

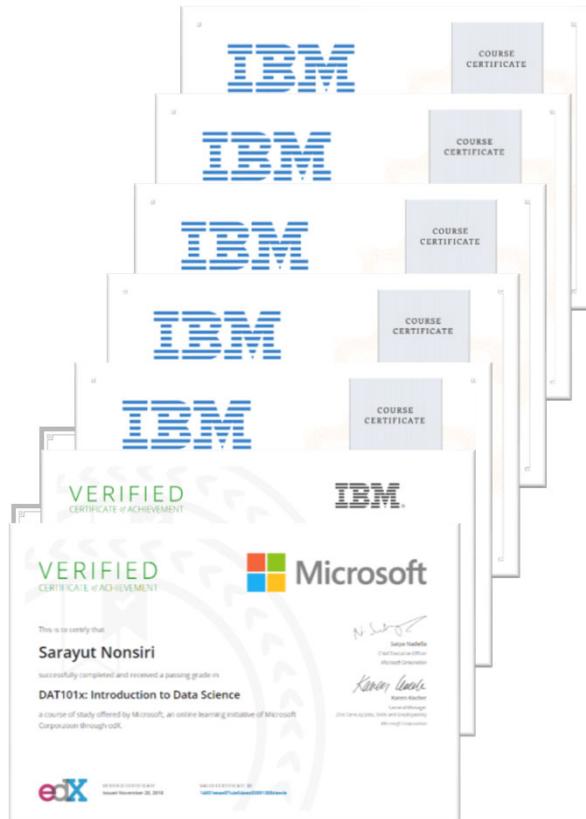


9Expert Training

Python Programming

9EXPERT TRAINING

COURSE ID : PYTHON-L1



ດ. ສරຍຸຕ ແນທຶນ

- ວິທຍາກ 9Expert
- Python programming

Certificate

- Python 3 Programming Specialization, University of Michigan
- Python for Everybody Specialization, University of Michigan
- A Crash Course in Data Science, Johns Hopkins University
- AI For Everyone, DeepLearning.ai
- Introduction to Artificial Intelligence, IBM
- Machine Learning with Python, IBM
- Machine Learning for All, University of London
- Deep Learning Fundamentals with Keras, IBM
- Etc.,

Researcher

- Artificial Intelligence and Machine Learning



TikTok : 9expert

 200 K+YouTube : 9EXPERT
9Expert Training 50 K+

Facebook : 9Expert Training

 100 K+



SQL Community Thailand



RPA Community Thailand



Excel Community Thailand



PowerPoint Community Thailand





รับของที่ระลึก Sticker LINE

1



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@9EXPERT

โค้ดได้รางวัล Scan เลย >>



4

เลือกรับรางวัลเป็น Sticker LINE 1 ชุด



Ver.3



Ver.4



Ver.5



Ver.6 Together we can!

NEW



Ver.7 I'm DBA Expert

NEW



Ver.8 Practical Training

อย่า
ชัยเด
เรียนรู้



ເກມທີ່ການຝ່ານກາຮອບມ

เวลาเข้าเรียนเกิน 80%

ส่ง Workshop เก็บ 70%

แบบทดสอบหลังเรียนเกิน 70%



៤៩



ຜູ້ທີ່ຜ່ານຈະໄດ້ຮັບວຸฒນິບັດຈາກ ສດຖະບັນ



- เวลาเรียน
- เวลาเบรก
- อาหารกลางวัน
- ห้องน้ำ
- ข้อเสนอแนะที่ training@9expert.co.th
- สอดคล้องเจ้าหน้าที่ [9Expert Training](#)

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หัวข้ออบรม

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1. ความรู้เบื้องต้นเกี่ยวกับการเขียนโปรแกรม
2. รู้จักกับภาษาโปรแกรม PYTHON
3. รู้จักกับ VISUAL STUDIO CODE
4. รู้จักกับ GOOGLE COLAB
5. หลักภาษาและไวยกรณ์ภาษา PYTHON
6. การจัดการข้อมูล STRING
7. การเขียนคำสั่งเกี่ยวกับทางเลือก
8. การเขียนคำสั่งวนลูป



9. การสร้างและใช้งาน LIST, TUPLE, DICTIONARY และ SET

10. การสร้างและใช้งานฟังก์ชัน

11. คำความรู้จักขอบเขตตัวแปร

12. การดักจับและตรวจสอบข้อผิดพลาดต่างๆ

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13. การทดสอบโปรแกรม

14. การใช้งานโมดูล (MODULES)

- NUMPY, PANDAS, AND MATPLOTLIB,

15. WEB SCRAPING

16. การดึงข้อมูลจาก WEB API



17. การอ่านและเขียนไฟล์

18. UNIT TESTING

19. การเขียนโปรแกรมเชื่อมต่อฐานข้อมูล SQLITE และ MySQL

20. BASIC OOP

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21. การประยุกต์ใช้งาน

- FACE DETECTION



การเขียนโปรแกรมคอมพิวเตอร์

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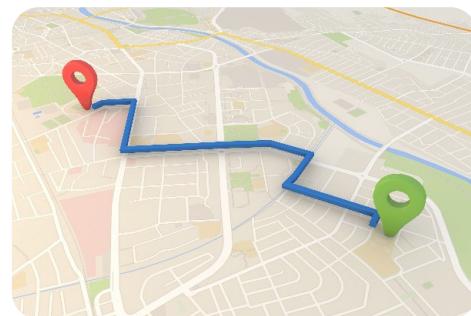
Online Banking



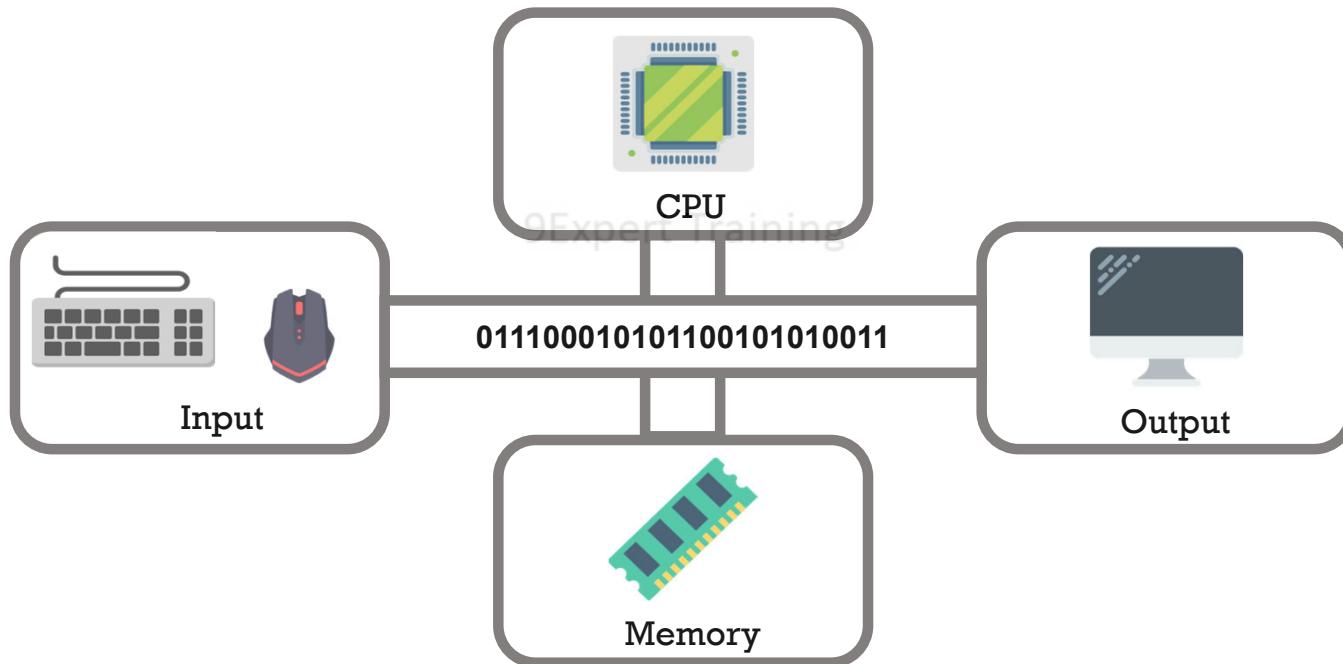
Health Application



Voice command



Navigation Map



```
section .data

num1 db 5
num2 db 10
result db 0

section .text

global _start

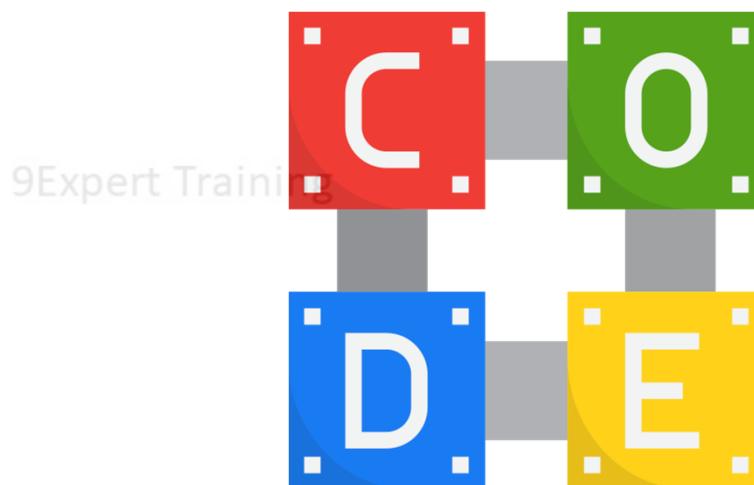
_start:          ; Load the values of num1 and num2 into registers
    mov al, num1
    mov bl, num2

    ; Multiply the values in AL and BL
    mul bl

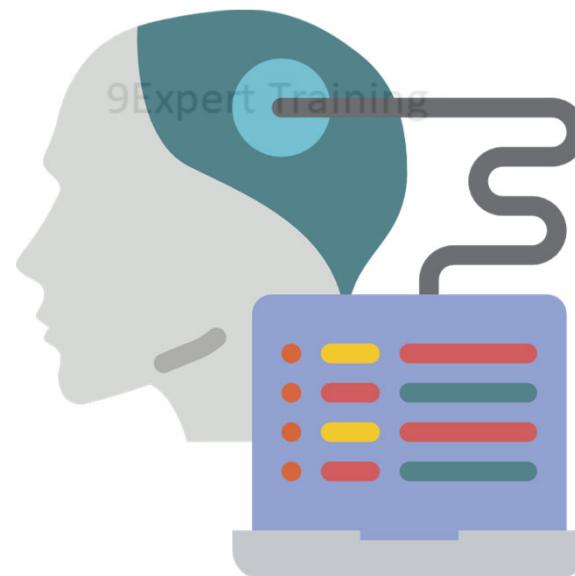
    ; Store the result in the result variable
    mov result, al

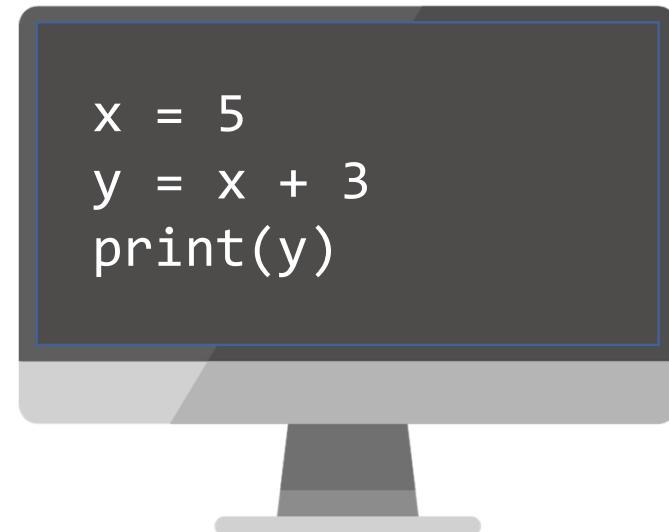
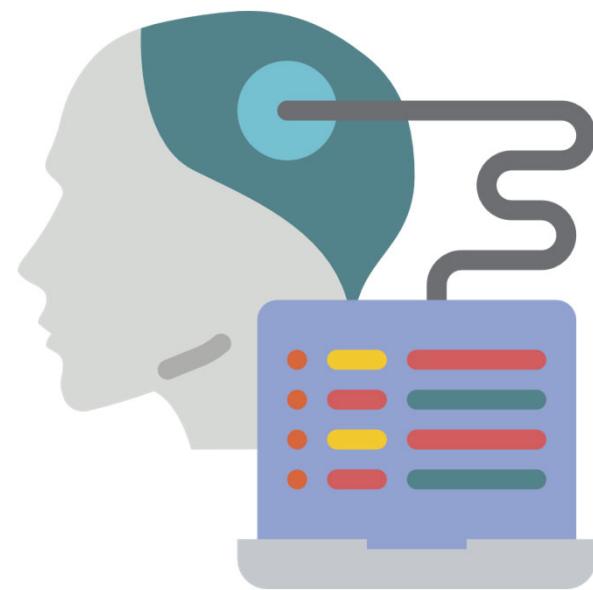
    ; Exit the program
    mov eax, 1
    xor ebx, ebx
    int 0x80
```

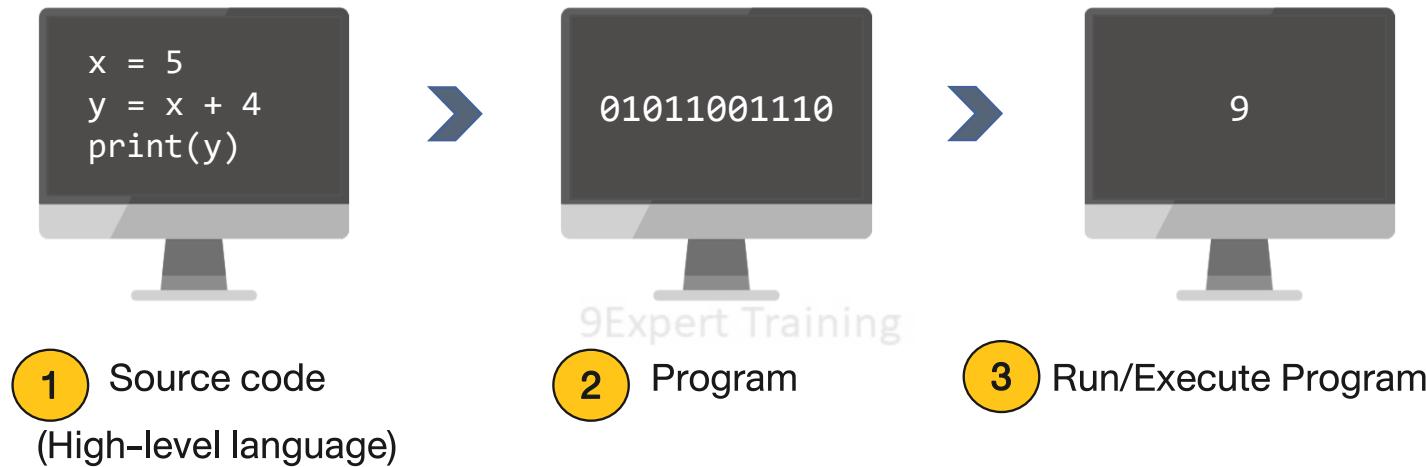
- Fortran
- COBOL
- Basic
- Pascal
- C/C++
- Python
- Java
- JavaScript
- R
- Scala
- Dart
- Rust
- Etc.,



- ภาษาโปรแกรมคอมพิวเตอร์ระดับสูง (High-level programming language) เป็นเครื่องมือที่อำนวยความสะดวกในการเขียนโปรแกรม โดยเป็นภาษาที่ถูกออกแบบมาสำหรับมนุษย์ในการแปลงความคิดของการแก้ปัญหาออกมายังคำสั่งที่ชัดเจนให้อยู่ในรูปแบบของชุดคำสั่ง (Source code)



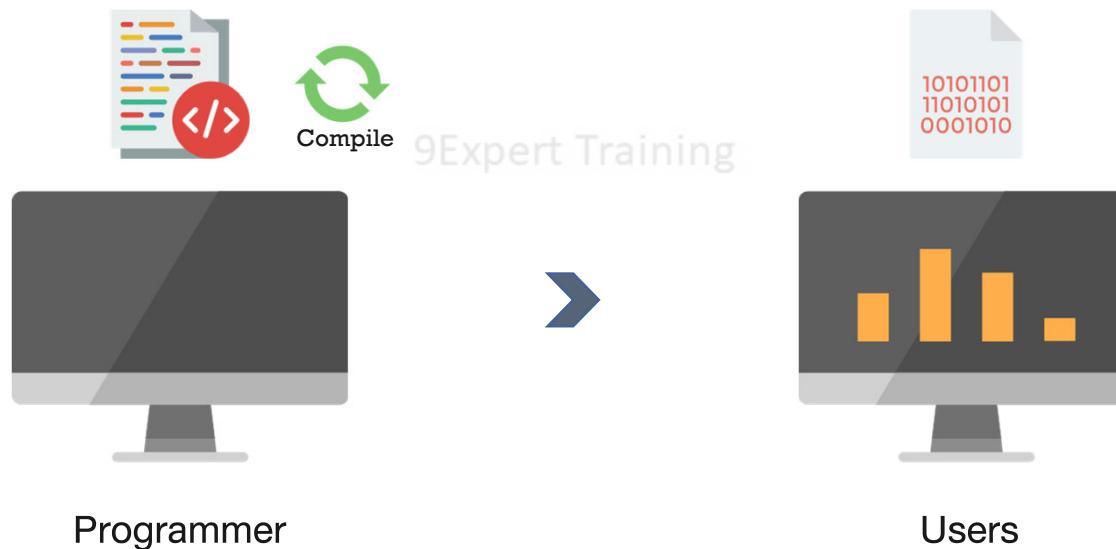


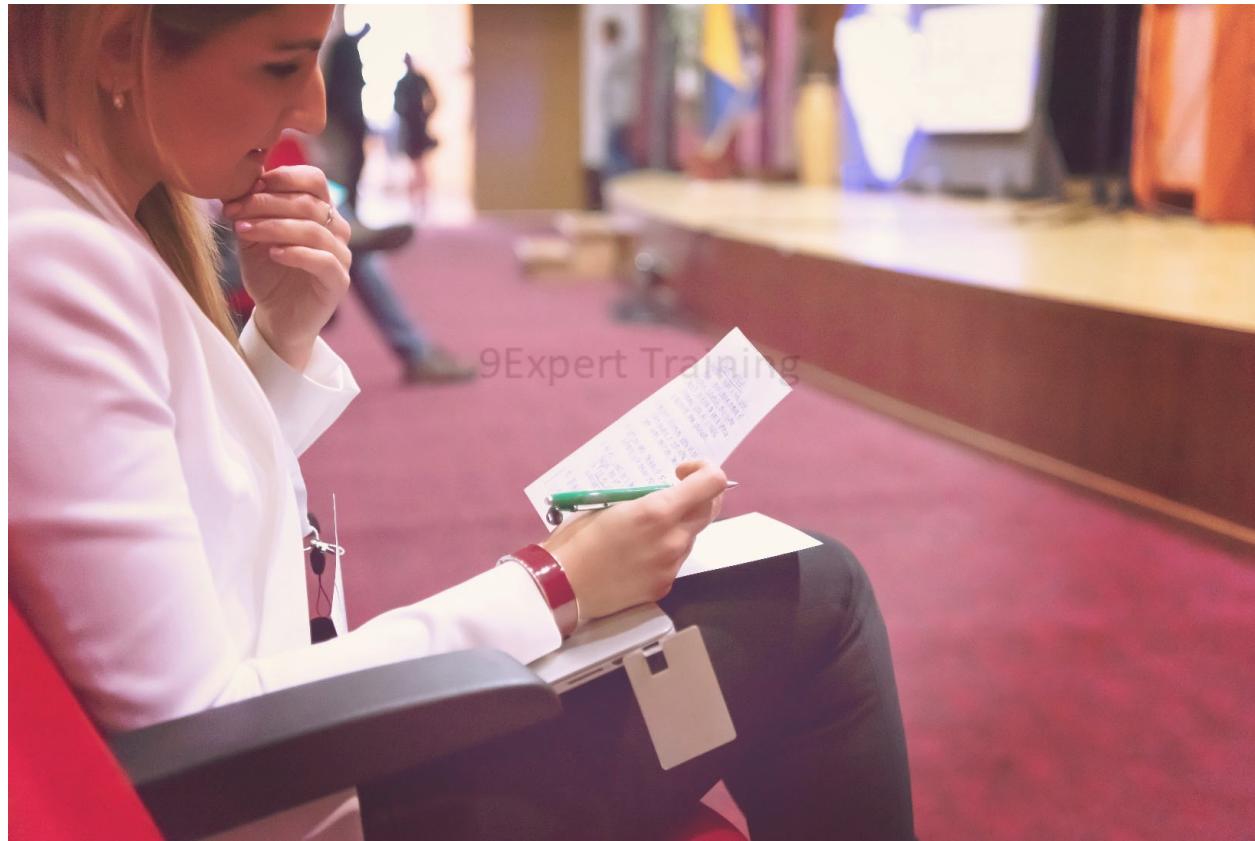


1. แปลงความคิดในการแก้ปัญหาเป็นชุดคำสั่ง (Source)
2. Compiler/Interpreter แปลงชุดคำสั่งเป็นภาษาเครื่อง
3. ทำการรันชุดคำสั่งให้คอมพิวเตอร์ทำงาน



- คอมไпал์เตอร์ (Compiler) คือโปรแกรมในการแปลงชุดคำสั่งไปเป็นภาษาเครื่อง โดยทำการตรวจสอบความถูกต้องของชุดคำสั่ง ก่อน จากนั้นจึงทำการแปลงชุดคำสั่งก่อนทำงาน

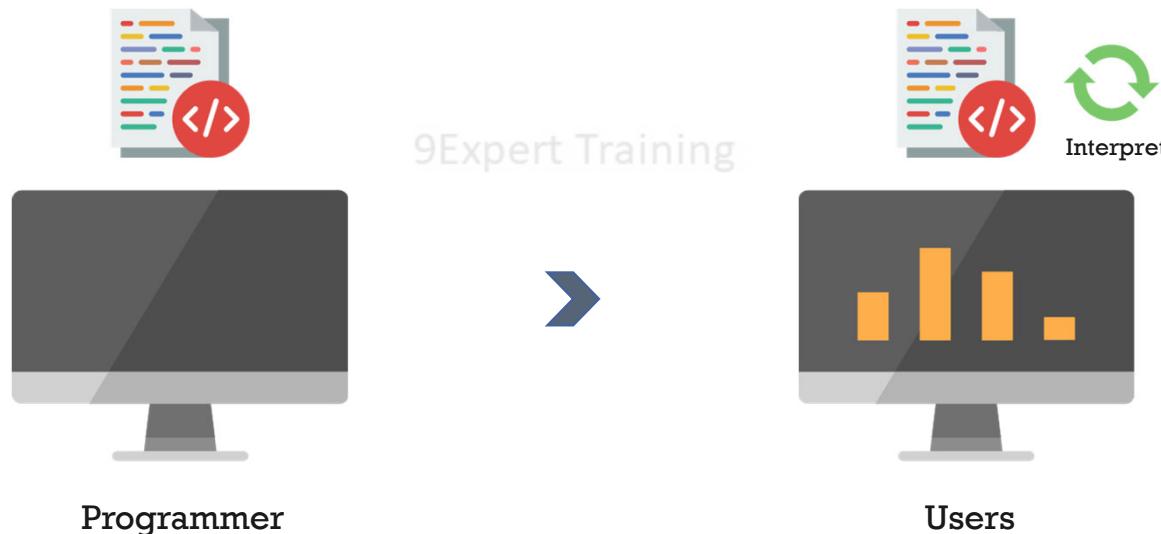






ตัวแปลคำสั่ง (Interpreter)

- ตัวแปลคำสั่ง (Interpreter) คือโปรแกรมในการแปลงชุดคำสั่งไปเป็นภาษาเครื่อง เป็นการแปลงชุดคำสั่งทีละบรรทัด เพื่อป้อนเข้าสู่หน่วยประมวลผลให้คอมพิวเตอร์ทำงานตามที่เราต้องการ







- Fortran
- COBOL
- Basic
- Pascal
- C/C++
- Python
- Java
- JavaScript
- R
- Scala
- Dart
- Rust
- Etc.,





Mojo 🔥 – a new programming language for all AI developers.

Mojo combines the usability of Python with the performance of C, unlocking unparalleled programmability of AI hardware and extensibility of AI models.

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LANGUAGES	TIME (S) *	SPEEDUP VS PYTHON
PYTHON 3.10.9	1027 s	1x
PYPY	46.1 s	22x
SCALAR C++	0.20 s	5000x
MOJO 🔥	0.03 s	35000x



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รู้จักกับภาษาโปรแกรม Python

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ภาษาโปรแกรม Python คือภาษาโปรแกรมคอมพิวเตอร์ระดับสูง มีความยืดหยุ่นสูง และถูกออกแบบมาให้เป็นภาษาสคริปต์ที่อ่านง่าย โดยทำการตัดความซับซ้อนของโครงสร้างและไวยกรณ์ของภาษาออกไป



```
public class HelloWorld {  
    public static void main(String[] args) {  
        System.out.println("hello, world");  
    }  
}
```

HelloWorld.java

```
#include <studio.h>  
main() {  
    printf("hello, world\n");  
}
```

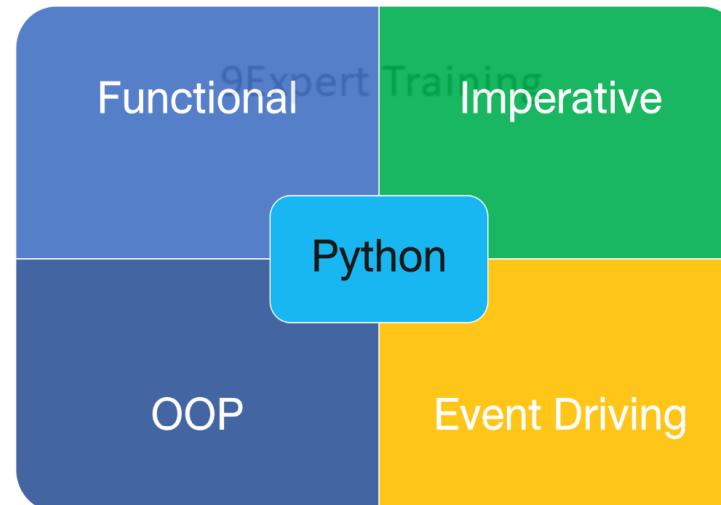
HelloWorld.c

```
print("hello, world")
```

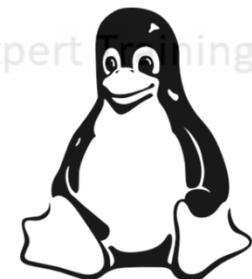
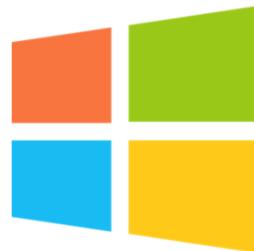
HelloWorld.py



- กระบวนการทัศน์การเขียนโปรแกรม (Programming Paradigm) คือแนวคิดหรือสื่อสารในการเขียนโปรแกรม โดยภาษา Python สนับสนุนการเขียนโปรแกรมได้หลายกระบวนการทัศน์



- ภาษา Python สามารถพัฒนาและนำไปใช้งานได้หลายระบบปฏิบัติการ



UNIX®



Python เป็นซอฟต์แวร์ประเภทโอเพนซอร์ส ทำให้สามารถนำชอร์สโค้ด (Source code) มาดัดแปลง แก้ไขได้กึ้งหมด โดยไม่จำเป็นต้องขออนุญาต และที่สำคัญเราสามารถนำไปใช้งานได้ฟรี โดยไม่มีค่าใช้จ่ายเรื่องค่าลิขสิทธิ์ใด ๆ



- วิทยาการข้อมูล (Data Science)
- ปัญญาประดิษฐ์และการเรียนรู้ด้วยเครื่องจักร (AI/ML)
- ระบบเว็บไซต์
- แอปพลิเคชันทางธุรกิจ
- เกม
- อื่น ๆ

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- Google
- YouTube
- Dropbox
- Facebook
- Instagram
- Netflix
- Spotify
- BitTorrent

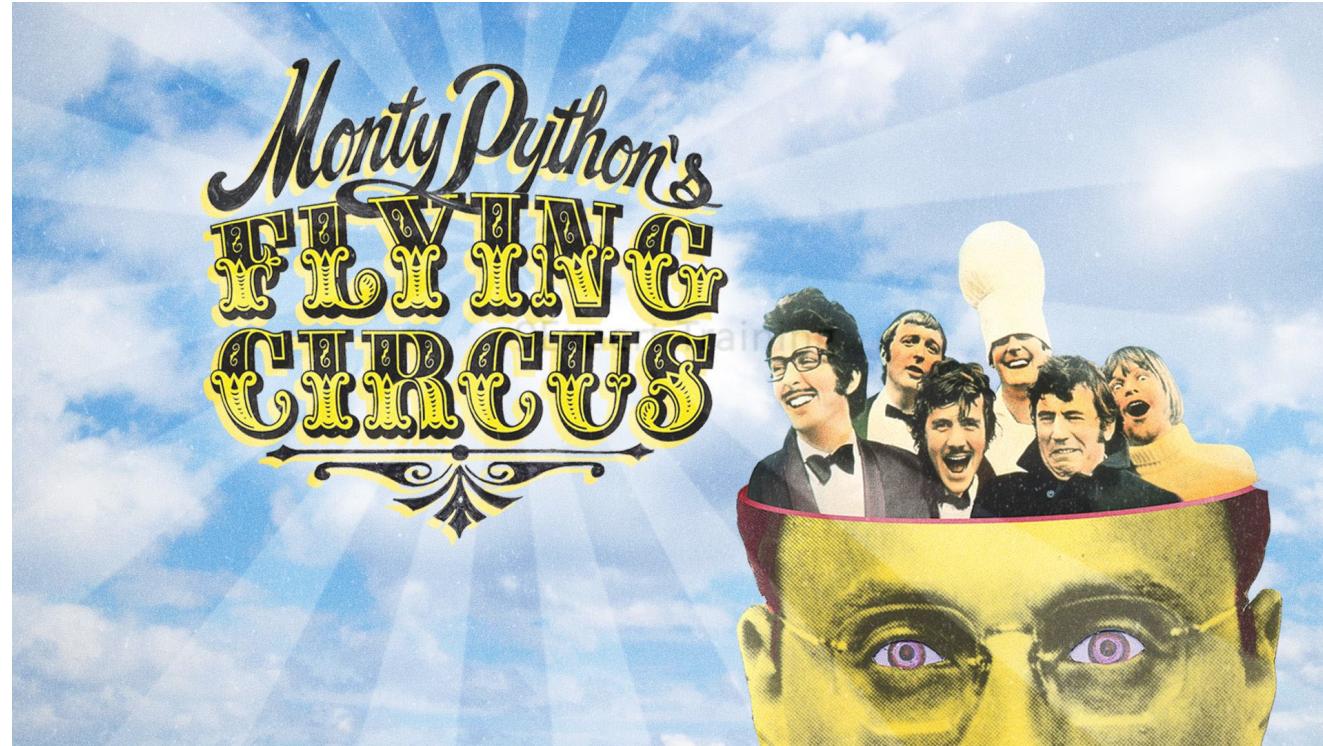
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- Guido van Rossum, 1956 โปรแกรมเมอร์ชาวดัตช์
- ปัจจุบันทำงานให้กับ Microsoft ในแผนกนักพัฒนา (Developer Division) เพื่อพัฒนาให้ภาษา Python ดียิ่งขึ้น

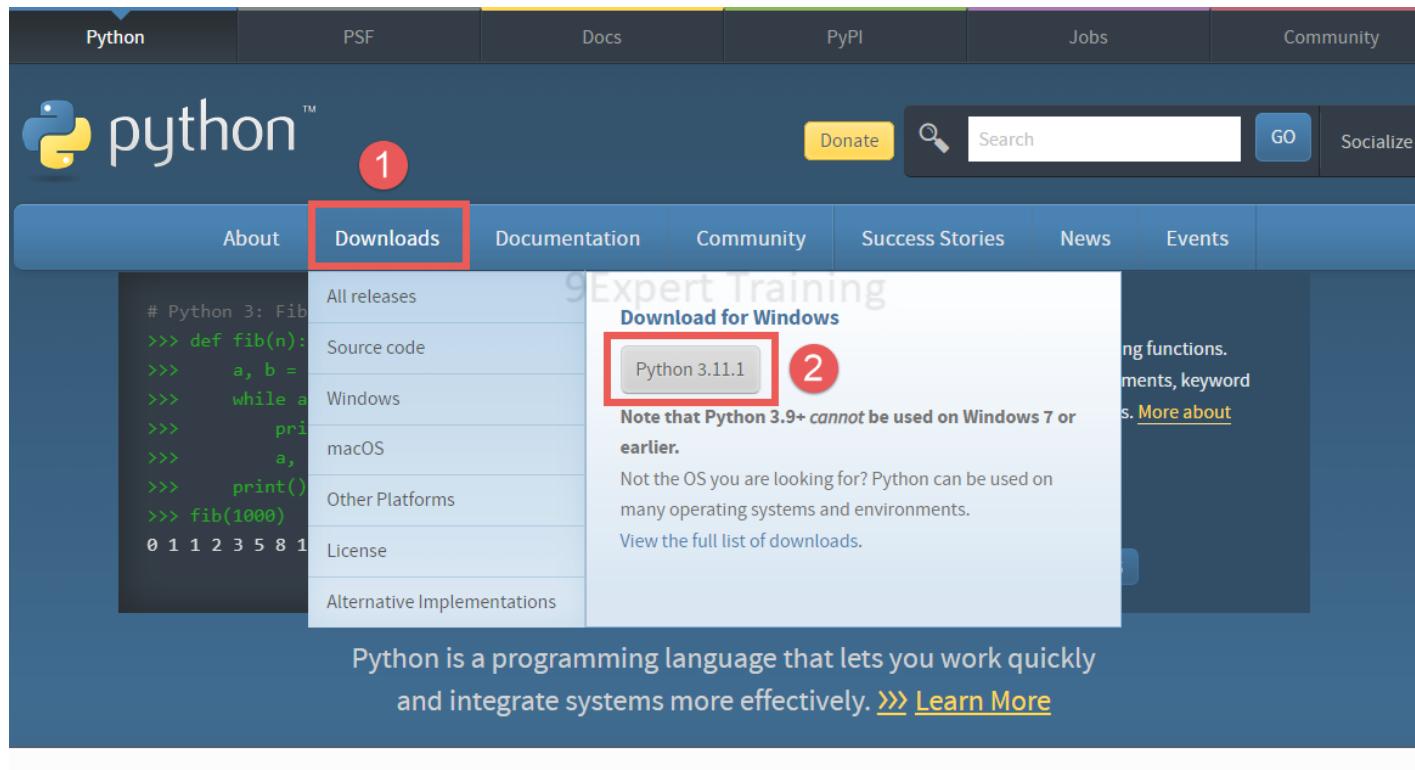


Guido van Rossum

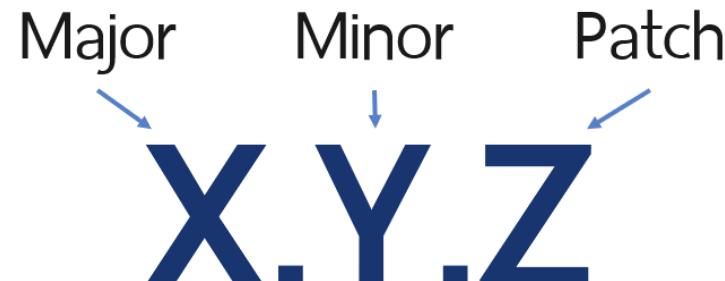


รายการ Monty Python's Flying Circus

- ดาวน์โหลดโปรแกรมได้จาก <http://www.python.org>

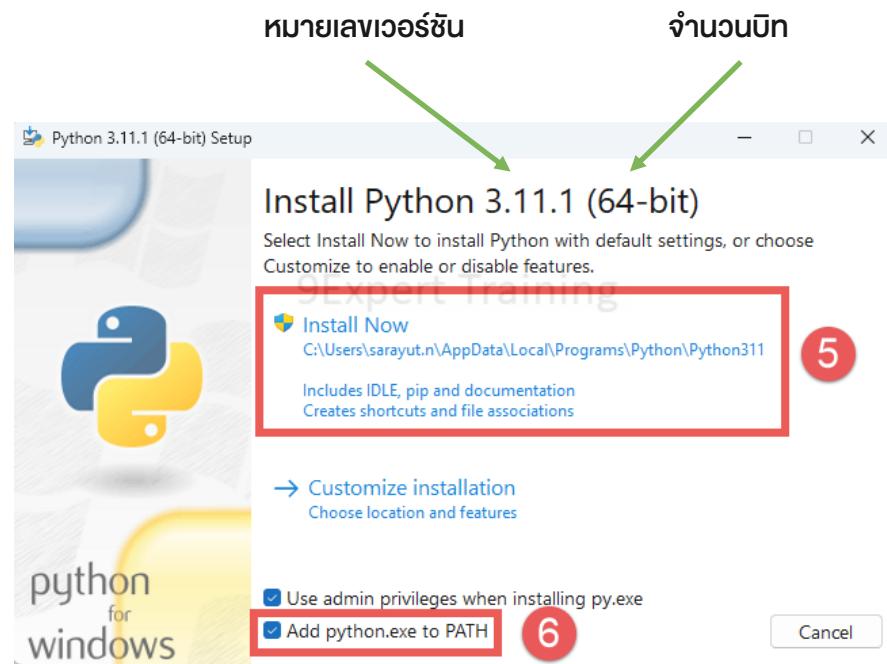


- Major คือเวอร์ชันการเปลี่ยนแปลงหรือเพิ่ม API หลักจำนวนมาก และไม่รองรับการเรียกใช้งาน API จากเวอร์ชันเก่าได้ ทำให้ชุดคำสั่งของทั้งเวอร์ชันใหม่ และเวอร์ชันเก่าไม่สามารถทำงานร่วมกันได้
- Minor คือเวอร์ชันการเปลี่ยนแปลงหรือเพิ่มฟังก์ชันการทำงานใหม่เพียงเล็กน้อย โดยไม่กระทบการทำงานของชุดคำสั่งเวอร์ชันปัจจุบันที่ใช้งานอยู่ (Backward compatibility)
- Patch คือเวอร์ชันการปรับปรุงการทำงานหรือแก้ไข Bugs ต่าง ๆ ของเวอร์ชันหลักปัจจุบัน



<https://semver.org/>

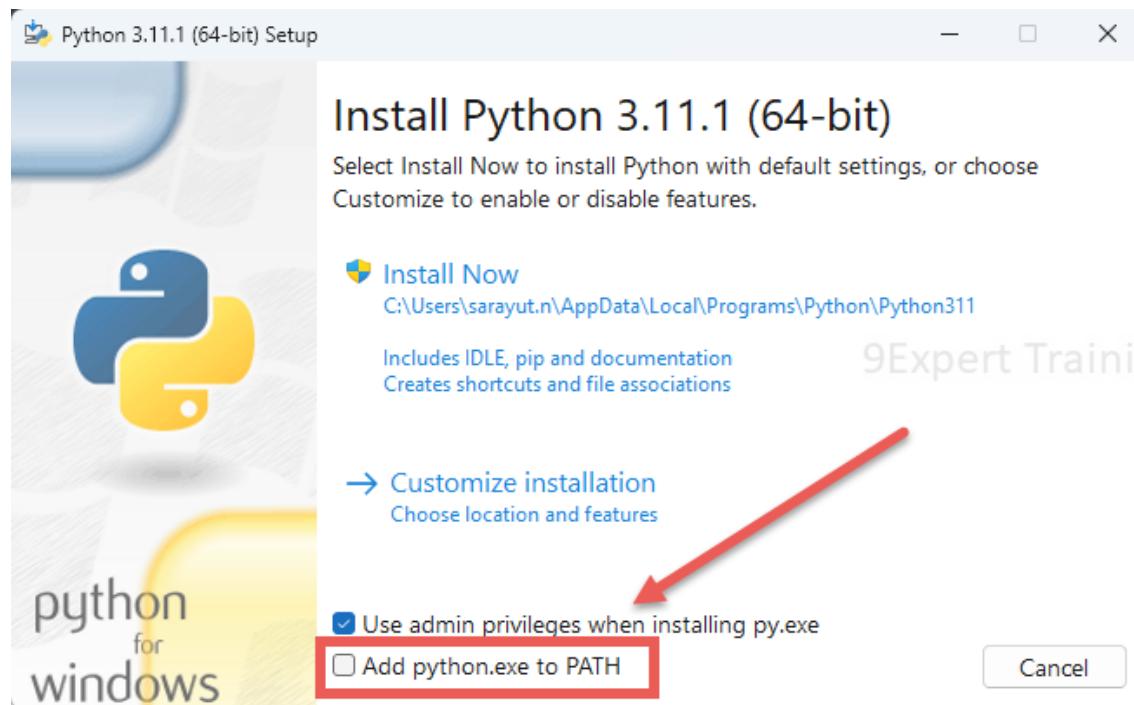
- ดาวน์โหลดโปรแกรมภาษา Python เวอร์ชัน 64 bit
- ทำการติดตั้งเพื่อใช้งาน



หมายเหตุ : ให้เลือก “Add Python 3.x to PATH”



Python path is not added



```
Microsoft Windows [Version 10.0.19042.928]
(c) Microsoft Corporation. All rights reserved.

C:\Users\ericm>python
'python' is not recognized as an internal or external command,
operable program or batch file.

C:\Users\ericm>
```

```
C:\Users\VenD>pip
'pip' is not recognized as an internal or external command,
operable program or batch file.

C:\Users\VenD>
```



- Script mode
- Interactive mode

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- Interactive mode หรือเรียกว่า Read–Eval–Print–Loop (REPL)
- หมายความว่าสามารถเขียนโปรแกรมที่มีขนาดเล็ก

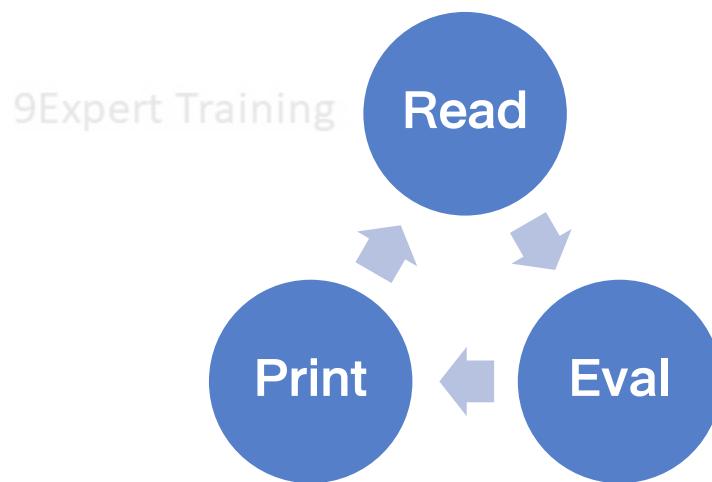
The screenshot shows the Python 3.6.8 Shell window. The title bar reads "Python 3.6.8 Shell". The menu bar includes File, Edit, Shell, Debug, Options, Window, and Help. The main window displays the following Python session:

```
Python 3.6.8 (tags/v3.6.8:3c6b436a57, Dec 24 2018, 00:16:47) [MSC v.1916 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>> print("hello, word")
hello, word
>>> 2*5
10
>>> x = 7
>>> x
7
>>> "Python programming"
'Python programming'
>>>
```

The window has scroll bars on the right and bottom. The status bar at the bottom right shows "Ln: 12 Col: 4".

