

Spring 2019

# CSE 216 : Programming Abstractions

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TOPIC 5 – INTRODUCTION TO PYTHON



# Outline

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- Why study Python?
- Java vs Python
- Python and PyCharm installation

# Why study Python?

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- Great for beginners
- Used for web applications
  - Django, Flask
- Build code quickly – with minimal lines of code
- Popular for agile programming
- High salaries
- Future of AI and machine learning
  - NumPy, SciPy, scikit-learn, Keras, TensorFlow
- Add a new weapon to your arsenal!

Salary information from gooroo.io



Salary Range

**43K - 135K**

Average Salary

**\$94,053**

# Java vs Python

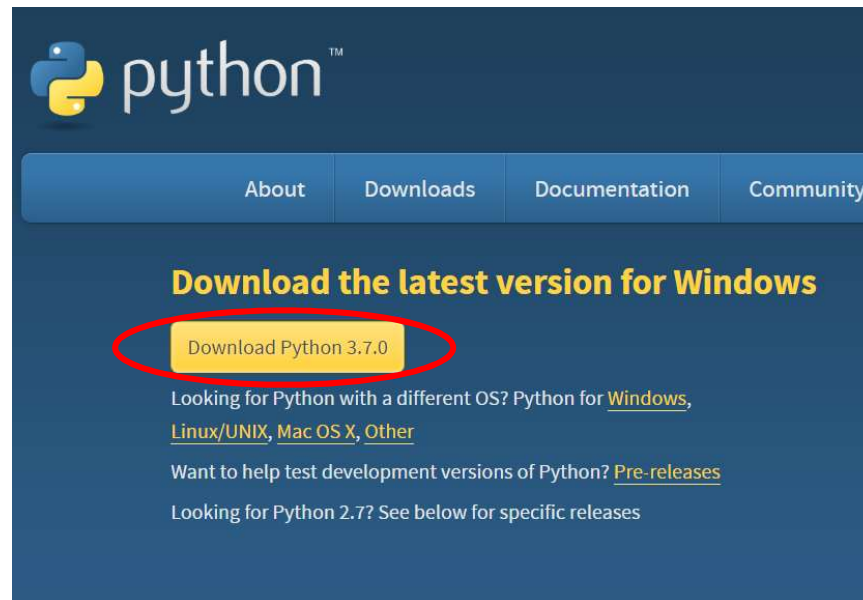
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Java	Python
Statically typed	Dynamically typed
Verbose	Terse (aka concise)
Not compact	Compact
Own file for each top level class	Multiple classes in a single file
Uses checked exceptions	Need not catch/throw exceptions in every method
Weak support for string handling	Good support for string handling
Heavy use of parenthesis	Minimal use of parenthesis

