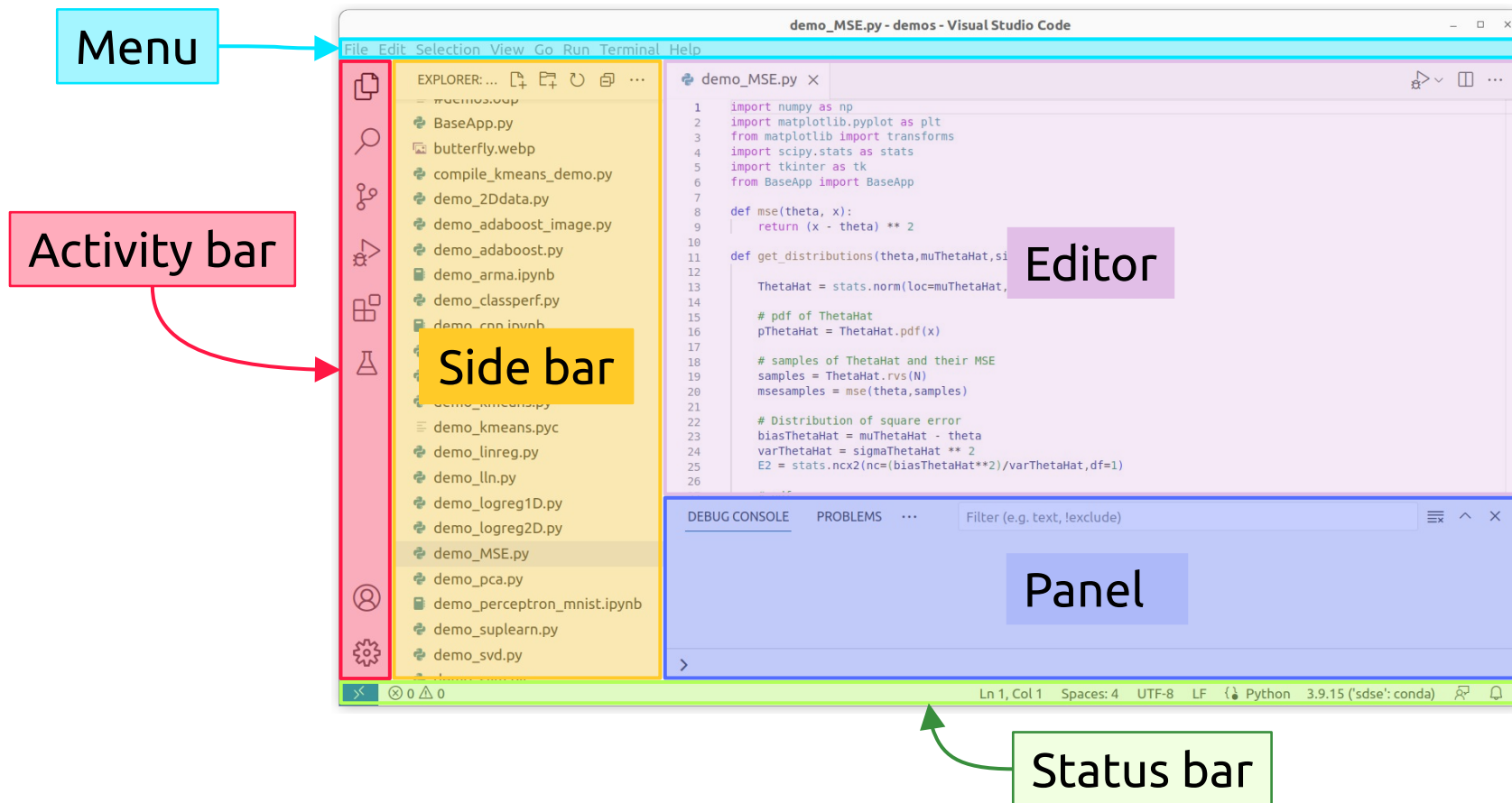
Python + - [] [x] ... ^ x

```
/bin/python3.11 /home/gomes/Desktop/sdse/myfirst.py
• gomes@ggss:sdse$ /bin/python3.11 /home/gomes/Desktop/sdse/myfirst.py
Hello
○ gomes@ggss:sdse$
```





VSCode layout



Useful VSCode keyboard shortcuts

Navigation

Shortcut	Action
Cmd B	Toggle side bar
Cmd J	Toggle panel
F11	Full Screen
Cmd ,	Open settings
Cmd Shift P	Open command palette
F5	Run debugger
Shift Enter	Run in interactive window
Cmd /	Toggle block comment
Cmd Space	Make a coding suggestion

Coding

Note: Cmd is Ctrl in Windows/Linux and ⌘ in Mac.