

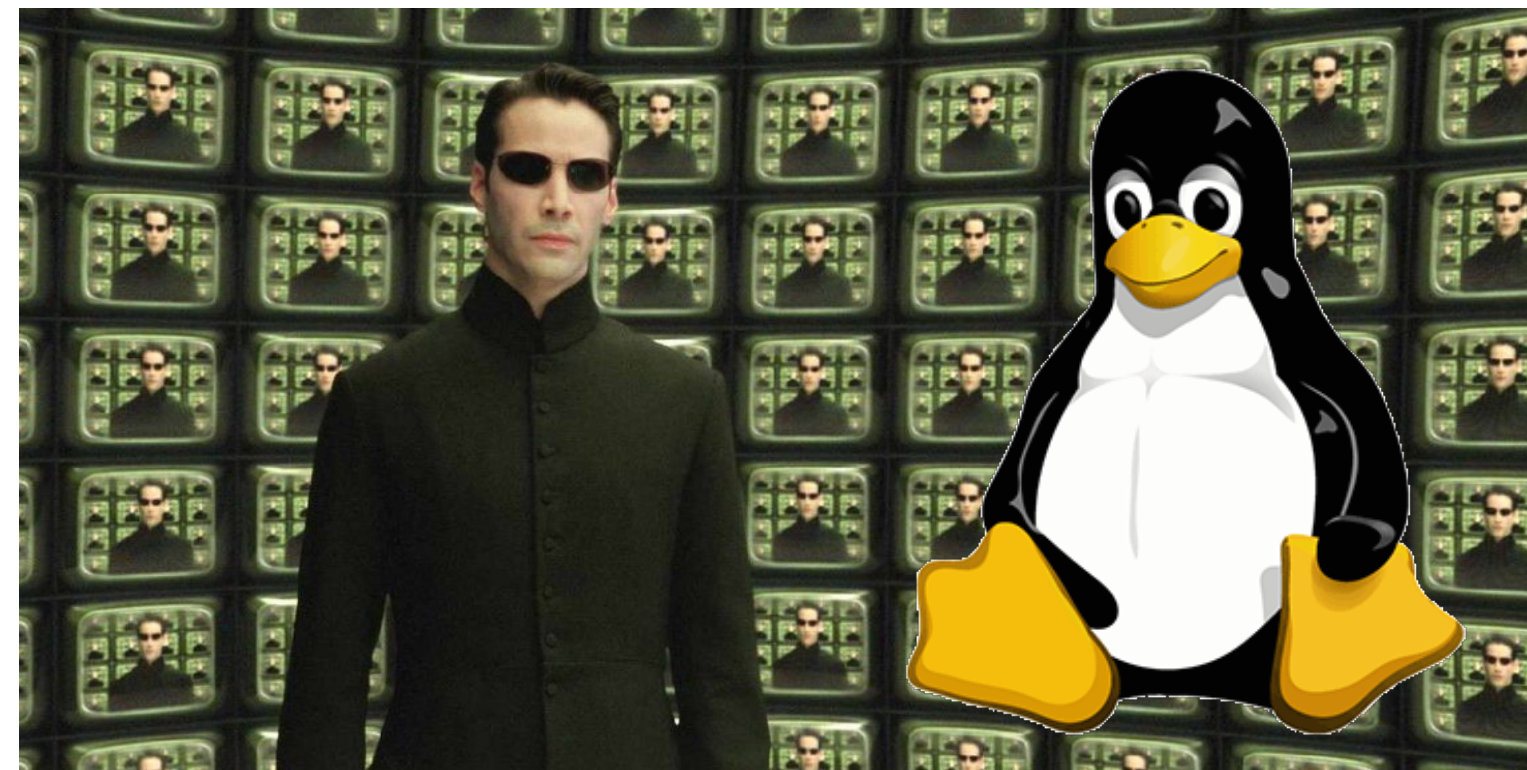


10.09.21 16:22

# CSCI 120

## Introduction to Computer Science and Programming I

### Lecture 0: Introduction to CS



Jetic Gū

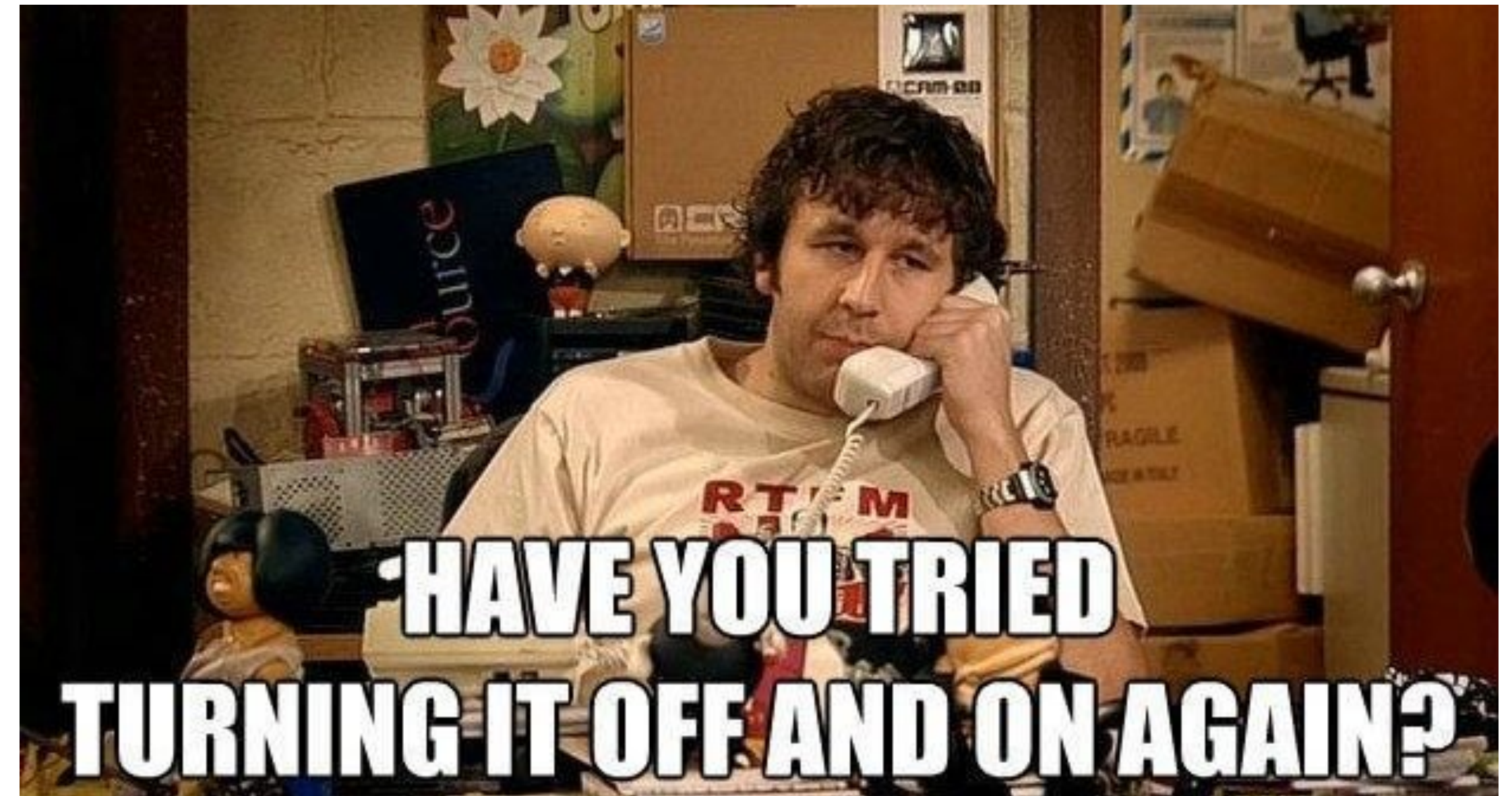
# Overview

- Focus: Introduction to CS
- Architecture: Chat
- Core Ideas:
  1. What is Computer Science? What are the other stuff that you thought were CS?
  2. Roadmap to CS: A Systematic Overview
  3. From Windows to Linux: why is it important?



# What is Computer Science?

- IT: Information Technology
- Computer Engineering
- Software Engineering
- Data Science; Data Analysis
- Artificial Intelligence
- Cloud Computing



# What is Science?

- Discovering the way the physical world works (e.g. Laws of Gravity)
- Scientific
  - Verifiability: a theory can stand field tests
  - Consistency: the same test when repeated gives consistent results
- Empirical
  - Theory are supported by empirical experiment

# What is Engineering?

- Practical knowledge transforming scientific theories into products
- "Without engineers, science is just philosophy."

# Information Technology

- Equivalent to Computer Science
- Anything that has anything to do with information processing using non-human labour (basically, computing machinery)

# Computer Engineering

- Subset of CS/IT
- More about hardware design
- e.g. Embedded system, Networking equipment, Scientific/High-Performance Design, Multimedia hardware chips

# Software Engineering

- Subset of CS/IT