# Python Installation on Windows

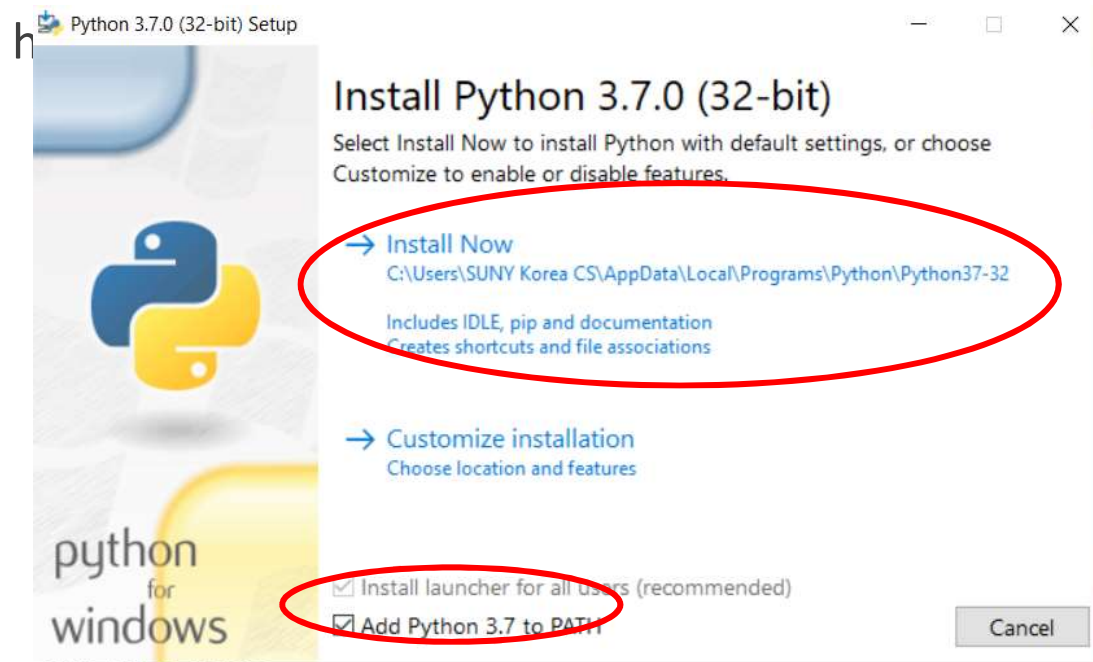
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<https://www.python.org/downloads/>

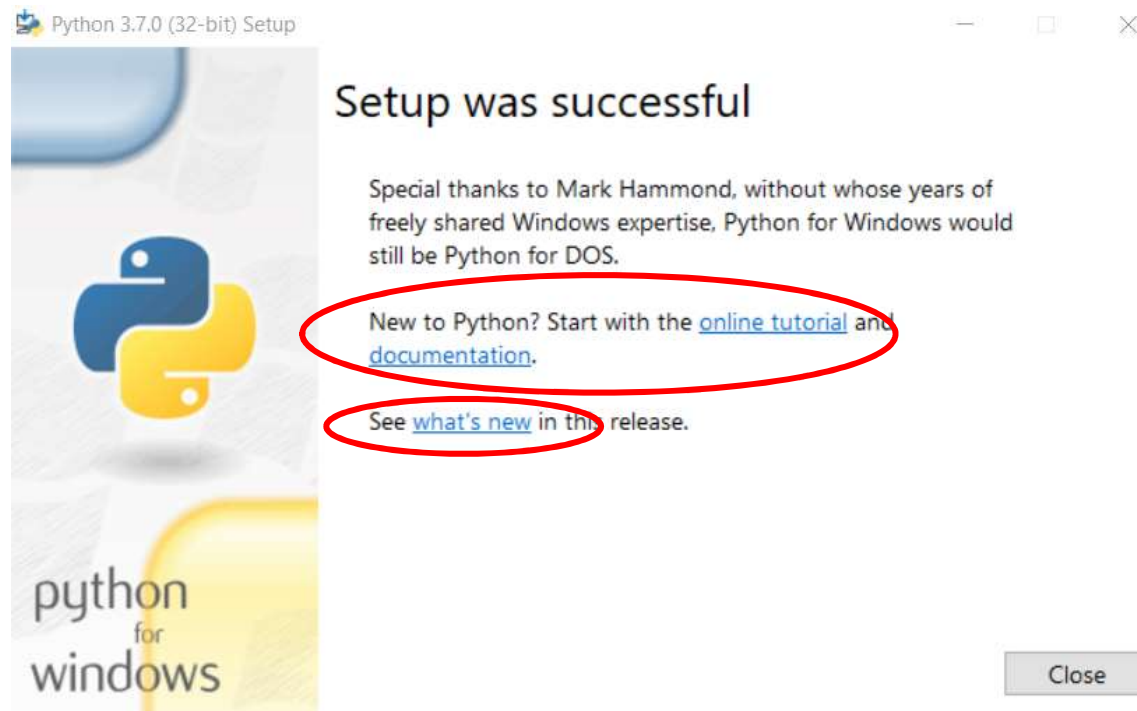


# Python Installation on Windows

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# Python Installation on Windows