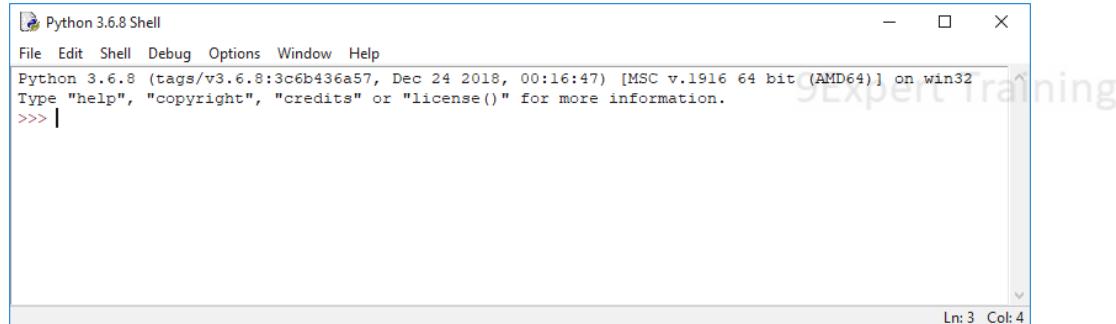
IDLE

- Read – การนำเข้าข้อมูลเข้าสู่โปรแกรม (Input)/อ่านชอร์สโค้ด (source code)
- Eval – ประมวลผลชุดคำสั่งแบบกันที
- Print – พิมพ์ผลลัพธ์ของการหน่วยแสดงผลข้อมูล
- Loop - การวนซ้ำนำเข้าข้อมูลใหม่อีกครั้ง

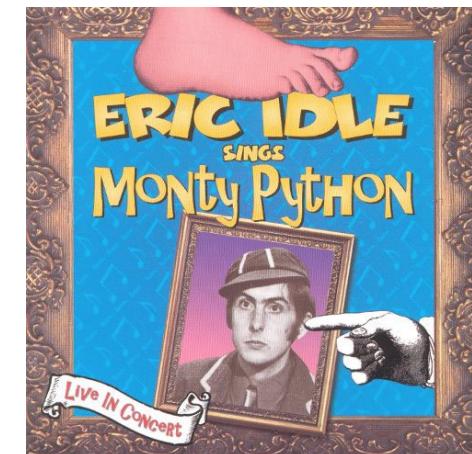




- IDLE คือเครื่องมือที่ช่วยในการพัฒนาโปรแกรมด้วยภาษา Python
- IDLE จะถูกติดตั้งมาพร้อมกับโปรแกรมภาษา Python
- กีฬาของซื่อมากจาก Eric Idle หนึ่งในนักแสดงกลุ่ม Monty Python



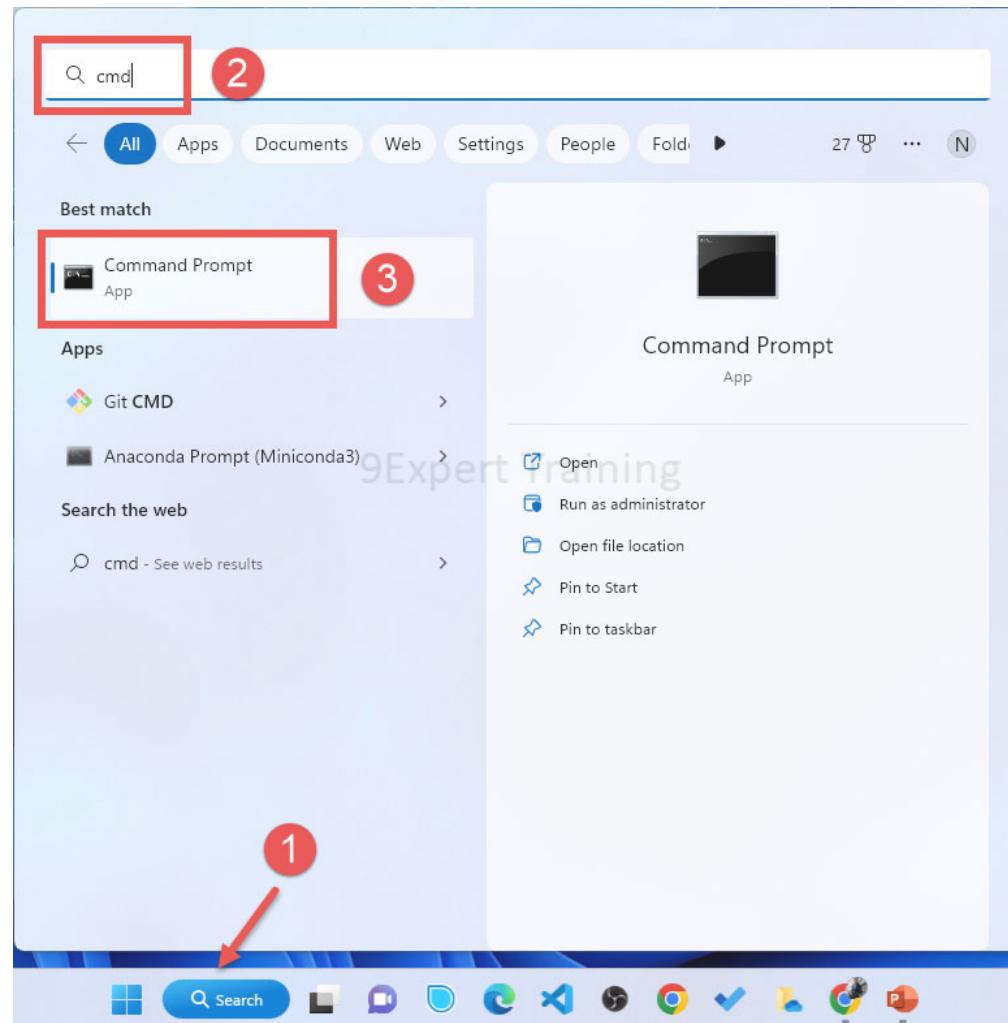
IDLE



Eric Idle



Open command prompt





> python

The screenshot shows a terminal window titled "Python 3.11 (64-bit)". The window contains the following text:
Python 3.11.1 (tags/v3.11.1:a7a450f, Dec 6 2022, 19:58:39) [MSC v.1934 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> | 9Expert Training



```
Command Prompt - python  X + | v

Microsoft Windows [Version 10.0.22621.963]
(c) Microsoft Corporation. All rights reserved.

C:\Users\sarayut.n>python
Python 3.7.7 (default, May  6 2020, 11:45:54) [MSC v.1916 64 bit (AMD64)] :: Anaconda, Inc. on win32

Warning:
This Python interpreter is in a conda environment, but the environment has
not been activated. Libraries may fail to load. To activate this environment
please see https://conda.io/activation

Type "help", "copyright", "credits" or "license" for more information.
>>> print('hello world')
hello world
>>> 2*3
6
>>> import numpy as np
>>> |
```



```
Microsoft Windows [Version 10.0.22621.963]
(c) Microsoft Corporation. All rights reserved.

C:\Users\sarayut.n>python
Python 3.7.7 (default, May  6 2020, 11:45:54) [MSC v.1916 64 bit (AMD64)] :: Anaconda, Inc. on win32
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Warning:
This Python interpreter is in a conda environment, but the environment has
not been activated. Libraries may fail to load. To activate this environment
please see https://conda.io/activation

Type "help", "copyright", "credits" or "license" for more information.
>>> exit()
```



A screenshot of a Windows Command Prompt window titled "Command Prompt". The window shows the following text:
C:\Users\sarayut.n>2*3 9Expert Training
'2*3' is not recognized as an internal or external command,
operable program or batch file.
C:\Users\sarayut.n>



Script Mode

ขั้นตอนการเขียนโปรแกรมแบบ Script mode

- เขียนโปรแกรมด้วย Text editor หรือ IDE
- บันทึก Source code ด้วยนามสกุล .py
- ทำการรันด้วยคำสั่ง python ตามด้วยชื่อไฟล์
 - >>> python <filename.py>

The screenshot displays two file explorers and two command-line windows. The top file explorer shows a folder named 'C:\learn_python\project1' containing a single file 'hello.py'. The bottom file explorer shows a folder named 'cmd' also containing a single file 'hello.py'. Both files are identified as 'Python Source File' and have a size of 0 KB. Below the file explorers are two command-line windows. The left window is titled 'hello - Notepad' and contains the Python script code:

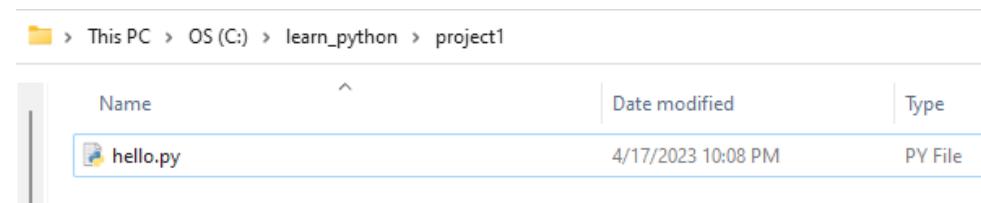
```
print("hello, word")
print(2*5)
print(3.141)
print(9/3)
```

The right window is titled 'C:\Windows\System32\cmd.exe' and shows the output of running the script:

```
C:\Users\DarkSide\Desktop\Lab\2>python hello.py
hello, word
10
3.141
3.0
C:\Users\DarkSide\Desktop\Lab\2>
```

```
> cd C:\learn_python\project1
```

```
> python hello.py
```



```
Microsoft Windows [Version 10.0.22621.1555]
(c) Microsoft Corporation. All rights reserved.

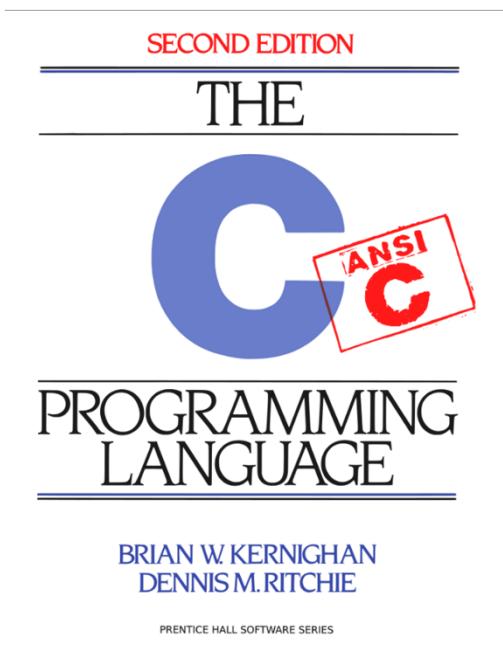
C:\Users\Nonsi>cd C:\learn_python\project1

C:\learn_python\project1>python hello.py
hello, world
10
3.14
4.5

C:\learn_python\project1>
```



ที่มาการเขียน hello, world



1978

1.1 Getting Started

The only way to learn a new programming language is by writing programs in it. The first program to write is the same for all languages:

*Print the words
hello, world*

```
#include <studio.h>
main() {
    printf("hello, world\n");
}
```

HelloWorld.c



ทดสอบคำสั่งต่อไปนี้บน IDLE

1. ทำการรันโปรแกรม hello.py ด้วยคำสั่งดังนี้

```
>>> python hello.py
```

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Python 3.9.x



Python 3.10.x



Python 3.11.x



Python 3.xx.x



Add or remove programs

The screenshot shows the Windows Settings app open to the 'Installed apps' section. The search bar at the top contains 'python'. Two apps are listed: 'Python 3.11.3 (64-bit)' and 'Python Launcher'. Both were installed on 4/17/2023. The 'Apps' category in the sidebar is selected.

App	Version	Size	Last Updated
Python 3.11.3 (64-bit)	3.11.3150.0	141 MB	4/17/2023
Python Launcher	3.11.3150.0	1.48 MB	4/17/2023

Related support

- Help from the web
- Learn about Control panel options moving to Settings

Get help

Give feedback



ทดสอบคำสั่งต่อไปนี้บน IDLE

1. `print("Python programming")`

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Using VS Code with Python

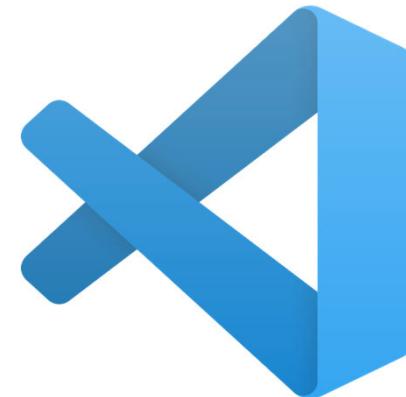
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- Source code editor
- Free to use
- Available for Windows, Mac OS, and Linux
- Run Python in Interactive and Script modes
- Support many programming languages

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The screenshot shows the official Visual Studio Code website. At the top, there's a navigation bar with links for Visual Studio Code, Docs, Updates, Blog, API, Extensions, and FAQ. To the right of the navigation is a search bar labeled "Search Docs" and a large blue "Download" button. A message at the top of the main content area says "Version 1.42 is now available! Read about the new features and fixes from January." Below this, a large white text area reads "Code editing. Redefined." followed by the subtitle "Free. Built on open source. Runs everywhere." There are two download buttons: "Download for Windows" (Stable Build) and "Other platforms and Insiders Edition". A note below the download buttons states: "By using VS Code, you agree to its license and privacy statement." On the right side of the screenshot, a portion of the Visual Studio Code interface is visible. It shows a code editor with three tabs: "App.js", "index.js", and "serviceWorker.js". The "serviceWorker.js" tab is active, displaying code related to service workers. To the left of the editor is the "Extensions: Marketplace" sidebar, which lists several popular extensions like Python, GitLens, ESLint, Debugger for Chrome, Language Support, vscode-icons, Vetur, and C#. The bottom of the interface shows a terminal window with the command "create-react-app" run, and status information like "Local: http://localhost:3000/" and "On Your Network: http://10.211.55.3:3000/".





Install Jupyter Extension for Visual Studio Code

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Knowledge Provider

The screenshot shows the Visual Studio Code interface with the Marketplace extension open. A red arrow points from the search bar to the 'jupyter' search result. A green box highlights the 'Jupyter' extension by Microsoft, with the text 'คลิก Install ของ Microsoft' (Click the Microsoft's Install) overlaid. The extension details page for 'Jupyter' is displayed, showing it has over 20 million installs and a 2.5 rating. The 'Install' button is highlighted with a red circle containing the number '2'. The sidebar on the right lists categories like Programming Languages, Extension Packs, Data Science, Machine Learning, Visualization, and Notebooks.

File Edit Selection View Go Run Terminal Help

EXTENSIONS: MARKETPL... T ... Extension: Jupyter x

jupyter 1

Jupyter 20.8M ★ 2.5 Jupyter notebook support, inter... Microsoft Install

Jupyter (depre... 754K ★ 3.5 Data Science with Jupyter on V... Don Jayamanne Install

VS Code Jupyter... 274K ★ 3.5 An easy to use extension for pr... jithurjacobs Install

Jupyter Keymap 35K Jupyter keymaps for notebooks Microsoft Install

Jupyter Checkpoint 634 Checkpoint control of Jupyter Peng Lv Install

Hy Jupyter 674 Evaluate a Hy form (S-expressi... Jonathan Huston Install

jupyter-noteboo... 53K ★ 1 Runs jupyter notebooks in vsc... Sam Helmhs Install

Remote editing - Jup... 5K This package allows you to edi... Sam Helmhs Install

Jupyter-QTConsole 7K

Extension: Jupyter - New folder - Visual Studio Code

Jupyter v2021.8.2031187289 microsoft | 20,867,522 | ★★★★☆(143) Jupyter notebook support, interactive programming and computing that supports Intellisense, debugging and more.

Install

Details Feature Contributions Changelog

Extension Pack (1)

Jupyter Keymap Jupyter keymaps for notebooks Microsoft Install

Jupyter Extension for Visual Studio Code

A Visual Studio Code extension that provides basic notebook support for language kernels that are supported in Jupyter Notebooks today. Many language kernels will work with no modification. To enable advanced features, modifications may be needed in the VS Code language extensions.

The Jupyter Extension includes the Jupyter Keymaps extension by default. The Jupyter Keymaps extension provides Jupyter-consistent keymaps and can be disabled or uninstalled.

Categories

- Programming Languages
- Extension Packs
- Data Science
- Machine Learning
- Visualization
- Notebooks

Resources

Marketplace

Repository

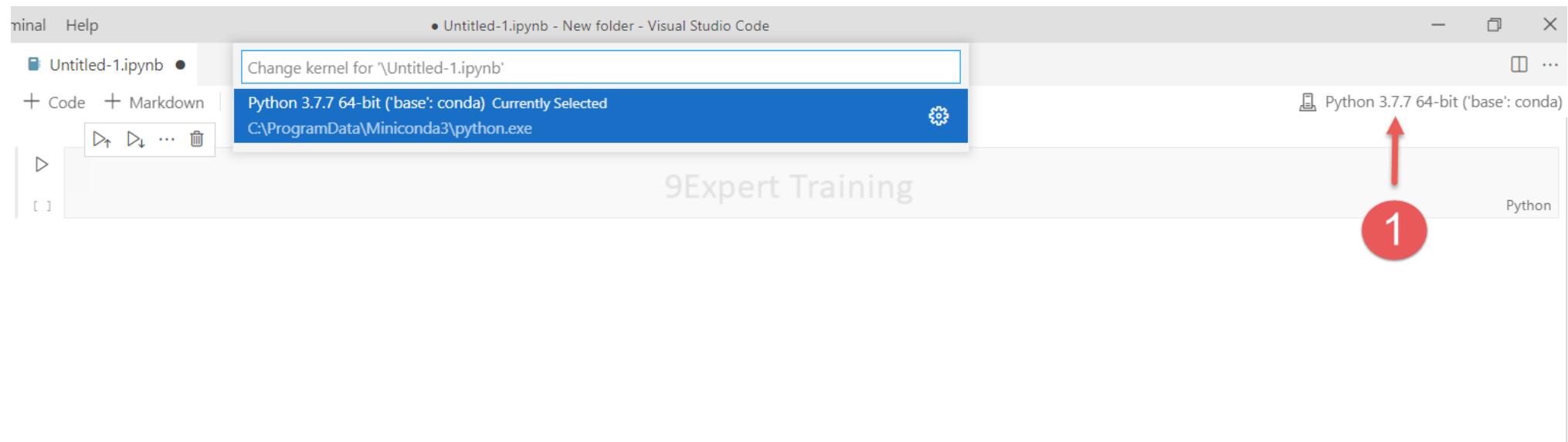
License

More Info

Released on 11/12/2020, 02:14:18

Last updated 9/1/2021, 01:59:08

Identifier ms-toolsai.jupyter



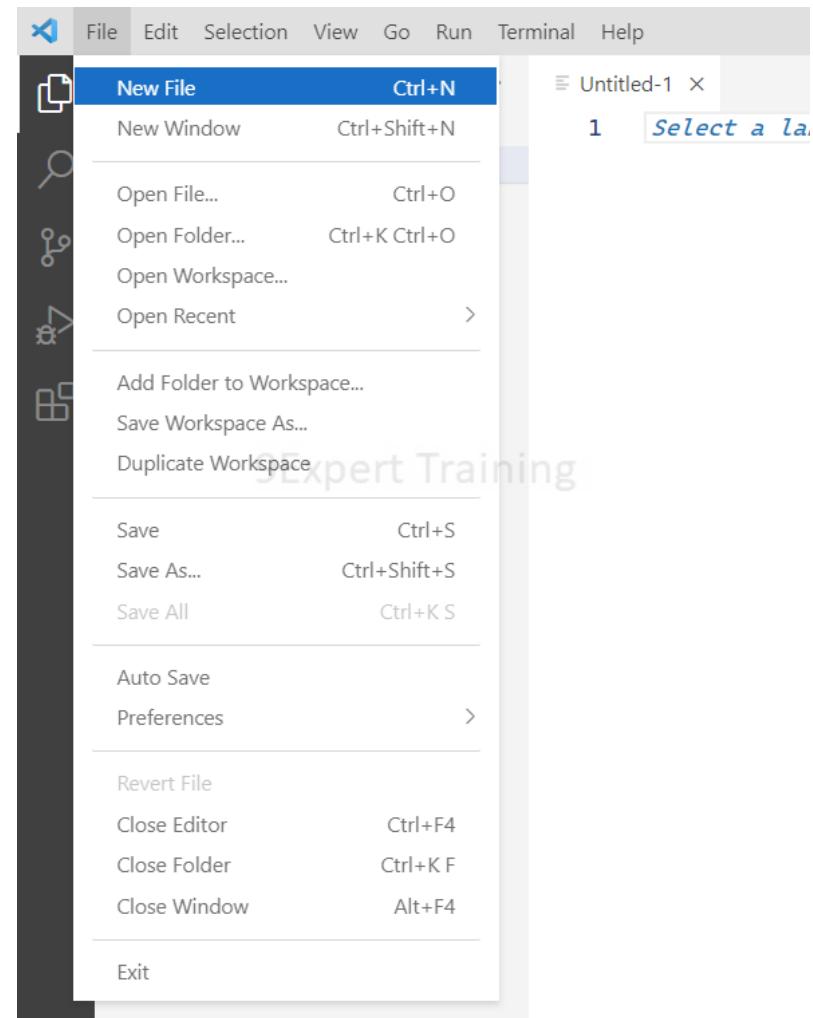


Script mode (VS Code)

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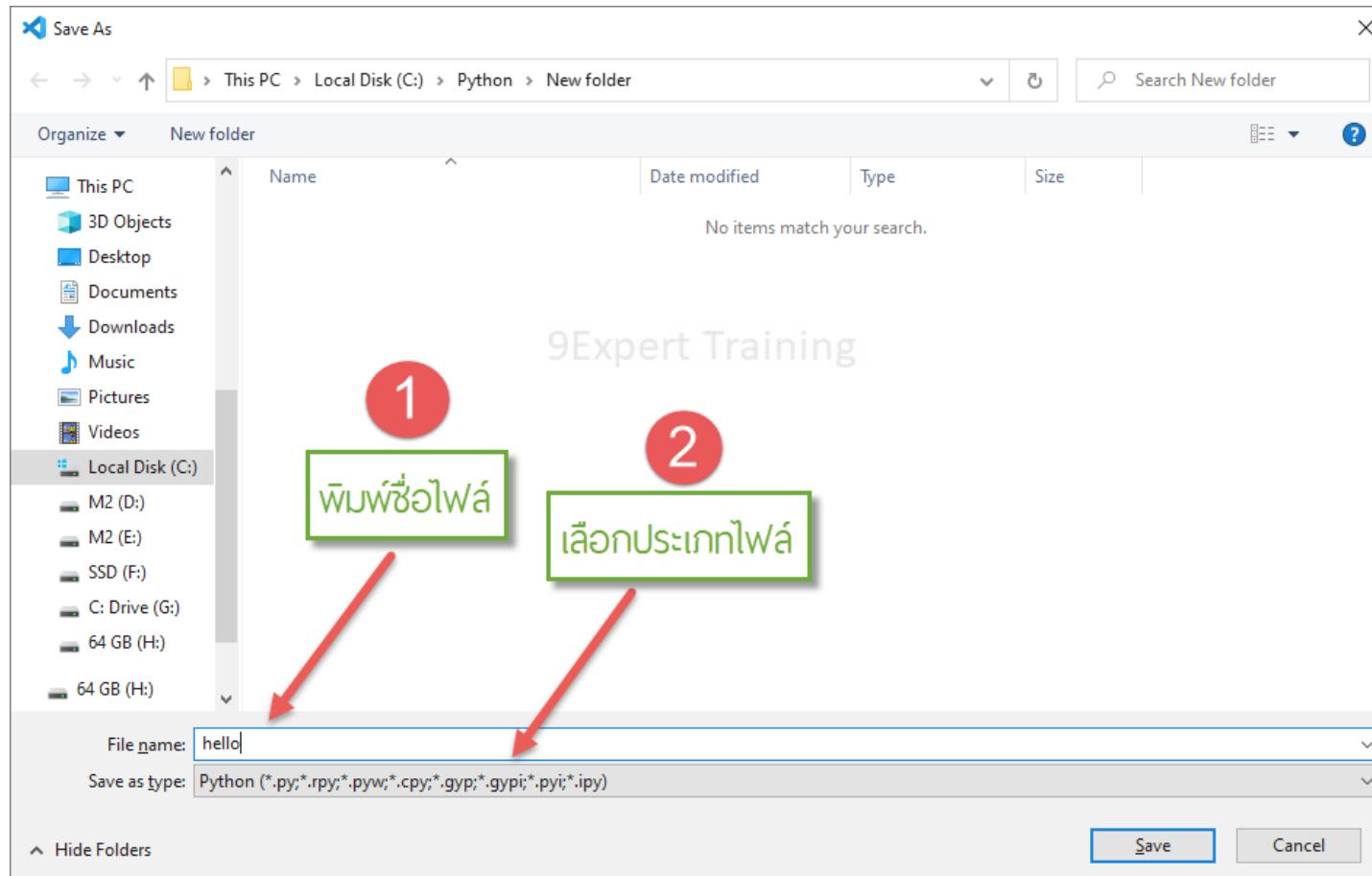
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การสร้างไฟล์ใหม่





```
> print('hello, world')
```





The screenshot shows a Visual Studio Code interface. In the top center, the title bar says "hello.py - New folder - Visual Studio Code". On the left sidebar, there are two files: "hello.py" and another "hello.py". On the right side, there's a toolbar with a green play button icon (numbered 1) and other icons. The main editor area contains the following code:

```
1 print('hello, world')
```

Below the editor is a terminal window titled "Windows PowerShell". The terminal output is as follows:

```
PROBLEMS OUTPUT MINAL
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Python\New folder> conda activate base
PS C:\Python\New folder> & C:/ProgramData/Miniconda3/python.exe "c:/Python/New folder/hello.py"
hello, world
PS C:\Python\New folder>
```

A red box highlights the word "hello, world" in the terminal output. A red arrow points from this box up to the green play button icon in the toolbar.



```
hello.py
```

```
1 print('hello, world')
```

Change All Occurrences Ctrl+F2
Format Document Shift+Alt+F
Format Document With...
Source Action...

Cut Ctrl+X
Copy Ctrl+C
Paste Ctrl+V

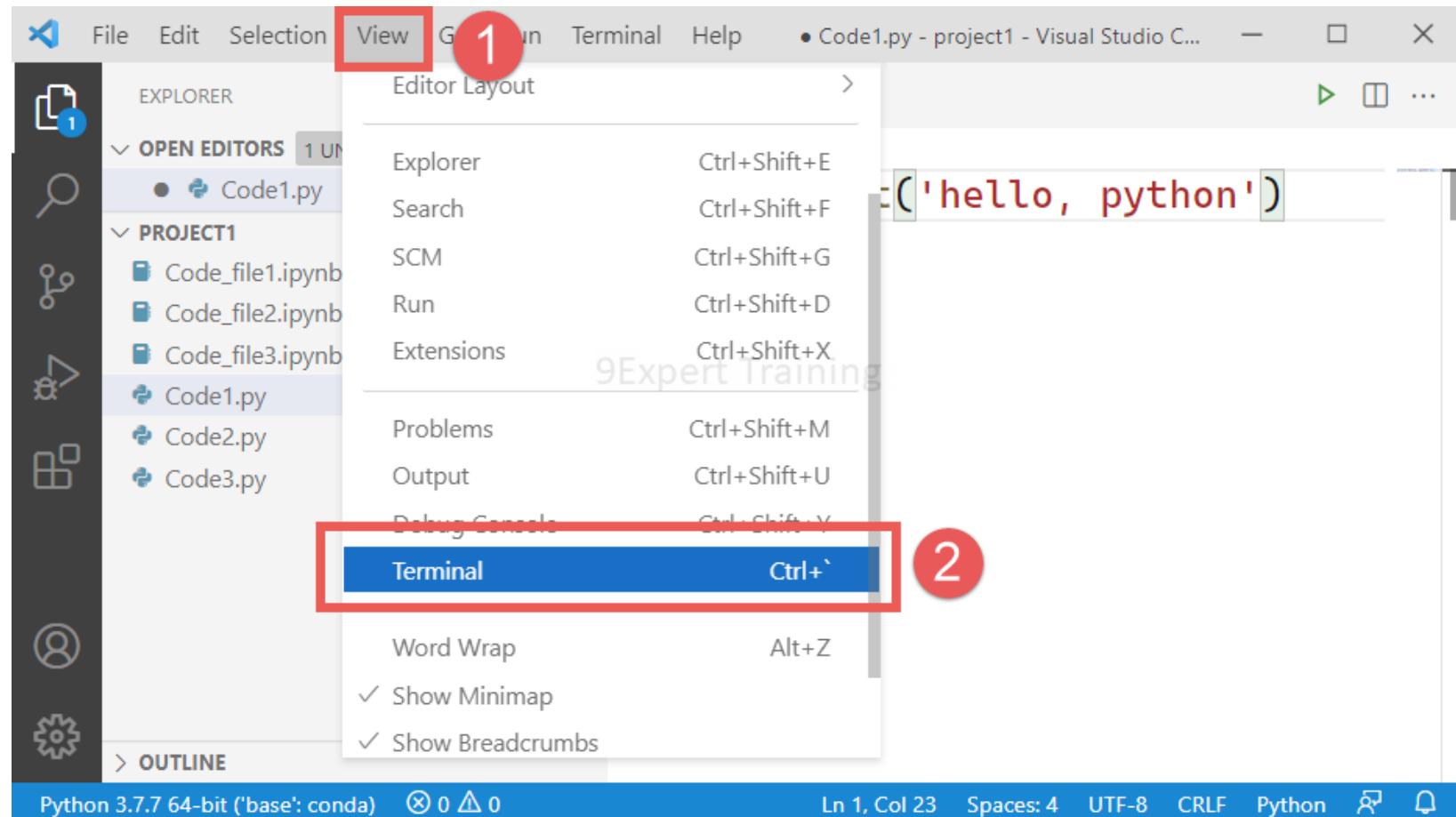
Run Current File in Interactive Window
Run From Line in Interactive Window
Run Selection/Line in Interactive Window Shift+Enter
Run To Line in Interactive Window

Run Current Test File
Run Python File in Terminal 1 Shift+Enter
Run Selection/Line in Python Terminal

Sort Imports
Command Palette... Ctrl+Shift+P

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

```
PS C:\Python\New folder> & C:/ProgramD  
hello, world  
PS C:\Python\New folder> 
```





The screenshot shows the Visual Studio Code interface. On the left is the Explorer sidebar with icons for files, folders, and terminals. The 'OPEN EDITORS' section shows 'Code1.py' is open. The 'PROJECT1' section lists 'Code_file1.ipynb', 'Code_file2.ipynb', 'Code_file3.ipynb', 'Code1.py', 'Code2.py', and 'Code3.py'. The main editor window displays the following Python code:

```
1 print('hello, python')
```

Below the editor is the Terminal tab, which shows the command 'python Code1.py' being run and the output 'hello, python'. A red box highlights the command in the terminal, and a red circle with the number '3' is positioned to the right of the terminal area.

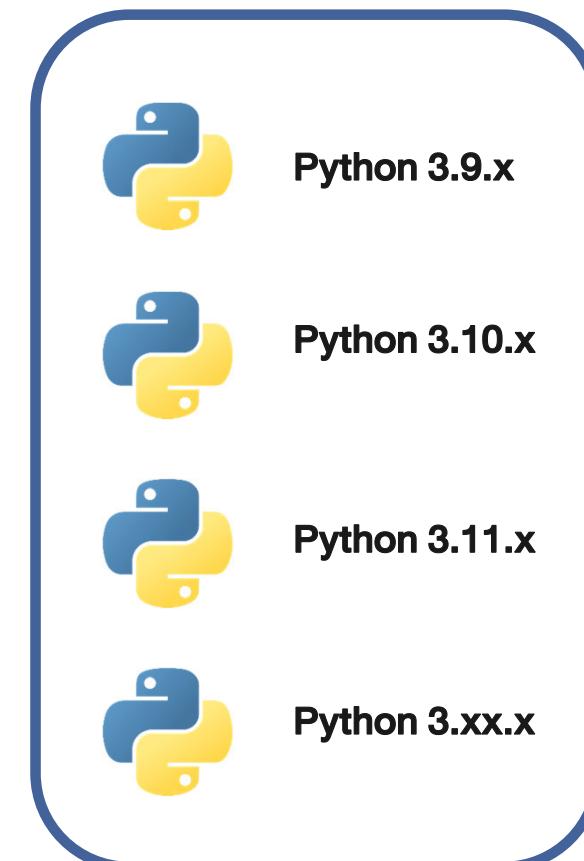
Bottom status bar: Python 3.7.7 64-bit ('base': conda) ⚡ 0 △ 0

Bottom status bar: Ln 1, Col 16 (7 selected) Spaces: 4 UTF-8 CRLF Python ⚡ 🔔

Python interpreter selection

The screenshot shows the Visual Studio Code interface with the following details:

- File Bar:** File, Edit, Selection, View, Go, Run, ...
- Title Bar:** reid_export.py - Smart pole - Visual St...
- Left Sidebar (EXPLORER):** Shows a file tree for the project "reid_export".
- Center Area:** A code editor window with Python code. A red box highlights the status bar at the bottom.
- Status Bar:** Shows "master*", "Ln 13, Col 25", "Spaces: 4", "UTF-8", "CRLF", "Python 3.7.7 ('base': conda)".
- Bottom Status Bar:** A "Select Interpreter" dialog is open, listing interpreters:
 - Selected Interpreter: ~\Miniconda3\python.exe
 - + Enter interpreter path...
 - Use Python from 'python.defaultInterpreterPath' setting ~\Miniconda3\pyth...
 - Python 3.9.12 ('yolov7') ~\Miniconda3\envs\yolov7\python.exe Conda
 - Python 3.7.7 ('base') ~\Miniconda3\python.exe





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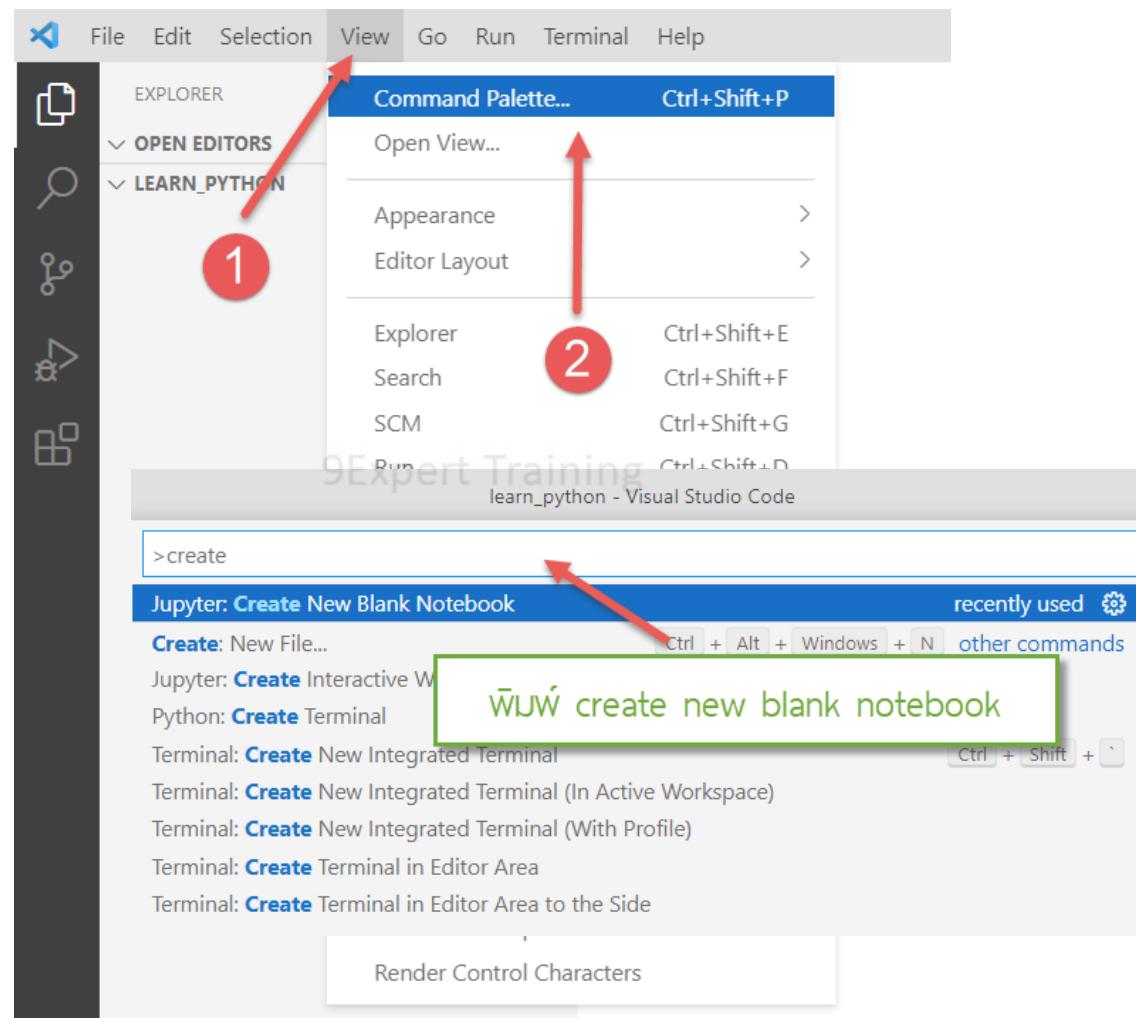


Interactive mode (VS Code)

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การสร้าง Python Jupyter Interactive Mode





The screenshot shows a Jupyter Notebook cell in Visual Studio Code. The cell contains the following Python code:

```
print('hello, world')
```

The output of the cell is:

```
[1] hello, world
```

The interface includes a toolbar with "Run All", "Clear Outputs", "Restart", "Interrupt", and "Variables" buttons. A status bar at the bottom indicates "9Expert Training".