- Vast majority of IT professionals
  - Developing software required by customers/project managers
- Systematic design of complex software systems



# Data Science/Analysis

- Subset mostly Math (Statistics) and CS/IT
- NOT Science: there is no science of data
  - DA is more on the Engineering side
- Use computer as tools, try to statistically analyse the data
  - e.g. How many people visited amazon.ca after Googling the term 'Refrigerator'?
  - e.g. "60% probability of 10% profit increase if we invest 100K on XXX advertising"

# Artificial Intelligence

- Subset of mostly Math (Statistics) and CS/IT
- Pure empirical: we don't have very good theories of why it works
  - or why it doesn't work: lack of verifiability

# Cloud Computing

- Subset of CS/IT
  - Stuff that you used to do on your own computer is now done by Amazon/Google/Microsoft online
  - You just see the results and interact with their servers
  - Engineering: a complicated hardware/software design problem
  - Science: optimisation, optimisation, optimisation

# Roadmap to CS

- You are (or considering) majoring in CS (B.Sc), now what?
- First two years of study: Basic of CS
  - Python, C/C++, Software Engineering Theories, OOP, Logical Circuits and Computer Organisation, algorithms and data structures, etc.
- Last 2 years of B.Sc: Pinpoint your interest, develop in-depth professional skills
  - SE, Cloud, Communications, Hardware, Graphics, AI, Network, Robotics, etc.

