Introduction to Computational and Algorithmic Thinking

LECTURE 2 – PYTHON AND PYCHARM INSTALLATION

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Announcements

This lecture: Computer Programming Fundamentals

Reading: Read Chapter 2 of Conery

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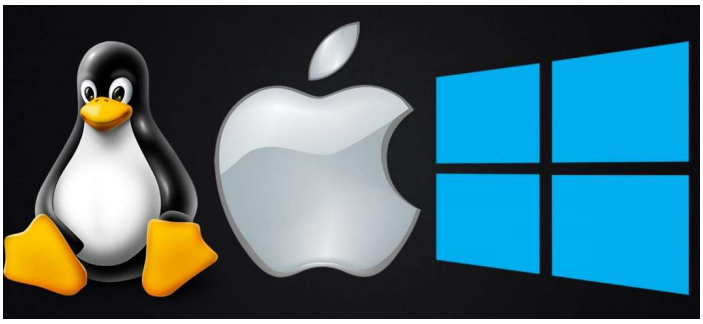
What is an Operating System?

Operating System is a program that manages computer hardware and software resources, and provide common services for computer applications.



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What is Python?

- Python is a computer programming language
  - Relatively simple **syntax** (set of rules programmers must follow when writing programs)
- Python can be used to write simple programs that do basic calculations or very complicated ones
  - Can write basic games!
  - Python is popular with scientists because they can do complex data analysis by writing short programs
- Python can be installed on a wide variety of computer types and operating systems

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Python Installation on Windows

https://www.python.org/downloads/

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Python Installation on Windows

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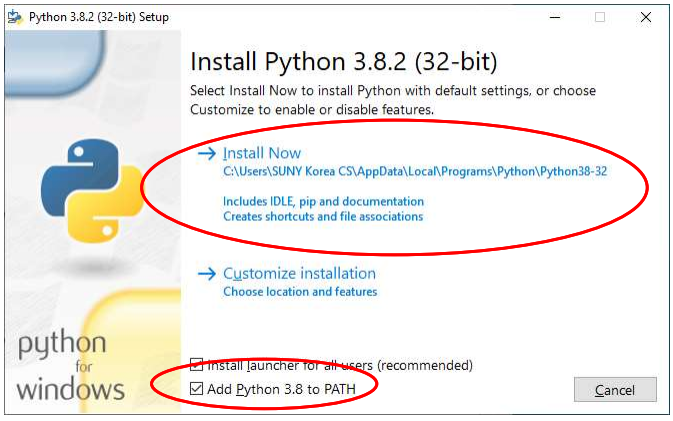

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Python Installation on Mac

1. Go to https://www.python.org/downloads/
2. Download Python 3.8.2. It should save a file named "python-3.8.2-macosx10.9.pkg" to your computer.
3. Double click on the file and run the install with default options and agree with the license. You'll need to type in your password to install it.

Video tutorial:

https://www.youtube.com/watch?v=8BiYGIDCvvA

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What is a computer program?

- A computer program is a sequence of instructions the computer executes to solve a well-defined problem
- The instructions or steps the programmer writes constitute the **source code** of the program
- In Python, many of these instructions look like regular, everyday English with some extra punctuation thrown in
- There are two basic ways to give commands written in Python to the computer:

1. Type individual instructions via a **shell**, an interactive program that executes the commands
2. Write a complete, stand-alone **application** that we can run over and over

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Python console / interactive shell

- The **console** (or interactive shell) is
  - a window where a single command or short set of commands can be typed to the computer
  - the computer tries to execute those command
- Python **interpreter**
  - Reads Python instructions typed into the console by the user
  - The interpreter converts them into a form the computer's hardware understands
  - The language that the hardware understands is called **machine language**
- No matter what language is used, at some point the source code must be translated into machine code for the computer to execute it

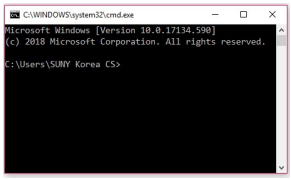
Opening a Terminal

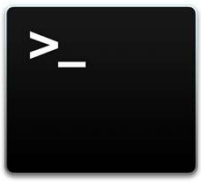
Windows

- Press "Win-R," type "cmd" and press "Enter" to open a Command Prompt session using just your keyboard.