# Python Installation on MacBook

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



# What is a computer program?

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- 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

# Python console / interactive shell

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- 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

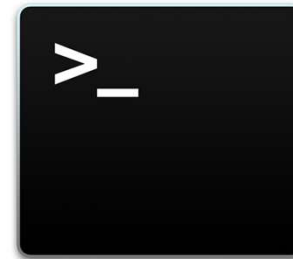
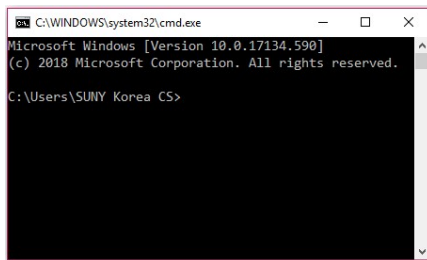
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## Windows

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

## Mac OS

- Finder -> Applications -> Utilities -> Terminal



# Some Python Statements

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- `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))`

# The PyCharm IDE

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- 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](http://www.python.org)
  - Go to [www.jetbrains.com/pycharm](http://www.jetbrains.com/pycharm) to download and install the free **Community Edition** of PyCharm

# PyCharm Installation

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

## Download PyCharm

Windows

macOS

Linux

### Professional

Full-featured IDE  
for Python & Web  
development

DOWNLOAD

Free trial

### Community

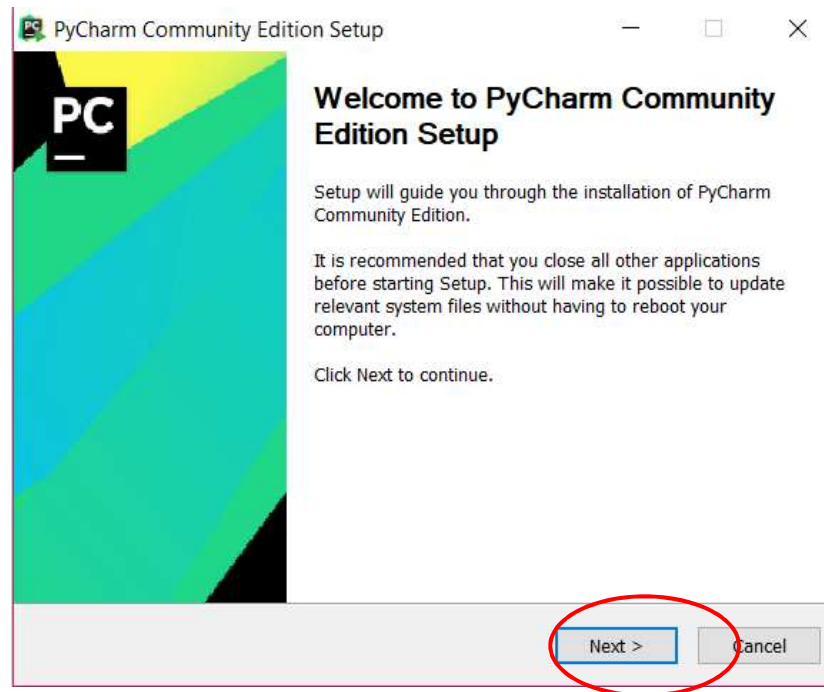
Lightweight IDE  
for Python & Scientific  
development