Annotations with red numbers and green boxes explain the steps:

1. A green box labeled "กดปุ่ม Shift + Enter เพื่อรันโปรแกรม" (Press Shift + Enter to run the program) is positioned over the "Run All" button.
2. A green box labeled "แสดงผลลัพธ์" (Show results) is positioned over the output cell [1].
3. A green box labeled "ลำดับการรันคำสั่ง" (Order of execution) is positioned over the cell header.

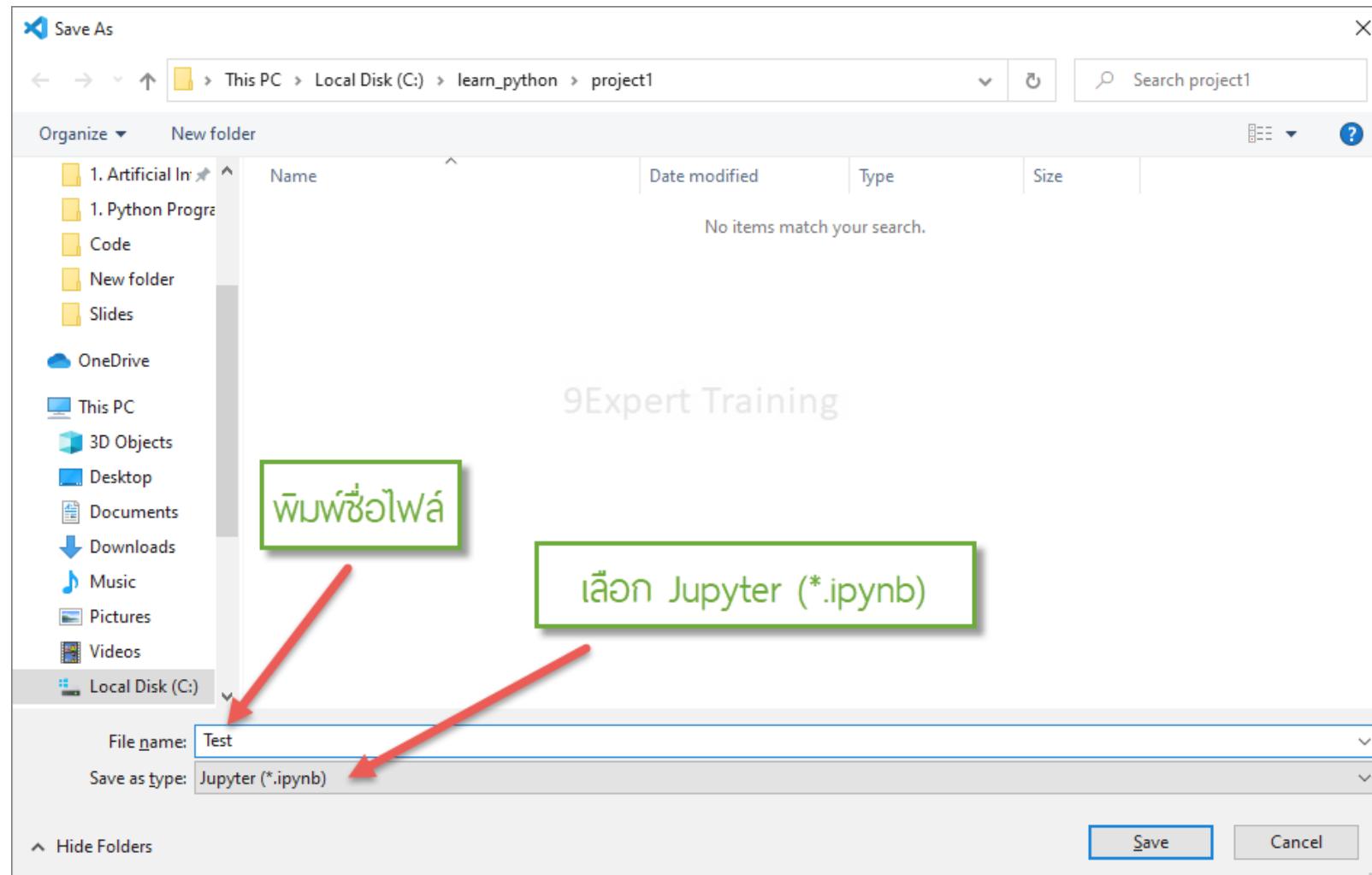
The screenshot shows a Jupyter Notebook interface with the file 'Untitled-1.ipynb' open. The toolbar includes Code, Markdown, Run All, Clear Outputs, Restart, Interrupt, Variables, and other options. A red box highlights the 'Run' button (a play icon) in the toolbar. A red arrow points from a red circle containing the number '1' to the output cell below. The output cell displays the code 'print('hello, world')' and its result 'hello, world'.

```
print('hello, world')
```

[2] ... hello, world



การบันทึกไฟล์



1. สร้างเซลล์ Code ใหม่

2. สร้างเซลล์ Markdown ใหม่

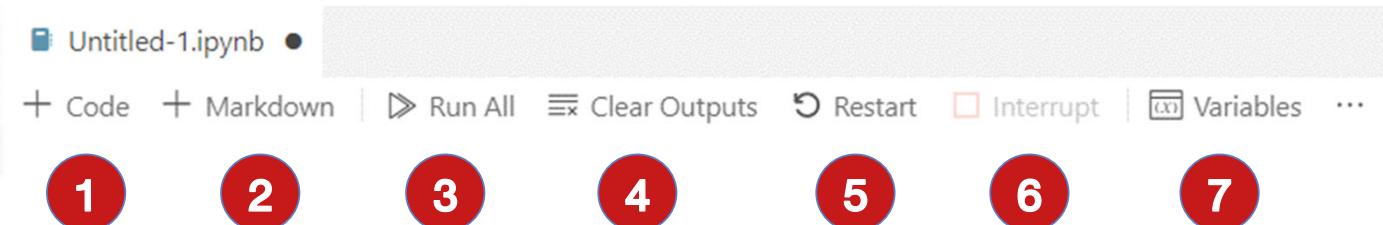
3. รันกั้งหมดทุกเซลล์

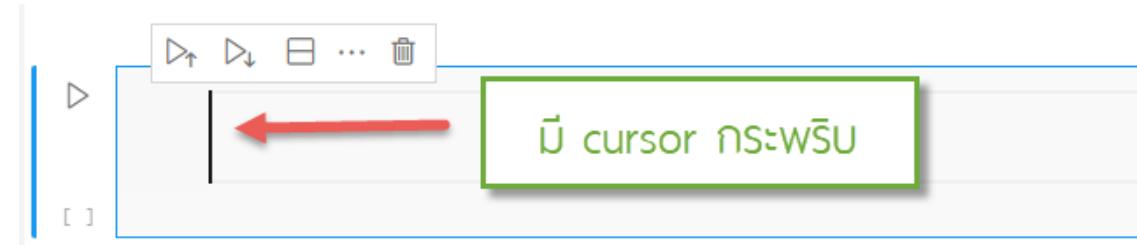
4. ลบผลลัพธ์กั้งหมด

5. Restart kernel โดยทำการลบตัวแปรและฟังก์ชันกั้งหมดในหน่วยความจำ

6. หยุดการทำงาน

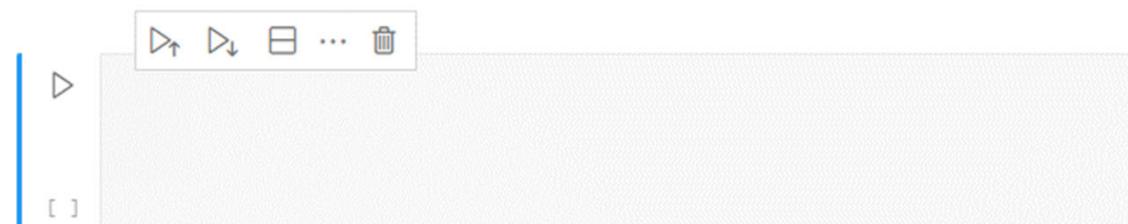
7. แสดงตัวแปรและค่าตัวแปรกั้งหมดในโปรแกรม





Edit mode

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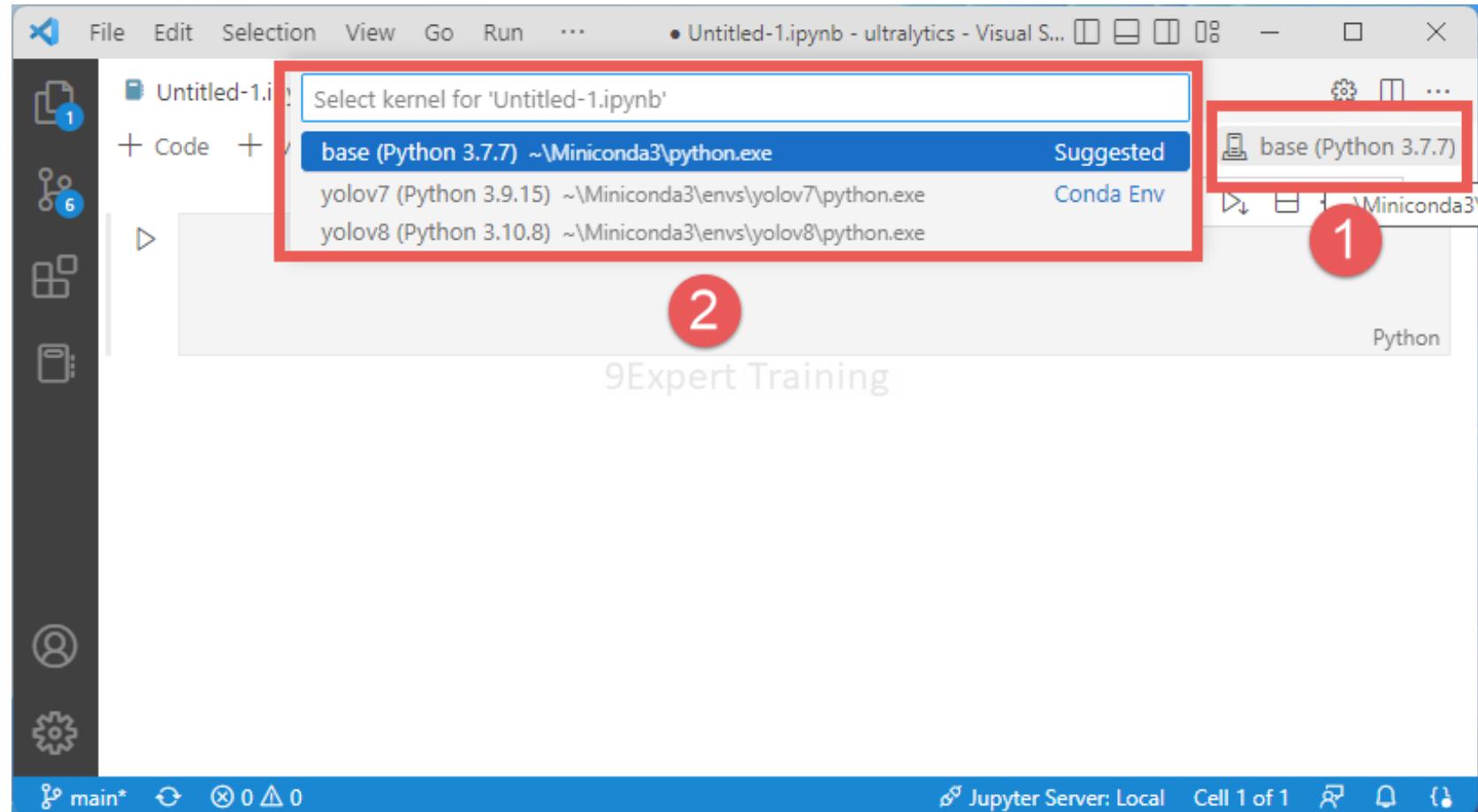
Command mode

หมายเหตุ: สลับโหมดการทำงานด้วยการกดปุ่ม Esc

Command Mode Action	Shortcut
insert empty cell above	a
insert empty cell below	b
copy cell	c
cut cell	x
paste cell below	v
to code cell	y
to markdown cell	m
save and checkpoint	s
execute cell	SHIFT+ENTER
to edit mode	ENTER
to command mode	ESC

หมายเหตุ: ต้องอยู่ใน Command mode ก่อนใช้งาน Shortcut เหล่านี้

Python interpreter selection (Interactive mode)





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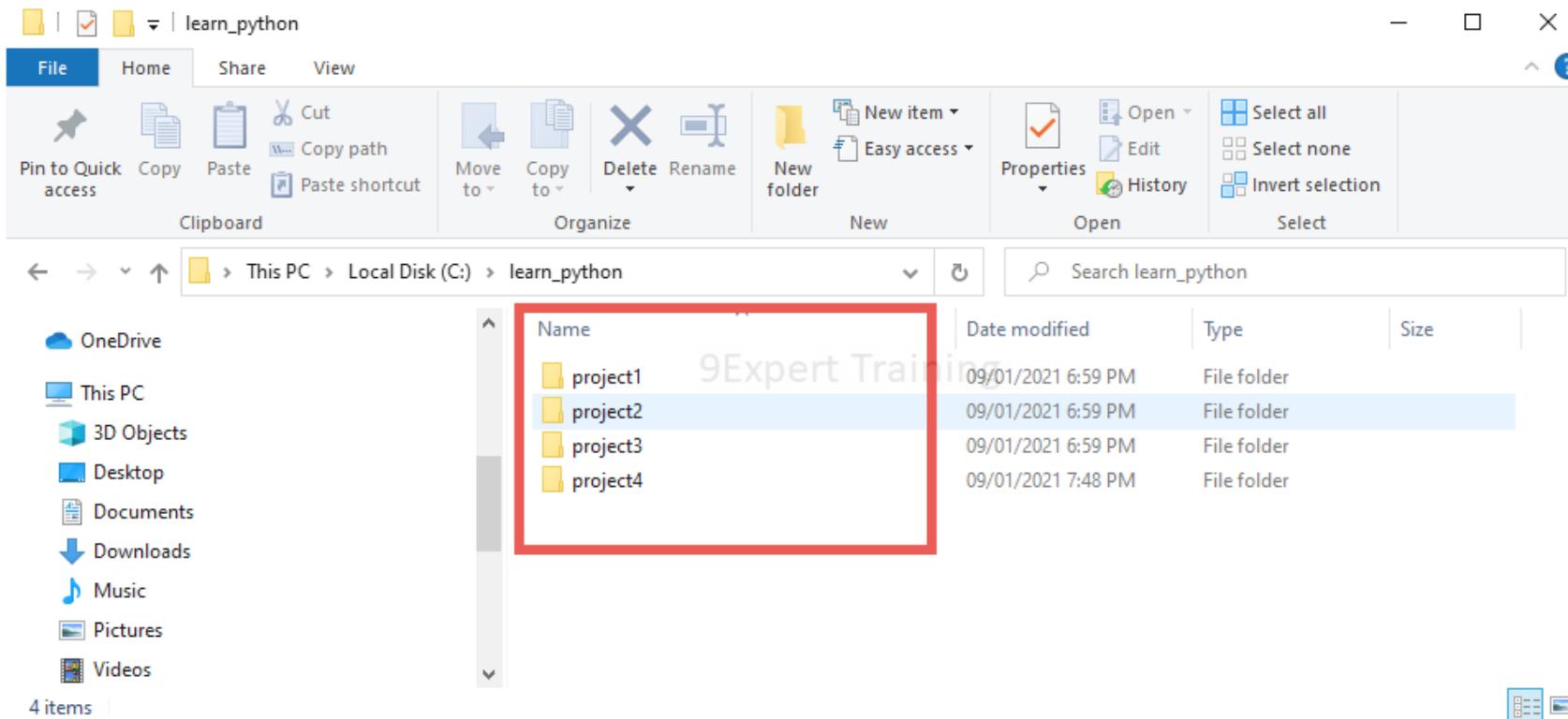
File organization

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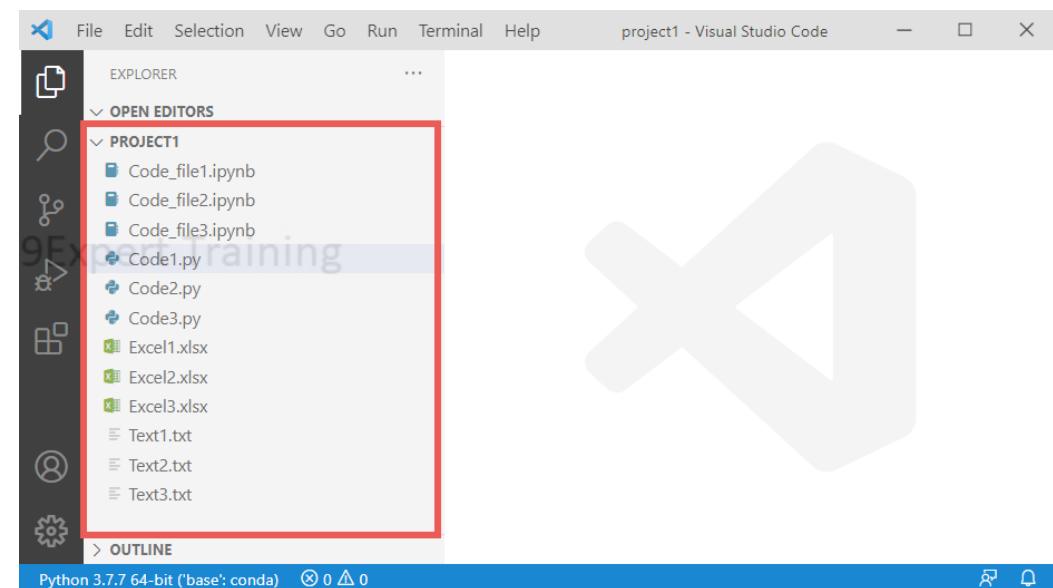
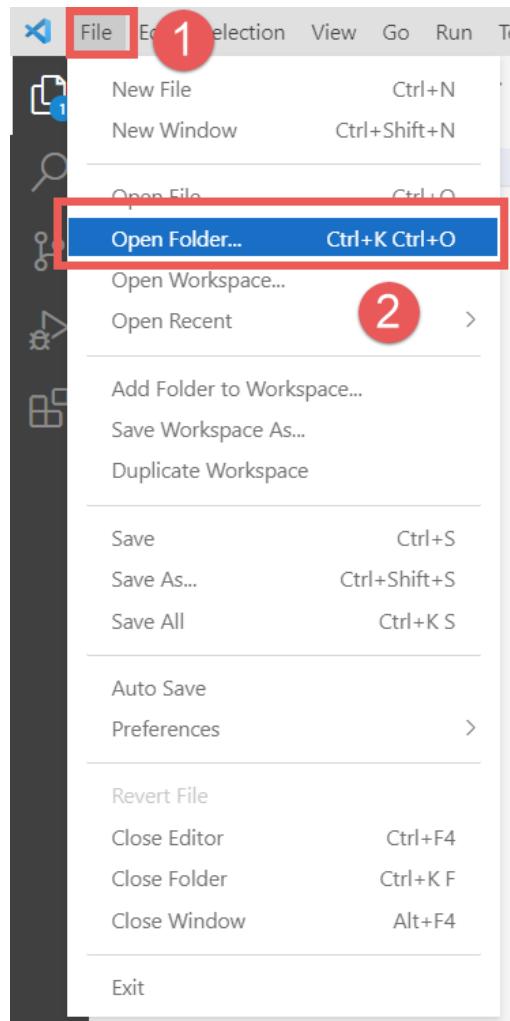


File organization



หมายเหตุ: แนะนำใช้ภาษาอังกฤษในการตั้งชื่อโฟลเดอร์และชื่อไฟล์ และไม่มีซองว่างภายในชื่อ

Open Folder...





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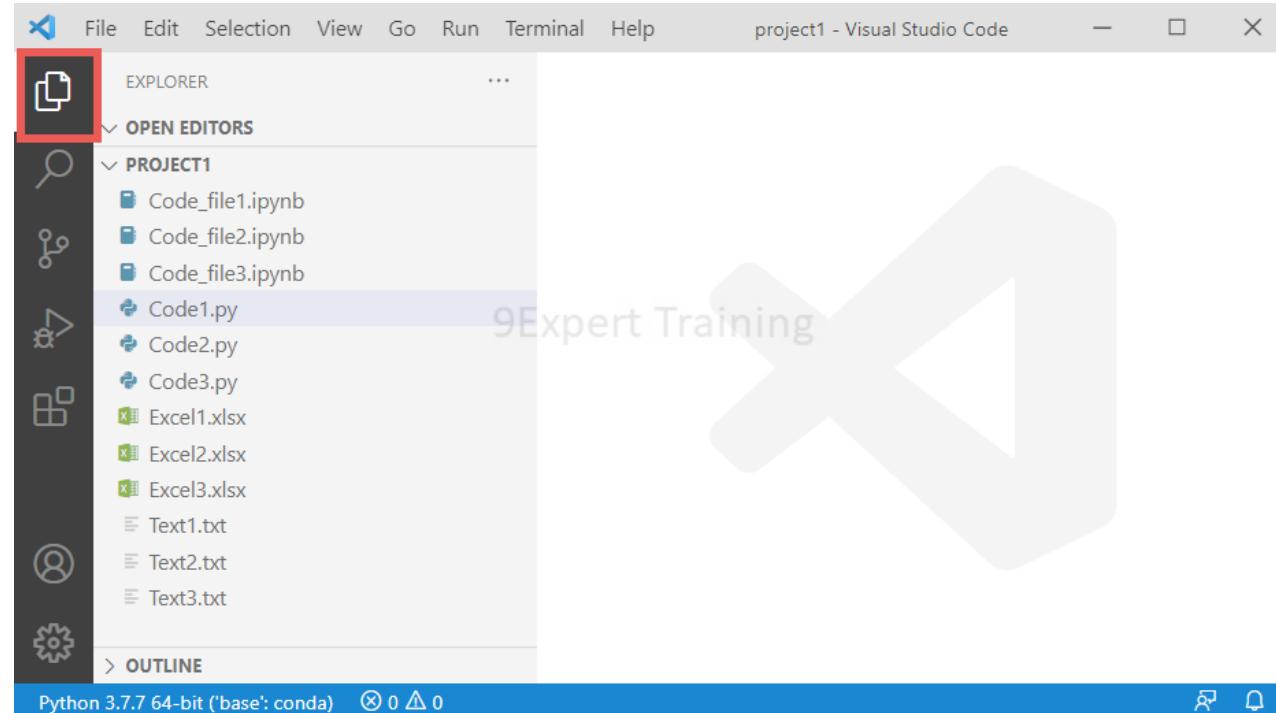
Shortcut keys in VS Code

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Open and close toggles



Shortcut: Ctrl + b (windows), Command + b (Mac)



Adjust font size

The screenshot shows the Visual Studio Code settings interface. The title bar reads "Settings - project1 - Visual Studio Co...". The left sidebar has a "Settings" icon and a search bar labeled "Search settings". Below the search bar are tabs for "User" and "Workspace", with "User" selected. A blue button "Turn on Settings Sync" is visible. On the left, a sidebar lists "Commonly Used" sections: Text Editor, Workbench, Window, Features, Application, Security, and Extensions. The "Editor: Font Size" setting is highlighted with a red box and a circled '1'. It has a description: "Controls the font size in pixels." and a value input field containing "20". Other settings visible include "Files: Auto Save" (set to "off") and "Editor: Font Weight" (set to "normal"). The bottom status bar shows "Python 3.7.7 64-bit ('base': conda) ⊗ 0 △ 0".



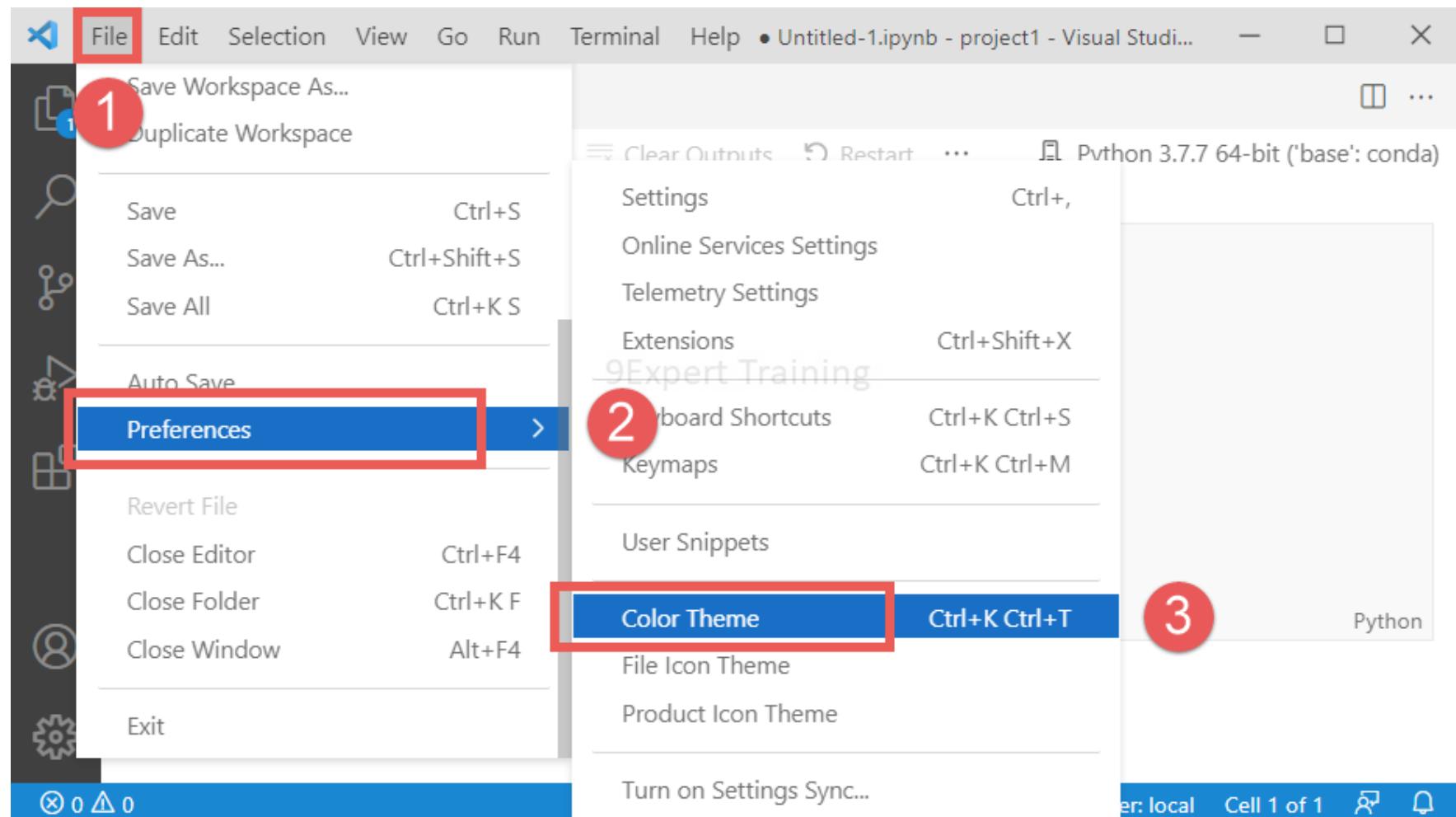
Show line number

A screenshot of the Visual Studio Code interface, specifically showing a Jupyter Notebook file named "Untitled-1.ipynb". The notebook cell contains the following Python code:

```
1
2
3
4
5
```

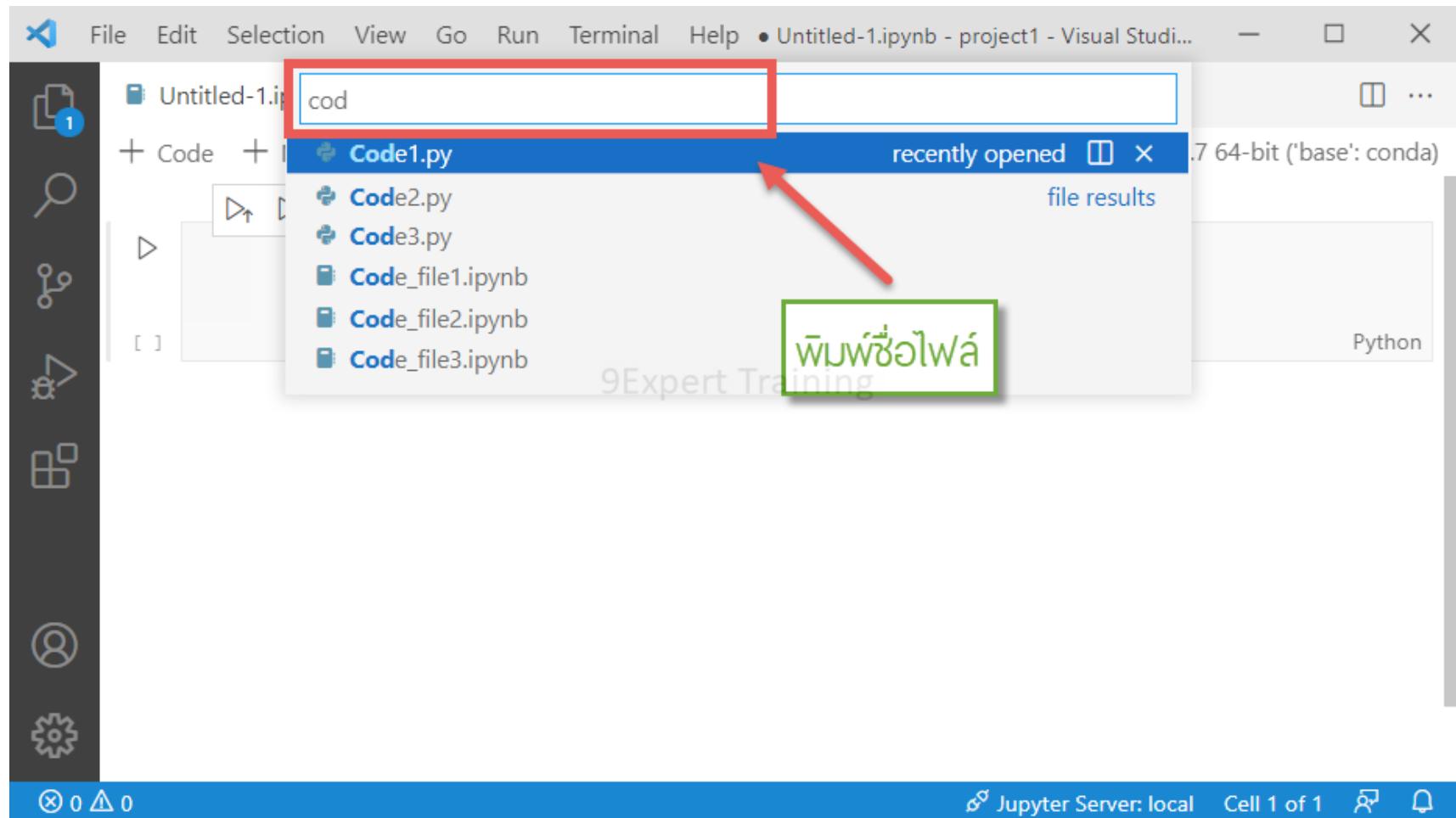
The "Show line number" feature is enabled, as indicated by the blue vertical bar on the left side of the code cell. The status bar at the bottom shows "Shortcut: Command mode: L ↵ Jupyter Server: local Cell 1 of 1".

Color Theme



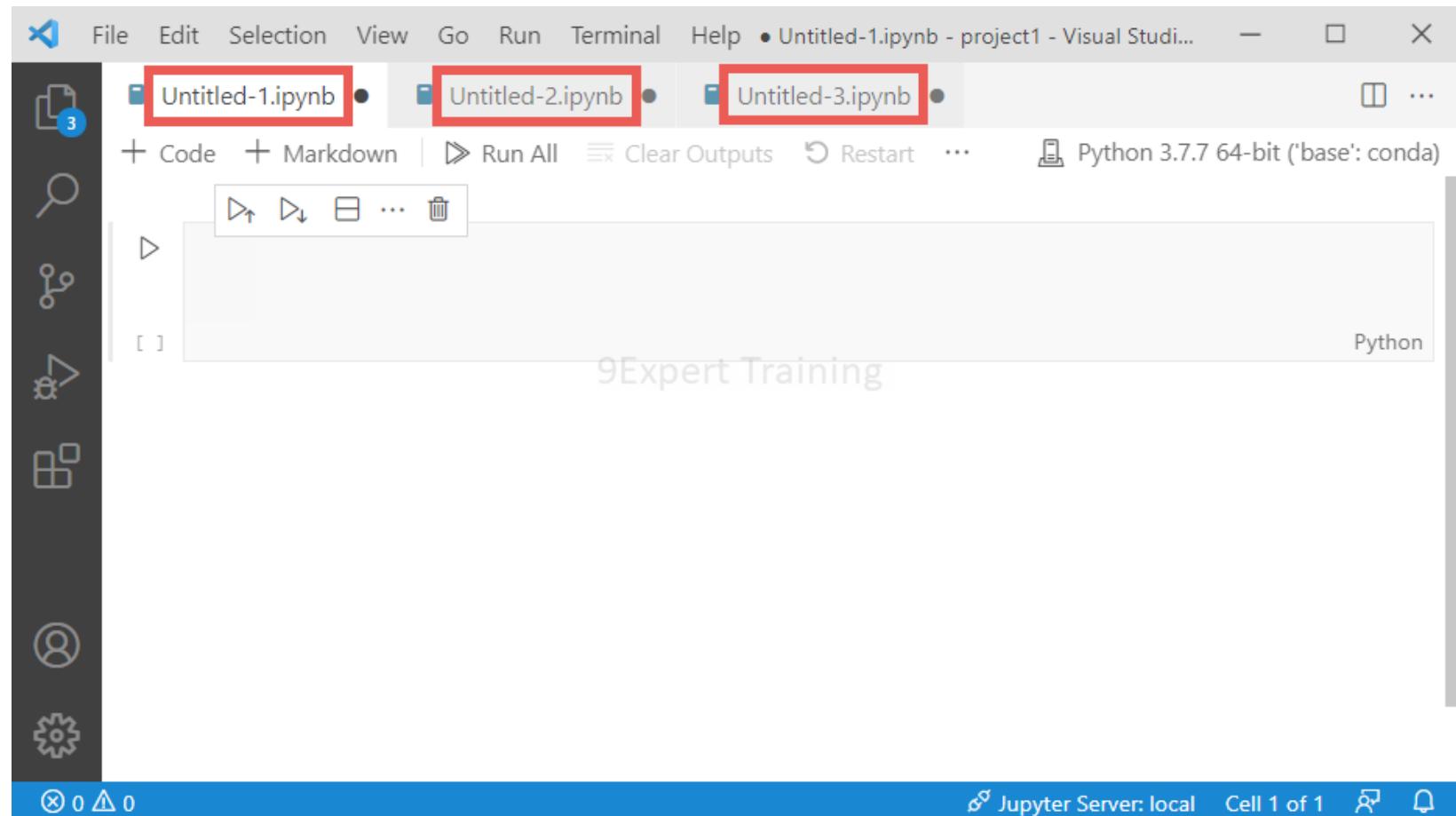


Quick open file (Ctrl + p)



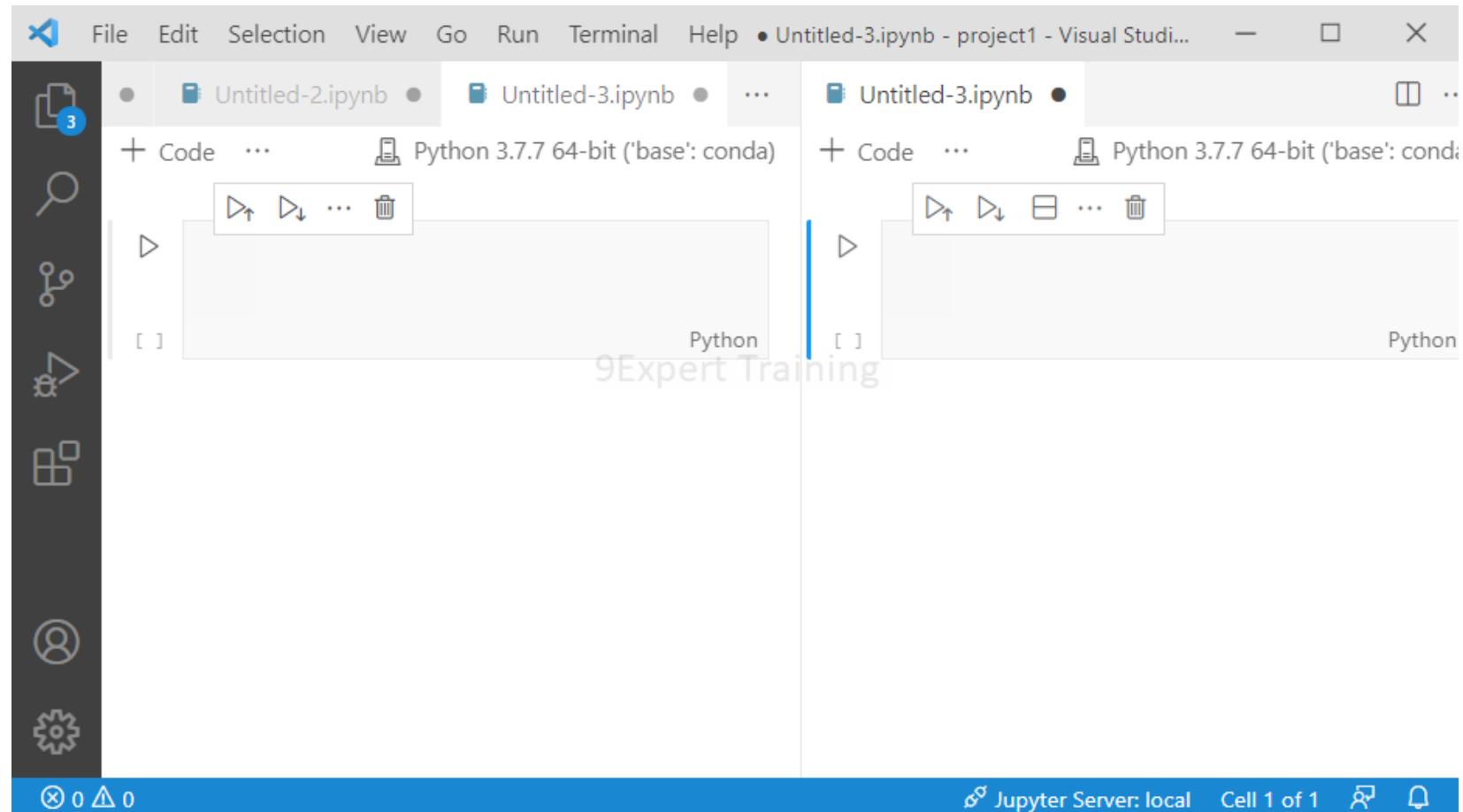


Quick open tab (Ctrl + Tab)





Open two files (Ctrl + \)





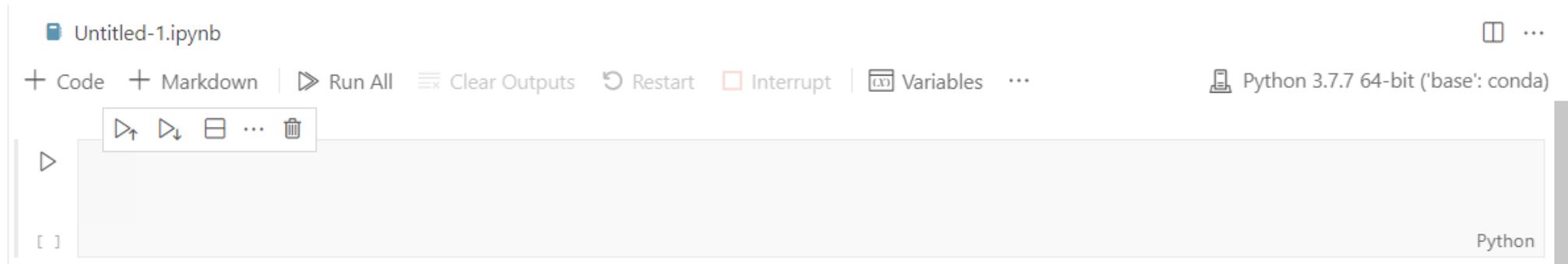
Duplicate line: Shift + alt + up/down

A screenshot of the Visual Studio Code interface showing a Jupyter Notebook file named "Untitled-1.ipynb". The code cell contains three "print()" statements. The third statement, "print()", is currently selected, indicated by a light gray background. The status bar at the bottom shows "Jupyter Server: local Cell 1 of 1".