Mac OS

- Finder -> Applications -> Utilities -> Terminal





Start the Python Interpreter

In your terminal:

On Windows:

Type "python " and press "Enter "

On Mac:

Type "python3" and press "Enter"

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Some Python Statements

- print (“helloworld”)
- 1 + 1
- a = 1;
- b = 2;
- a + b
- name = “SUNY”
- country = “Korea”
- print (name + country)
- Pi = 22/7
- print (type(name))
- print (type(Pi))

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The PyCharm IDE

- In this course, an **integrated development environment** (IDE) called PyCharm will be used
- PyCharm is industry-grade software used by professional software developers
  - still easy enough for novice programmers to use
  - First download and install Python from www.python.org (ignore if already done)
  - Go to www.jetbrains.com/pycharm/download to download and install the free Community Edition of PyCharm

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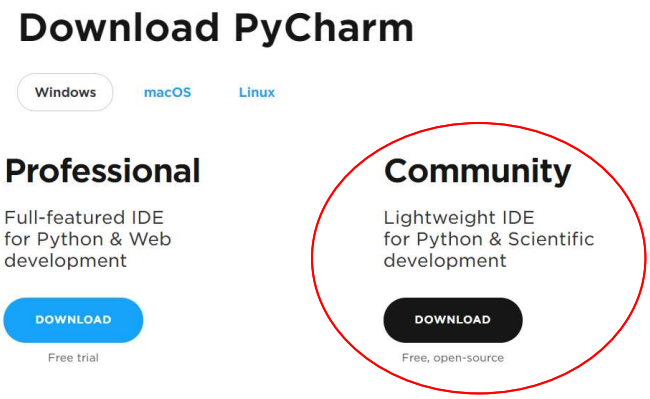
PyCharm Installation

https://www.jetbrains.com/pycharm/download/#section=windows



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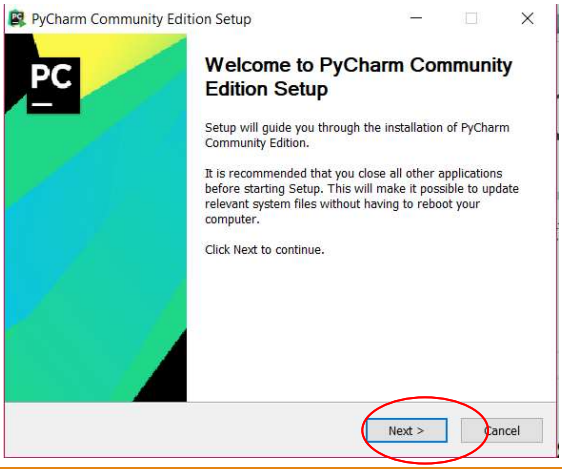
PyCharm Installation



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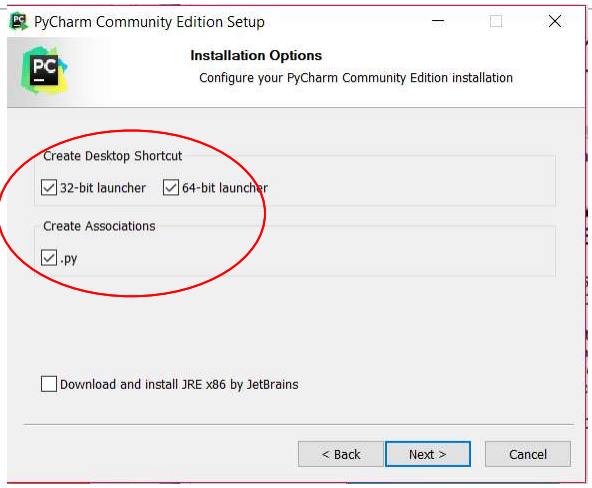
PyCharm Installation