# Roadmap to CS

- Columbia College (or first 2 years)
  - CSCI 101: fun
  - CSCI 120, CSCI 125: Python, C/C++. Basic programming skills
  - CSCI 150, CSCI 250, CSCI 295: Computer Hardware. How Computers work
  - CSCI 165: Internet
  - CSCI 225: Data Structure and Programming: algorithms
  - CSCI 237: CS for business students
  - CSCI 275: Basic Software Engineering stuff



# Roadmap to CS

- University (or last 2 years of B.Sc)
- Advanced Algorithms, Operating System. Database System, Advanced Networks

## Artificial Intelligence

Vision  
Language  
Signal  
Machine Learning  
Reasoning

## Computer Graphics

UI Design  
Graphics Engine  
Multimedia  
Animation  
VR

## Computing Systems

Memory  
CPU  
Networks  
Distributed Sys.  
Embedded Sys.

## Information Systems

Cloud Computing  
Database  
Web Applications  
Search Engine  
Data Mining

## Software Engineer

Programming Lang  
Software Testing  
Requirement  
Verification

## Theoretical CS

Cryptography  
Computability  
Complexity  
Security

Concept

**End of Chit-chat**

# Environmental Setup

PyCharm  
Online Judge

# What do you need

- A computer running Windows, macOS, or Linux
- Graphical IDE: PyCharm
  - Easy to use for beginners
- Command line: I recommend Vim
  - Command line is not required, but I will mention it and demonstrate it in class

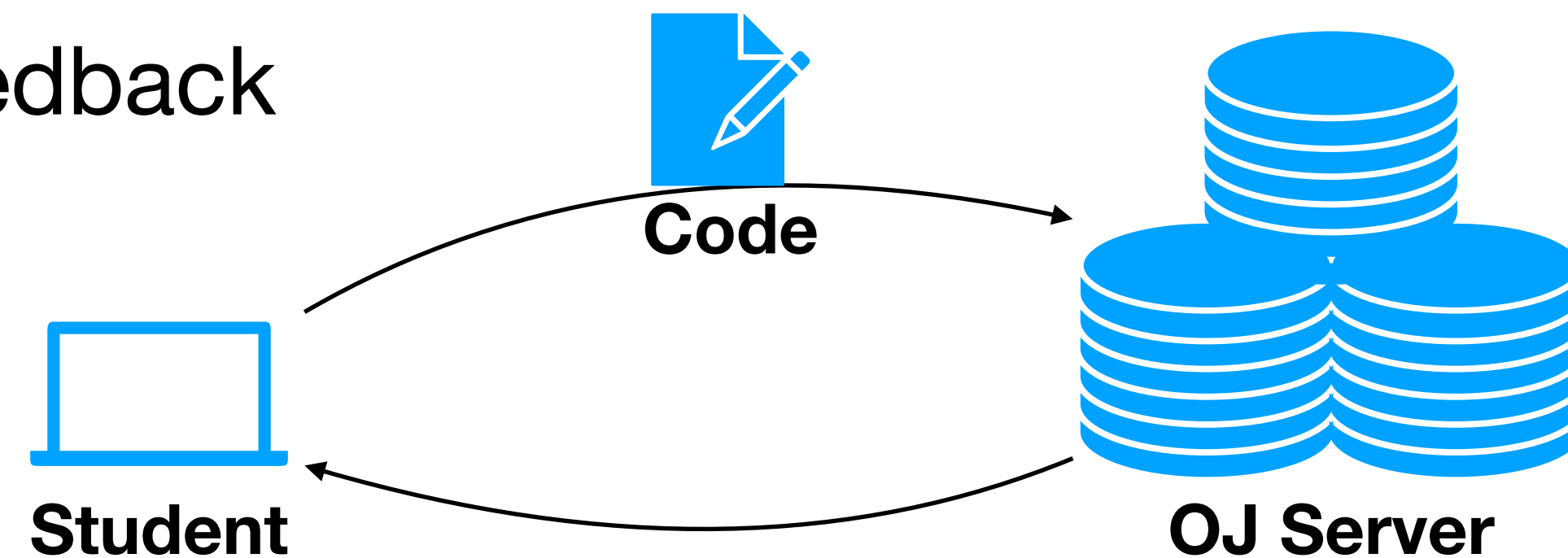
# For This Course

- You will need to register an account on the Online Judge ([link](#) on my website)
- Use your Columbia College email ONLY.
- It is recommended for you to **NOT** use your real name or student number as ID (privacy)
- Your coding assignments/exams will be published and submitted on the OJ as Contests. I may post optional exercises there as well.
- The OJ compares code submissions against each other to detect Plagiarism. DO NOT CHEAT!