DOWNLOAD

Free, open-source

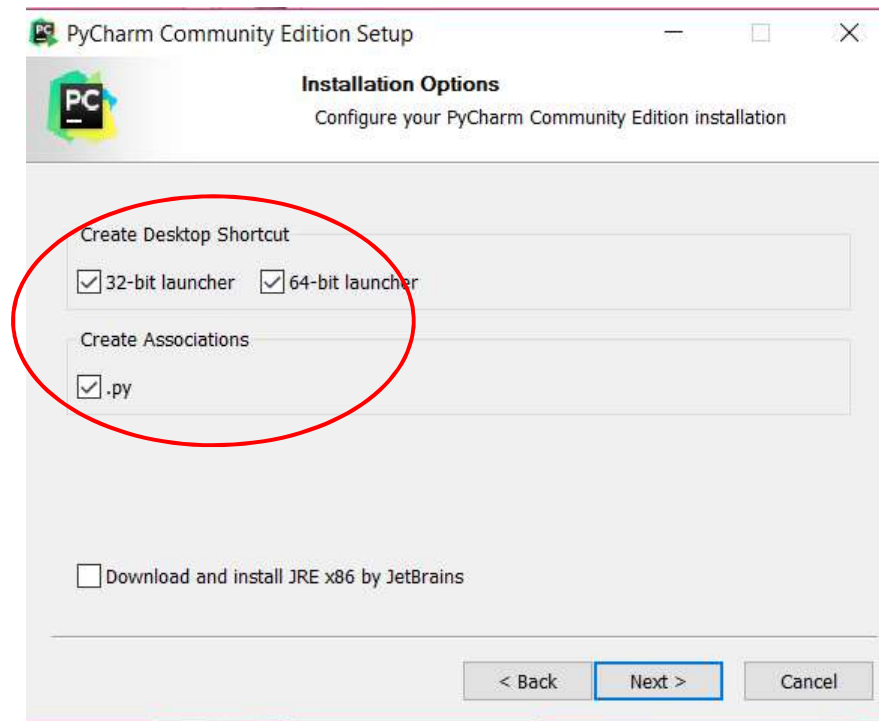
# PyCharm Installation

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# PyCharm Installation

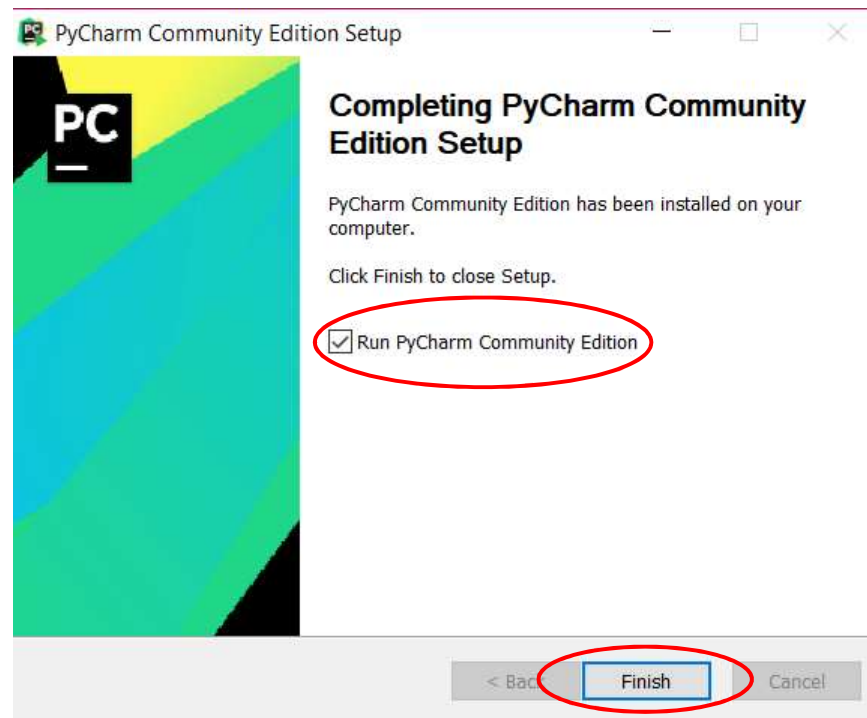
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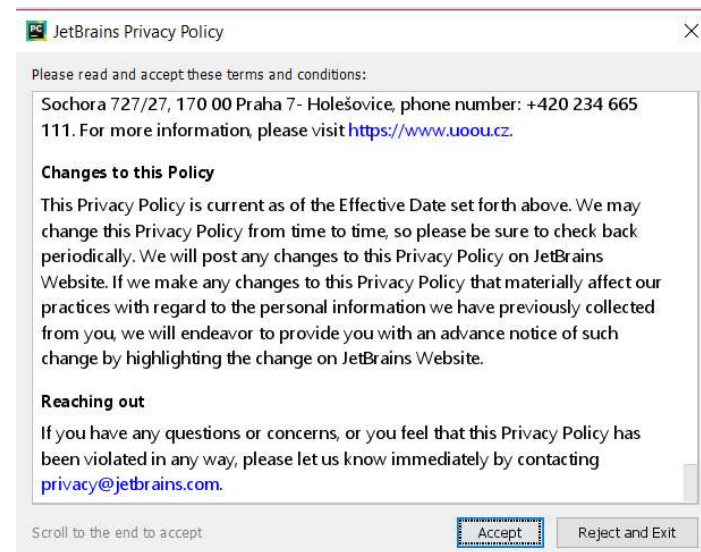
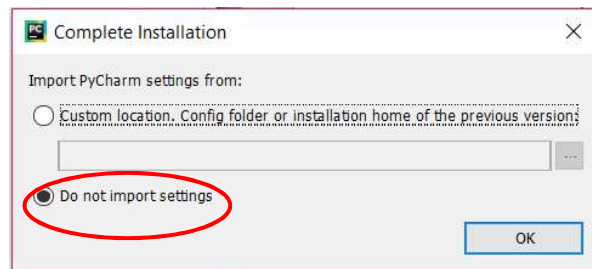