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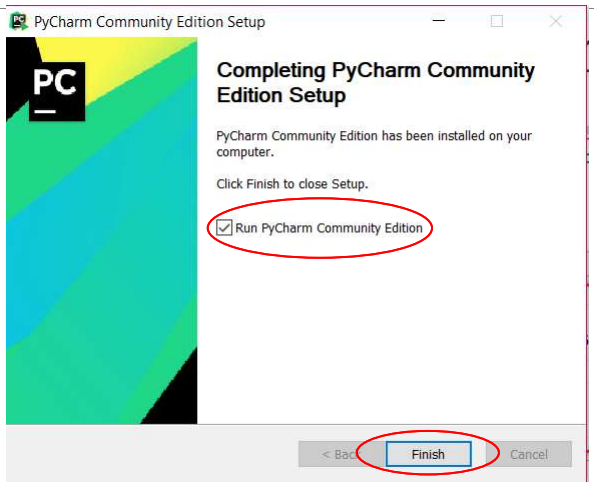
PyCharm Installation



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PyCharm Installation on Mac

1. Go to https://www.jetbrains.com/pycharm/download/ to download and install the **free Community Edition of PyCharm**.
2. Now, go to the Applications folder and start **PyCharm CE.app**. You might want to put it on the dock.

Video tutorial: https://www.youtube.com/watch?v=wb4HNqQtIlI

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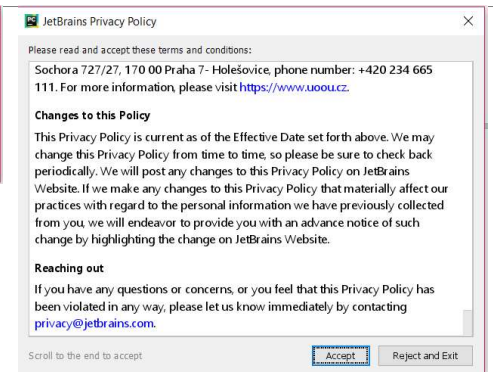
PyCharm Configuration for the first time



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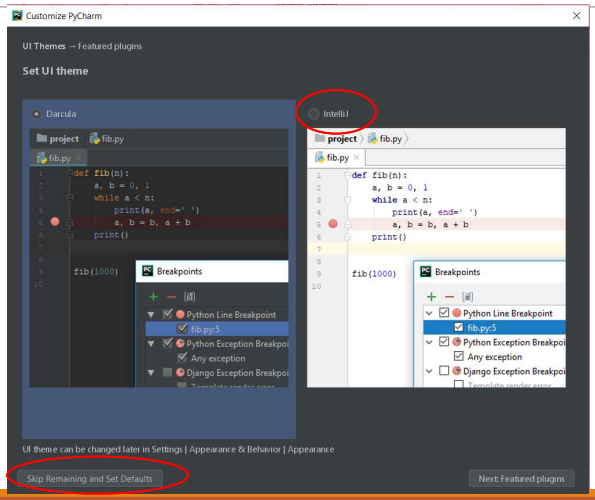
PyCharm Configuration for the first time



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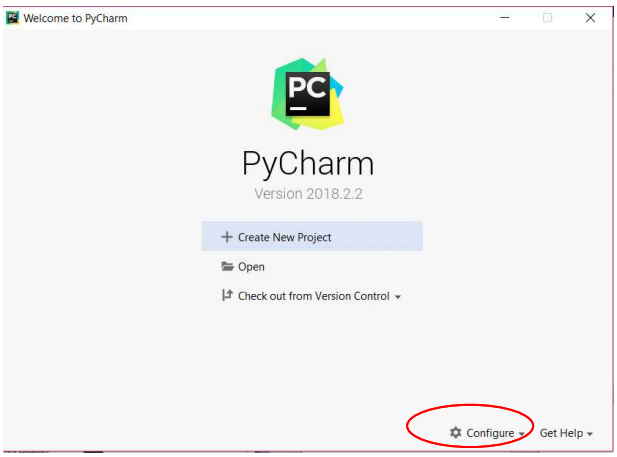
Setting default interpreter

Step 1:

Select Configure -> Preferences



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Setting Default Python Interpreter in PyCharm

Step 2: Find out installation location of Python program:

Windows terminal command
- **where python**

Mac terminal command
- **which python3**

Note down the paths of python installation.