# What is Online Judge

- Online platform that judges programming code's correctness
- Provides instant feedback



Response	
AC	You have passed
WA	Wrong answer, your output is incorrect
IR	Invalid Run, your programme crashed
TLE	Time Limit Exceeded, your programme took too long

# What is Online Judge

- What to do
- Register using your **college email**
- Do **NOT** use your real name as Username  
use your id num as Username
- Select **Python3** as default language

PROBLEMS SUBMISSIONS USERS CONTESTS ABOUT

---

**Username**

**E-Mail-Adresse**

**Password** (?)

**Password<sup>2</sup>** (again, for confirmation)

**Timezone** (select your closest major city)  
 [oder pick from map, detect](#)

**Default language**

**Affiliated organizations**

By registering, you agree to our [Terms & Conditions](#).

Register!

# What is Online Judge

The screenshot shows the DM::OJ website interface. The top navigation bar includes links for PROBLEMS, SUBMISSIONS, USERS, CONTESTS (highlighted), and ABOUT. There are also links for Login and Registrieren. Below the navigation bar, the 'Contests' section is active, with tabs for List and Calendar. Under 'Ongoing Contests', a table lists the 'CSCI120 2021S3 Lab 0' contest. The table has columns for Contest, Users, and an action button. The contest details include 'Ends in 12 days 08:13:31', 'Sep 7, 2021, 14:44', and '12 days 09:15 long'. The 'Users' column shows '0', and the 'Join' button is visible.

Contest	Users	
<b>CSCI120 2021S3 Lab 0</b> rated Ends in 12 days 08:13:31 Sep 7, 2021, 14:44 12 days 09:15 long	0	<a href="#">Join</a>

- After registration and logged in, go to contest and join Lab 0

# What is Online Judge

This is your first lab, you need to finish all problems in it using Python3

Due 19 Sept 23:59:59

## ? Problems

Problem	Points	AC Rate	Users	
<a href="#">Hello World</a>	1	70,0%	<a href="#">1</a>	
<a href="#">A plus B Simple</a>	1	100,0%	<a href="#">1</a>	

## 💬 Comments



- When you are in, this is what you will see, 2 problems to solve for Lab 0
- We'll walk you through `Hello World` first

# What is Online Judge

## Hello World

Print "Hello World!" in a single line.

Submit solution

## Input Specification

No input.

[My submissions](#)  
[All submissions](#)  
[Best submissions](#)

## Output Specification

Just the sentence "Hello World!" in a single line.

[Manage tickets](#)  
[Edit problem](#)  
[Edit test data](#)  
[Manage submissions](#)  
[Clone problem](#)

## Sample Input

No Input

Copy

✓ **Points:** 10 (partial)  
⌚ **Time limit:** 1.0s  
📄 **Memory limit:** 64M

## Sample Output

Hello World!

Copy

✍ **Author:**  
admin  
  
➤ **Problem type**  
  
▼ **Allowed languages**  
C, C++, Python3  
  
👤 **Judge:**  
[Melchior-VM](#)

Concept



# Let's go to PyCharm

- Download the **Community** version of it, and install it
- After installation, launch it

## Download PyCharm

Windows macOS Linux

### Professional

For both Scientific and Web Python development. With HTML, JS, and SQL support.