# PyCharm Installation

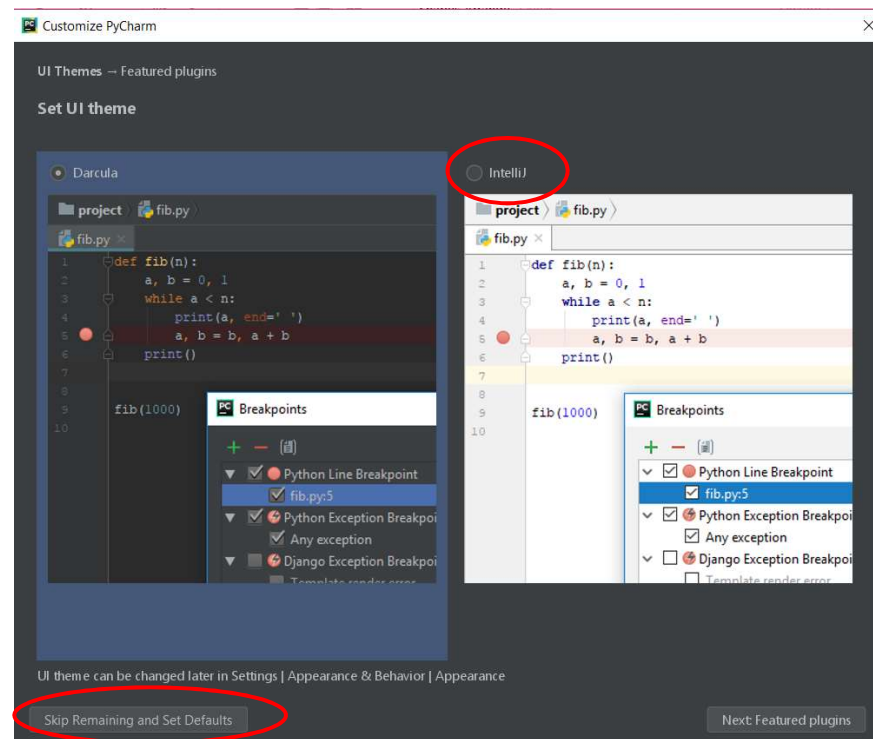
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# PyCharm Installation