Note the path that is printed out. This is where your Python is installed – you will need this next.

The path can be different for each computer.

On Mac it may be: /Library/Frameworks/Python.framework/Versions/3.8/bin/python3

On the Windows machine it may be: C:\Users\SUNYCS\AppData\Local\Programs\Python\Python38-32\python.exe

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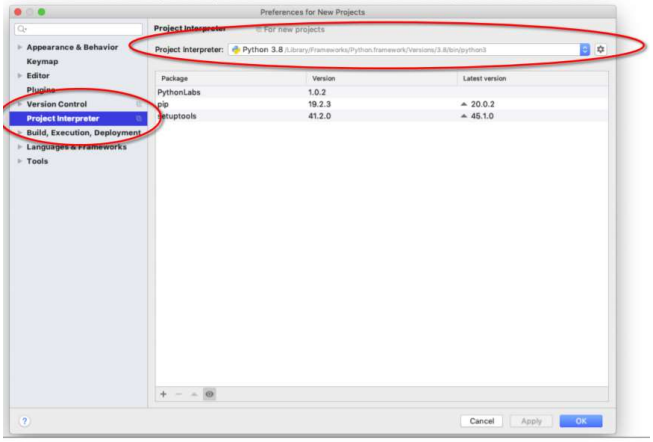
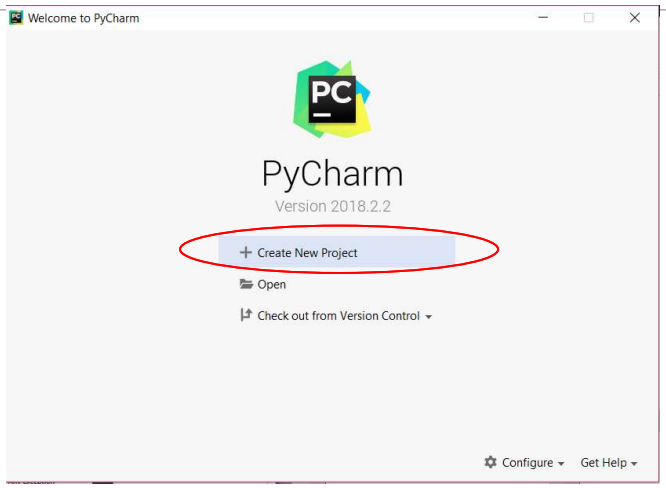
Setting Default Python Interpreter in PyCharm

Step 3: Configure project settings (and New Project Settings) in PyCharm:

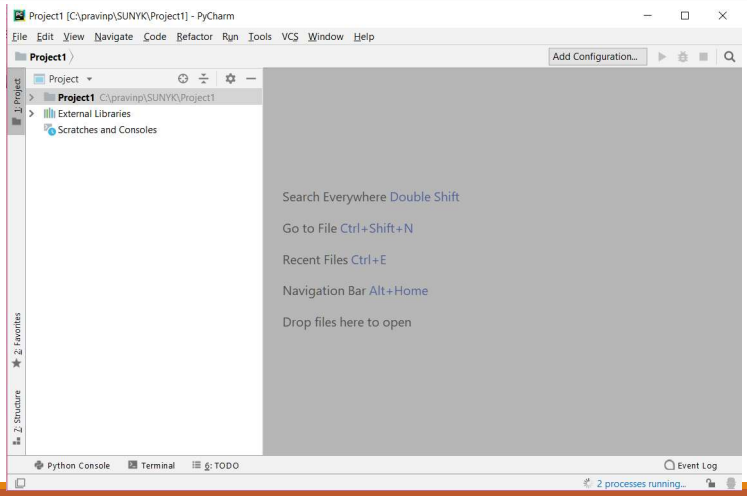
Go back to PyCharm's Configuration Screen. Click on the Project Interpreter tab on the left side. Then click on the "Project Interpreter" box and select or add the Python 3.8 interpreter. This box should have the same path you noted in the last step.