Download

.dmg (Intel) ▼

Free trial

### Community

For pure Python development

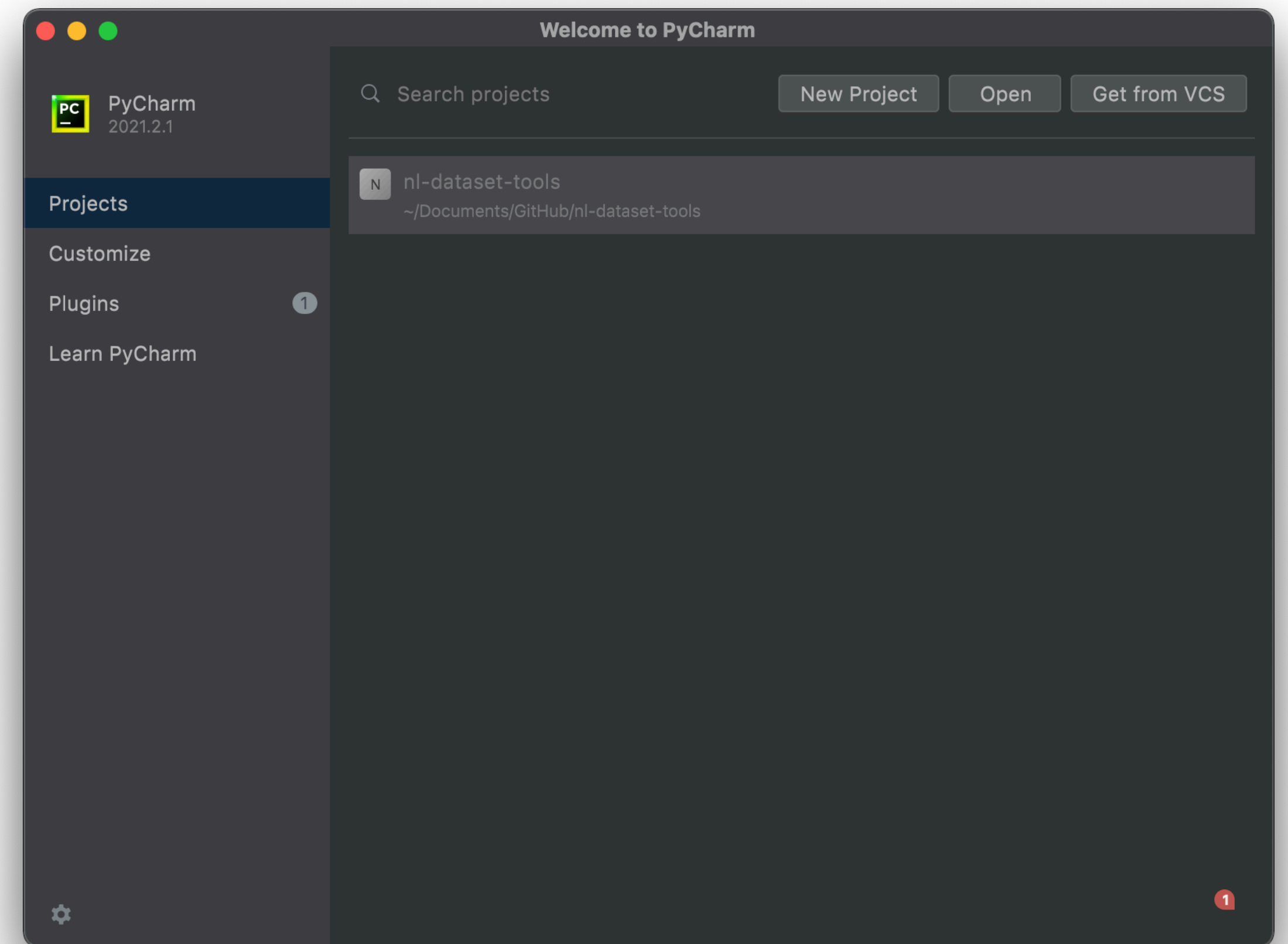
Download

.dmg (Intel) ▼

Free, open-source

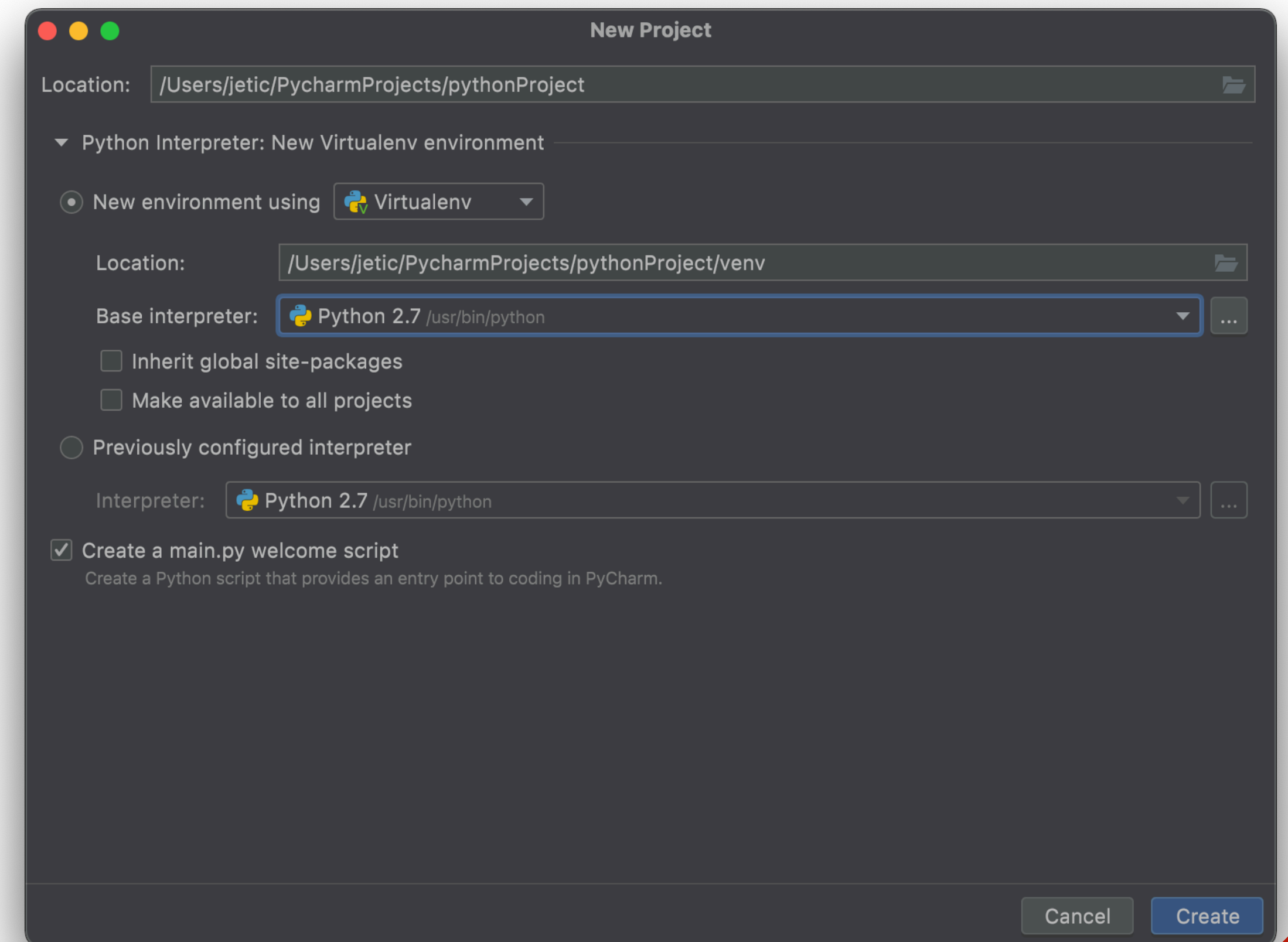