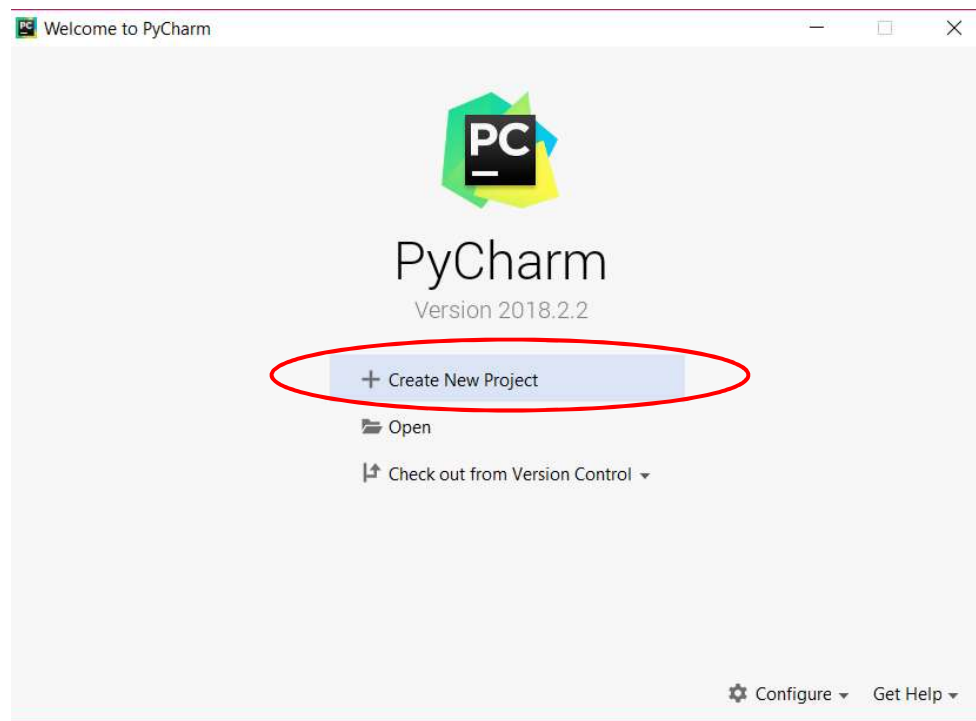


# PyCharm Installation



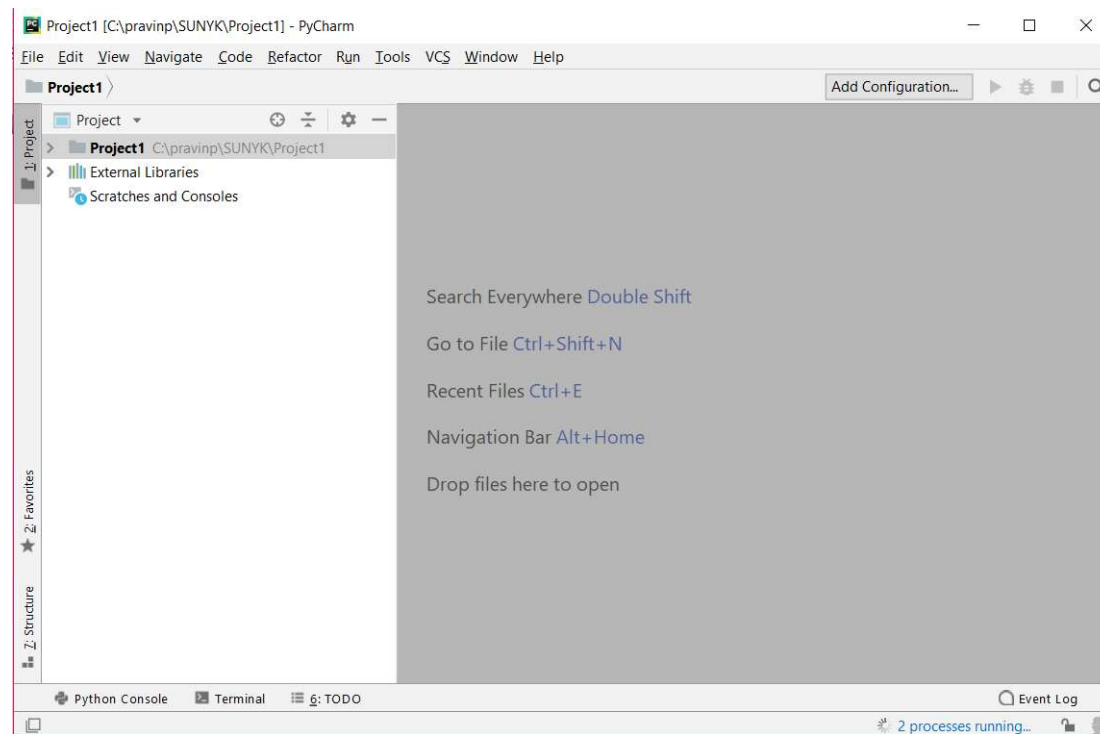
# PyCharm Project