Multiple cursor: Ctrl + Alt + Shift + up/down

A screenshot of the Visual Studio Code interface. The title bar shows "Untitled-1.ipynb - project1 - Visual Studio...". The main area displays a Jupyter notebook cell with three "print()" statements. A blue rectangular selection highlights all three lines. A context menu is open over the highlighted text, showing options like Run Cell, Run Selection, Insert Cell Above, Insert Cell Below, and Delete. The status bar at the bottom shows "Jupyter Server: local Cell 1 of 1".



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หลักภาษาและไวยกรรมภาษา Python

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- คำสั่ง `print()` เป็นการแสดงผลลัพธ์จากการทำงานหน้าจอ

```
print()  
print('single quotes')  
print("double quotes")
```

Output console:

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```
single quotes  
double quotes
```



```
print('Python Programming')
print()
print('Did you see that blank line')
print('Blank line \n in the middle of string')
```

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Output console:

```
Python Programming

Did you see that blank line
Blank line
in the middle of string
```



```
print('Mixing the ingredients')
print('Pouring the mixture into a frying pan')
print('Cooking the first side')
print('Flipping it!')
print('Cooking the other side')
omelette1 = 'a tasty Omelette'
```



```
print('Performing Addition')
x = 23 + 7
print('Performing Division')
y = x / 0
print('Math Calculation Complete')
```

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Output console:

```
Performing Addition
Performing Division
-----
ZeroDivisionError                                Traceback (most recent call last)
<ipython-input-3-501621ffcd89> in <module>
      2 x = 23 + 7
      3 print('Performing Division')
----> 4 y = x / 0
      5 print('Math Calculation Complete')

ZeroDivisionError: division by zero
```



```
print('I love Python')
```

Output console:

```
I love Python
```

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```
print('Product price is $904')
```

Output console:

```
Product price is $904
```



```
language = 'Python'  
print('I love {}'.format(language))
```



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Output console:

```
I love Python
```

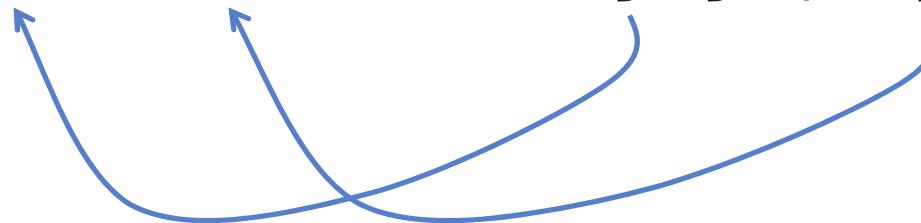


```
language = 'Python'  
print('I love {}'.format(language))
```



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```
language1 = 'Python'  
language2 = 'Java'  
print('I love {} and {}'.format(language1,language2))
```





```
language = 'Python'  
print(f'I love {language}')
```

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```
language1 = 'Python'  
language2 = 'Java'  
print(f'I love {language1} and {language2}')
```



%s

- String

%d

- Integers

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%f

- Floating point numbers

%.(number of digits)f

- Floating point numbers with a fixed number of digits



Comment คือส่วนที่ใช้เขียนโนธิบายการทำงานของชุดคำสั่งหรือข้อมูลที่เกี่ยวข้อง

Comment ในภาษา Python มี 2 แบบคือ

1. Comment แบบบรรทัดเดียว

- ใช้เครื่องหมาย #

2. Comment แบบหลายบรรทัด

- ใช้เครื่องหมาย single quote

'''

This is my comment

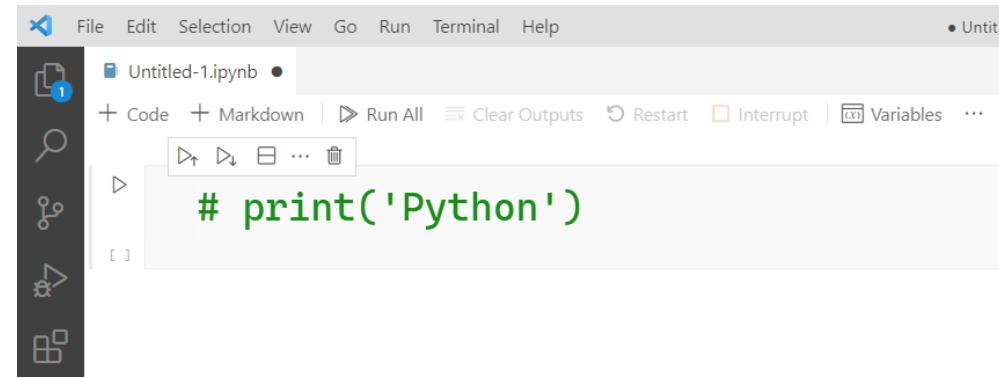
'''

- ใช้เครื่องหมาย double quote

"""

This is my comment

"""



```
# print('Python')
```

Shortcut: Ctrl + /



```
""" print('Python')
print('Python')
print('Python')
print('Python') """
```

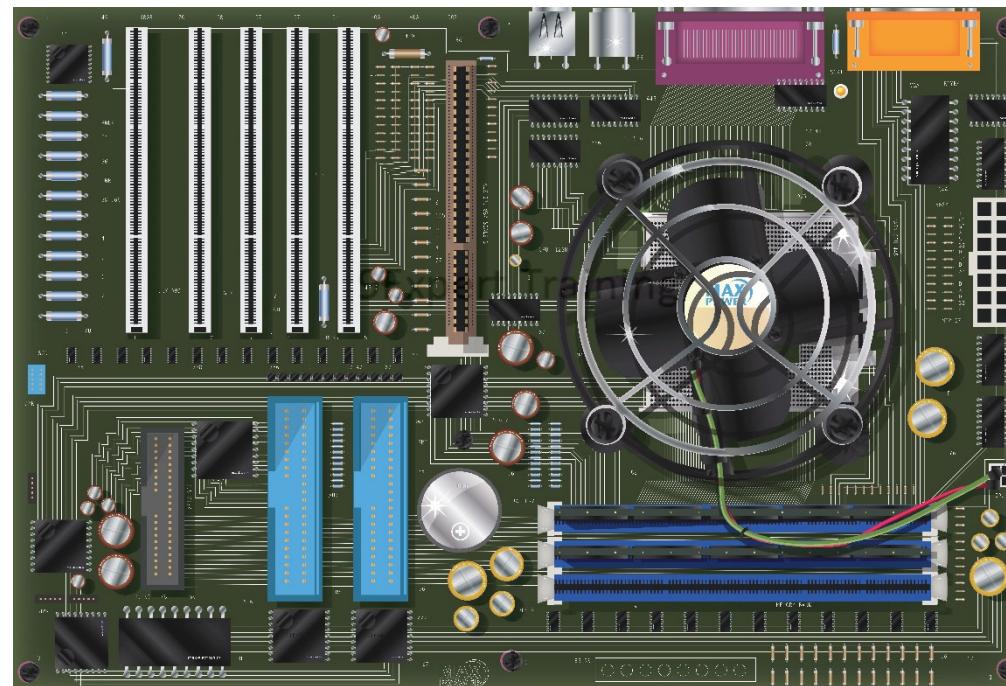
Shortcut: Alt + Shift + a



- Arithmetic Operators คือตัวดำเนินการที่ใช้ในการคำนวณทางคณิต

Operator	Description	Example
+	Addition	$5 + 10 = 15$
-	Subtraction	$7 - 2 = 5$
*	Multiplication	$3 * 2 = 6$
/	Division	$8 / 2 = 4.0$
//	Division and floor	$10 // 3 = 3$
%	Modulo	$5 \% 2 = 1$
**	Power	$2 ** 3 = 8$

- Variable คือตัวแปรที่ใช้ในการเก็บค่าที่ต้องการ โดยทำการบันทึกลงในหน่วยความจำ เพื่อนำมาประมวลผล ตามต้องการ



Computer Mainboard



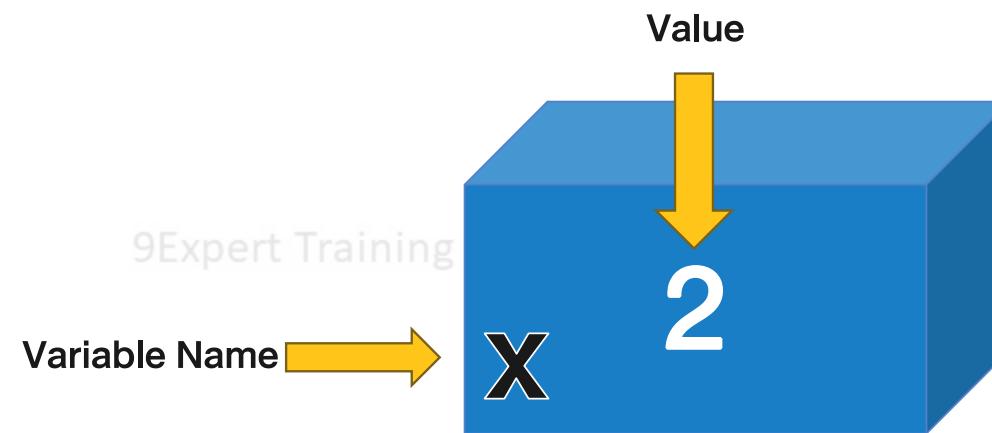
$$1000 \text{ g} \cdot \frac{1 \text{ kg}}{1000 \text{ g}} = 1 \text{ kg}$$

$$15 = 10 + 5$$

Price = 100



x = 2



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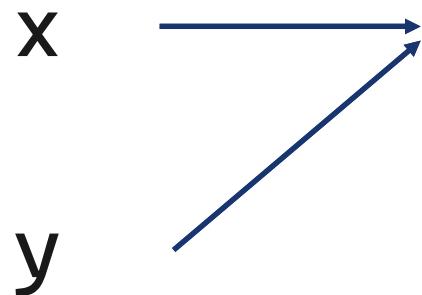
x = 2

X

Pointer reference →

Variable Data	Memory Address Location
2	140721604764080

Memory



Variable Data	Memory Address Location
2	140721604764080
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Memory



y = 10

X →

y →

Variable Data	Memory Address Location
2	140721604764080
9Expert Training	
10	140721604764336

Memory

- ตัวอักษร, ตัวเลข, และ สัญลักษณ์ _ (underscore)
- ห้ามใช้ตัวเลขนำหน้า
- ห้ามใช้คำสlang (Keyword)

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- Keyword คือคำส่วนในภาษา Python ที่ไม่สามารถใช้ชื่อเหล่านี้ในการตั้งชื่อตัวแปร พิมพ์ชัน หรือคลาสได้

False	class	finally	is	return
None	continue	for	lambda	try
True	def	from	nonlocal	while
and	del	global	not	with
as	elif	if	or	yield
assert	else	import	pass	break
except	In	raise		



```
import keyword
print(keyword.kwlist)
```

Output console:

```
['False', 'None', 'True', 'and', 'as', 'assert', 'async', 'await', 'break',
'class', 'continue', 'def', 'del', 'elif', 'else', 'except', 'finally', 'for',
'from', 'global', 'if', 'import', 'in', 'is', 'lambda', 'nonlocal', 'not', 'or',
'pass', 'raise', 'return', 'try', 'while', 'with', 'yield']
```

- number9
- Games
- winner
- person_id
- Student_name
- -

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- 13Number
- user-password
- Pop Rock
- New_year's_day
- for

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```
x4fgsd3g5fdgs6fdgs6 = 1000.00
```

```
y651sadf1asdf615asdfd = 50.00
```

```
x4fgsd3g5fdgs6fdgs6 = x4fgsd3g5fdgs6fdgs6 - y651sadf1asdf615asdfd
```

```
print(x4fgsd3g5fdgs6fdgs6)
```

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```
x = 1000.00
```

```
y = 50.00
```

```
x = x - y
```

```
print(x)
```



```
balance = 1000.00
withdrawal_amount = 50.00
balance = balance - withdrawal_amount
print(balance)
```

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- A set of rules defining how to name entities in source code.

Case Type	Example
Original Variable as String	some awesome var
Camel Case	someAwesomeVar
Snake Case	some_awesome_var
Kebab Case	some-awesome-var
Pascal Case	SomeAwesomeVar
Upper Case Snake Case	SOME_AWESOME_VAR

<https://dev.to/chaseadamsio/most-common-programming-case-types-30h9>



Data type คือชนิดของข้อมูลที่กำหนดให้กับตัวแปร ตัวอย่างเช่น

- int - Integer
- float - Floating-Point Numbers
- str - String
- bool - Boolean
- complex - Complex number

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Student Id	Name	GPA	Birthdate*	Program	Credits	Honors
001	Steve Vai	3.5	1996-11-22	IT	32	True
002	Eric Clapton	4.0	1997-04-07	CS	32	True
003	Paul Gilbert	3.8	1999-05-25	IT	32	True
004	Jimi Hendrix	3.6	1996-02-07	MT	32	True
005	Jimmy Page	4.0	1999-03-21	CS	32	True
006	Gary Moore	3.2	1996-06-06	CE	30	False
007	John Doe	2.0	2001-04-04	DC	20	False



Student Id	Name	GPA	Birthdate*	Program	Credits	Honors
001	Steve Vai	3.5	1996-11-22	IT	32	True
002	Eric Clapton	4.0	1997-04-07	CS	32	True
003	Paul Gilbert	3.8	1999-05-25	IT	32	True
004	Jimi Hendrix	3.6	1996-02-07	MT	32	True
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007	John Doe	2.0	2001-04-04	DC	20	False



Student Id	Name	GPA	Birthdate*	Program	Credits	Honors
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003	Paul Gilbert	3.8	1999-05-25	IT	32	True
004	Jimi Hendrix	3.6	1996-02-07	MT	32	True
005	Jimmy Page	4.0	1999-03-21	CS	32	True
006	Gary Moore	3.2	1996-06-06	CE	30	False
007	John Doe	2.0	2001-04-04	DC	20	False



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004	Jimi Hendrix	3.6	1996-02-07	MT	32	True
005	Jimmy Page	4.0	1999-03-21	CS	32	True
006	Gary Moore	3.2	1996-06-06	CE	30	False
007	John Doe	2.0	2001-04-04	DC	20	False



- Profit = (Selling Price - Cost Price)
- Full name = First Name + Last Name
- Age of a Person = Given date - Date of birth
- Full name + Profit // Error

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```
number = 0.1 + 0.2
print(number)
```

Output console:

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0.3000000000000004



```
from decimal import *
number = Decimal('.1') + Decimal('.2')
print(number)
```

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Output console:

```
0.3
```



- Assignment Operators คือตัวดำเนินการในการกำหนดค่าให้กับตัวแปร

Operator	Example	Equivalent to
=	x = 5	x = 5
+=	x += 5	x = x + 5
-=	x -= 5	x = x - 5
*=	x *= 5	x = x * 5
/=	x /= 5	x = x / 5
%=	x %= 5	x = x % 5
//=	x //= 5	x = x // 5
**=	x **= 5	x = x ** 5



- Comparison operators คือตัวดำเนินการสำหรับเปรียบเทียบค่า โดยผลลัพธ์ของการเปรียบเทียบจะคืนค่า เป็น True ถ้าเงื่อนไขเป็นจริง และคืนค่าเป็น False ถ้าเงื่อนไขเป็นเท็จ

Operator	Description	Example
<code>==</code>	Equal	<code>a == b</code>
<code>!=</code>	Not equal	<code>a != b</code>
<code>></code>	Greater than	<code>a > b</code>
<code><</code>	Less than	<code>a < b</code>
<code>>=</code>	Greater than or equal to	<code>a >= b</code>
<code><=</code>	Less than or equal to	<code>a <= b</code>



- Logical operators คือตัวดำเนินการทางตรรกศาสตร์ โดยผลลัพธ์ของการเปรียบเทียบจะค่าเป็นจริง (True) หรือเท็จ (False) เท่านั้น

Operator	Description	Example
and	ผลลัพธ์เป็นค่าจริง (True) ถ้าทั้งสองคำสั่งเป็นจริง	True and True = True
or	ผลลัพธ์เป็นค่าจริง (True) ถ้าคำสั่งใดคำสั่งหนึ่งเป็นจริง	True or False = True
not	ผลลัพธ์ค่าตรงกันข้าม	not True = False



- Input() คือฟังก์ชันสำหรับนำเข้าข้อมูลสำหรับผู้ใช้งาน

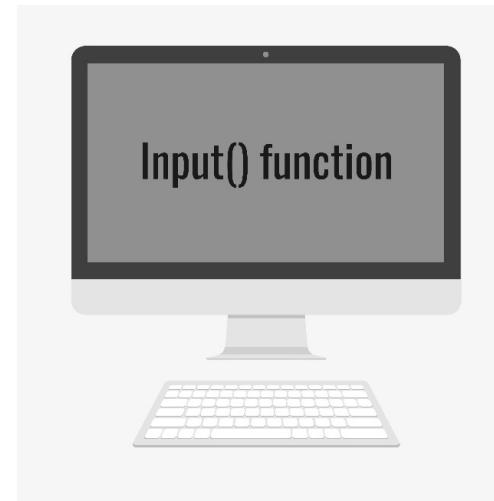
Syntax

> `input(prompt)`

ตัวอย่าง

> `input("What is your name?")`

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การจัดการข้อมูล String

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รู้จักการจัดการข้อมูลประเภท String



- การสร้างตัวแปรประเภท String

```
string1 = 'single quotes'  
print(string1)  
string2 = "double quotes"  
print(string2)
```

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Output console:

```
single quotes  
double quotes
```

Concatenation คือฟังก์ชันในการเชื่อมข้อความเข้าด้วยกัน

```
msg1 = 'Python'  
msg2 = 'Programming'  
print(msg1 + msg2)  
print(msg1 + ' ' + msg2)
```

Output console:

```
PythonProgramming  
Python Programming
```

**Warning:**

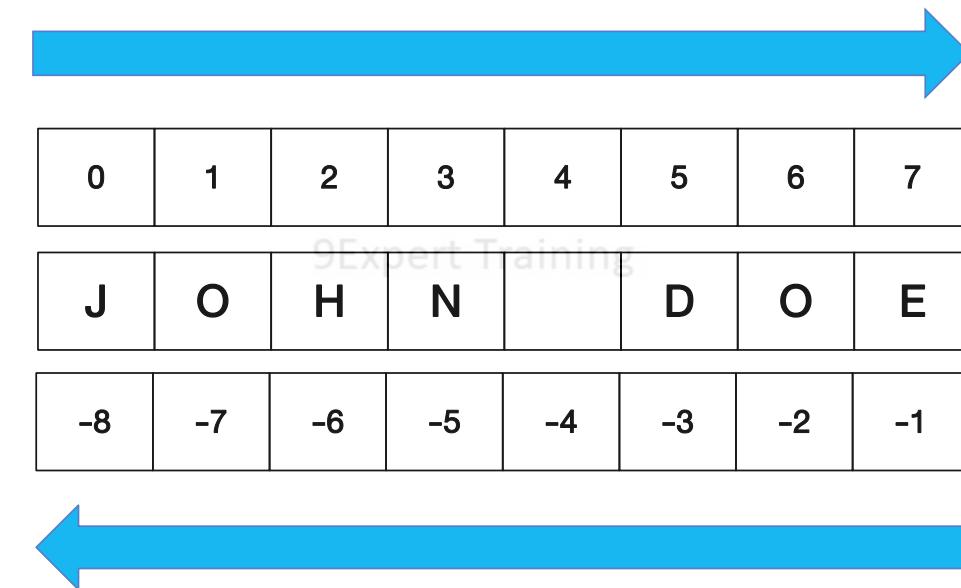
```
str = 'Python' + 1994
```

Output console:

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```
-----
TypeError                                Traceback (most recent call last)
<ipython-input-10-5aa538ad33b6> in <module>
----> 1 str = 'Python' + 1994

TypeError: can only concatenate str (not "int") to str
```





Syntax: [Start:Stop]

ตัวอย่าง

```
str = 'ABCDEFGHIJKLMNOPQRSTUVWXYZ'  
str[0:5]
```

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Output console:

```
ABCDE
```

หมายเหตุ: ตัวอักษรที่ถูกตัดมาจะไม่รวมตำแหน่ง Stop



Syntax: [Start:Stop:Step]

ตัวอย่าง

```
str = 'ABCDEFGHIJKLMNOPQRSTUVWXYZ'  
str[0:8:2]
```

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Output console:

```
ACEG
```

หมายเหตุ: ตัวอักษรที่ถูกตัดมาจะไม่รวมตำแหน่ง Stop



```
> str = 'ABCDEFGHIJ'  
> str[::2]
```

0	1	2	3	4	5	6	7	8	9
A	B	C	D	E	F	G	H	I	J

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ACEGI



```
> str = 'ABCDEFGHIJ'  
> str[::3]
```

0	1	2	3	4	5	6	7	8	9
A	B	C	D	E	F	G	H	I	J



ADGJ



```
letter = 'abcdefghijklmnopqrstuvwxyz'  
letter[0] = 'A'
```

Output console:

```
-----  
TypeError                      Traceback (most recent call last)  
<ipython-input-7-7d43de261520> in <module>  
      1 letter = 'abcdefghijklmnopqrstuvwxyz'  
----> 2 letter[0] = 'A'  
      3  
  
TypeError: 'str' object does not support item assignment
```



```
letter = 'abcdefghijklmnopqrstuvwxyz'  
letter = letter.capitalize()  
print(letter)
```

Output console:

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```
Abcdefghijklmnopqrstuvwxyz
```



- แสดงข้อความ I love Rock 'n' Roll! \m/
- แปลงหมายเลข credit card number: 5489-2465-3497-3215 เป็น 5489246534973215

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การเขียนคำสั่งเกี่ยวกับงานเลือก

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- ในภาษา Python จะใช้ Whitespace หรือ Tab ในการกำหนดบล็อกของโปรแกรมเพื่อบอกขอบเขตเริ่มต้นและสิ้นสุดของกลุ่มชุดคำสั่ง

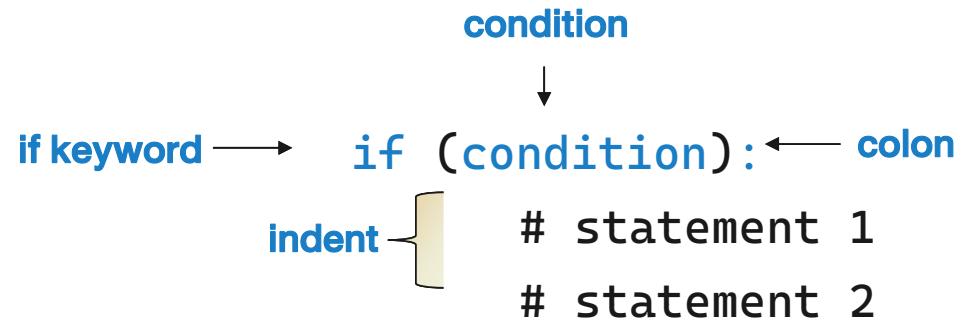
ตัวอย่างเช่น

```
def f1():
    print("The first line")
    print("The second line")
f1()
```

Output console:

```
The first line
The second line
```

หมายเหตุ: แนะนำให้ใช้ 4 spaces ต่อ 1 indentation level



Operator	Description	Example
==	Equal	a == b
!=	Not equal	a != b
>	Greater than	a > b
<	Less than	a < b
>=	Greater than or equal to	a >= b
<=	Less than or equal to	a <= b



- If-then Statement

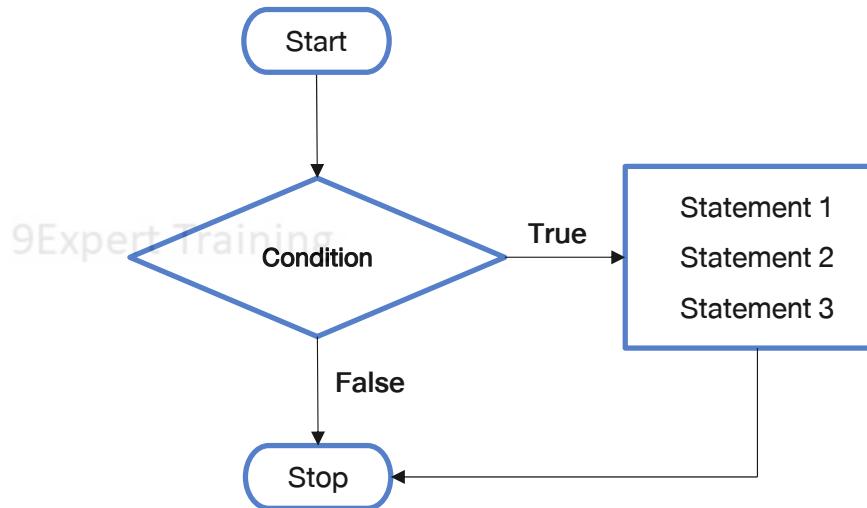
Syntax:

True or False?



```
if (condition):
```

```
    # statement 1  
    # statement 2  
    # statement 3
```



Flow Chart



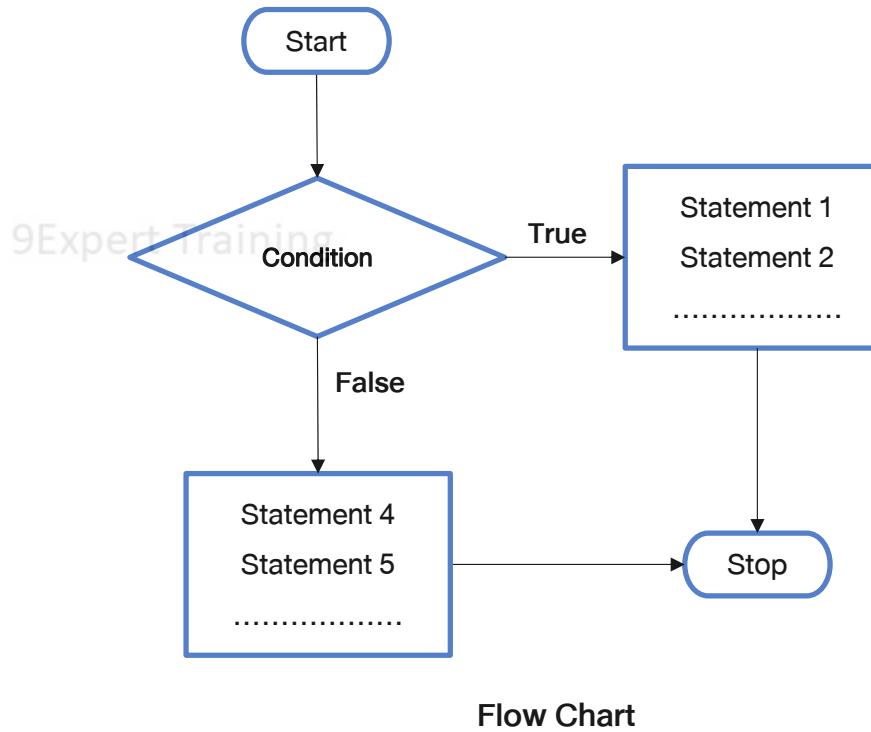
- If-then-else Statement

Syntax:

True or False?



```
if (condition):  
    # statement 1  
    # statement 2  
    ....  
  
else:  
    # statement 4  
    # statement 5  
    ....
```



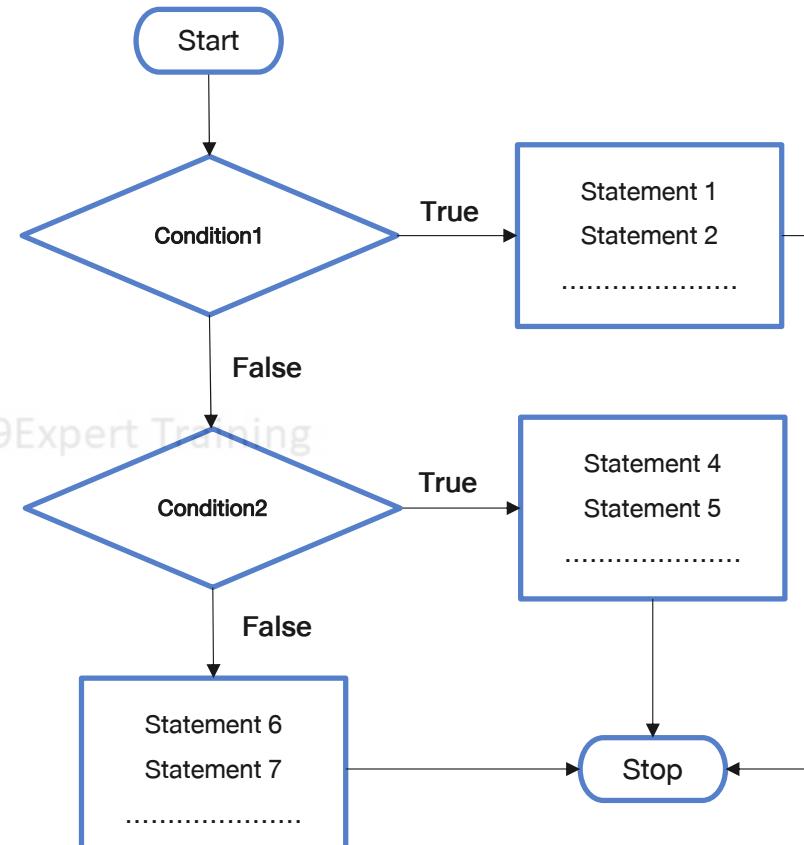
Flow Chart



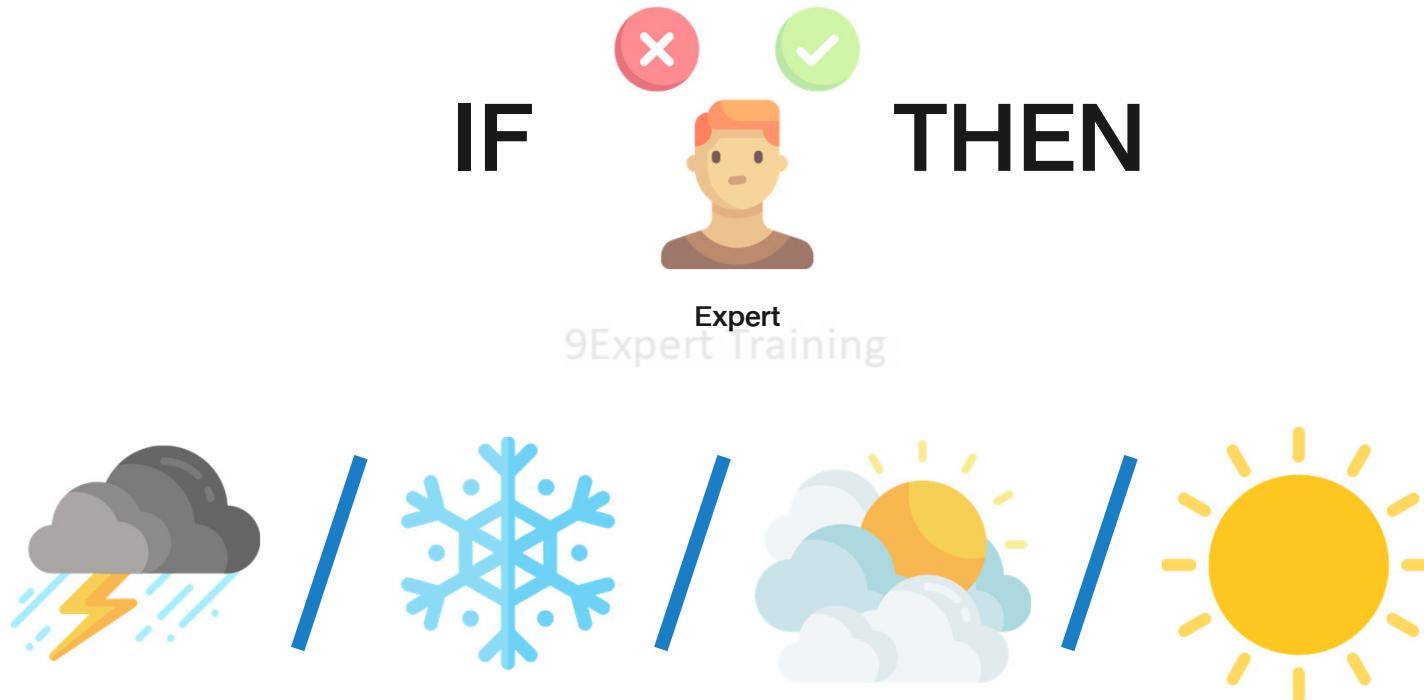
- If-elif-else Statement

Syntax:

```
if (Condition1):  
    # statement 1  
    # statement 2  
    ....  
elif(Condition2):  
    # statement 4  
    # statement 5  
    ....  
else:  
    # statement 6  
    # statement 7  
    ....
```



Flow Chart





1. จงเขียนโปรแกรมเพื่อรับเมื่อเป้าหมายดังต่อไปนี้

AQI	Air pollution level
0 - 50	Good
51 - 100	Moderate
101 - 150	Unhealthy for Sensitive Groups
151 - 200	Unhealthy
201 - 300	Very Unhealthy
300+	Hazardous



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การเขียนคำสั่งวนลูป

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ภาษา Python มีคำสั่งวนลูปอยู่ 2 ประเภท

1. **for loops**
2. **while loops**

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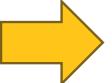


range(N) → [0, 1, ..., N-1]

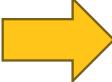
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range(5) → [0, 1, 2, 3, 4]



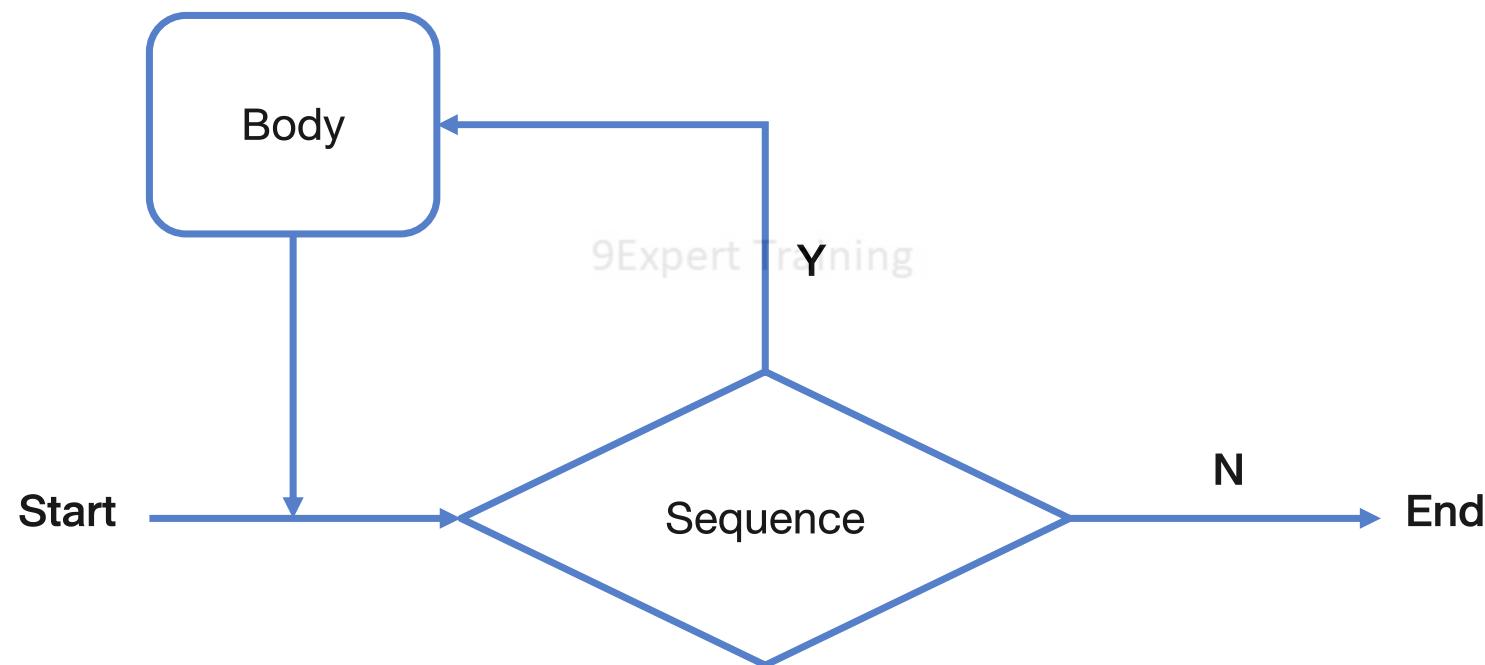
range(X, Y)  [X, X+1, ..., Y-1]

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range(5, 10)  [5, 6, 7, 8, 9]



range(0, 10, 2)  [0, 2, 4, 6, 8]





- for loop เป็นคำสั่งให้โปรแกรมทำงานอย่างซ้ำ ๆ ตามจำนวนรอบที่กำหนด

Syntax:

```
for i in sequence:  
    Body of for
```

List
Tuple
Dict
Set
....

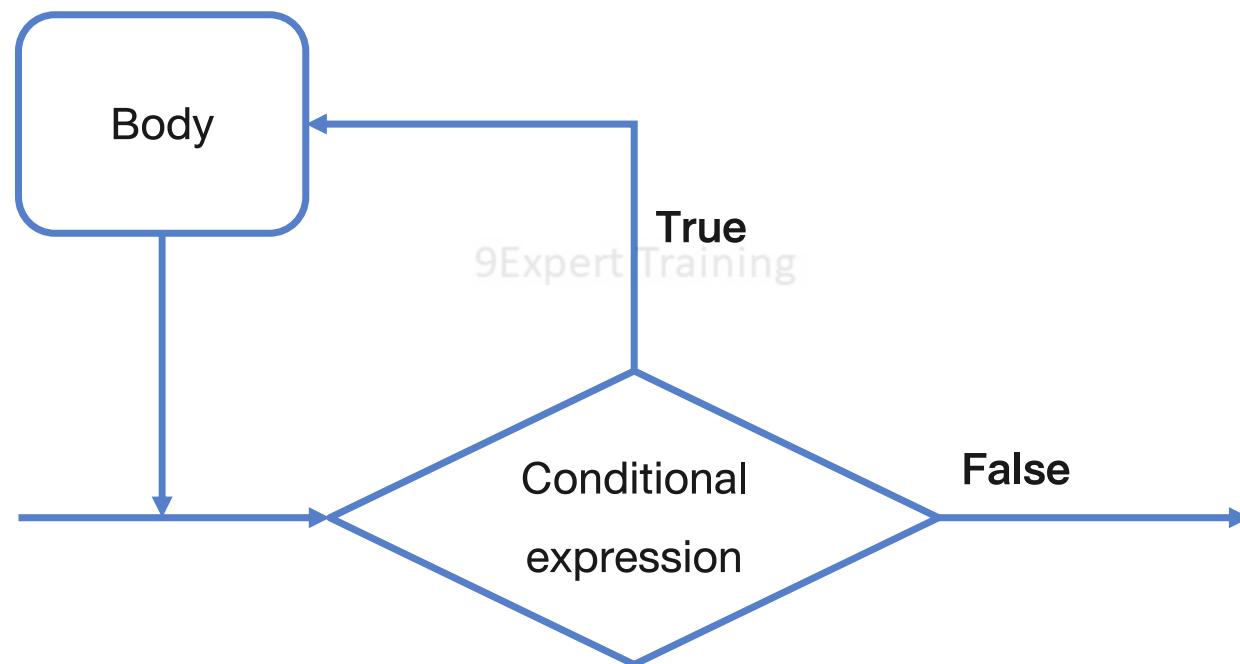
ตัวอย่าง

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```
for x in range(6):  
    print(x)
```

Output console:

```
0 1 2 3 4 5
```





while loop คือคำสั่งที่ใช้ควบคุมการทำงานของโปรแกรมอย่างซ้ำๆ หากเงื่อนไขที่กำหนดยังเป็นจริงอยู่

Syntax: True or False?



while (condition):

```
# statement 1  
# statement 2  
# statement 3
```

} If the condition is True

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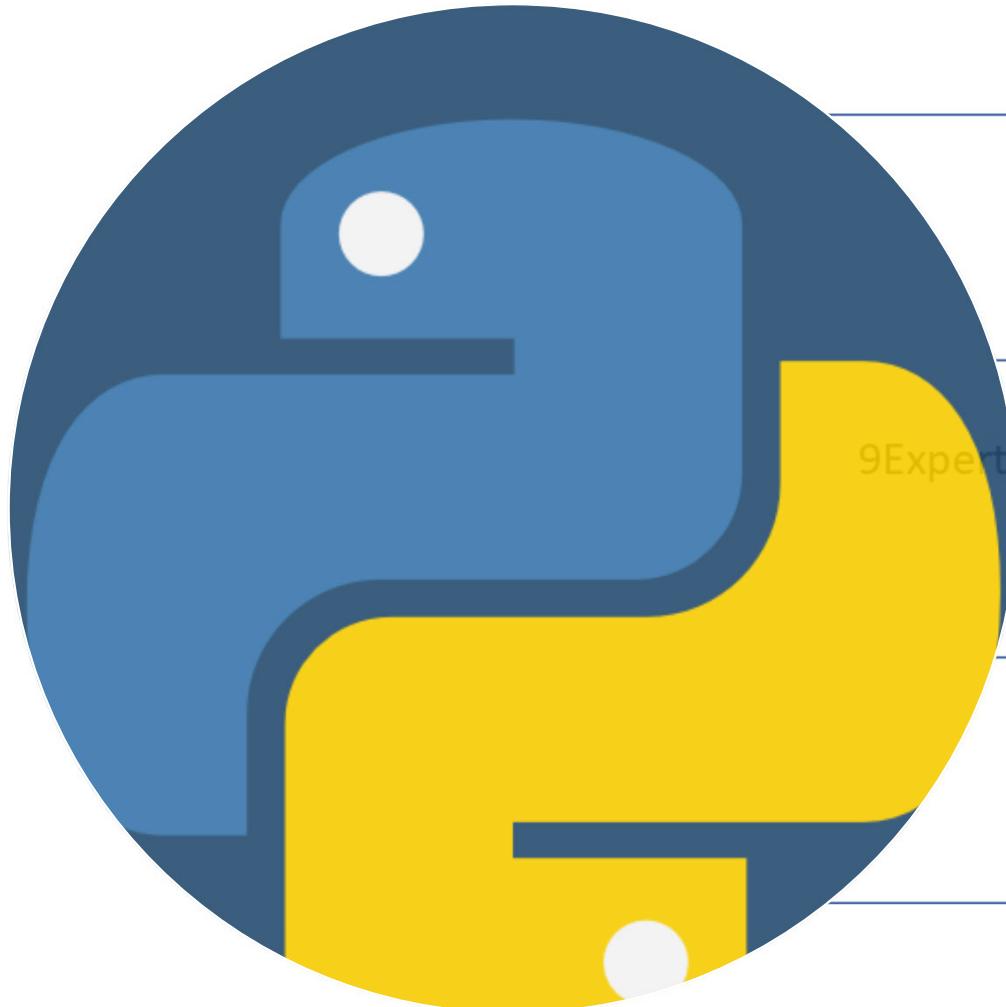




การสร้างและใช้งาน List, Tuple, Dictionary และ Set

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List

Tuple

Dictionary

Set

List คือโครงสร้างข้อมูลชนิดหนึ่งในภาษา Python ที่ใช้เก็บลำดับข้อมูลโดยมีคุณสมบัติดังนี้

- สามารถเปลี่ยนแปลงข้อมูลได้
- สามารถเก็บข้อมูลที่มีชนิดต่างกันได้
- มีค่าซ้ำกันได้
- ใช้เครื่องหมาย [] ในการสร้าง List

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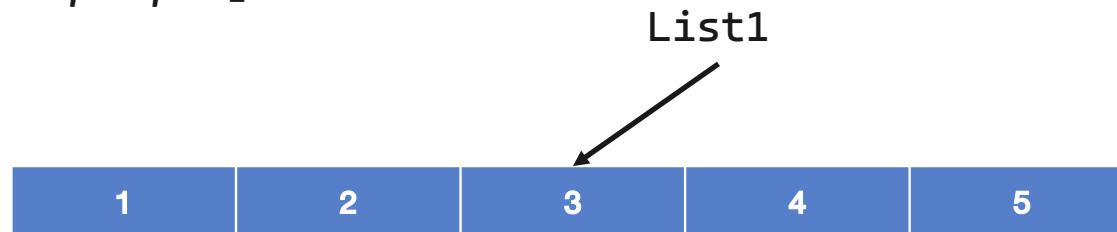
ตัวอย่าง

```
cars = ["Ford", 2019, "2.0L Bi-Turbo Titanium+ 4x4 10AT", 1799000]
```

"Ford"	2019	"2.0L Bi-Turbo Titanium+ 4x4 10AT"	1799000
0	1	2	3

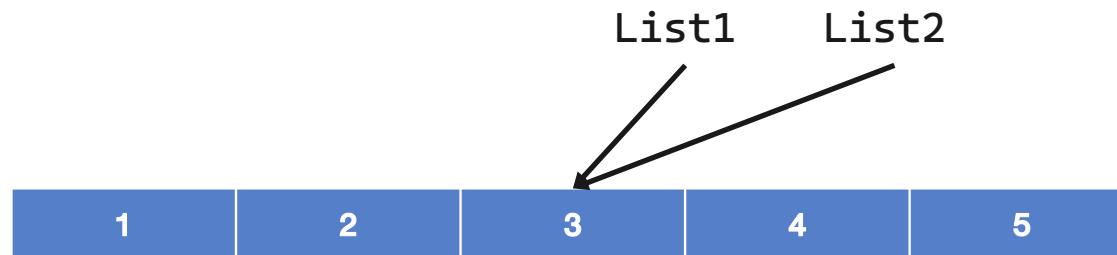


```
List1 = [1, 2, 3, 4, 5]
```



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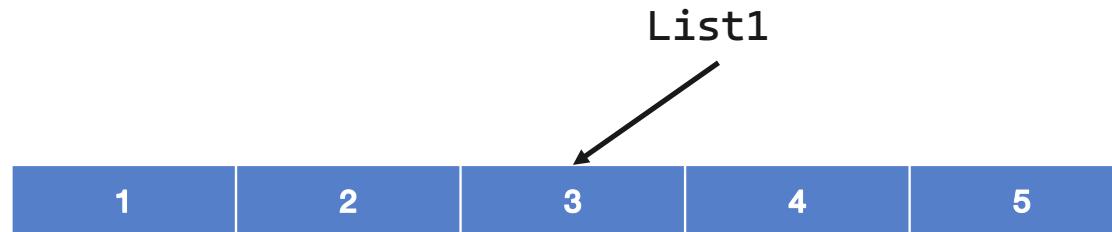
```
List2 = List1      # assign the reference
```



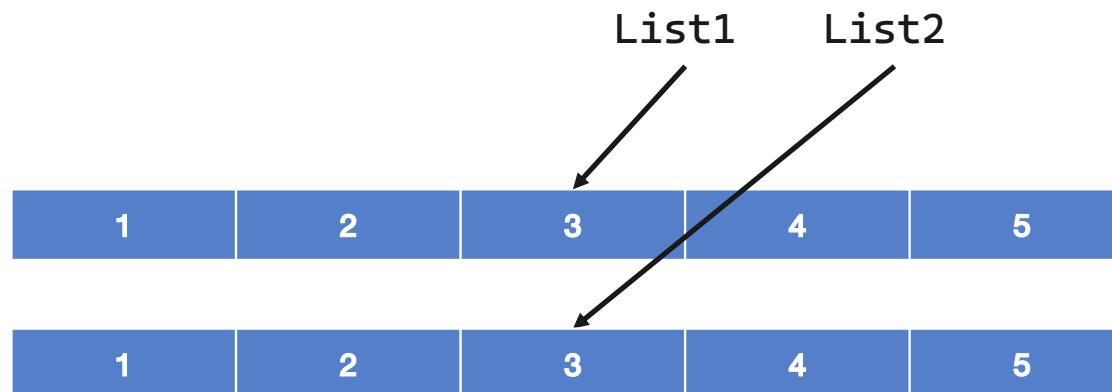


list.copy()

```
List1 = [1, 2, 3, 4, 5]
```



```
List2 = List1.copy()
```





List:

```
['Steve Vai', 39, 'New York']
```

List comprehensions:

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```
[expr for val in collection]
```

```
[expr for val in collection if <condt>]
```

```
[expr for val in collection if <condt1> and <condt2>]
```



Tuple คือโครงสร้างข้อมูลชนิดหนึ่งในภาษา Python ที่ใช้เก็บลำดับข้อมูลโดยมีคุณสมบัติดังนี้

- ไม่สามารถเปลี่ยนแปลงข้อมูลได้
- สามารถเก็บข้อมูลที่มีชนิดต่างกันได้
- มีค่าซ้ำกันได้
- ใช้เครื่องหมาย () ในการสร้าง Tuple

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ตัวอย่าง

```
cars = ("Ford", 2019, "2.0L Bi-Turbo Titanium+ 4x4 10AT", 1799000)
```

“Ford”	2019	"2.0L Bi-Turbo Titanium+ 4x4 10AT"	1799000
0	1	2	3



Dictionary คือโครงสร้างข้อมูลชนิดหนึ่งในภาษา Python ที่ใช้เก็บข้อมูลโดยมีคุณสมบัติดังนี้

- ข้อมูลไม่ได้เรียงลำดับ
- ข้อมูล Key ห้ามซ้ำและเปลี่ยนแปลงไม่ได้
- ข้อมูล Value เปลี่ยนแปลงได้และเป็นข้อมูลซ้ำได้
- สามารถเพิ่ม/ลบข้อมูลด้วย Key ได้
- ใช้เครื่องหมาย { } ในการสร้าง Dictionary

ตัวอย่าง

```
person = {
    "name": "Elon Musk",
    "company": "SpaceX",
    "year": 1971
}
```

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Key	Value
"name"	"Elon Musk"
"company"	"SpaceX"
"year"	1971



Set คือโครงสร้างข้อมูลชนิดหนึ่งในภาษา Python ที่ใช้เก็บข้อมูลโดยมีคุณสมบัติดังนี้

- ข้อมูลไม่ได้เรียงลำดับ
- ไม่สามารถเปลี่ยนแปลงข้อมูล แต่เพิ่มข้อมูลได้
- สามารถเก็บข้อมูลที่มีชนิดต่างกันได้
- ใช้เครื่องหมาย { } ในการสร้าง Set

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ตัวอย่าง

```
fruit = {"Apple", "Banana", "Cherry", "Mango"}
```

"Apple"	"Banana"	"Cherry"	"Mango"
---------	----------	----------	---------



- Parentheses ()

- ພຶບ
- print('hello world')
- ໂຄງຮ້າງຂໍ້ມູນ Tuple
- t = (1, 2, 3, 4, 5)

- Square brackets []

- ໂຄງຮ້າງຂໍ້ມູນ List
- l = [1, 2, 3, 4, 5]
- Variable[number]
- product[0]

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product

0	1	2	3	4	5	6
---	---	---	---	---	---	---

- Bracket { }

- ໂຄງຮ້າງຂໍ້ມູນ Dictionary
- d = {'name': 'Elon Musk', 'Age': 52}
- ໂຄງຮ້າງຂໍ້ມູນ Set
- S = {1, 2, 3, 4, 5}



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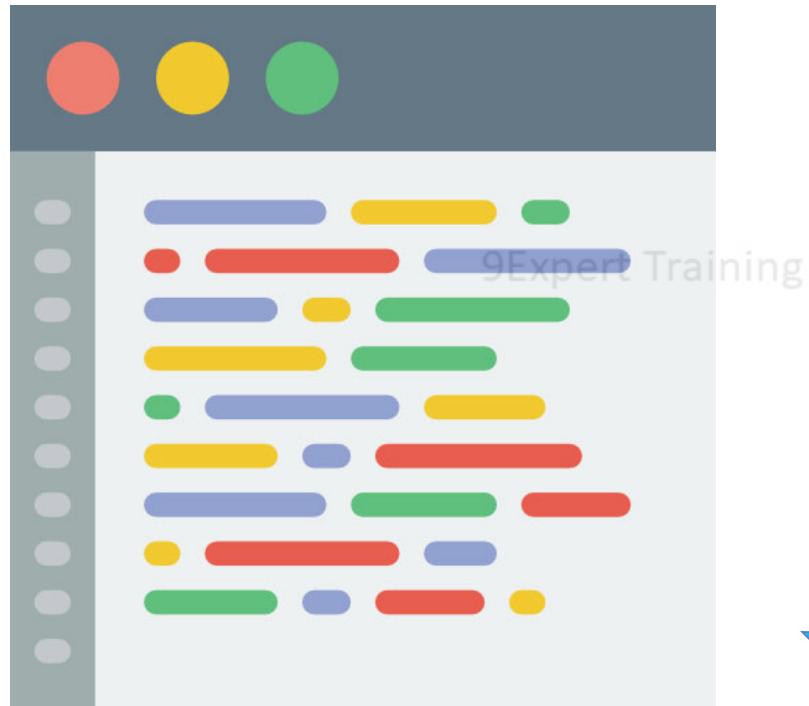
การสร้างและใช้งานฟังก์ชัน

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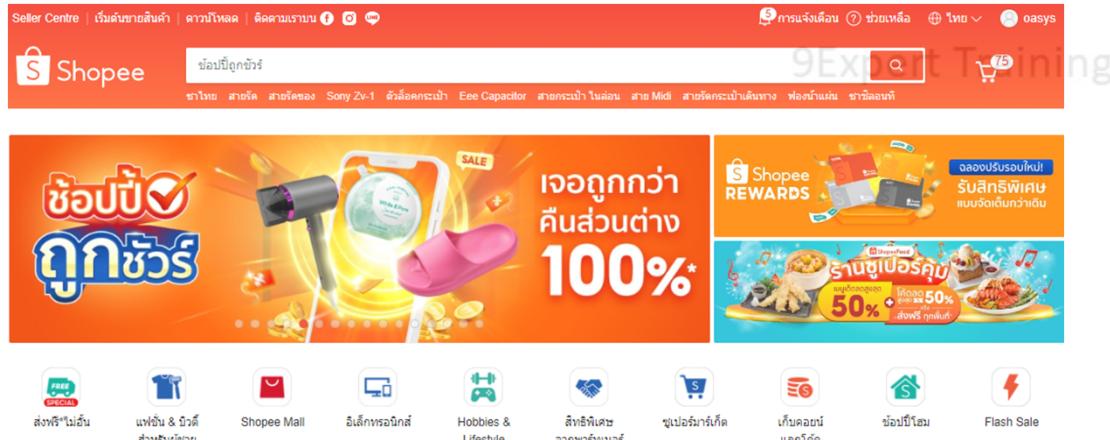
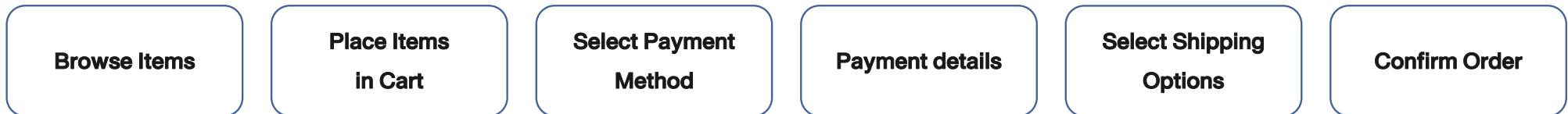
Python main program



ทำงานจากบนลงล่าง



Procedural programming



<https://shopee.co.th/>

```

print('Browse items')
print('Place items in cart')
print('Select payment method')
print('Enter payment details')
print('Select shipping options')
print('Confirm order!')
  
```



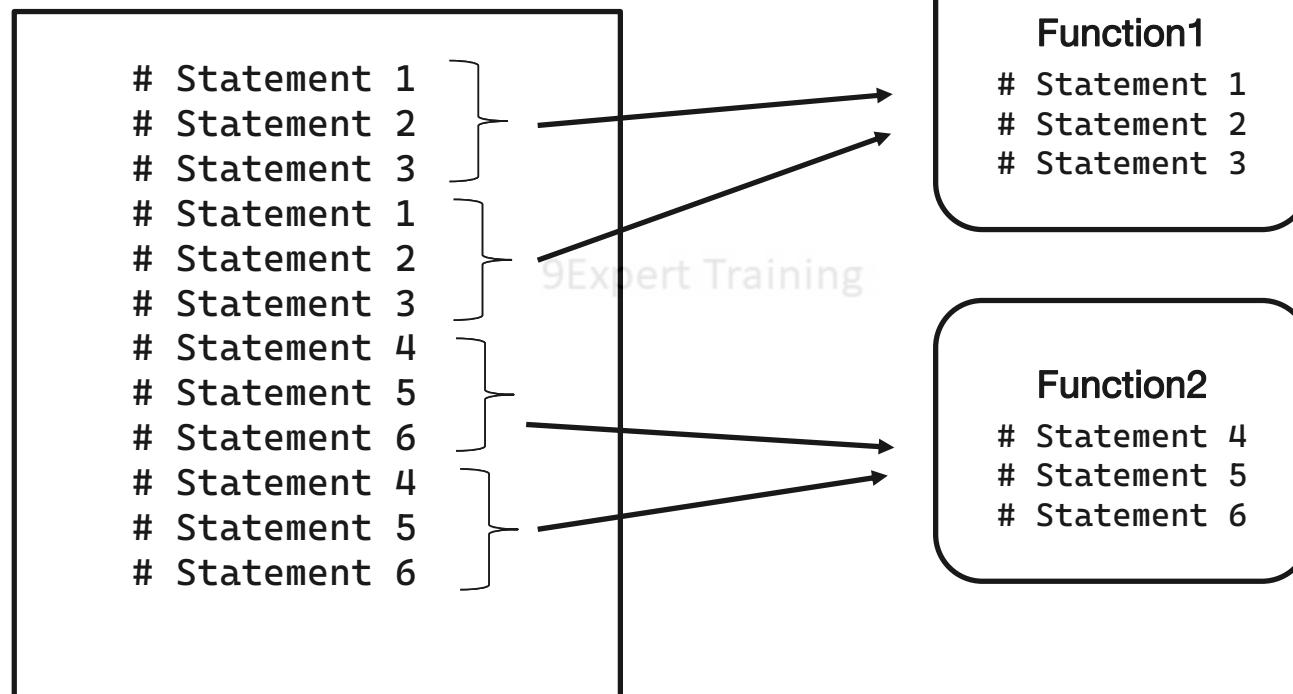
```
print('Mixing the ingredients')
print('Pouring the mixture into a frying pan')
print('Cooking the first side')
print('Flipping it!')
print('Cooking the other side')
omelette1 = 'a tasty Omelette'
```



```
print('Mixing the ingredients')
print('Pouring the mixture into a frying pan')
print('Cooking the first side')
print('Flipping it!')
print('Cooking the other side')
omelette1 = 'a tasty Omelette'

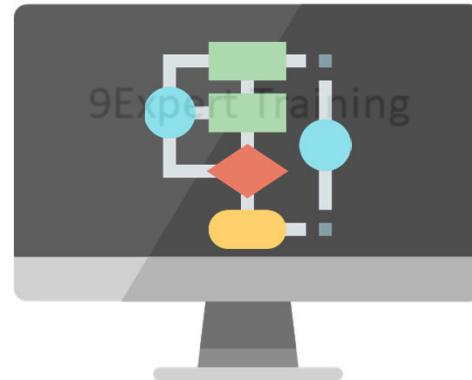
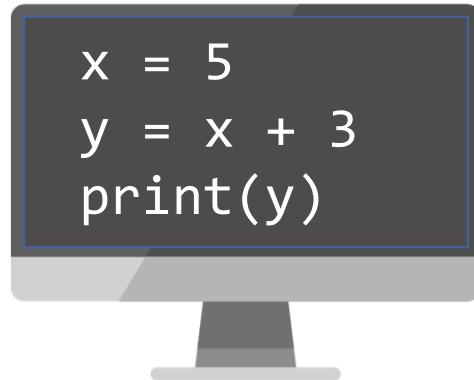
print('Mixing the ingredients')
print('Pouring the mixture into a frying pan')
print('Cooking the first side')
print('Flipping it!')
print('Cooking the other side')
omelette2 = 'a tasty Omelette'
```

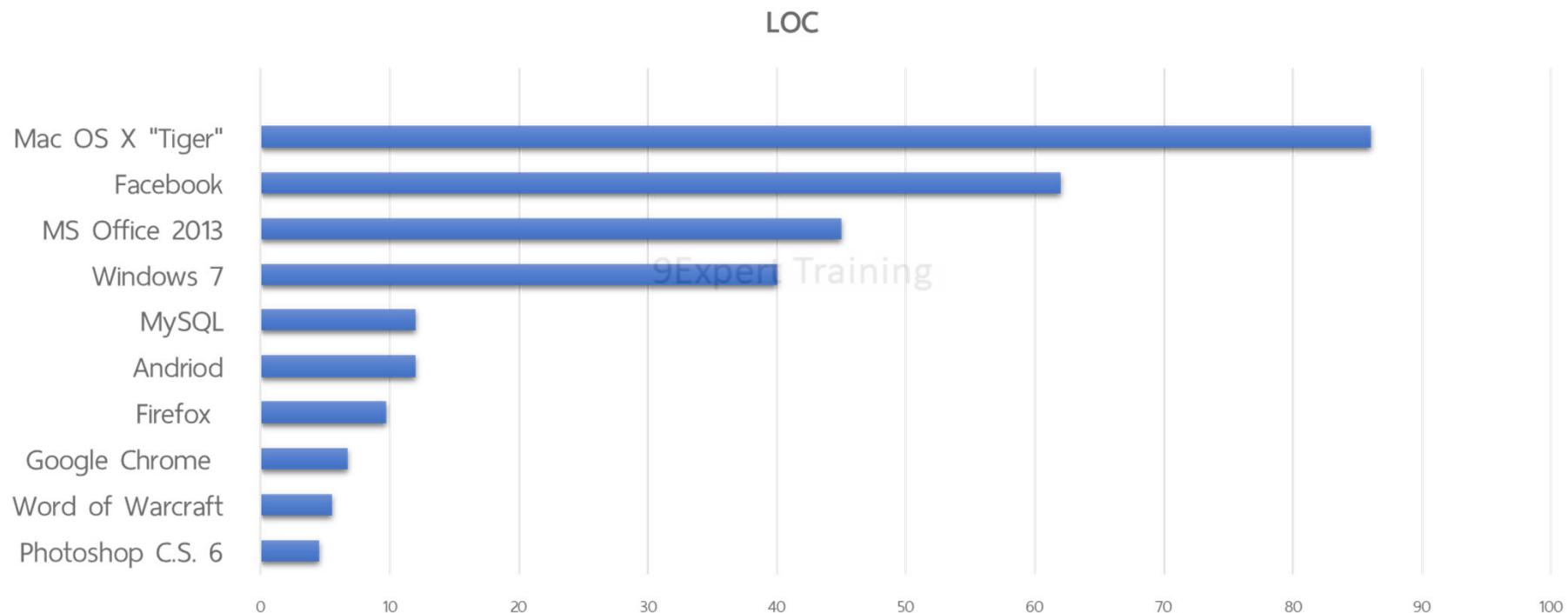
Python main program





- ขนาดของโปรแกรมมีขนาดที่เล็กลง
- สามารถนำกลับมาใช้งานใหม่ได้ (reuse code)
- หากต้องการแก้ไขชุดคำสั่ง ก็สามารถแก้ไขได้เพียงที่เดียว







2,000,000,000 Lines of Code!

Source: <https://informationisbeautiful.net/visualizations/million-lines-of-code/>



- Function (do return the values)
- Procedures (don't return the values)
- Methods
- Subprograms
- Subroutines

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Built-in function คือฟังก์ชันที่มากับ Python และสามารถเรียกใช้งานได้ทันที

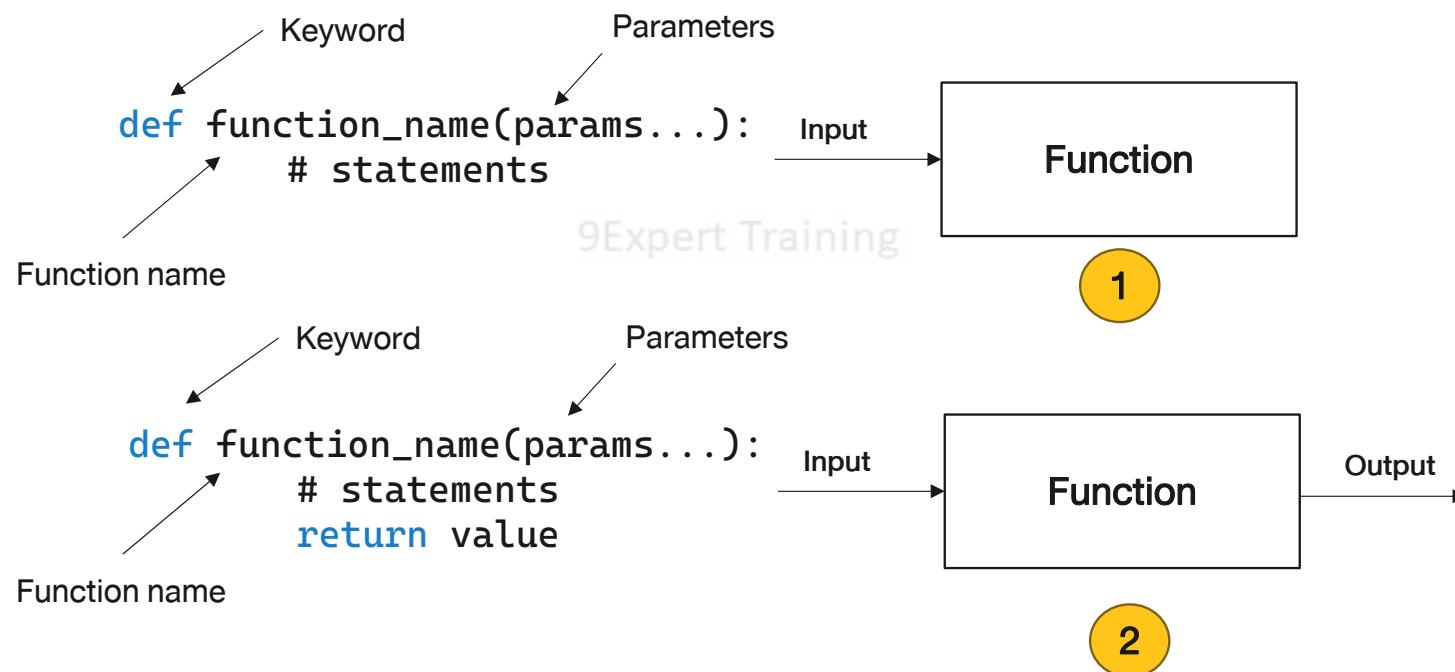
Built-in Functions				
<code>abs()</code>	<code>delattr()</code>	<code>hash()</code>	<code>memoryview()</code>	<code>set()</code>
<code>all()</code>	<code>dict()</code>	<code>help()</code>	<code>min()</code>	<code>setattr()</code>
<code>any()</code>	<code>dir()</code>	<code>hex()</code>	<code>next()</code>	<code>slice()</code>
<code>ascii()</code>	<code>divmod()</code>	<code>id()</code>	<code>object()</code>	<code>sorted()</code>
<code>bin()</code>	<code>enumerate()</code>	<code>input()</code>	<code>oct()</code>	<code>staticmethod()</code>
<code>bool()</code>	<code>eval()</code>	<code>int()</code>	<code>open()</code>	<code>str()</code>
<code>breakpoint()</code>	<code>exec()</code>	<code>isinstance()</code>	<code>ord()</code>	<code>sum()</code>
<code>bytearray()</code>	<code>filter()</code>	<code>issubclass()</code>	<code>pow()</code>	<code>super()</code>
<code>bytes()</code>	<code>float()</code>	<code>iter()</code>	<code>print()</code>	<code>tuple()</code>
<code>callable()</code>	<code>format()</code>	<code>len()</code>	<code>property()</code>	<code>type()</code>
<code>chr()</code>	<code>frozenset()</code>	<code>list()</code>	<code>range()</code>	<code>vars()</code>
<code>classmethod()</code>	<code>getattr()</code>	<code>locals()</code>	<code>repr()</code>	<code>zip()</code>
<code>compile()</code>	<code>globals()</code>	<code>map()</code>	<code>reversed()</code>	<code>__import__()</code>
<code>complex()</code>	<code>hasattr()</code>	<code>max()</code>	<code>round()</code>	

อ้างอิง: <https://docs.python.org/3/library/functions.html>



Function คือส่วนของโปรแกรมที่ทำหน้าที่บางอย่าง เพื่อสามารถเรียกใช้งานซ้ำๆ ได้

Syntax:





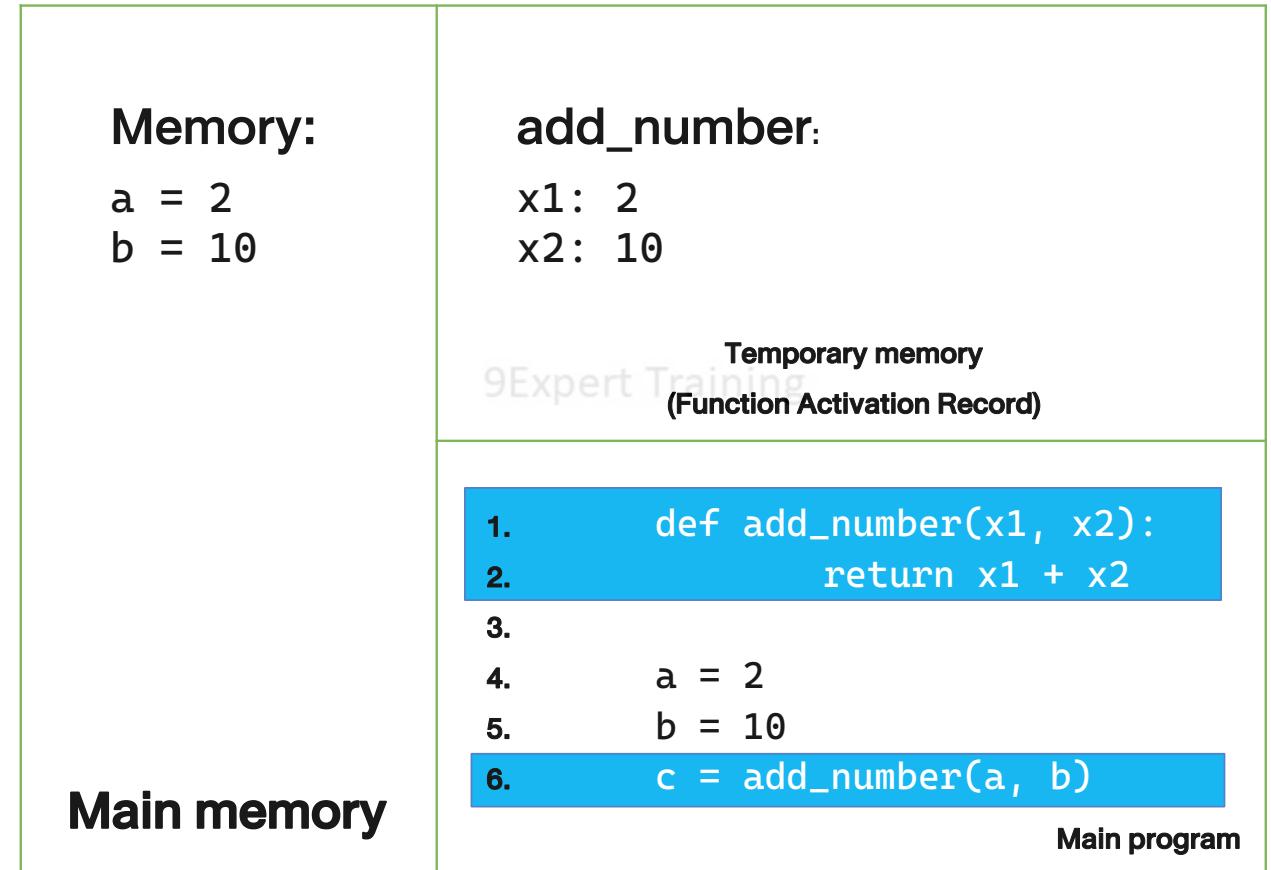
- Parameters are used inside functions. Parameters of a function are like local variables that live inside of a function
- Arguments are the actual values that are passed to the function when the function is called. Arguments are the values that are assigned to these variables from the outside by the caller of the function

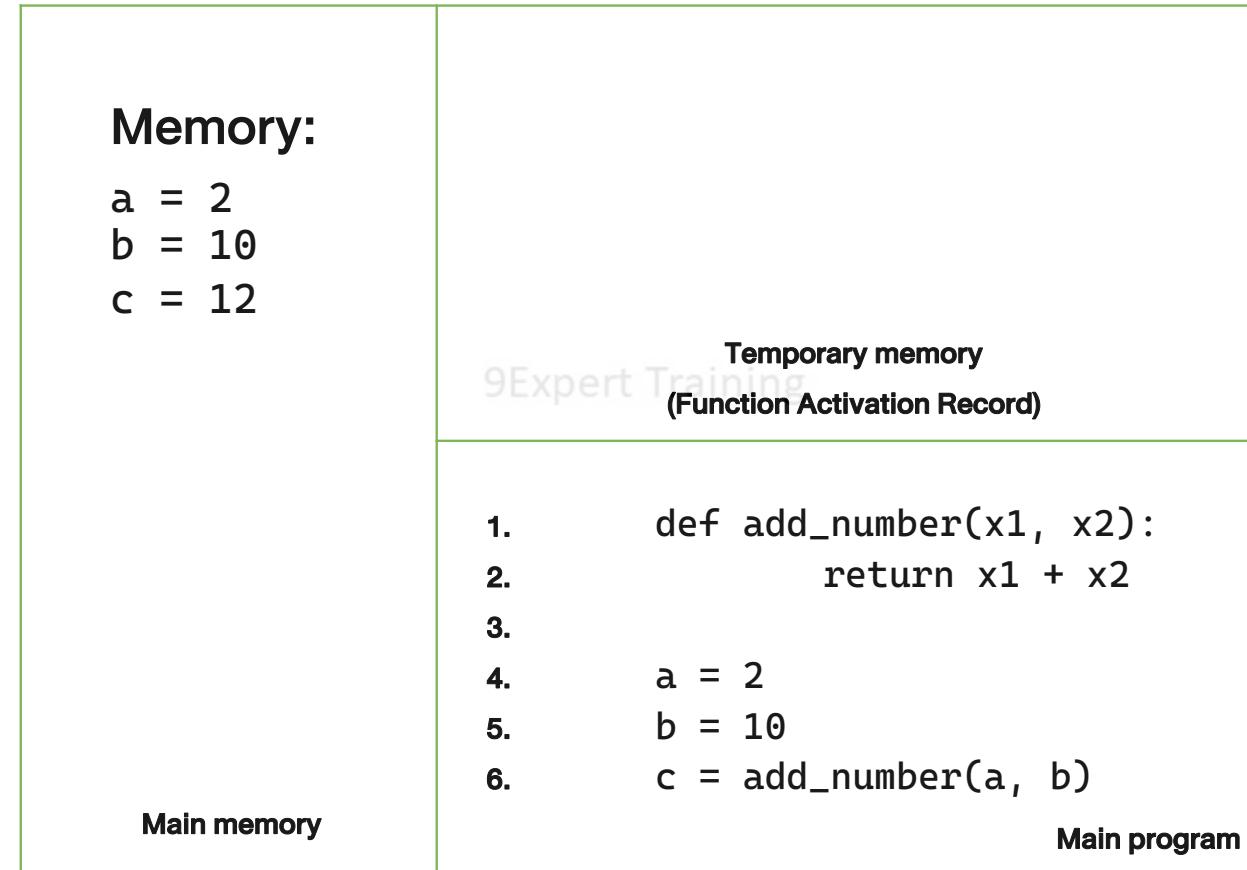
Example:

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```
def add_number(param1, param2):  
    return param1 + param2
```

```
arg1, arg2 = 15 + 5  
add_number(arg1, arg2)
```







Lambda expression คือฟังก์ชันขนาดเล็กที่มีเพียง expression เดียว

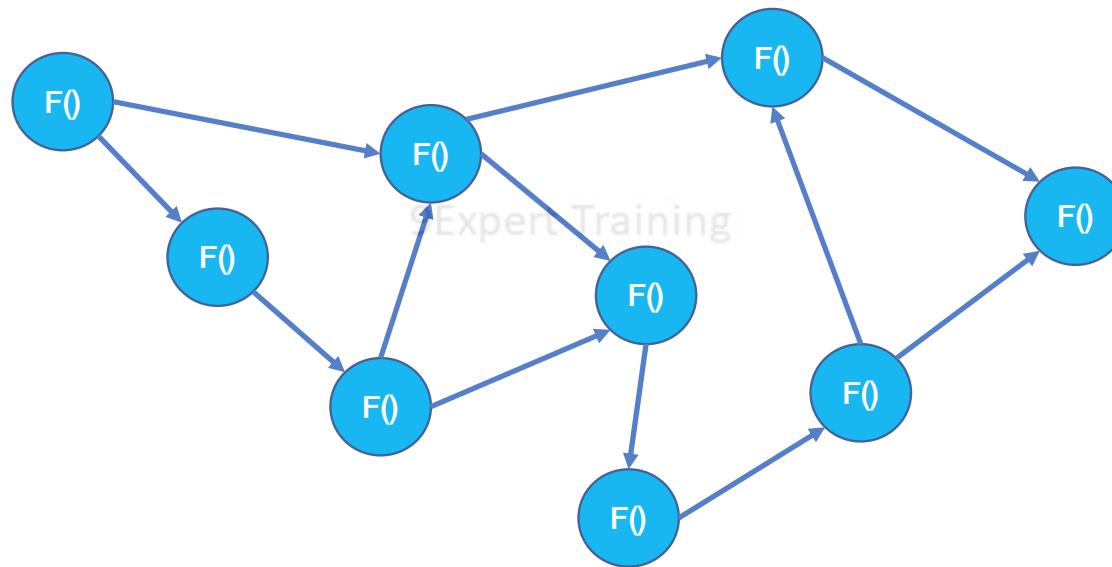
ตัวอย่าง 1.

```
f = lambda x: x + 1
print(f(2))
print(f(5))
```

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ตัวอย่าง 2.

```
g = lambda a, b: a + b
print(g(2,3))
print(g(10,5))
```

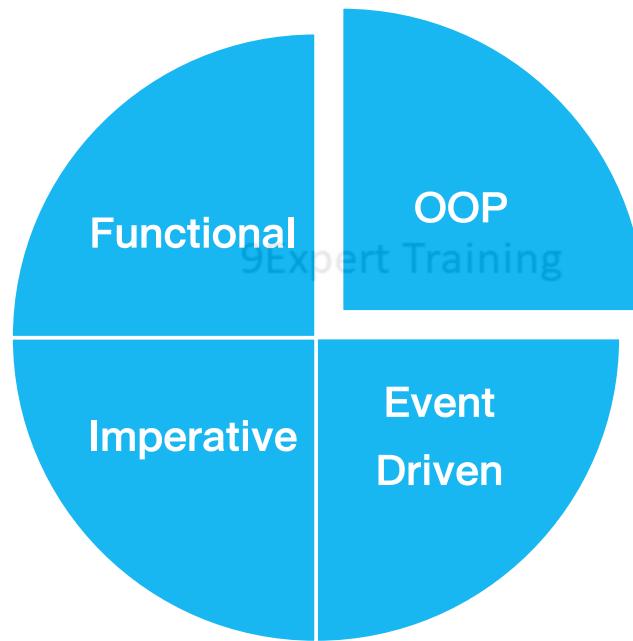




Spaghetti code is a pejorative phrase for unstructured and difficult-to-maintain source code.