# Let's go to PyCharm

- Select New Project



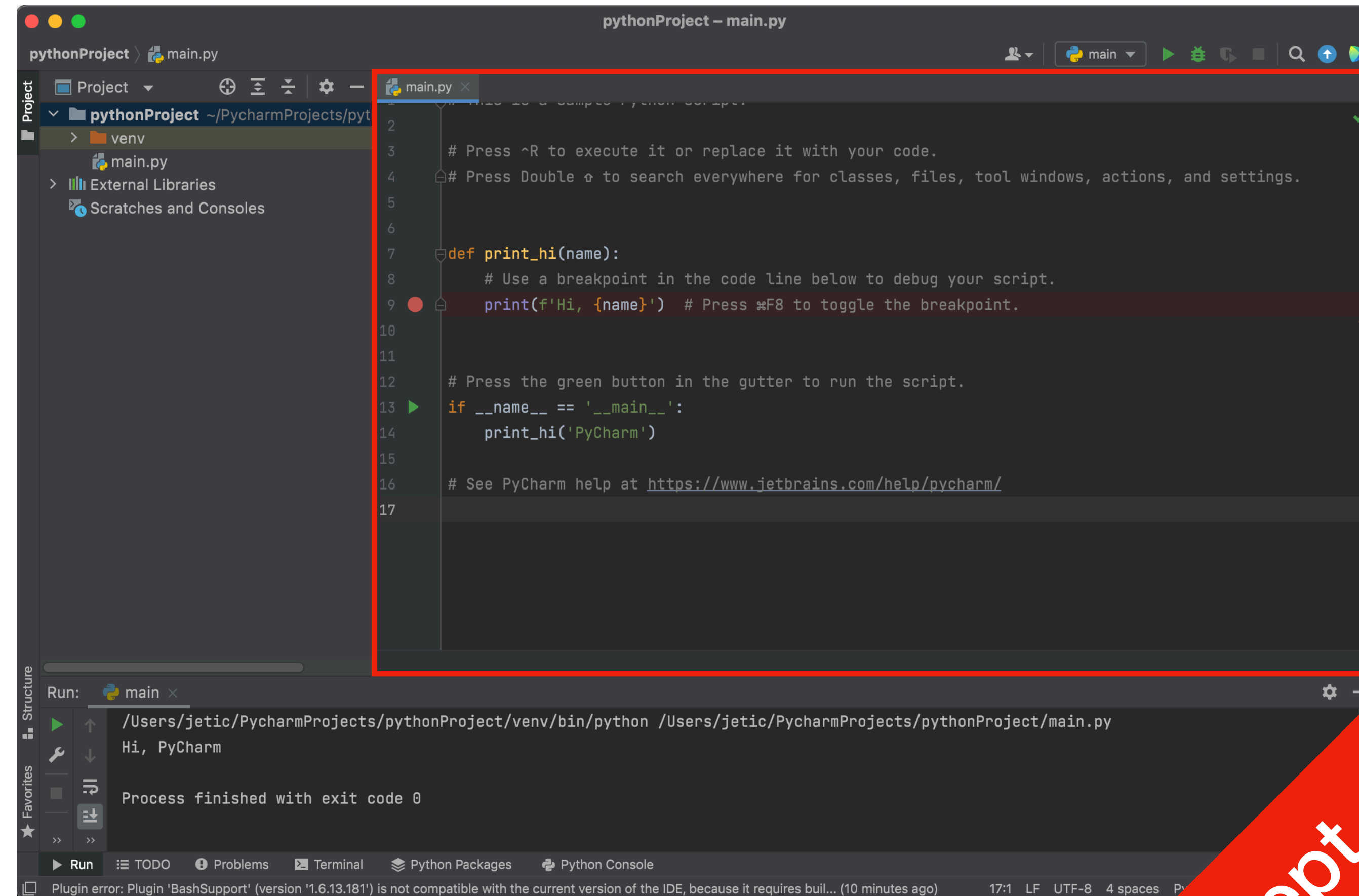
# Let's go to PyCharm

- This is a very important Step!
- Select **python3** instead of python2
- If you are using windows, it should say Python3.9, which is fine