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# PyCharm IDE

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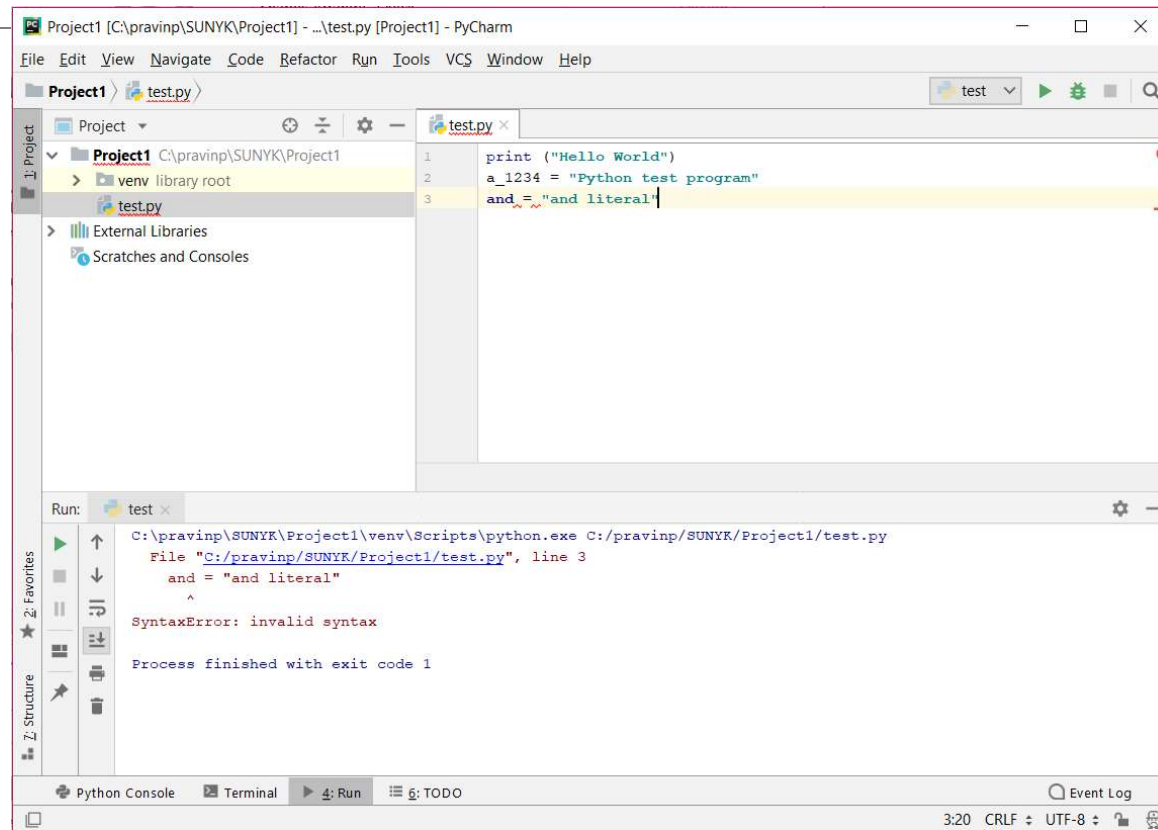