- กระบวนการทัศน์การเขียนโปรแกรม (Programming Paradigm) คือแนวคิดหรือสไตร์ในการเขียนโปรแกรม





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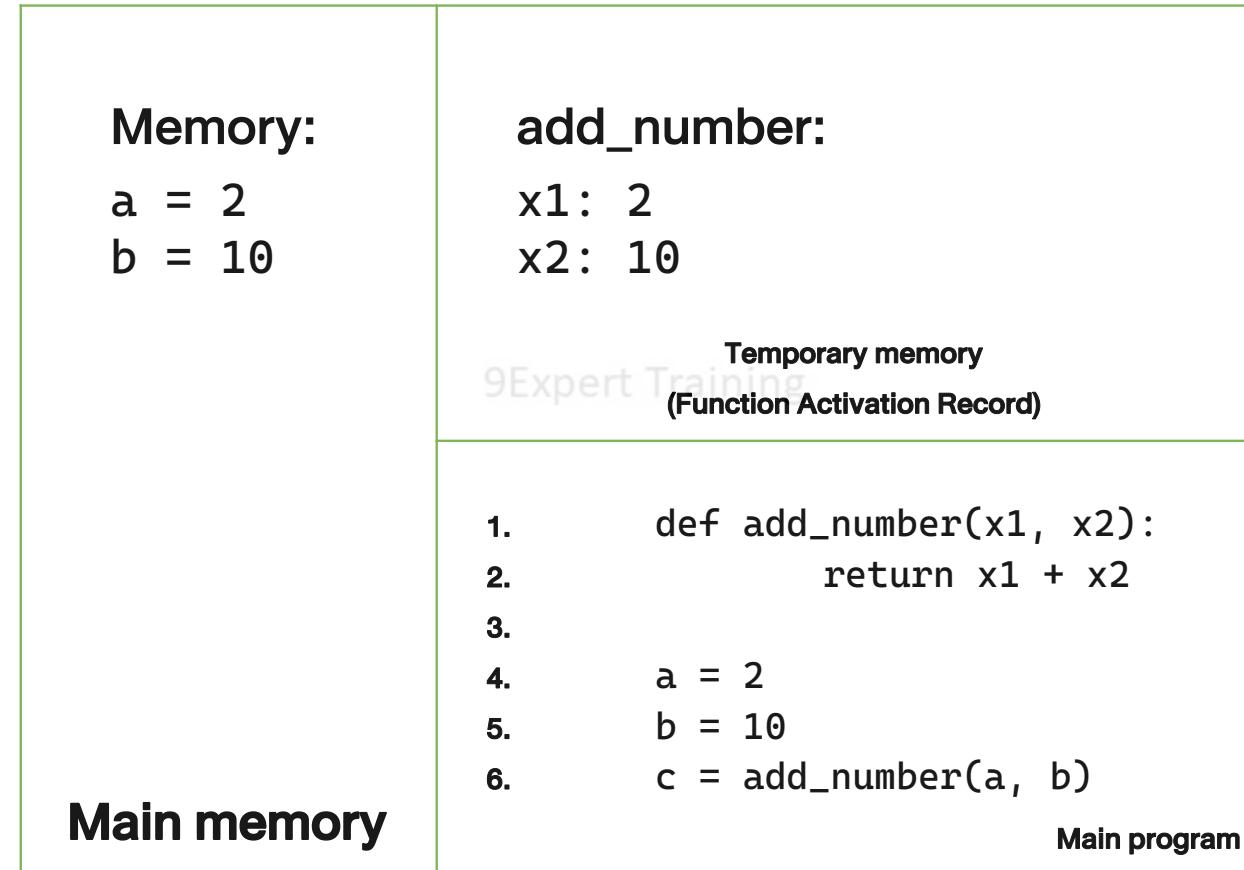


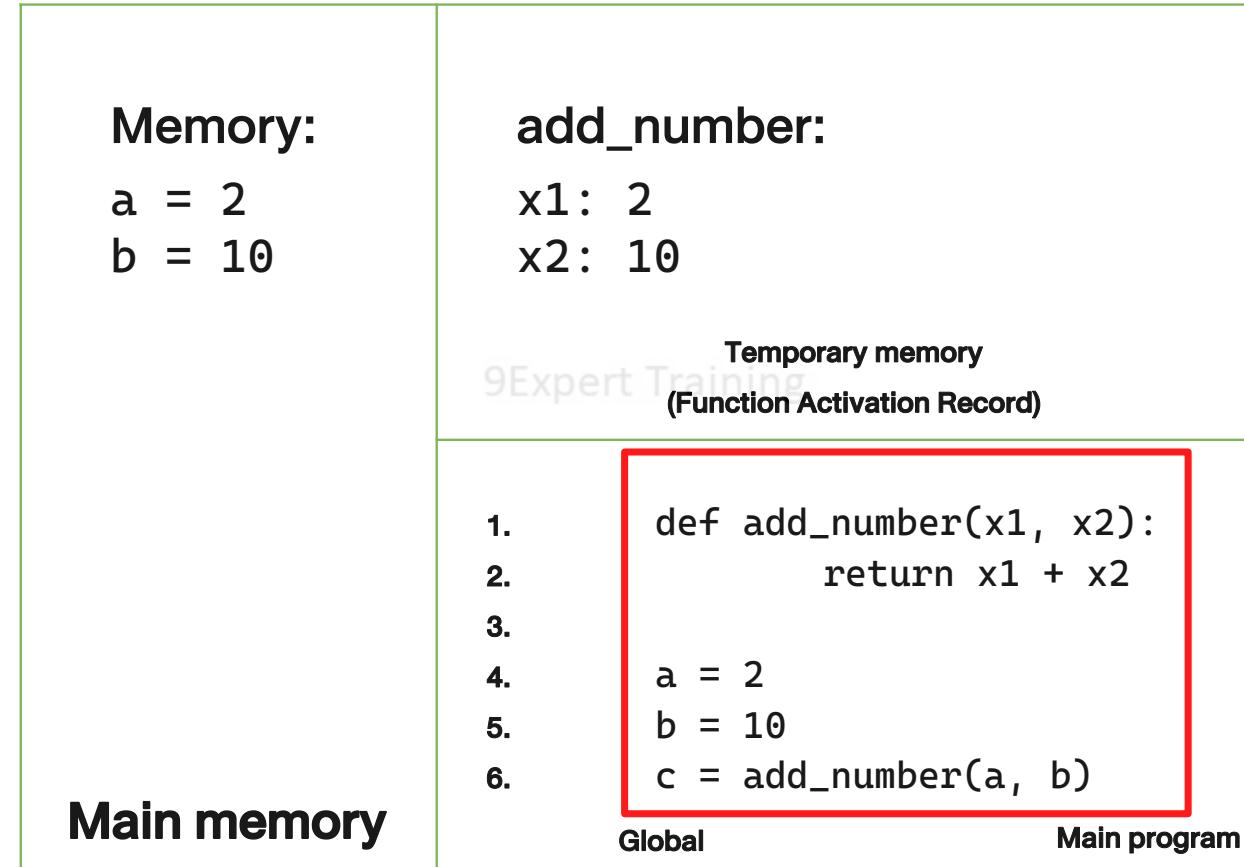


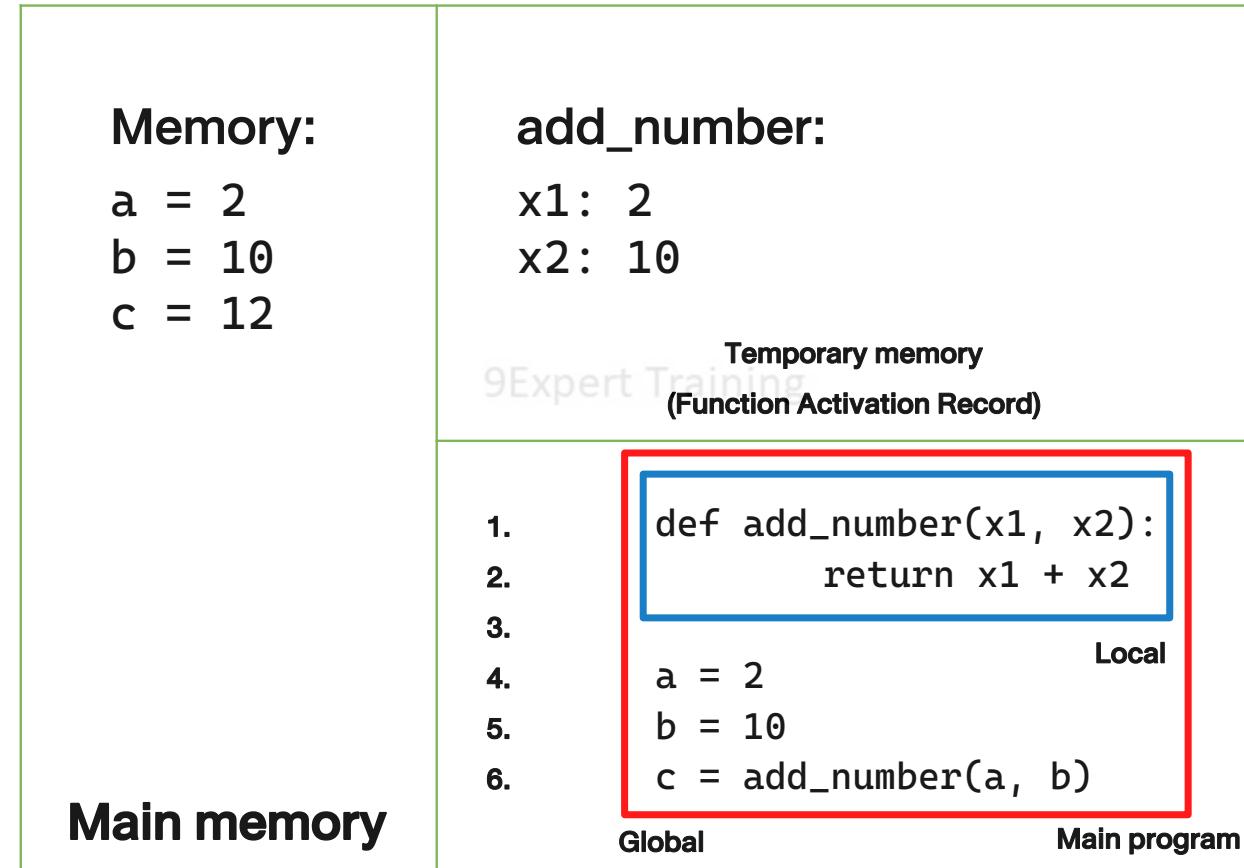
กำความรู้จักขอบเขตตัวแปร

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การดักจับและตรวจสอบข้อผิดพลาดต่างๆ

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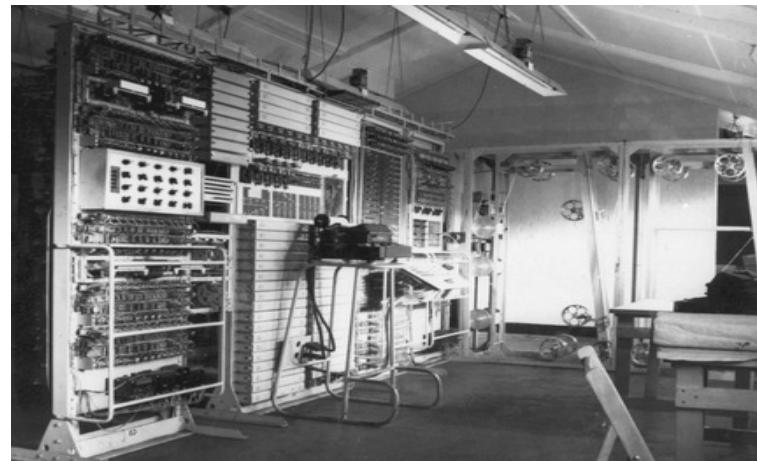
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$$\text{Errors} = (\text{more code})^2$$
$$E = mc^2$$



- Bug หรือแมลงได้เข้าไปติดอยู่ในรีเลย์ (Relay) ของเครื่องคอมพิวเตอร์ Mark II และทำให้การทำงานเกิดการขัดข้อง หลังจากนั้นทีมงาน Mark II ก็จะเรียกเป็นหาต่างๆ ที่เกิดขึ้นว่า “Bug” และได้มีการนำคำว่า Bug มาใช้ในวงการวิทยาการคอมพิวเตอร์ในเวลาต่อมา



Computer Mark II

9/9

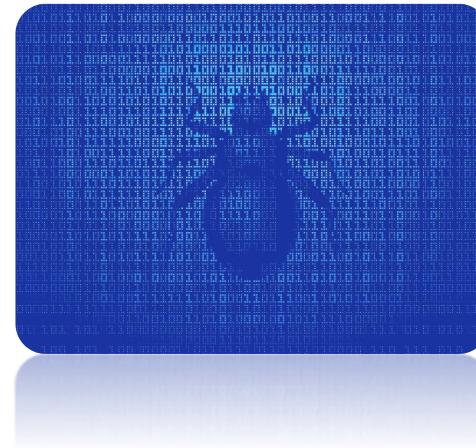
0800	Autan started		
1000	stopped - autan ✓	{ 1.2700	9.032 847 025
	13'uc (033) MP - MC	1.4821420000	9.037 846 995 connect
	(033) PRO.2	1.130476415 (-3)	4.615925059 (-1)
	connect	2.130476415	
		2.130476415	
			Pulling 2145
			Relay 3370
1100	Started Cosine Tape (Sine check)		
1525	Started Multi Adder Test.		
1545		Relay #70 Panel F (moth) in relay.	
1630	First actual case of bug being found.		
1700	Autan started.		
	closed down.		

รายงานการเกิด Bug



- Bug คือจุดบกพร่องหรือข้อผิดพลาดที่เกิดขึ้นภายในโปรแกรมจากโปรแกรมเมอร์ ทำให้คอมพิวเตอร์ทำงานไม่ถูกต้อง

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- Syntax errors
- Run-time errors
- Logic errors

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- Syntax errors เกิดจากการพิมพ์ชุดคำสั่งผิดพลาด

Syntax Error in Python:

“invalid syntax”

Example I

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```
[1]: citys = ['Bangkok', 'New York', 'Helsinki', 'Chicago']
      for city in citys
          print(city)
```

```
File "<ipython-input-1-072aa695091f>", line 2
      for city in citys
          ^
SyntaxError: invalid syntax
```

- Run-time errors เกิดขึ้นเมื่อข้อมูลนำเข้าไม่อยู่ในรูปแบบที่ระบบต้องการ

Example I

```
[3]: filename = input("Enter file name to read from: ")
      file = open(filename, 'r')

Enter file name to read from: python
-----
FileNotFoundException                                     Traceback (most recent call last)
<ipython-input-3-bbf8b4c32dd4> in <module>
      1 filename = input("Enter file name to read from: ")
----> 2 file = open(filename, 'r')

FileNotFoundException: [Errno 2] No such file or directory: 'python'
```

ข้อผิดพลาดเกิดจากผู้ใช้งานป้อนชื่อไฟล์ที่ไม่มีอยู่ในระบบ

Example II

```
[5]: month = int(input('Enter month'))

Enter month January
-----
ValueError                                         Traceback (most recent call last)
<ipython-input-5-d1f4dabc875e> in <module>
----> 1 month = int(input('Enter month'))

ValueError: invalid literal for int() with base 10: 'January'
```

ข้อผิดพลาดเกิดจากผู้ใช้งานป้อนข้อมูลเดือนเป็นตัวอักษร



Logic Errors เกิดขึ้นเมื่อโปรแกรมสามารถทำงานได้ถูกต้อง แต่ผลลัพธ์ไม่ถูกต้อง

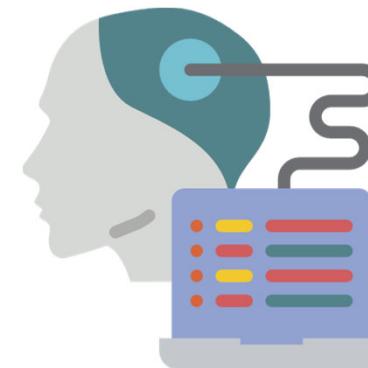
Example I

Wrong order

```
[ ]: def printDate(month, day, year):
        print('Date:', month, day, year)
m = 4
d = 3
y = 2019
printDate(d, m, y)
```

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ข้อผิดพลาดเกิดจากโปรแกรมเนื่องสัมภารามีเทอร์มินัลคำสั่ง





- Debug คือการแก้ไขจุดบกพร่องของโปรแกรมให้ทำงานเป็นปกติ

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Cost \$500M

Operand Error exception

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“exception was caused during execution of a data conversion from 64-bit floating point to 16-bit signed integer value”

https://www.youtube.com/watch?v=gp_D8r-2hwk



Erroneous angle-of-attack (AOA) information (Preliminary Report)

Maneuvering Characteristics Augmentation System (MCAS)



- Lion Air Flight 610 (October 2018)
- Death: 189 people
- Ethiopian Airlines Flight 302 (March 2019)
- Death: 157 people



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Boeing 737 Max Maneuvering Characteristics Augmentation System

Activates automatically when:

- Angle of attack is high
- Autopilot is off
- Flaps are up
- Steeply turning

MCAS pushes the jet's nose down to reduce the risk of stalling





Exceptions คือการจัดการเงื่อนไขการเกิดข้อผิดพลาดในกรณ์พิเศษ ในขณะที่โปรแกรมกำลังรัน

ตัวอย่างเช่น

- การเปิดไฟล์ที่ไม่มีอยู่ในระบบ
- การแปลงข้อความเป็นตัวเลขแต่ข้อความเป็นตัวอักษร
- การหารด้วยศูนย์

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Syntax:

```
try:  
    # statement  
except <name of exception>:  
    # how to handle that exception
```



Syntax:

```
try:  
    # statement  
except: <name of exception>:  
    # how to handle that exception  
else:  
    # if there is no exception, run this code  
finally:  
    # Always run this code
```



- **TypeError**
- **EOFError**
- **IndexError**
- **MemoryError**
- **NameError**
- **OSError**
- **SyntaxError**
- **SystemError**
- **ValueError**
- **ZeroDivisionError**

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การใช้งานโมดูล (Modules)

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Module (โมดูล) คือฟังก์ชันหรือกลุ่มของฟังก์ชันที่ถูกรวมไว้ด้วยกัน เพื่อให้สามารถเรียกใช้งานจากโปรแกรมอื่นได้

Package (แพคเกจ) คือการรวมโมดูลหลายโมดูลไว้ด้วยกัน

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- **math**
- **webbrowser**
- **http**
- **csv**
- **json**
- **html**
- **xml**
- **socket**
- **etc.**

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ข้อมูลเพิ่มเติม: <https://docs.python.org/3/library/index.html>



- math
- webbrowser
- http
- csv
- json
- html
- xml
- socket
- etc.

```
import math  
print(math.pi)
```

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คำสั่ง “import” มีไว้สำหรับใช้ในการโหลดโปรแกรมต่าง ๆ มาใช้ในโปรแกรมของเรา



- math
- webbrowser
- http
- csv
- json
- html
- xml
- socket
- etc.

```
import math as m  
print(m.pi)
```

```
import webbrowser as web  
print(web.open('https://www.google.com'))
```



```
from [module] import [function or value]
```

```
from random import choice
name = ['Python', 'Java', 'C/C++']
print(choice(name))
```

Output console:

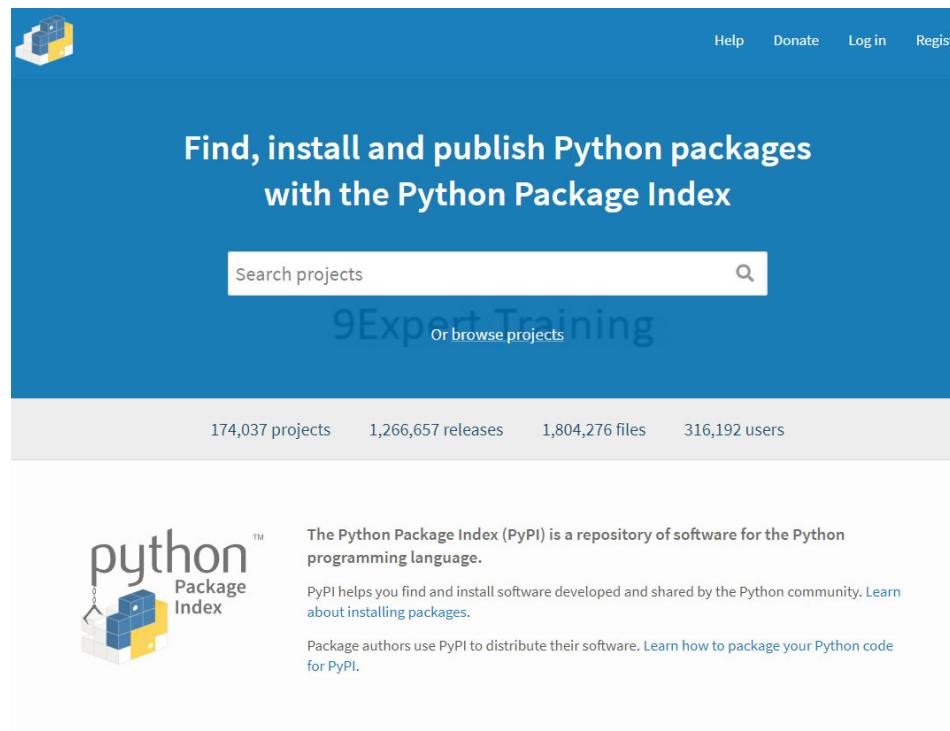
```
Python
```



```
Windows PowerShell
konze@YODA ~ > Programming > vscode_relative_import
> tree /F
Folder PATH listing
Volume serial number is 54A7-6ED5
C:.
├── extern
│   └── my_package
│       ├── classes.py
│       └── __init__.py
└── my_code
    └── main.py

konze@YODA ~ > Programming > vscode_relative_import
> |
```

- Python Package Index (PyPI) เป็นแหล่งรวมซอฟต์แวร์ไม่ดูแลต่างๆ เพื่อนำมาใช้งานกับภาษา Python



<https://pypi.org/>



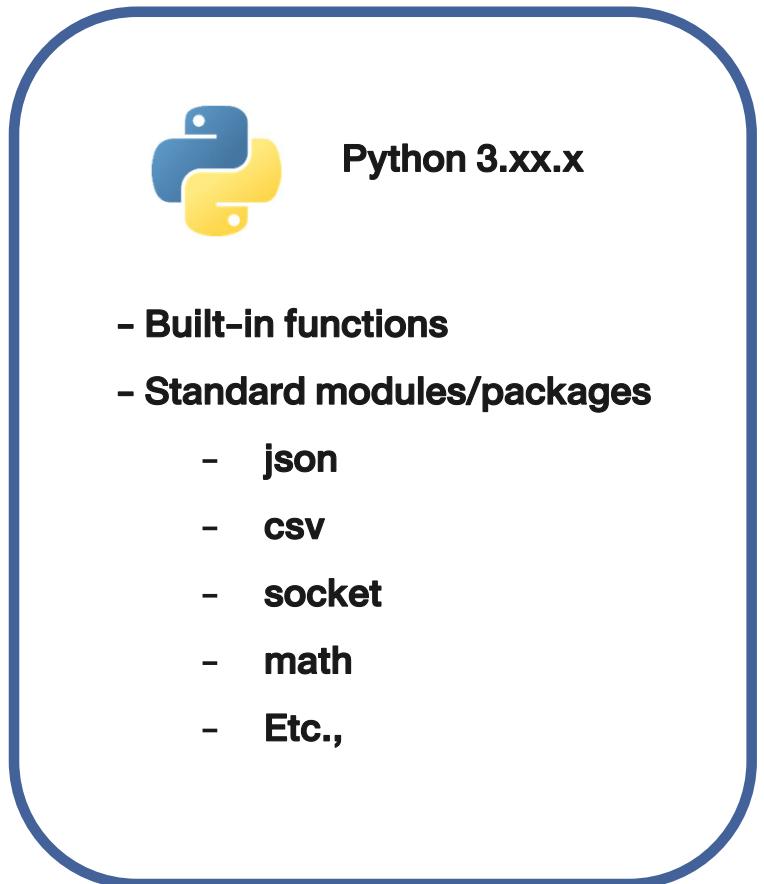
Python 3.xx.x

- Built-in functions
- Standard modules/packages
 - json
 - csv
 - socket
 - math
 - Etc.,



- Scientific Computing
 - NumPy
 - SciPy
 - Statsmodels
- Data Manipulation and Analysis
 - Pandas
- Natural Language Processing
 - NLTK
- Machine Learning
 - TensorFlow
 - Scikit-learn
 - Keras
 - Theano
- Visualization
 - Matplotlib
 - Seaborn







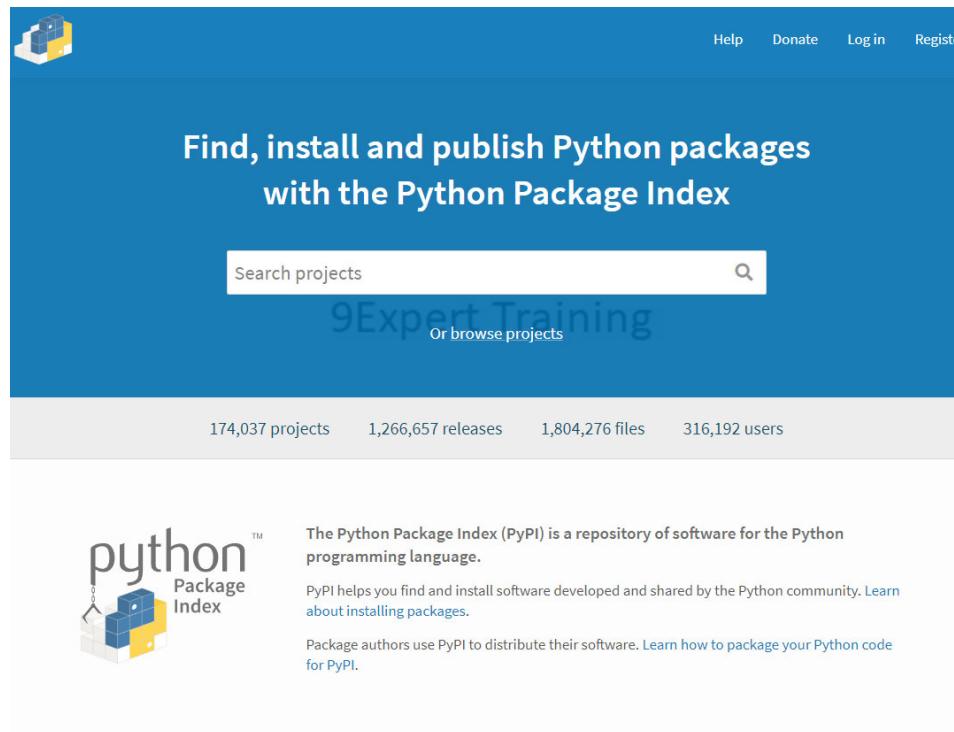
การติดตั้งใช้งาน Module

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- Python Package Index (PyPI) เป็นแหล่งรวมซอฟต์แวร์ไม่ดูแลต่างๆ เพื่อนำมาใช้งานกับภาษา Python



<https://pypi.org/>



- **Install**

> `pip install <package name>`

- **Install specific package version**

> `pip install <package name>==x.x.x`

Upgrading package

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> `pip install --upgrade <package name>`

- **Uninstall**

> `pip uninstall <package name>`

- **List**

> `pip list`



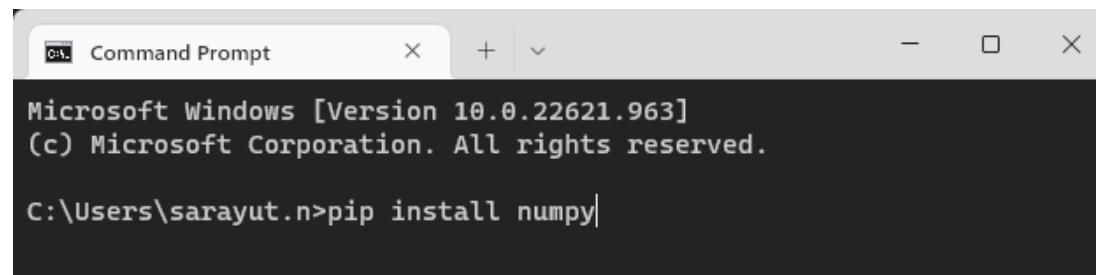
- Module ยังไม่ได้ทำการติดตั้งบนเครื่อง

Error: No module named 'ชื่อโมดูล'

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- pip คือ Python Package Manager ซึ่งอำนวยความสะดวกในการติดตั้งโมโนล็อกต่างๆ เพื่อใช้งาน
- สามารถนำมาใช้งานได้จากการ command line
 - Windows: cmd
 - Mac: Terminal (Applications/Utilities)

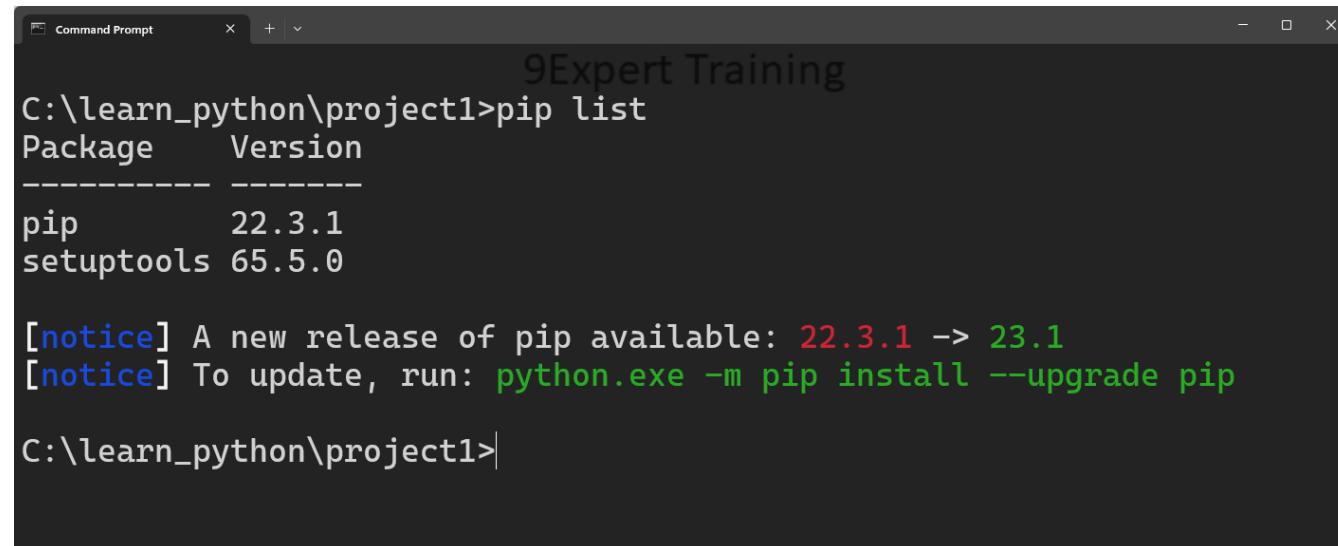
```
> pip install <package name>
> pip3 install <package name>
> python -m pip install <package name>
> python -m pip3 install <package name>
```



A screenshot of a Microsoft Windows Command Prompt window. The window title is "Command Prompt". The text area shows the following output:
Microsoft Windows [Version 10.0.22621.963]
(c) Microsoft Corporation. All rights reserved.
C:\Users\sarayut.n>pip install numpy|

- **WARNING:** You are using pip version x.x.x, however version x.x.x is available. You should consider upgrading via the 'pip install --upgrade pip' command.

```
> pip install --upgrade pip
```



```
Command Prompt
9Expert Training
C:\learn_python\project1>pip list
Package      Version
-----
pip          22.3.1
setuptools   65.5.0

[notice] A new release of pip available: 22.3.1 -> 23.1
[notice] To update, run: python.exe -m pip install --upgrade pip

C:\learn_python\project1>
```



The screenshot shows a Microsoft Windows Command Prompt window titled "Command Prompt". The window title bar includes standard icons for minimize, maximize, and close. The command prompt itself displays the following text:

```
Microsoft Windows [Version 10.0.22621.963]
(c) Microsoft Corporation. All rights reserved.

C:\Users\sarayut.n>pip install numpy
```

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Python

python.org

Miniconda

conda.io/miniconda.html

Anaconda

anaconda.com



Miniconda

- Conda (Package manager)
- Python
- Base packages

Anaconda

- Conda (Package manager)
- Python
- 150+ high-quality packages

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Conda



Package, dependency and environment management for any language—Python, R, Ruby, Lua, Scala, Java, JavaScript, C/C++, Fortran, and more.

Conda is an open source package management system and environment management system that runs on Windows, macOS, and Linux. Conda quickly installs, runs and updates packages and their dependencies. Conda easily creates, saves, loads and switches between environments on your local computer. It was created for Python programs, but it can package and distribute software for any language.

Conda as a package manager helps you find and install packages. If you need a package that requires a different version of Python, you do not need to switch to a different environment manager, because conda is also an environment manager. With just a few commands, you can set up a totally separate environment to run that different version of Python, while continuing to run your usual version of Python in your normal environment.

In its default configuration, conda can install and manage the thousand packages at repo.anaconda.com that are built, reviewed and maintained by Anaconda®.

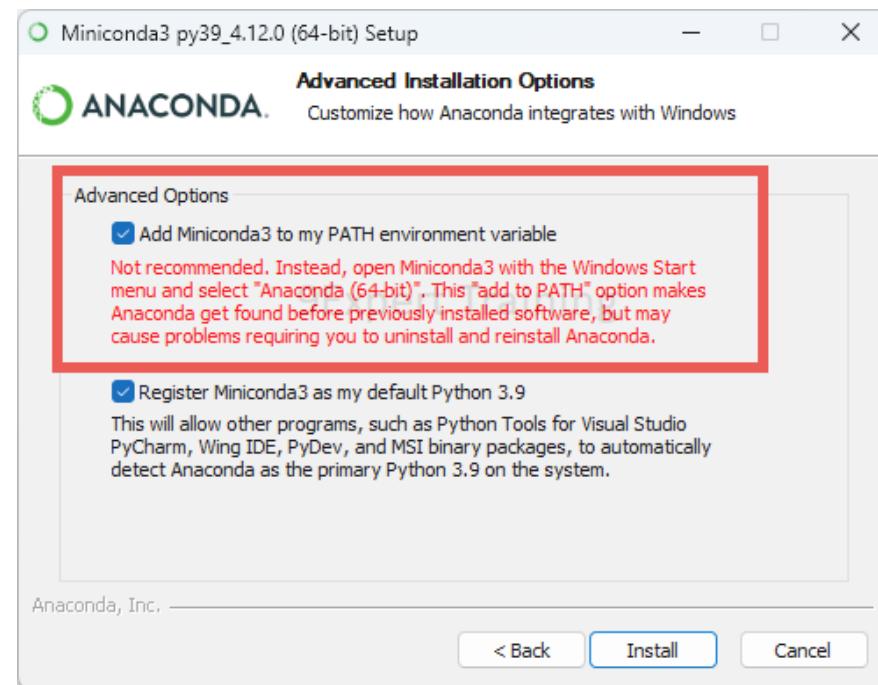
Conda can be combined with continuous integration systems such as Travis CI and AppVeyor to provide frequent, automated testing of your code.

The conda package and environment manager is included in all versions of Anaconda and Miniconda.

Conda is also included in Anaconda Enterprise, which provides on-site enterprise package and environment management for Python, R, Node.js, Java and other application stacks. Conda is also available on [conda-forge](#), a community channel. You may also get conda on [PyPI](#), but that approach may not be as up to date.

Next

<https://docs.conda.io/en/latest/Index.html>



Error: No module named 'Module name'

> pip install <package name>

> conda install <package name>

Python

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Miniconda

Anaconda



Google

pip cv2

X |

[All](#) [Videos](#) [Images](#) [News](#) [Books](#) [More](#)

Tools

About 3,960,000 results (0.33 seconds)

<https://pypi.org/project/opencv-python/> ::

opencv-python - PyPI

Installation and Usage · Option 1 - Main modules package: `pip install opencv-python` · Option 2

- Full package (contains both main modules and contrib/extr...)

Python :: 3.8 · 4.2.0.34 Apr 4, 2020 · Python :: 3.7 · MacOS

You've visited this page many times. Last visit: 9/9/21

<https://pypi.org/project/cv2-tools/> ::

cv2-tools - PyPI

Library to help the drawing process with OpenCV. Thought to add labels to the images.

Classification of images, etc.

opencv-python 4.6.0.66

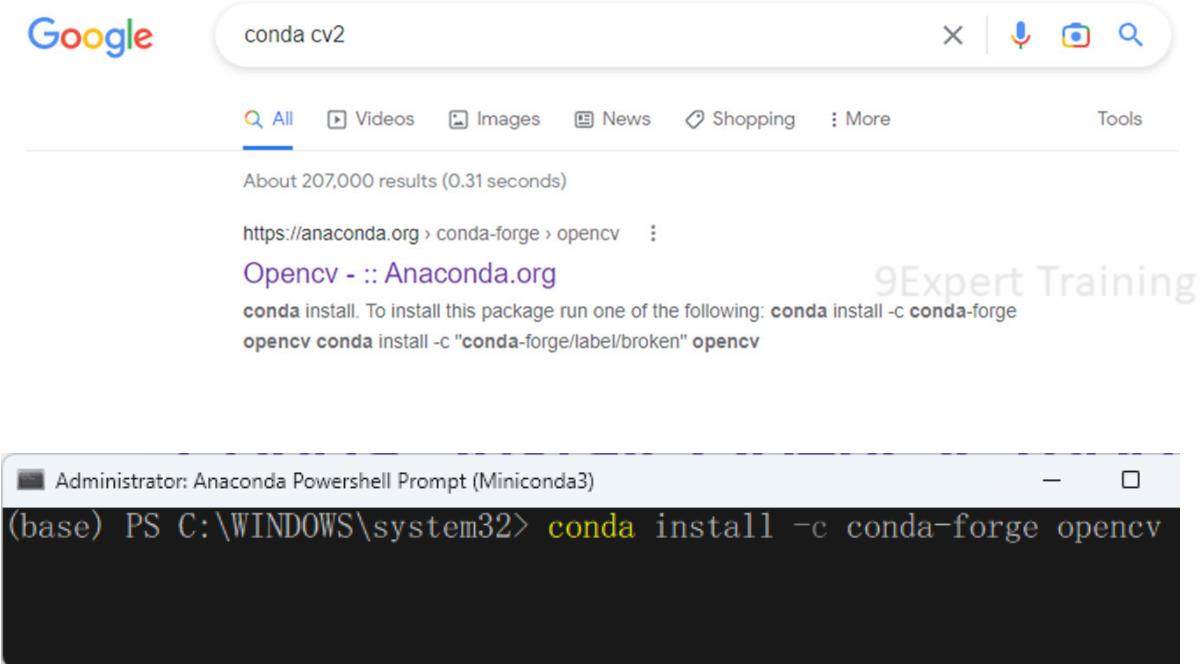
`pip install opencv-python`

Wrapper package for OpenCV python bindings.

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```
Command Prompt
Microsoft Windows [Version 10.0.22621.963]
(c) Microsoft Corporation. All rights reserved.

C:\Users\sarayut.n>pip install opencv-python
```



Google search results for "conda cv2":

- About 207,000 results (0.31 seconds)
- <https://anaconda.org> > conda-forge > opencv
- Opencv - :: Anaconda.org**
- conda install. To install this package run one of the following: `conda install -c conda-forge opencv` `conda install -c "conda-forge/label/broken" opencv`

Administrator: Anaconda Powershell Prompt (Miniconda3)

```
(base) PS C:\WINDOWS\system32> conda install -c conda-forge opencv
```

Installers

Info: This package contains files in non-standard **labels**.

linux-ppc64le	v4.6.0
osx-arm64	v4.6.0
linux-64	v4.6.0
win-32	v3.4.1
linux-aarch64	v4.6.0
osx-64	v4.6.0
win-64	v4.6.0

conda install ?