# Let's go to PyCharm

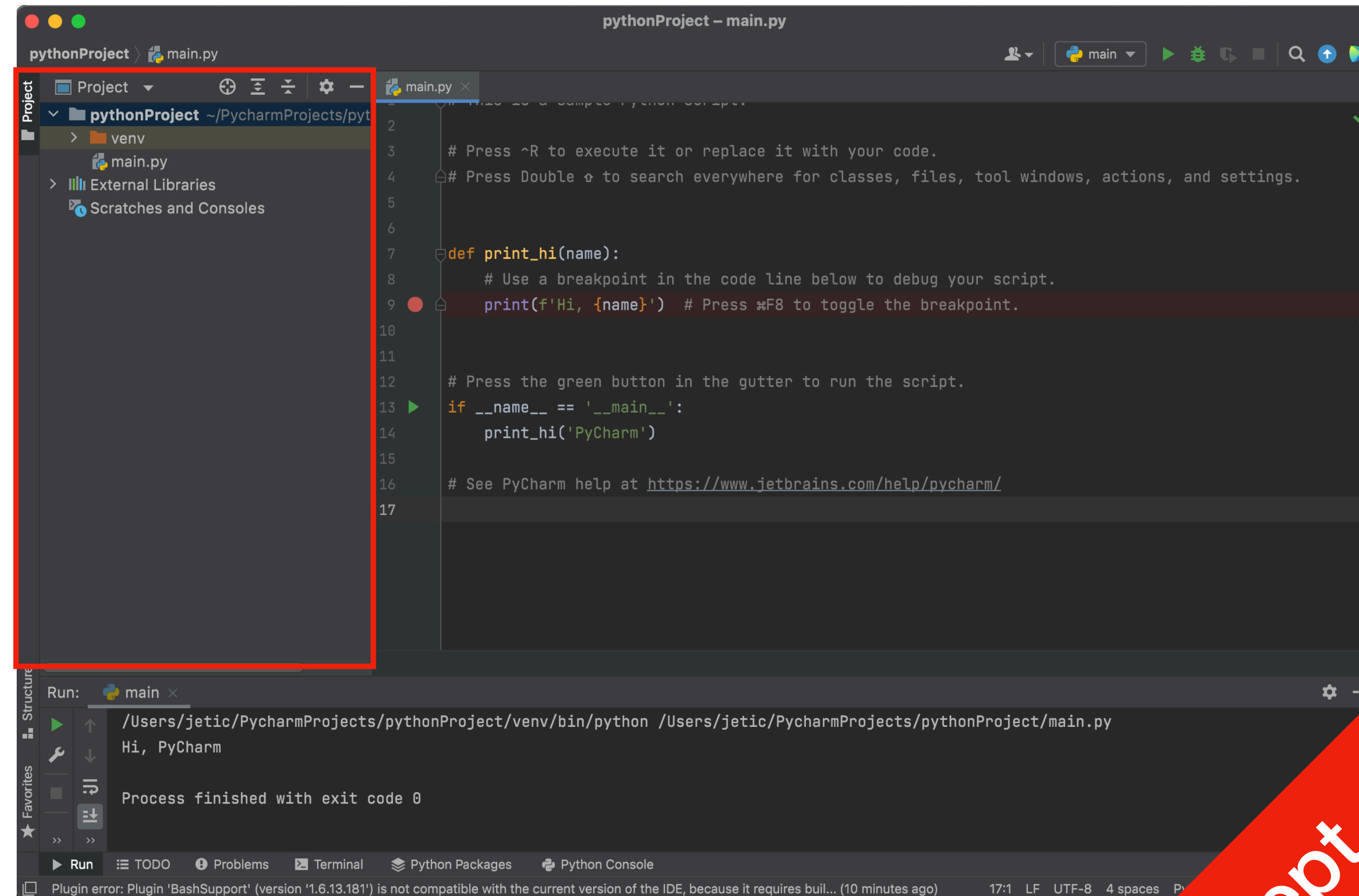
- Code editor
- This is where you edit the code