PyCharm Project



PyCharm IDE



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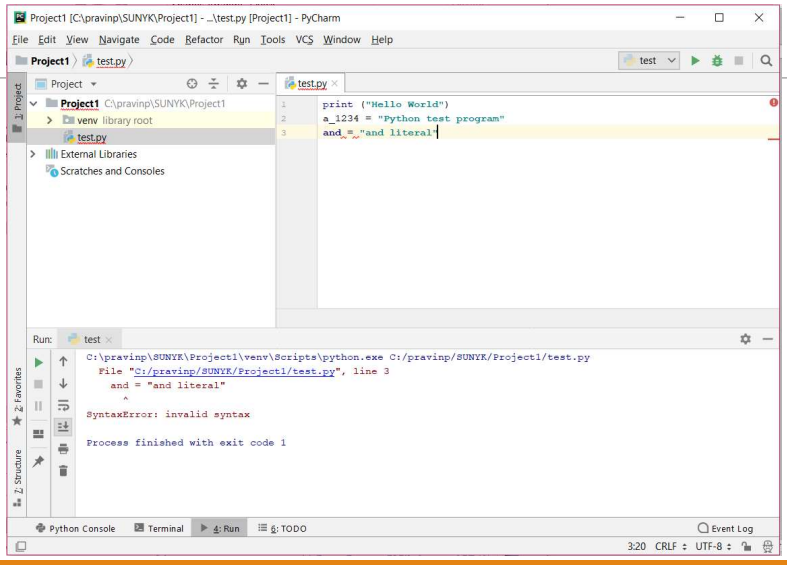
PyCharm IDE



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PyCharm basics

- To create and run a stand-alone Python program:
  1. Start PyCharm and press the “Create New Project” button.
  2. Pick a “Location” and name for the Project (e.g., “CSE 101”).
  3. Select File Menu > New > Python File and enter the name of the file for the source code.
  4. Write the program and save the file.
  5. After saving, go to Run Menu > Run.
  6. Select the name of the program file to run it.
- The next time the program is to be run:
  - Hit the green triangle in the lower-left corner of the screen.
  - Or, right-click the name of the file and choose Run.

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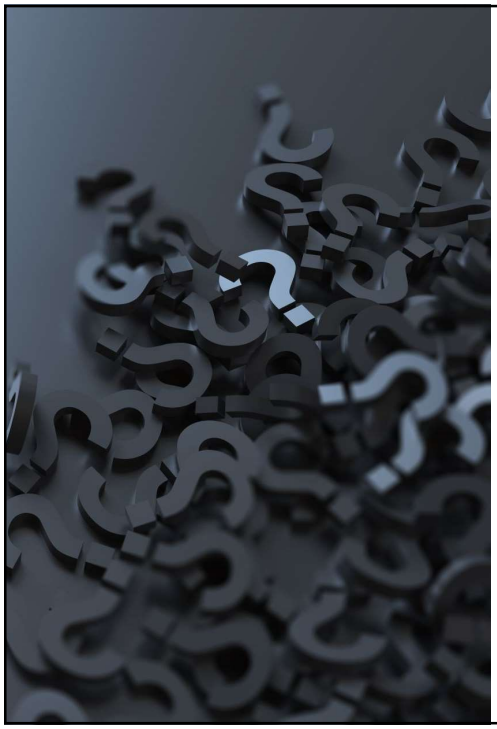

Questions?