To install this package run one of the following:

`conda install -c conda-forge opencv`
`conda install -c "conda-forge/label/broken" opencv`
`conda install -c "conda-forge/label/cf201901" opencv`
`conda install -c "conda-forge/label/cf202003" opencv`
`conda install -c "conda-forge/label/gcc7" opencv`



Check if the module is installed correctly

+ Code + Markdown | ▶ Run All ⌂ Clear Outputs of All Cells ⌂ Restart | ⌓ Outline ...

```
import cv2
```

[1] ✓ 0.5s

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[]



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การอ่านและเขียนไทย

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Text Files	Binary Files
Plain Text	Media files
CSV	- images
XML	- audio
HTML	- video
Source code	App data
Etc.	Compiled code



- Text
- Microsoft Excel
- JSON

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• Absolute Paths

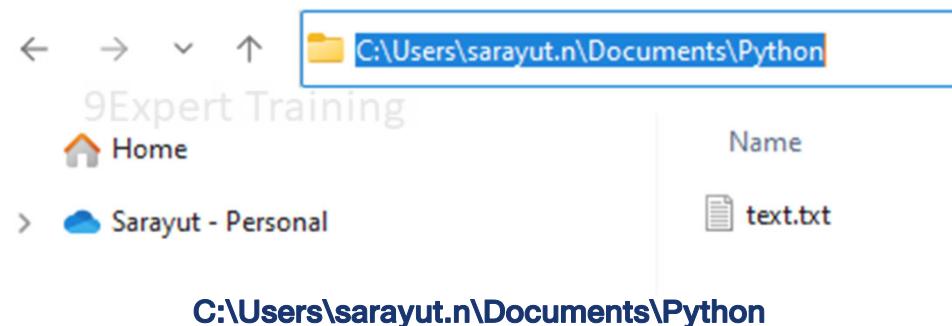
- It is a full path of the file from the root directory
- For example:
 - C:\Pythons\File\Example\data.text
 - D:\Python\Project\package\program.py

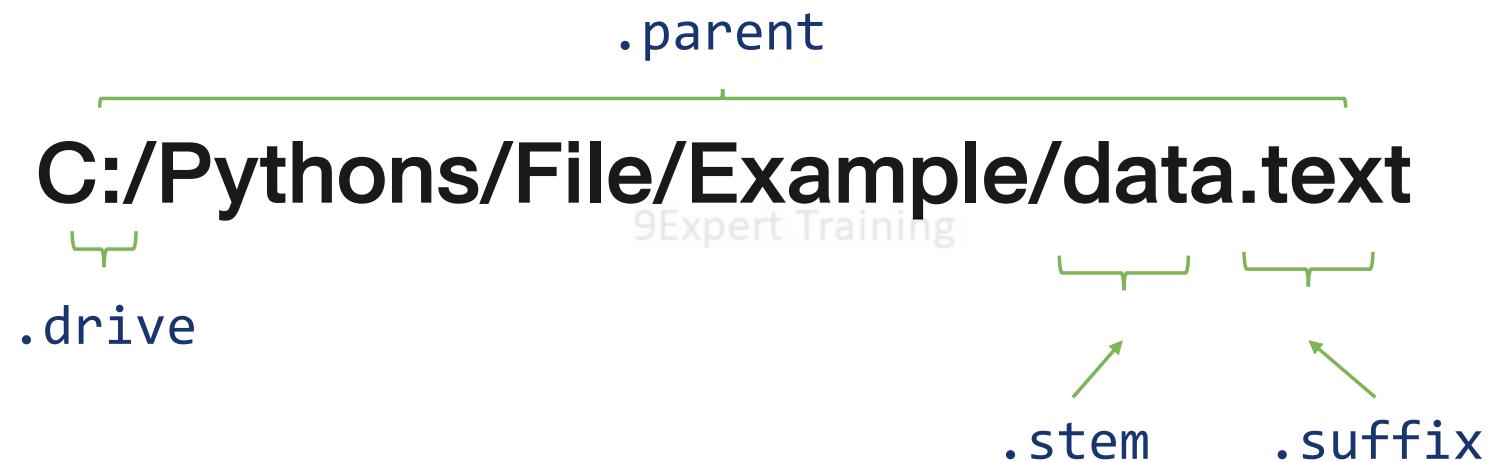
• Relative Paths

- It is the path of the file from the current working directory
- For example: C:\Python\ (Current directory)
 - Data.xlsx
- For example: D:\Python\Project (Current directory:)
 - .\package\program.py



- Windows
 - “dir_1\dir_2\file.txt”
- macOS/Linux
 - “dir_1/dir_2/file.txt”





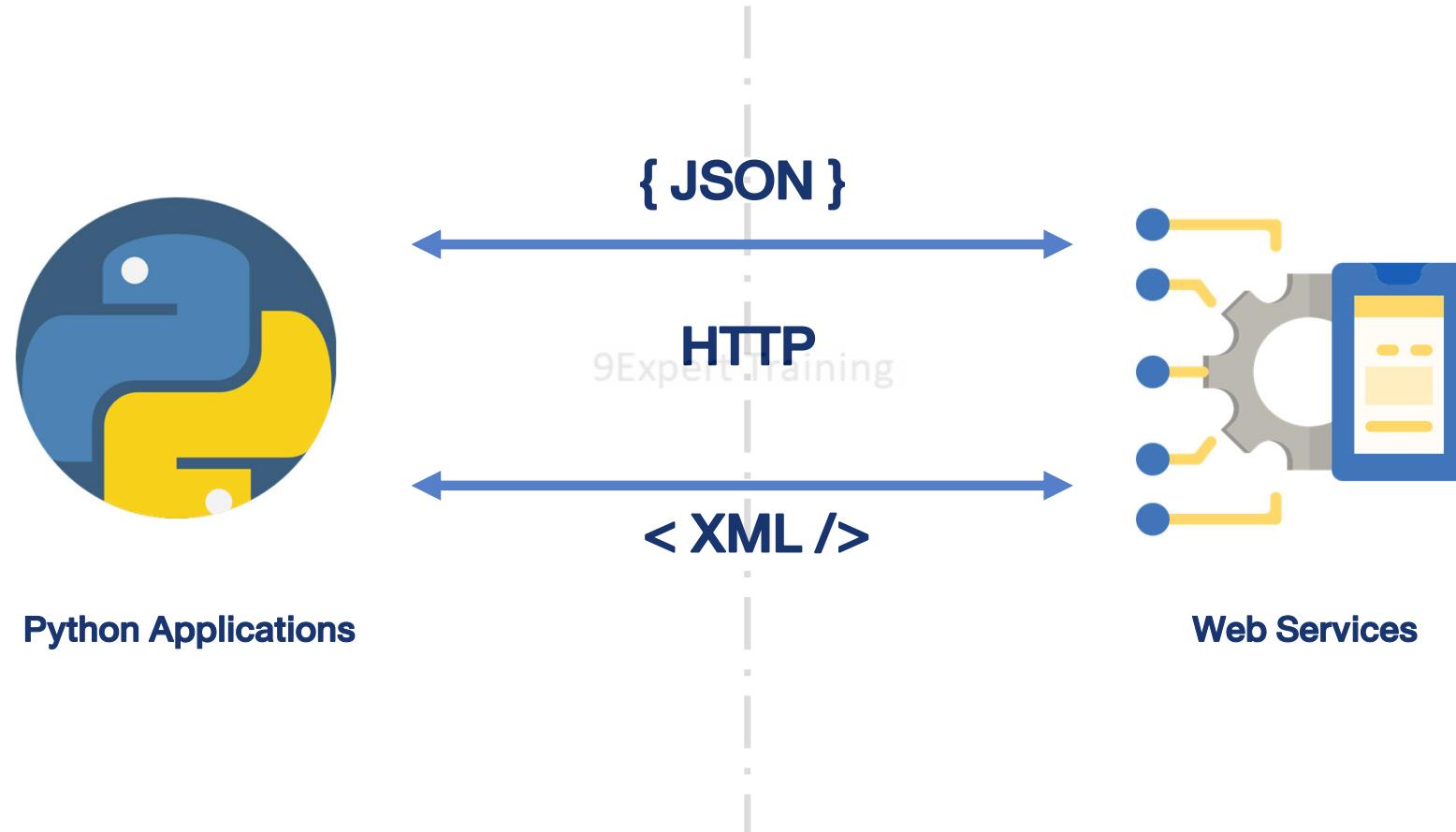


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- Move File
- Delete file
- Rename file

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• JSON

```
{  
    "name": "Thailand",  
    "capital": "Bangkok",  
    "area": "513,120 km sq"  
}
```

• XML

```
<country>  
    <name>Thailand</name>  
    <capital>Bangkok</capital>  
    <area>513,120 km sq</area>  
</country>
```



Example: <https://randomuser.me/>

- <https://randomuser.me/> เว็บไซต์ API ฟรีสำหรับสร้างข้อมูลผู้ใช้งานแบบสุ่ม

RANDOM USER GENERATOR

A free, [open-source](#) API for generating random user data. Like Lorem Ipsum, but for people.

[Follow us @randomapi](#)

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Hi, My name is
Yvonne Stanley



- เปิดเว็บไซต์ดังนี้ <https://randomuser.me/api?results=3>



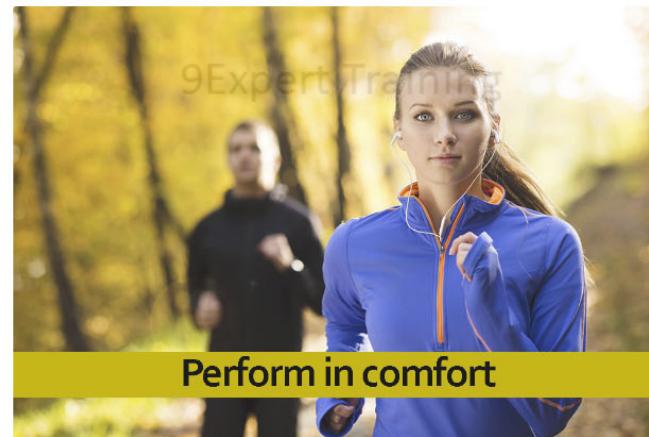
```
{"results":[{"gender":"female","name":{"title":"Miss","first":"Florence","last":"Gagnon"},"location":{"street":{"number":1307,"name":"Simcoe St"},"city":"Princeton","state":"Manitoba","country":"Canada","postcode":"U6J 8C4","coordinates":{"latitude":-65.6947,"longitude":62.9862}, "timezone":{"offset":"-3:00","description":"Brazil, Buenos Aires, Georgetown"}}, "email":"florence.gagnon@example.com","login":{"uuid":"74252ca2-ac78-4dde-8d6d-c67fc01f9222","username":"ticklishrabbit453","password":"fusion","salt":"WBGZ24U2","md5":"a7fb20164fc7756a00ddc366c5103337"}, "sha1":"edf5f162c8eddf7edb2dd4d136cd2ea109a2a3b4e", "sha256":"77f54a8a4627c686fec74910fb095d4272c7cea460f504d95bdde521a789fd4"}, "dob":{"date":"1970-03-31T07:00:09.166Z","age":50}, "registered":{"date":"2019-02-03T16:22:12.710Z","age":1}, "phone":"009-611-1497", "cell":689-913-2720}, "id":{"name":"","value":null}, "picture":{"large":"https://randomuser.me/api/portraits/women/77.jpg","medium":"https://randomuser.me/api/portraits/med/women/77.jpg", "thumbnail":"https://randomuser.me/api/portraits/thumb/women/77.jpg"}, "nat":"CA"}, {"gender":"female","name":{"title":"Mrs","first":"Onur","last":"Onur"}, "location":{"street":{"number":7365,"name":"Abanoz Sk"}}, "city":"Silint","state":"Zonguldak","country":"Turkey","postcode":17918,"coordinates":{"latitude":-10.4557,"longitude":145.2727}, "timezone":{"offset":-8:00}, "description":"Pacific Time (US & Canada)"}, "email":"onur.onur@example.com", "login":{"uuid":"cadff253-b30c-4a5d-97ee-d92b6bd1598","username":"angryzebra175","password":"tribble"}, "salt":"vJHknsEt", "md5":"11803e9776fe9acf53c9f78df1a89e27"}, "sha1":"d258fb41a7b87bb36542325beef9ba945bf04", "sha256":"c4ed8ffaf6ed965e33f63337827494ea668ef087bc172cfc9ab1bed20fd2f}, "dob":{"date":"1979-10-05T17:27:56.133Z","age":41}, "registered":{"date":"2002-12-11T08:42:34.790Z","age":18}, "phone":"(525)-667-0816", "cell":"(939)-561-7974}, "id":{"name":"","value":null}, "picture":{"large":"https://randomuser.me/api/portraits/women/59.jpg","medium":"https://randomuser.me/api/portraits/med/women/59.jpg", "thumbnail":"https://randomuser.me/api/portraits/thumb/women/59.jpg"}, "nat":"TR"}, {"gender":"female","name":{"title":"Mrs","first":"Rosemere","last":"Fogaca"}, "location":{"street":{"number":1616,"name":"Rue São Sebastião"}}, "city":"Jandira","state":"Sergipe","country":"Brazil","postcode":75125,"coordinates":{"latitude":-23.2734,"longitude":-40.9194}, "timezone":{"offset":+1:00}, "description":"Brussels, Copenhagen, Madrid, Paris)"}, "email":"rosemere.fogaca@example.com", "login":{"uuid":475e0f1a0984-49aa-b0d2-95f993cec71,"username":"ticklishmouse986","password":"tanker"}, "salt":IQPKXkPp", "md5":db9afa68623445cf94749c533312a35b}, "sha1":63219a9ae6c8d511c638fc57a490b9272fdfdf", "sha256":ccaa52b125f30cf721f0d0d93d8800d92b37b756542280b30c7b54b572d07edfd}, "dob":{"date":"1972-03-12T00:30:59.471Z","age":48}, "registered":{"date":"2011-07-31T19:57:42.929Z","age":9}, "phone":"(46) 0066-1188", "cell":"(71) 8570-8127}, "id":{"name":"","value":null}, "picture":{"large":"https://randomuser.me/api/portraits/women/68.jpg","medium":"https://randomuser.me/api/portraits/med/women/68.jpg", "thumbnail":"https://randomuser.me/api/portraits/thumb/women/68.jpg"}, "nat":"BR"]}, "info": {"seed":3b14973fb0bc0aed1}, "results":3, "page":1, "version":1.3} } 
```



h+ sport

[Home](#)
[Company](#)
[Products](#)
[Shop](#)
[Blog](#)
[Contact](#)

\$0.00 0 items





Example II

- <https://hplussport.com/api/products>
- <https://hplussport.com/api/posts>

```
[{"id": "259", "name": "Raspberry Mineral Water", "description": "An 8-ounce serving of our refreshing H+ Sport raspberry mineral water fulfills a day's nutritional requirements for over 12 vitamins and minerals.", "price": "2.80", "image_title": "mineral-water-raspberry_600px"}, {"id": "429", "name": "Strawberry Mineral Water", "description": "An 8-ounce serving of our refreshing H+ Sport strawberry mineral water fulfills a day's nutritional requirements for over 12 vitamins and minerals.", "price": "2.80", "image_title": "mineral-water-strawberry_600px"}, {"id": "436", "name": "Blueberry Mineral Water", "description": "An 8-ounce serving of our refreshing H+ Sport blueberry mineral water fulfills a day's nutritional requirements for over 12 vitamins and minerals.", "price": "2.80", "image_title": "mineral-water-blueberry_600px"}, {"id": "437", "name": "Lemon-Lime Mineral Water", "description": "An 8-ounce serving of our refreshing H+ Sport lemon-lime mineral water fulfills a day's nutritional requirements for over 12 vitamins and minerals.", "price": "2.80", "image_title": "mineral-water-lemon-lime_600px"}, {"id": "438", "name": "Peach Mineral Water", "description": "An 8-ounce serving of our refreshing H+ Sport peach mineral water fulfills a day's nutritional requirements for over 12 vitamins and minerals.", "price": "2.80", "image_title": "mineral-water-peach_600px"}, {"id": "439", "name": "Orange Mineral Water", "description": "An 8-ounce serving of refreshing H+ Sport orange mineral water fulfills a day's nutritional requirements for over 12 vitamins and minerals.", "price": "2.80", "image_title": "mineral-water-orange_600px"}, {"id": "440", "name": "Multi-Vitamin (90 capsules)", "description": "A daily dose of our Multi-Vitamins fulfills a day's nutritional needs for over 12 vitamins and minerals.", "price": "9.99", "image_title": "multi-vitamin_600px"}, {"id": "441", "name": "Flaxseed Oil 1000 mg (90 capsules)", "description": "Our Flaxseed Oil contains Omegas 3, 6, and 9 for a heart-healthy option without the use of fish oil.", "price": "12.49", "image_title": "flaxseed-oil_600px"}, {"id": "472", "name": "Magnesium 250 mg (100 tablets)", "description": "Magnesium is critical to many bodily processes, and supports nerve, muscle, and heart function.", "price": "12.49", "image_title": "magnesium_600px"}, {"id": "473", "name": "Iron 65 mg (150 caplets)", "description": "Iron is essential for transporting oxygen in the body and for the formation of red blood cells.", "price": "13.99", "image_title": "iron_600px"}, {"id": "474", "name": "Calcium 400 IU (150 tablets)", "description": "Our Calcium supports strong bones and teeth and may help prevent osteoporosis.", "price": "9.99", "image_title": "calcium_600px"}, {"id": "475", "name": "Vitamin D3 1000 IU (100 tablets)", "description": "Vitamin D3 is the body's preferred form of Vitamin D, and helps support bone, teeth, and immune health.", "price": "12.49", "image_title": "vitamin-d_600px"}, {"id": "476", "name": "Vitamin A 10,000 IU (125 caplets)", "description": "Vitamin A is essential for normal night vision, and helps maintain healthy skin and mucous membranes.", "price": "11.99", "image_title": "vitamin-a_600px"}, {"id": "477", "name": "Vitamin C 1000 mg (100 tablets)", "description": "Protects against free radicals and supports the immune system.", "price": "9.99", "image_title": "vitamin-c_600px"}, {"id": "478", "name": "Vitamin B-Complex (100 caplets)", "description": "Contains a combination of essential B vitamins that help convert food to energy.", "price": "12.99", "image_title": "b-complex_600px"}, {"id": "479", "name": "In the Kitchen with H+ Sport", "description": "Henry Twill, founder and CEO of H+ Sport, teams up with celebrity nutritionist Jill Bayner, CNS, to bring you recipes and tips designed to maximize your athletic performance, while minimizing your time in the kitchen.", "price": "24.99", "image_title": "in-the-kitchen-with-h-book-cover"}, {"id": "483", "name": "Stretchy Dance Pants", "description": "Whether dancing the samba, mastering a yoga pose, or scaling the climbing wall, our stretchy dance pants, made from 80% organic cotton and 20% Lycra, are the most versatile and comfortable workout pants you'll ever have the pleasure of wearing.", "price": "55", "image_title": "stretch-dance-pants_lynda_29942"}, {"id": "500", "name": "Thermal Fleece Jacket", "description": "Our thermal organic fleece jacket is perfect for staying warm during your outdoor activities."}]
```

```
[{"id": "259", "name": "Raspberry Mineral Water", "description": "An 8-ounce serving of our refreshing H+ Sport raspberry mineral water fulfills a day's nutritional requirements for over 12 vitamins and minerals.", "price": "2.80", "image_title": "mineral-water-raspberry_600px"}, {"id": "429", "name": "Strawberry Mineral Water", "description": "An 8-ounce serving of our refreshing H+ Sport strawberry mineral water fulfills a day's nutritional requirements for over 12 vitamins and minerals.", "price": "2.80", "image_title": "mineral-water-strawberry_600px"}, {"id": "436", "name": "Blueberry Mineral Water", "description": "An 8-ounce serving of our refreshing H+ Sport blueberry mineral water fulfills a day's nutritional requirements for over 12 vitamins and minerals.", "price": "2.80", "image_title": "mineral-water-blueberry_600px"}, {"id": "437", "name": "Lemon-Lime Mineral Water", "description": "An 8-ounce serving of our refreshing H+ Sport lemon-lime mineral water fulfills a day's nutritional requirements for over 12 vitamins and minerals.", "price": "2.80", "image_title": "mineral-water-lemon-lime_600px"}, {"id": "438", "name": "Peach Mineral Water", "description": "An 8-ounce serving of our refreshing H+ Sport peach mineral water fulfills a day's nutritional requirements for over 12 vitamins and minerals.", "price": "2.80", "image_title": "mineral-water-peach_600px"}, {"id": "439", "name": "Orange Mineral Water", "description": "An 8-ounce serving of refreshing H+ Sport orange mineral water fulfills a day's nutritional requirements for over 12 vitamins and minerals.", "price": "2.80", "image_title": "mineral-water-orange_600px"}, {"id": "440", "name": "Multi-Vitamin (90 capsules)", "description": "A daily dose of our Multi-Vitamins fulfills a day's nutritional needs for over 12 vitamins and minerals.", "price": "9.99", "image_title": "multi-vitamin_600px"}, {"id": "441", "name": "Flaxseed Oil 1000 mg (90 capsules)", "description": "Our Flaxseed Oil contains Omegas 3, 6, and 9 for a heart-healthy option without the use of fish oil.", "price": "12.49", "image_title": "flaxseed-oil_600px"}, {"id": "472", "name": "Magnesium 250 mg (100 tablets)", "description": "Magnesium is critical to many bodily processes, and supports nerve, muscle, and heart function.", "price": "12.49", "image_title": "magnesium_600px"}, {"id": "473", "name": "Iron 65 mg (150 caplets)", "description": "Iron is essential for transporting oxygen in the body and for the formation of red blood cells.", "price": "13.99", "image_title": "iron_600px"}, {"id": "474", "name": "Calcium 400 IU (150 tablets)", "description": "Our Calcium supports strong bones and teeth and may help prevent osteoporosis.", "price": "9.99", "image_title": "calcium_600px"}, {"id": "475", "name": "Vitamin D3 1000 IU (100 tablets)", "description": "Vitamin D3 is the body's preferred form of Vitamin D, and helps support bone, teeth, and immune health.", "price": "12.49", "image_title": "vitamin-d_600px"}, {"id": "476", "name": "Vitamin A 10,000 IU (125 caplets)", "description": "Vitamin A is essential for normal night vision, and helps maintain healthy skin and mucous membranes.", "price": "11.99", "image_title": "vitamin-a_600px"}, {"id": "477", "name": "Vitamin C 1000 mg (100 tablets)", "description": "Protects against free radicals and supports the immune system.", "price": "9.99", "image_title": "vitamin-c_600px"}, {"id": "478", "name": "Vitamin B-Complex (100 caplets)", "description": "Contains a combination of essential B vitamins that help convert food to energy.", "price": "12.99", "image_title": "b-complex_600px"}, {"id": "479", "name": "In the Kitchen with H+ Sport", "description": "Henry Twill, founder and CEO of H+ Sport, teams up with celebrity nutritionist Jill Bayner, CNS, to bring you recipes and tips designed to maximize your athletic performance, while minimizing your time in the kitchen.", "price": "24.99", "image_title": "in-the-kitchen-with-h-book-cover"}, {"id": "483", "name": "Stretchy Dance Pants", "description": "Whether dancing the samba, mastering a yoga pose, or scaling the climbing wall, our stretchy dance pants, made from 80% organic cotton and 20% Lycra, are the most versatile and comfortable workout pants you'll ever have the pleasure of wearing.", "price": "55", "image_title": "stretch-dance-pants_lynda_29942"}, {"id": "500", "name": "Thermal Fleece Jacket", "description": "Our thermal organic fleece jacket is perfect for staying warm during your outdoor activities."}]
```



- **JSON (JavaScript Object Notation)**
- **Text-based format for data interchange**
- **Easy for humans to read and machines to use**
- **Derived from JavaScript, but language-independent data format**

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JSON

Double quotes

```
{ "Course_name": "Python for Data Science"}
```

JavaScript Object

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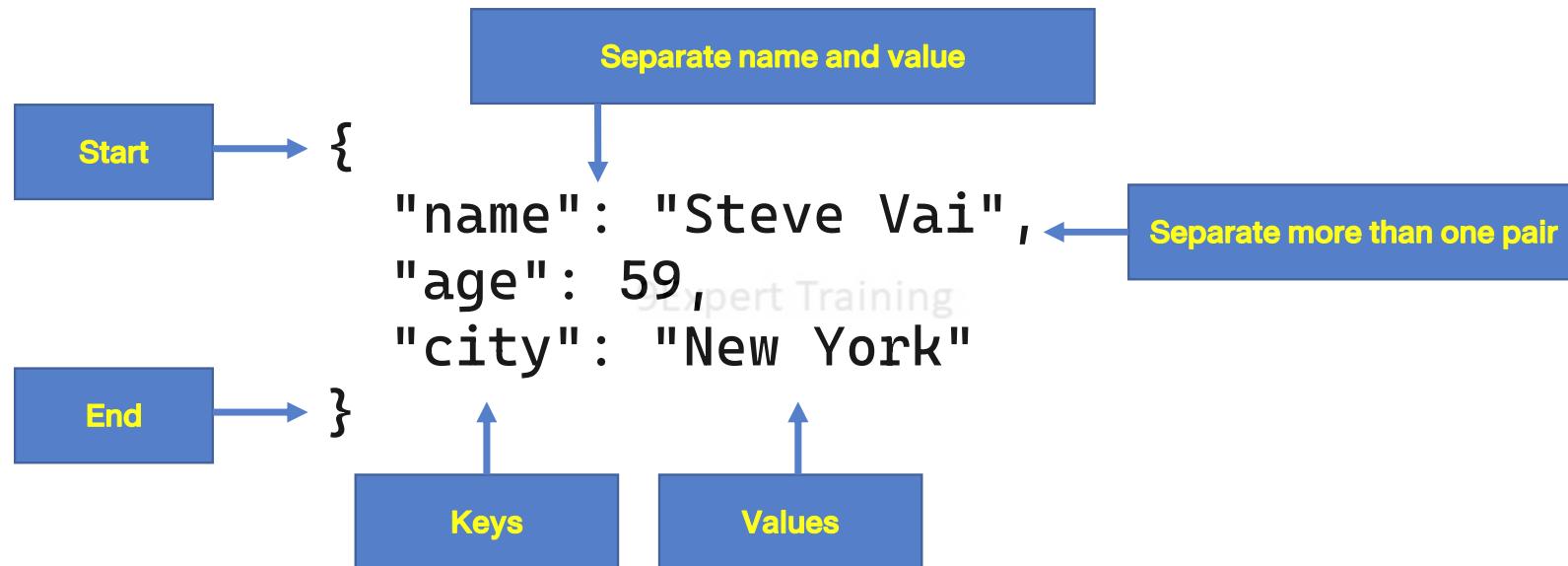
```
Var object = {Course_name: "Python for Data Science"}
```

Note: In JSON, String must be double quotes



```
{  
    "name": "Steve Vai",  
    "age": 59,  
    "city": "New York"  
}
```

Person.json





Square brackets hold arrays

```
{ "guitarists": [  
    {"name": "Steve Vai", "age": 59, "city": "New York" },  
    {"name": "Jimmy Page", "age": 76, "city": "Hounslow" },  
    {"name": "Angus Young", "age": 64, "city": "Cranhill" }  
]
```

No comma for the last object



JSON Validation: jsonlint.com

The screenshot shows a JSON validation interface. At the top, there is a code editor containing the following JSON:

```
1 {  
2   "name": "Steve Vai",  
3   "age": 59,  
4   "city": "New York"  
5 }
```

A red box highlights the code editor area. Below it, the text "9Expert Training" is displayed.

On the right side of the interface, there are three numbered callouts:

- 1 ป้อนข้อมูล JSON (Input JSON data)
- 2 Validate JSON (Validate JSON button)
- 3 ตรวจสอบผลลัพธ์ (Check results) - This callout has a red arrow pointing to the "valid JSON" message in the results section.

The results section shows the message "valid JSON". Above the results section, there is a "Support JSONLint for \$2/Month" button.

<https://jsonlint.com/>



- ทำการ copy ข้อมูล JSON ลงในเว็บ jsonlint.com เพื่อทำการตรวจสอบรูปแบบ

```
{"guitarists": [  
    {"name": "Steve Vai", "age": 59, "city": "New York"},  
    {"name": "Jimmy Page", "age": 76, "city": "Hounslow"},  
    {"name": "Angus Young", "age": 64, "city": "Cranhill"}  
]}
```

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Primitive Types	Description
Number	Signed decimal number
String	Unicode or escaped characters inside double quotes
Boolean	True or False
Null	Null value

Structured Types	Description
Array	List of ordered values
Object	Collection of key-value pairs



Example:

```
{  
    "checked": false, ← Boolean  
    "dimensions": {  
        "width": 5, ← Object  
        "height": 10  
    },  
    "id": 1, ← Number  
    "name": "A green door",  
    "price": 12.5, ← Number  
    "tags": [  
        "home", ← Array  
        "green"  
    ],  
    "type": null ← Null  
}
```

String (Double quote)



- JSON Module is a built-in library in Python

```
>>> import json
```

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Serialization is the process of encoding JSON. This term refers to the transformation of data into a series of bytes (hence serial) to be stored or transmitted across a network. (reference: [realpython.com](https://realpython.com/python-json-serialization/))



Python	JSON
dict	object
list, tuple	array
str	string
int, float	number
True, False	True, false
None	null



- **dump(obj, file): # Write JSON object to file**

Example:

```
with open('people.json', 'w') as f:  
    json.dump(data, f)
```

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- **str = dumps(obj): # Output JSON object as string**

Example:

```
jsonStr = json.dumps(py_data)
```



Deserialization is the reciprocal process of decoding data that has been stored or delivered in the JSON standard. (reference: realpython.com)



JSON	Python
object	dict
array	list
string	str
Number (integer)	int
Number (real)	float
true, false	True, False
null	None



- `obj = load(file) # load JSON data from file`

Example:

```
obj = load('json_file.json')
```

- `obj = loads(string) # load JSON data from string`

Example:

```
json_str = '{"name": "Steve Vai",  
            "age": "59",  
            "city": "New York"}'
```

```
obj = loads(json_str )
```



Microsoft Excel

9Expert
Knowledge Provider

The screenshot shows the Microsoft Excel web interface. At the top, there's a navigation bar with the Microsoft logo, Office, Products, Resources, Templates, Support, and a 'Buy Office 365' button. To the right are links for 'All Microsoft', 'Search', 'Sign in', and a user profile icon. A banner at the top says 'Looking to use Excel on the web? Sign in >'. Below the banner, there's a large image of a smartphone displaying a bar chart titled 'Contoso Expenses' for the years 2010 to 2015. To the right of the phone is a larger image of the full Excel desktop application window. The desktop window shows a pie chart and a bar chart side-by-side, with a table of data below them. The title bar of the desktop window reads 'Monthly Budget.xlsx - Last Saved 12/1/2018 2:30 PM'. The overall theme is professional and focused on data analysis.

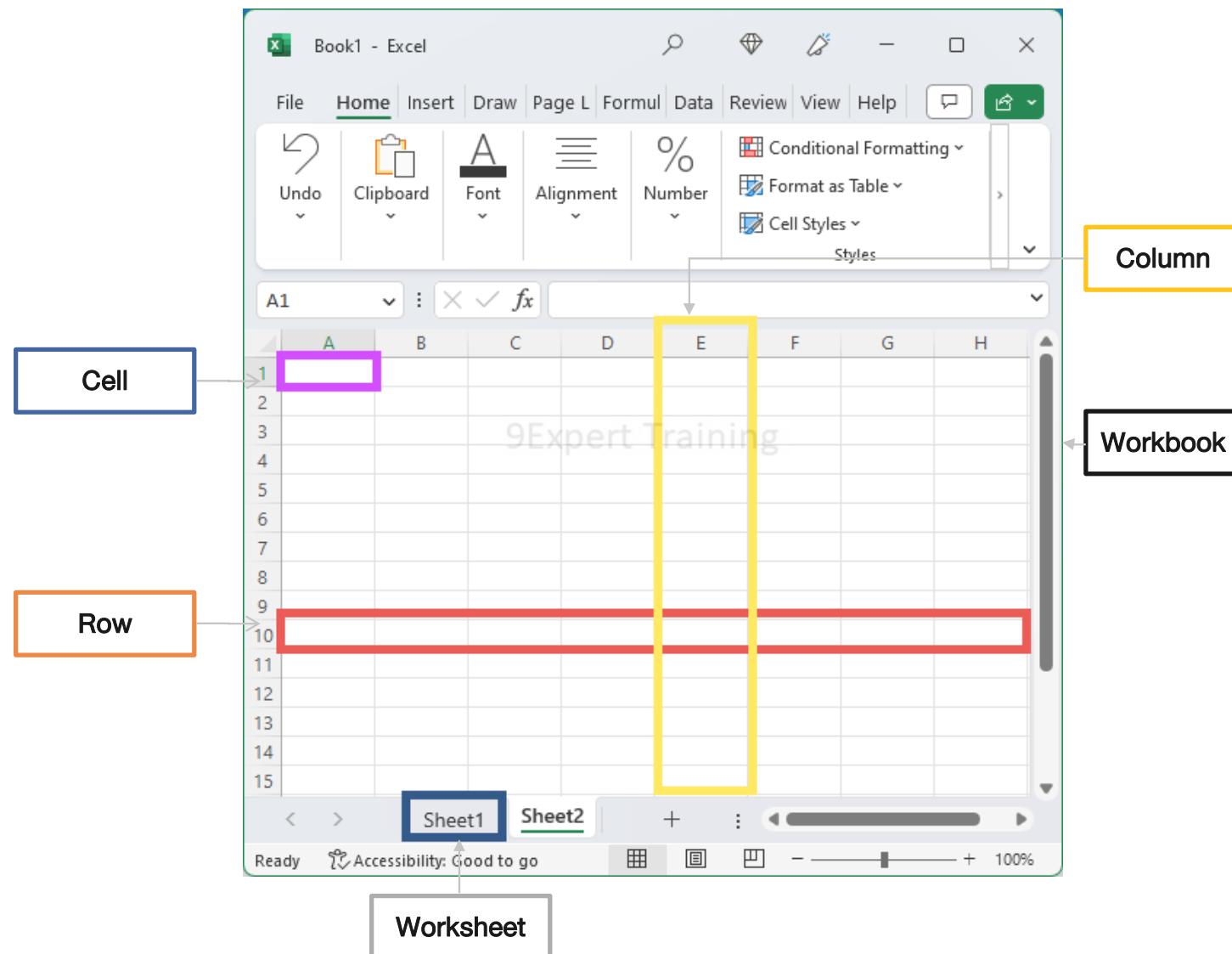
Microsoft Excel

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Term	Explanation
Spreadsheet or Workbook	A Spreadsheet is the main file you are creating or working with.
Worksheet or Sheet	A Sheet is used to split different kinds of content within the same spreadsheet. A Spreadsheet can have one or more Sheets.
Column	A Column is a vertical line, and it's represented by an uppercase letter: A.
Row	A Row is a horizontal line, and it's represented by a number: 1.
Cell	A Cell is a combination of Column and Row, represented by both an uppercase letter and a number: A1.