# PyCharm Installation on Mac

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<https://www.youtube.com/watch?v=wb4HNqQtIII>

# PyCharm IDE



# Setting Default Python Interpreter in PyCharm

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**Step 1:** Find out installation location of Python program:

Windows terminal command

- where python

Mac terminal command

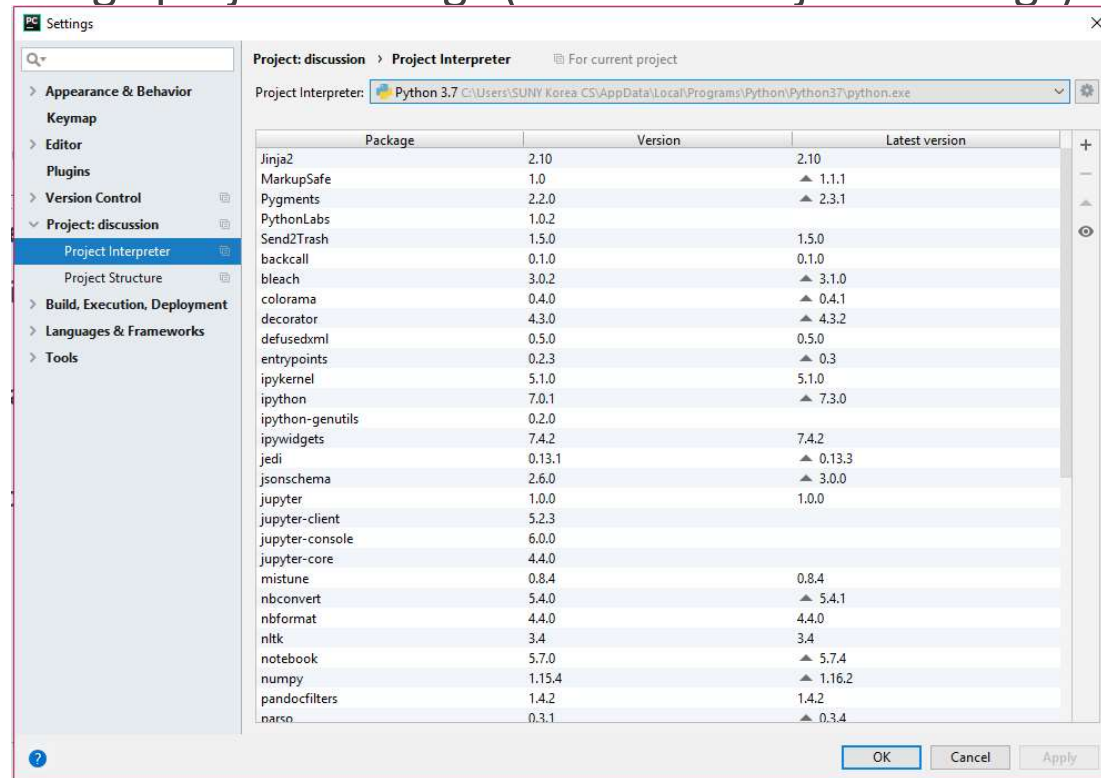
- which python3

Note down the paths of python installation.



# Setting Default Python Interpreter in PyCharm

## ~~Step 2: Change project settings (and New Project Settings) in PyCharm:~~



# PyCharm basics

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- 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?