Concept

# Let's go to PyCharm

- Code editor
- This is all of your project files





# Let's go to PyCharm

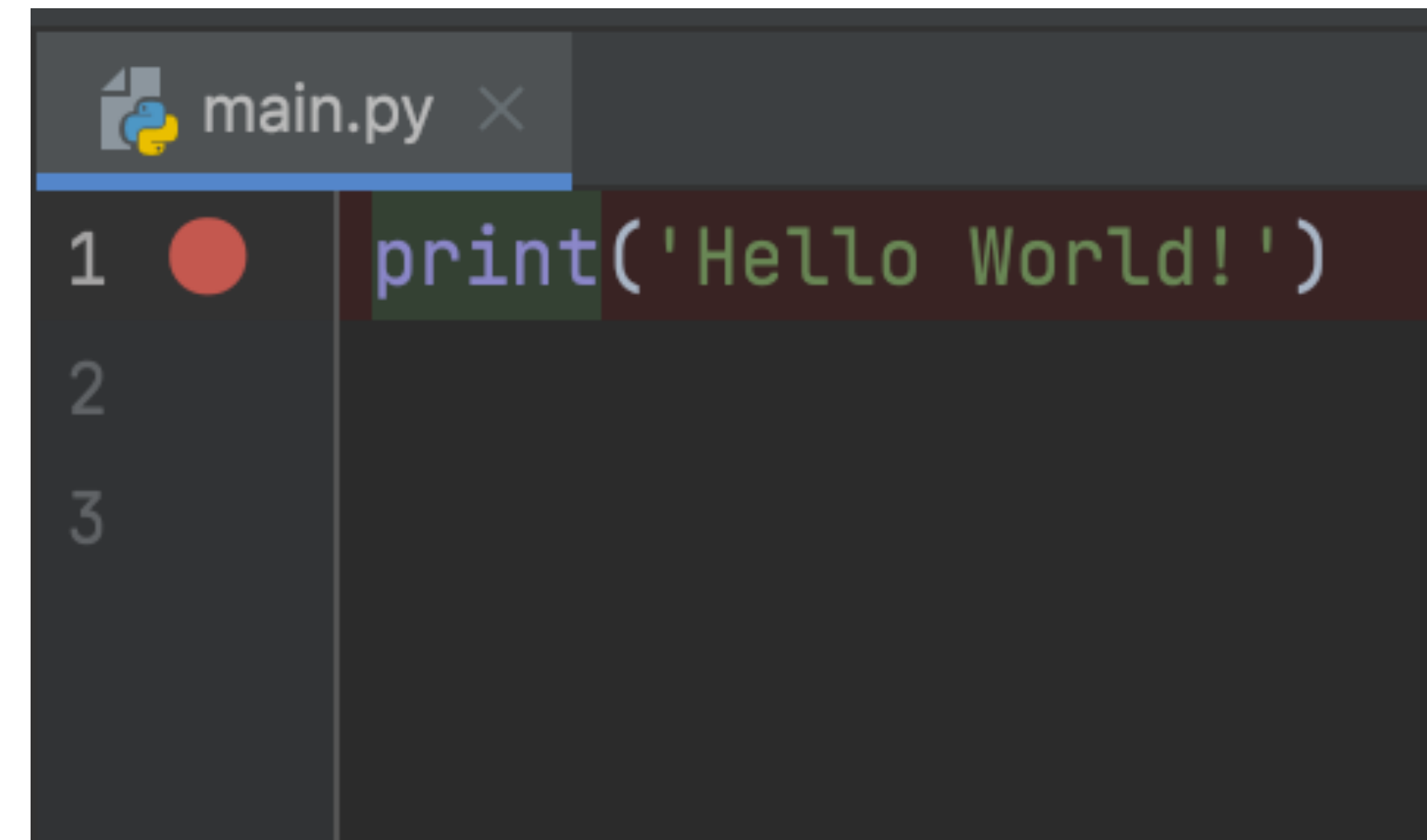
- Let's replace the code with the following

```
print('Hello World!')
```

- then save, and hit RUN
- You will see a window at the bottom pop up, with the sentence

```
Hello World!
```

- on it

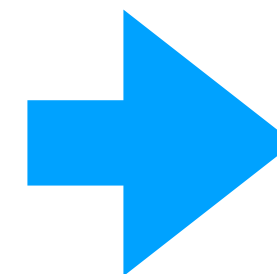


# Go back to the Online Judge

## Hello World

Print "Hello World!" in a single line.

**Click** Submit Solution



Submit solution

## Input Specification

No input.

## Output Specification

Just the sentence "Hello World!" in a single line.

## Sample Input

No Input

Copy

## Sample Output

Hello World!

Copy

[My submissions](#)  
[All submissions](#)  
[Best submissions](#)

[Manage tickets](#)  
[Edit problem](#)  
[Edit test data](#)  
[Manage submissions](#)  
[Clone problem](#)

✓ **Points:** 10 (partial)

⌚ **Time limit:** 1.0s

📄 **Memory limit:** 64M

✍ **Author:**  
admin

➤ **Problem type**


▼ **Allowed languages**  
C, C++, Python3

🏠 **Judge:**  
Melchior-VM

Concept

# Go back to the Online Judge

- Copy and Paste your code here in the box
- Make sure the language is Python 3
- Hit submit!

 Hello, admin.

Submit to [Hello World](#)

1 |

Python 3 (python3 3.6.9)

Submit!

Concept

# Go back to the Online Judge

- You will see this page.
- This page does not update itself automatically, you can refresh the webpage...
- 

## Submission of [Hello World](#) by [admin](#)

Sept. 7, 2021, 4:39 nachm.on Melchior-V  
Python 3 [[Admin](#)]

[View source](#)  
[Resubmit](#)  
[Rejudge](#)

Your submission is being processed...

Abort

Concept

# Go back to the Online Judge

- You will see this page.
- This page does not update itself automatically, you can refresh the webpage...
- Until you see this!

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## Submission of [Hello World](#) by [admin](#)

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Sept. 7, 2021, 4:39 nachm.on Melchior-V  
Python 3 [[Admin](#)]

[View source](#)  
[Resubmit](#)  
[Rejudge](#)

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### Execution Results

Test case #1: **AC** [0,053s, 9.14 MB] (10/10)

**Resources:** 0,053s, 9.14 MB  
**Final score:** 10/10 (10.0/10 points)