- Openpyxl is a Python library to read/write Excel 2010 xlsx/xlsm/xltx/xltm files.
 - Manipulate data and spreadsheet properties
 - Style sheets, parse data, and create graphs
-
- Installation

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```
$ pip install openpyxl
```



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Unit Testing

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Software testing is a process, to evaluate the functionality of a software application with an intent to find whether the developed software met the specified requirements or not and to identify the defects to ensure that the product is defect free in order to produce the quality product.

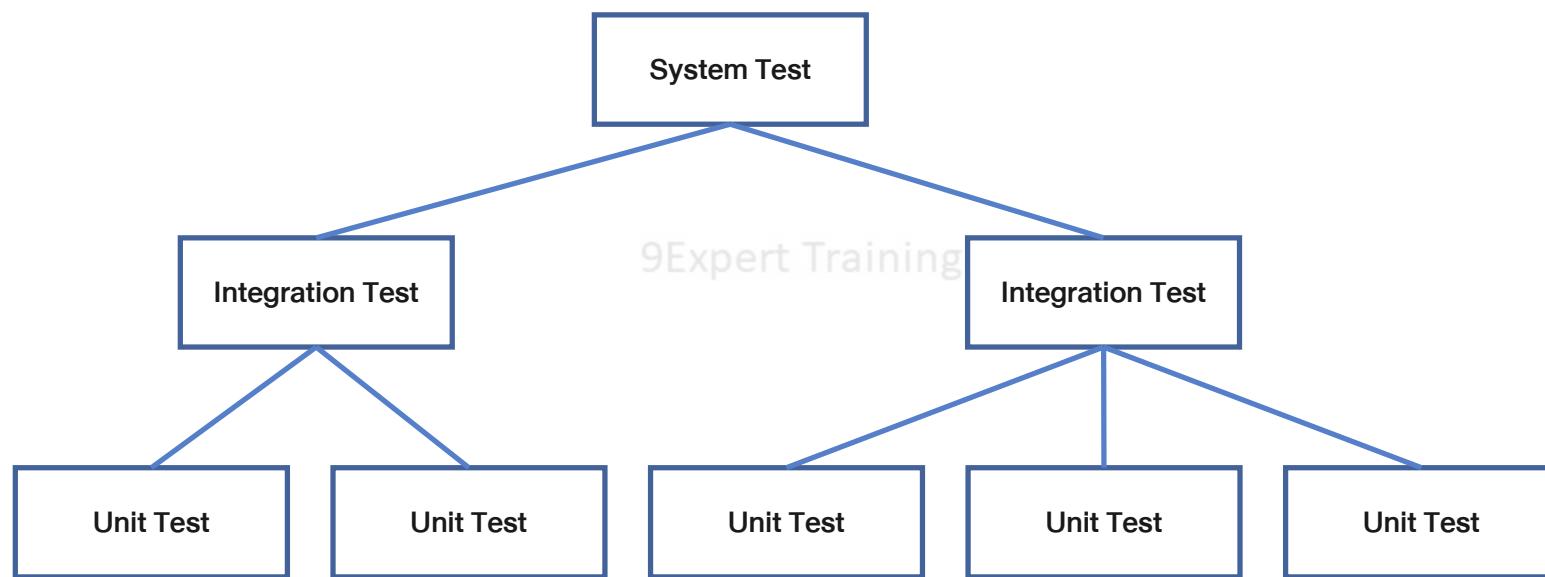
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- **Unit Testing**
- **Integration Testing**
- **System Testing**
- **User Acceptance Testing (UAT)**
 - Ensures software will work for users
- **Regression Testing**
 - Checks for unexpected side effects

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- Logically separates the system into units
- Units can range in size: small functions or whole classes
- Usually performed by developers
- Completed during development
- Exercise code in a pass/fail manner

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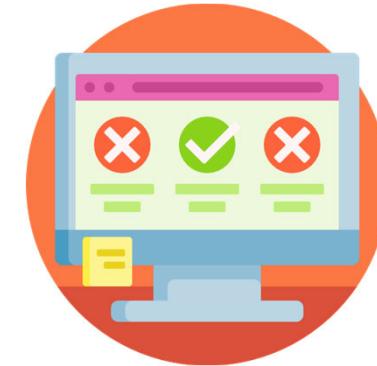
```
2 def add(x, y):
3     """Add Function"""
4     return x + y
5
6
7 def subtract(x, y):
8     """Subtract Function"""
9     return x - y
10
11
12 def multiply(x, y):
13     """Multiply Function"""
14     return x * y
15
16
17 def divide(x, y):
18     """Divide Function"""
19     if y == 0:
20         raise ValueError('Can not divide by zero!')
21     return x / y
22
```

```
23
24 print(add(10, 5))
25
```



Automated testing uses the assistance of tools, scripts, and software to perform test cases by repeating pre-defined actions

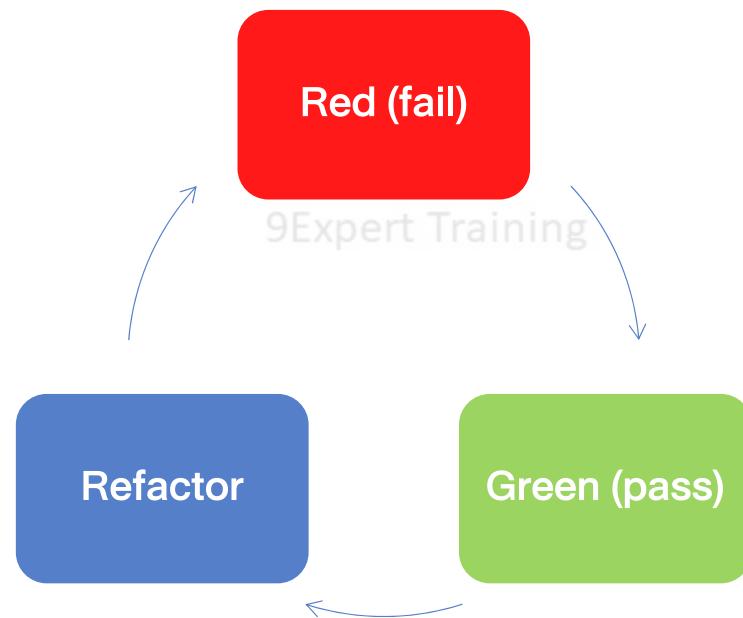
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- Reliability
 - Manual Testing is always not accurate due to human error, hence it is less reliable
 - Automated testing is more reliable, as it is performed by tools and/or scripts
- Time Required
 - Manual Testing is time-consuming
 - Automated testing is executed by software tools. It's significantly faster than a manual approach
- When to use?
 - Manual Testing is suitable for exploratory, Usability and Adhoc Testing
 - Automated testing is suitable for highly repeatable functional/non-functional test cases

- เราจะไม่เขียน Code จนกว่าจะเขียน Test





The **unittest** unit testing framework was originally inspired by JUnit and has a similar flavor as major unit testing frameworks in other languages. unittest has been built into the Python standard library since version 2.1.

For more information: <https://docs.python.org/3/library/unittest.html>

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debug()

Run the test without collecting the result. This allows exceptions raised by the test to be propagated to the caller, and can be used to support running tests under a debugger.

The `TestCase` class provides several assert methods to check for and report failures. The following table lists the most commonly used methods (see the tables below for more assert methods):

Method	Checks that	New in
<code>assertEqual(a, b)</code>	<code>a == b</code>	
<code>assertNotEqual(a, b)</code>	<code>a != b</code>	
<code>assertTrue(x)</code>	<code>bool(x) is True</code>	
<code>assertFalse(x)</code>	<code>bool(x) is False</code>	
<code>assertIs(a, b)</code>	<code>a is b</code>	3.1
<code>assert IsNot(a, b)</code>	<code>a is not b</code>	3.1
<code>assertIsNone(x)</code>	<code>x is None</code>	3.1
<code>assert IsNotNone(x)</code>	<code>x is not None</code>	3.1
<code>assertIn(a, b)</code>	<code>a in b</code>	3.1
<code>assertNotIn(a, b)</code>	<code>a not in b</code>	3.1
<code>assertIsInstance(a, b)</code>	<code>isinstance(a, b)</code>	3.2
<code>assertNotIsInstance(a, b)</code>	<code>not isinstance(a, b)</code>	3.2





```
class TestCalc(unittest.TestCase):

    def test_add(self):
        self.assertEqual(calc.add(10, 5), 15)
        self.assertEqual(calc.add(-1, 1), 0)
        self.assertEqual(calc.add(-1, -1), -2)

    def test_subtract(self):
        self.assertEqual(calc.subtract(10, 5), 5)
        self.assertEqual(calc.subtract(-1, 1), -2)
        self.assertEqual(calc.subtract(-1, -1), 0)

    def test_multiply(self):
        self.assertEqual(calc.multiply(10, 5), 50)
        self.assertEqual(calc.multiply(-1, 1), -1)
        self.assertEqual(calc.multiply(-1, -1), 1)

    def test_divide(self):
        self.assertEqual(calc.divide(10, 5), 2)
        self.assertEqual(calc.divide(-1, 1), -1)
        self.assertEqual(calc.divide(-1, -1), 1)

if __name__ == '__main__':
    unittest.main()
```

```
....  
-----  
Ran 4 tests in 0.000s  
OK
```



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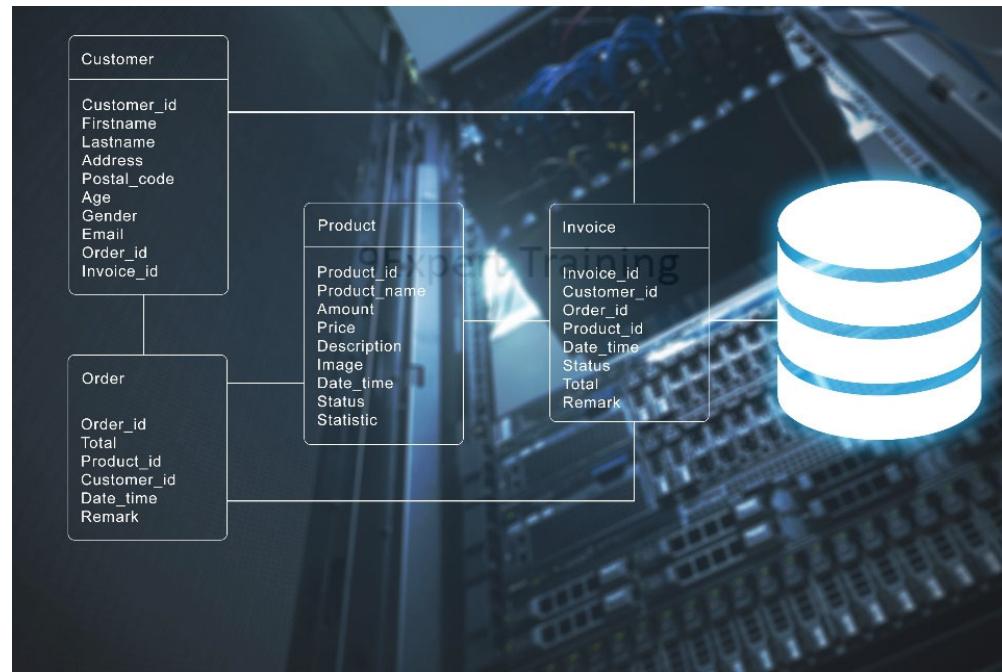
การเขียนโปรแกรมเชื่อมต่อฐานข้อมูล Database

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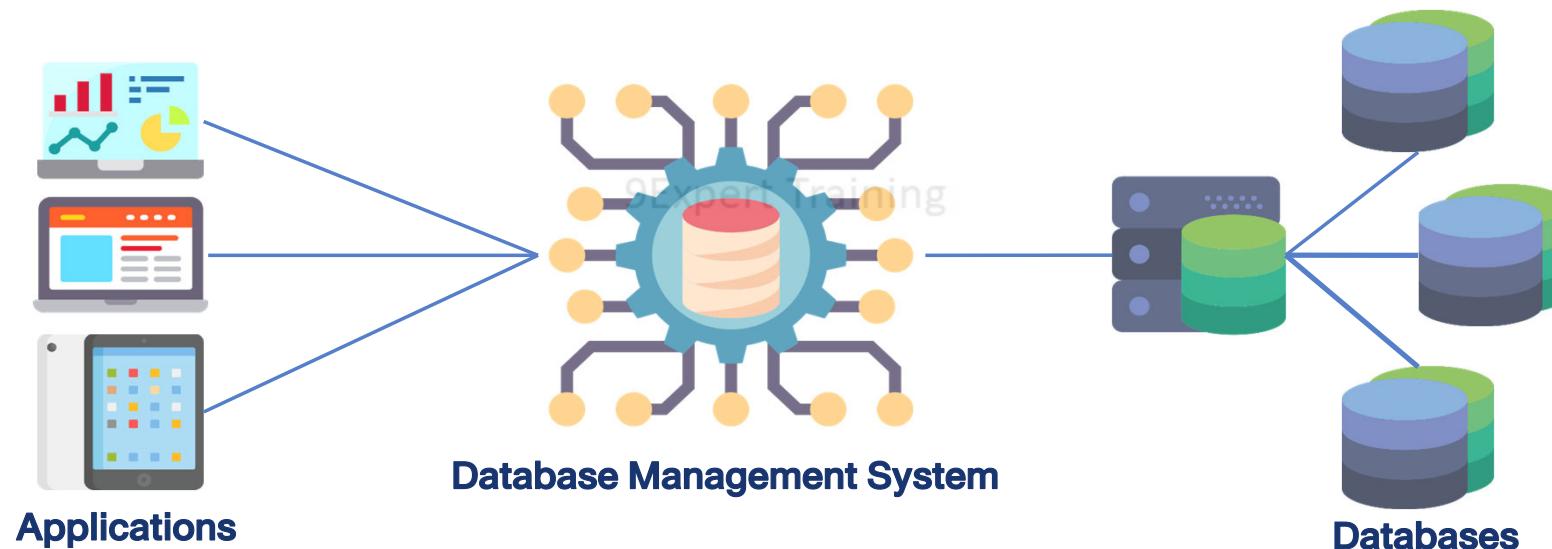


- **ฐานข้อมูล (Database)** คือ แหล่งที่ใช้สำหรับเก็บรวบรวมข้อมูลที่มีความสัมพันธ์กันมาร่วมอยู่ในที่เดียวกัน





Database Management System (DBMS) is a software application that interact with the user, applications and the database itself to capture and analyze data.



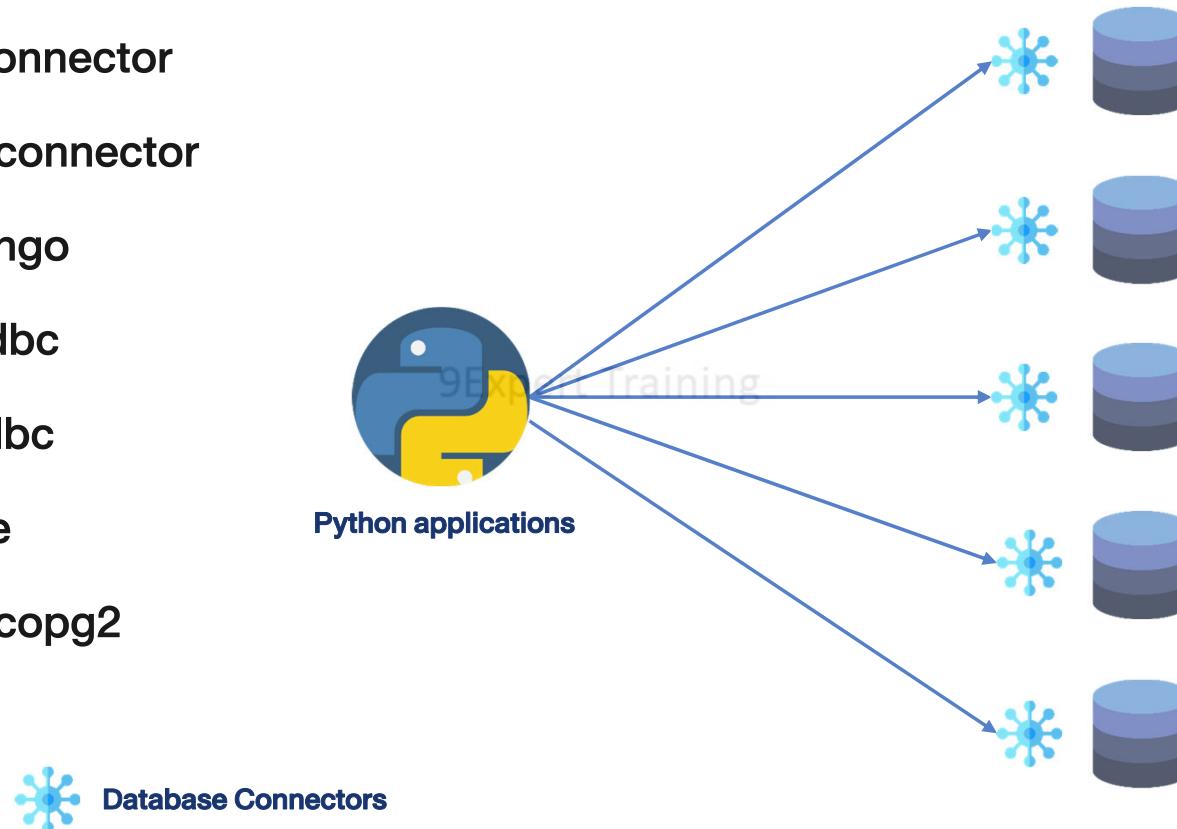


- Relational DBMS
- Hierarchical DBMS
- Network DBMS
- Object-oriented DBMS

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- SQLite3: `sqlite3`
- MySQL: `mysql-connector`
- MariaDB: `mysql-connector`
- MongoDB: `pymongo`
- SQL Server: `pyodbc`
- MS Access: `pyodbc`
- Oracle: `cx_Oracle`
- PostgreSQL: `psycopg2`
- Etc.,





- File and Directory Access
 - `pathlib` — Object-oriented filesystem paths
 - `os.path` — Common pathname manipulations
 - `fileinput` — Iterate over lines from multiple input streams
 - `stat` — Interpreting `stat()` results
 - `filecmp` — File and Directory Comparisons
 - `tempfile` — Generate temporary files and directories
 - `glob` — Unix style pathname pattern expansion
 - `fnmatch` — Unix filename pattern matching
 - `linecache` — Random access to text lines
 - `shutil` — High-level file operations
 - `macpath` — Mac OS 9 path manipulation functions
- Data Persistence
 - `pickle` — Python object serialization
 - `copyreg` — Register `pickle` support functions
 - `shelve` — Python object persistence
 - `marshal` — Internal Python object serialization
 - `dbm` — Interfaces to Unix "databases"
 - `sqlite3` — DB-API 2.0 interface for SQLite databases
- Data Compression and Archiving
 - `zlib` — Compression compatible with `gzip`
 - `gzip` — Support for `gzip` files
 - `bz2` — Support for `bzip2` compression
 - `lzma` — Compression using the LZMA algorithm
 - `zipfile` — Work with ZIP archives
 - `tarfile` — Read and write tar archive files
- File Formats
 - `csv` — CSV File Reading and Writing
 - `configparser` — Configuration file parser
 - `netrc` — netrc file processing
 - `xdrlib` — Encode and decode XDR data
 - `plistlib` — Generate and parse Mac OS X `.plist` files

For more details: <https://docs.python.org/3/library/index.html>



MySQL is an open-source relational database management system (RDBMS). Its name is a combination of "My", the name of co-founder Michael Widenius's daughter, and "SQL", the abbreviation for Structured Query Language.





My comes from Monty's first daughter "My"



Michael Widenius



MariaDB is a community-developed, commercially supported fork of the MySQL relational database management system (RDBMS), intended to remain free and open-source software under the GNU General Public License. Development is led by some of the original developers of MySQL, who forked it due to concerns over its acquisition by Oracle Corporation in 2009.

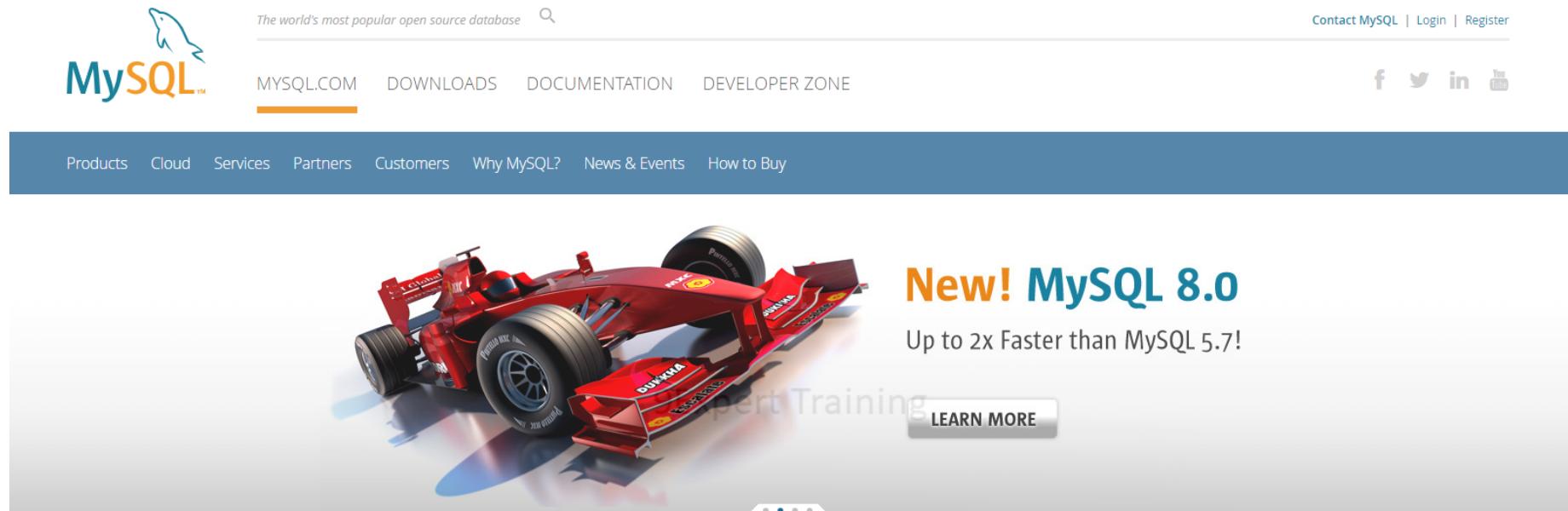
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MaxDB is an ANSI SQL-92 (entry level) compliant relational database management system (RDBMS) from SAP AG, which was also delivered by MySQL AB from 2003 to 2007. MaxDB is targeted for large SAP environments.



<https://www.mysql.com/>


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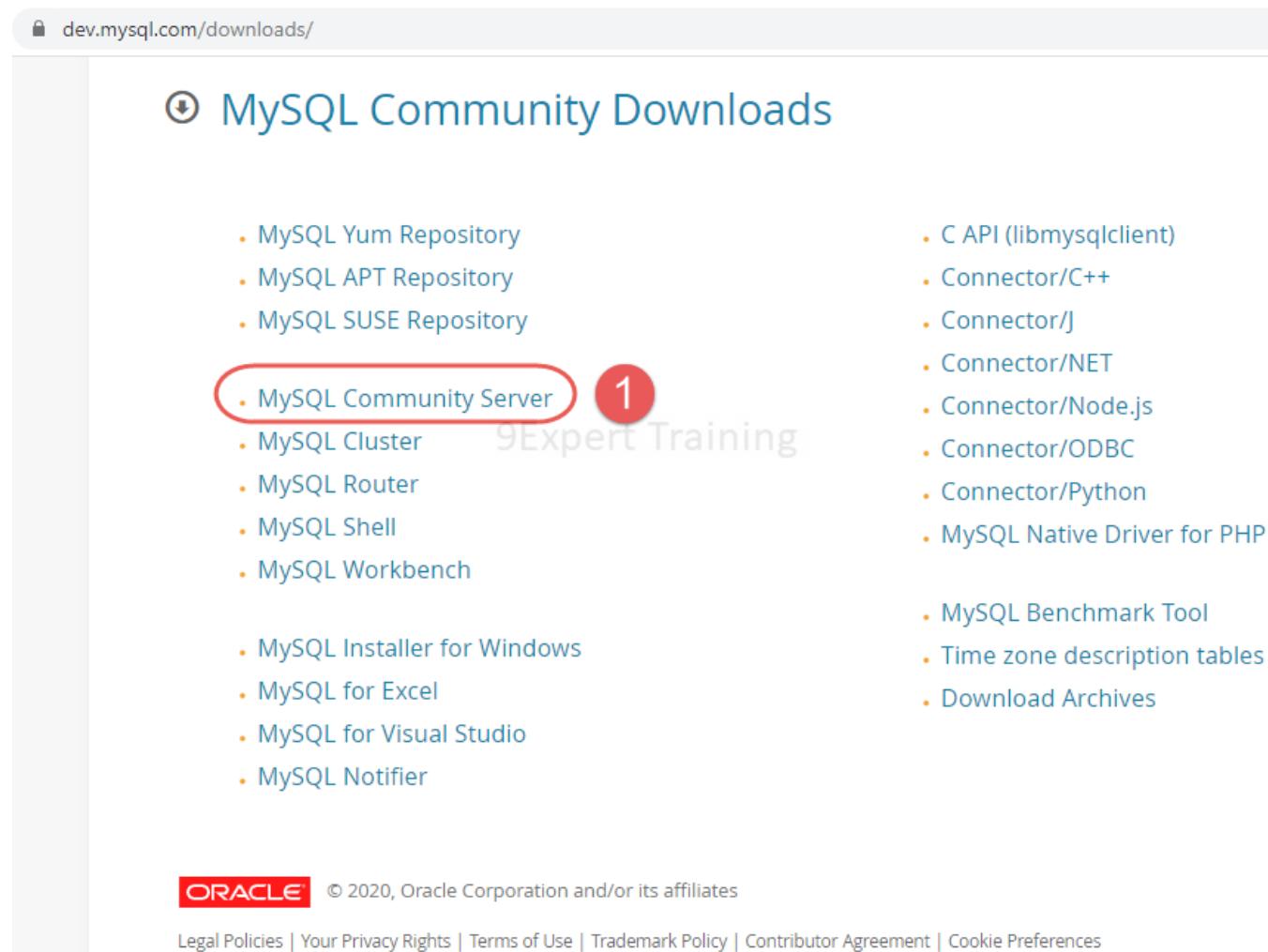
MySQL for OEM/ISV

Over 2000 ISVs, OEMs, and VARs rely on MySQL as their products' embedded database to make their applications, hardware and appliances more competitive, bring them to market faster, and lower their cost of goods sold.





ໃປ web browser: <https://dev.mysql.com/downloads/>



The screenshot shows the MySQL Community Downloads page. The URL in the address bar is <https://dev.mysql.com/downloads/>. The page title is "MySQL Community Downloads". A red circle with the number "1" highlights the "MySQL Community Server" link in the left sidebar, which is also circled in red.

MySQL Community Downloads

- MySQL Yum Repository
- MySQL APT Repository
- MySQL SUSE Repository
- MySQL Community Server 1
- MySQL Cluster
- MySQL Router
- MySQL Shell
- MySQL Workbench
- MySQL Installer for Windows
- MySQL for Excel
- MySQL for Visual Studio
- MySQL Notifier

- C API (libmysqlclient)
- Connector/C++
- Connector/J
- Connector/.NET
- Connector/Node.js
- Connector/ODBC
- Connector/Python
- MySQL Native Driver for PHP
- MySQL Benchmark Tool
- Time zone description tables
- Download Archives

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[MySQL Community Server](#)

General Availability (GA) Releases Archives ⓘ

MySQL Community Server 8.0.33

Select Operating System: Microsoft Windows ②

Looking for previous GA versions?

Recommended Download:

MySQL Installer for Windows 
All MySQL Products. For All Windows Platforms.
In One Package.

Starting with MySQL 5.6 the MySQL Installer package replaces the standalone MSI packages.

Windows (x86, 32 & 64-bit), MySQL Installer MSI Go to Download Page >

Other Downloads:

Windows (x86, 64-bit), ZIP Archive (mysql-8.0.33-winx64.zip)	8.0.33	230.1M	③	Download
Windows (x86, 64-bit), ZIP Archive Debug Binaries & Test Suite (mysql-8.0.33-winx64-debug-test.zip)	8.0.33	663.7M		Download

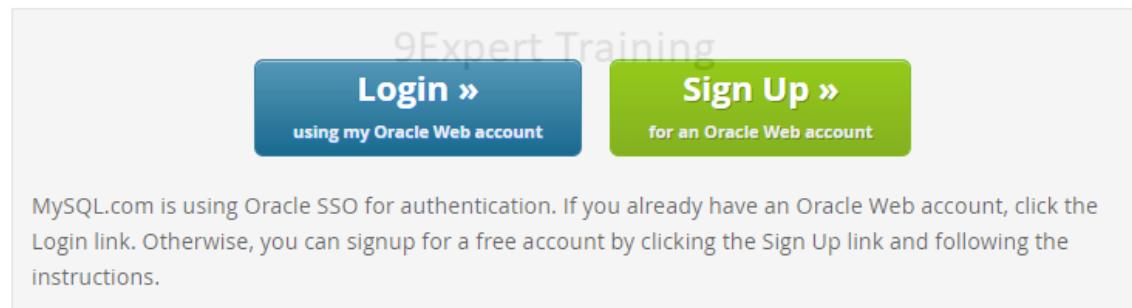
We suggest that you use the MD5 checksums and GnuPG signatures to verify the integrity of the packages you download.

⬇ MySQL Community Downloads

Login Now or Sign Up for a free account.

An Oracle Web Account provides you with the following advantages:

- Fast access to MySQL software downloads
- Download technical White Papers and Presentations
- Post messages in the MySQL Discussion Forums
- Report and track bugs in the MySQL bug system

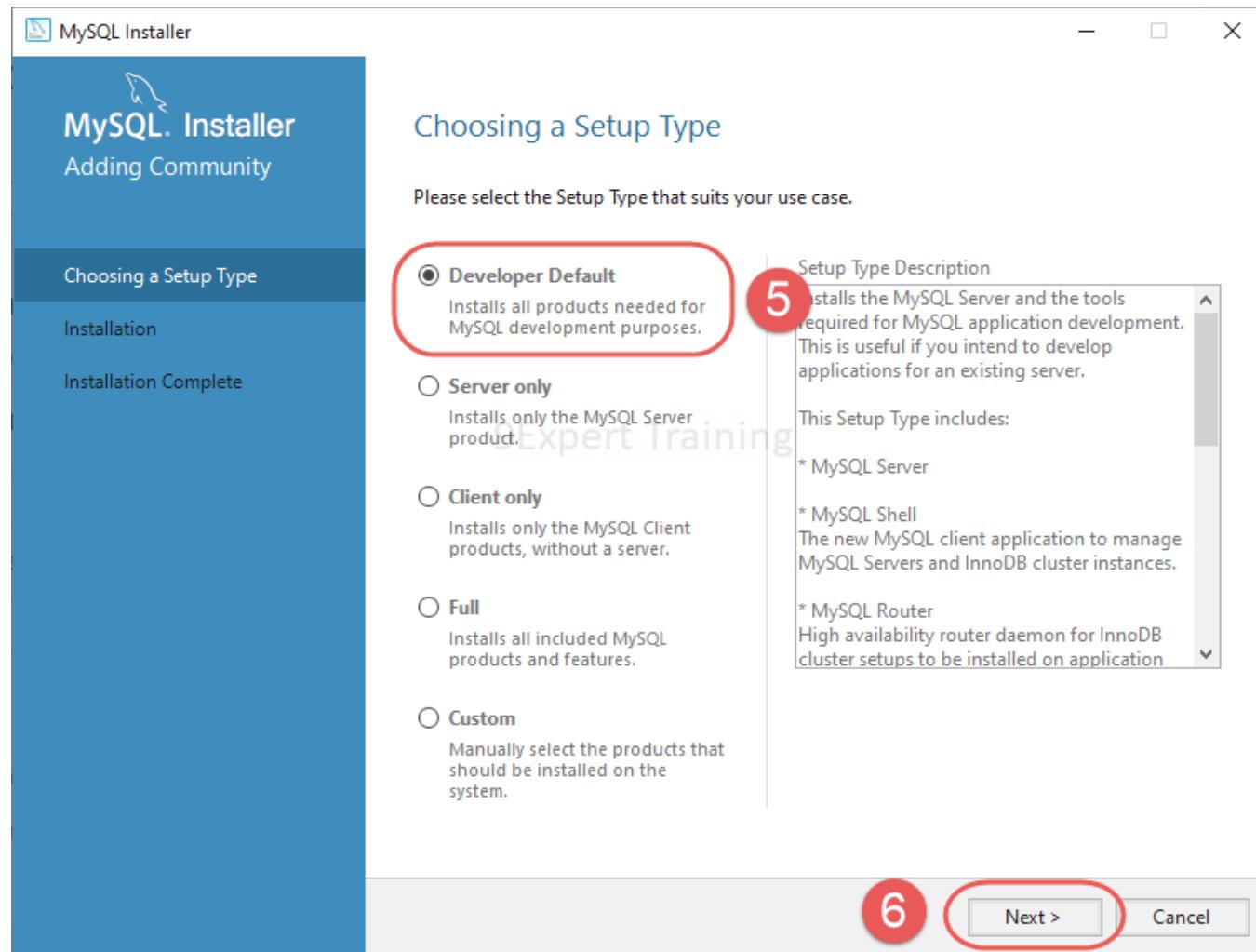


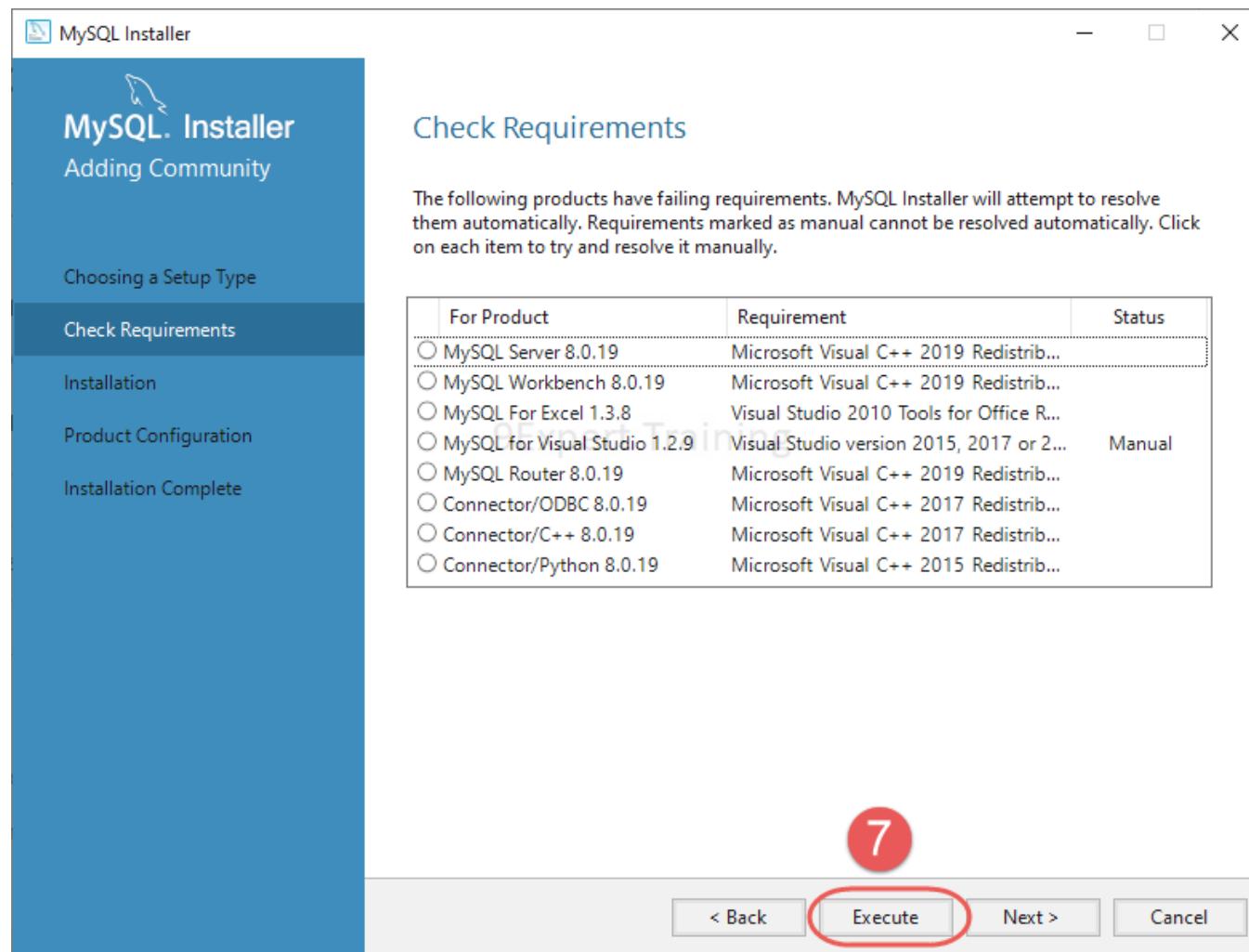
No thanks, just start my download.

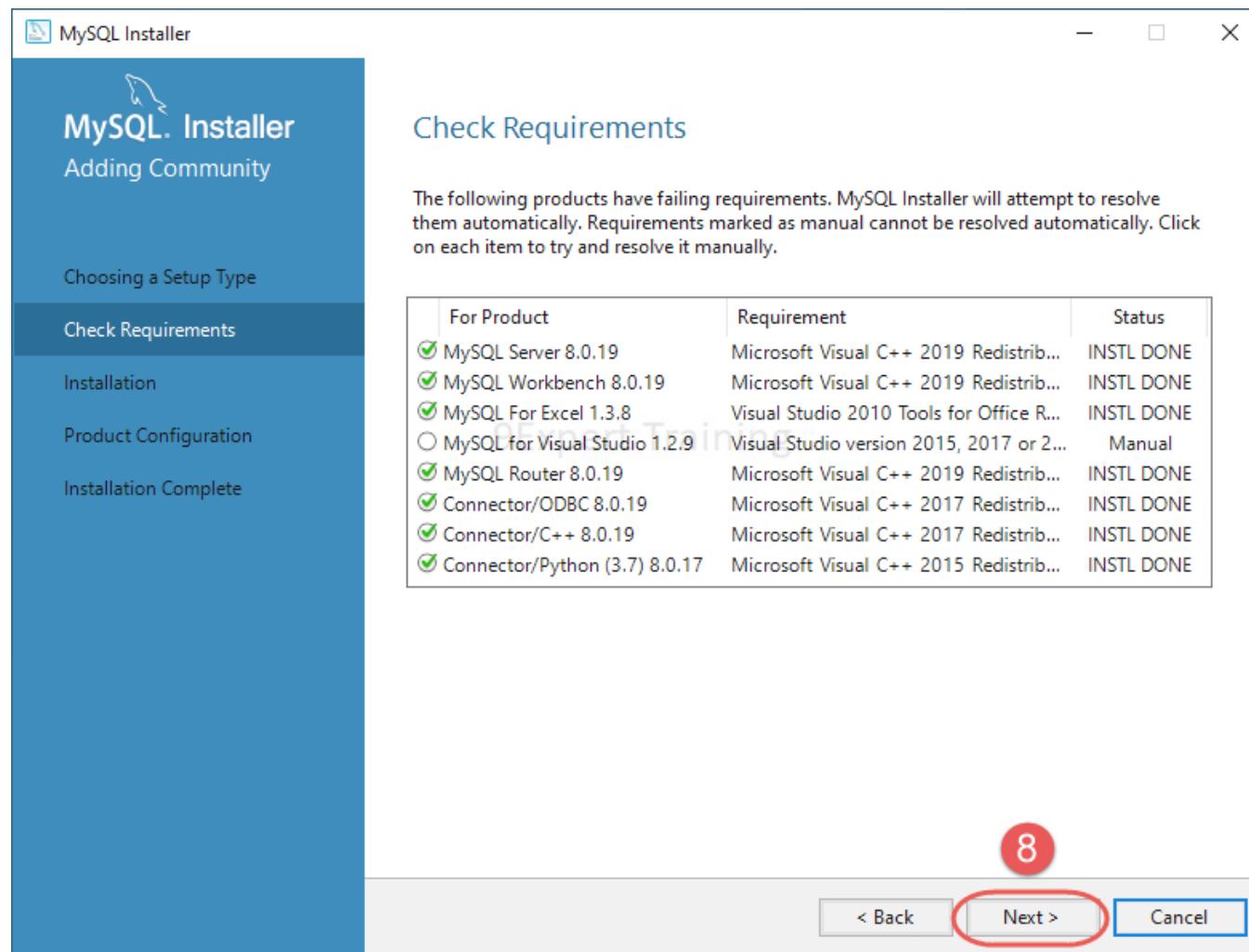
4

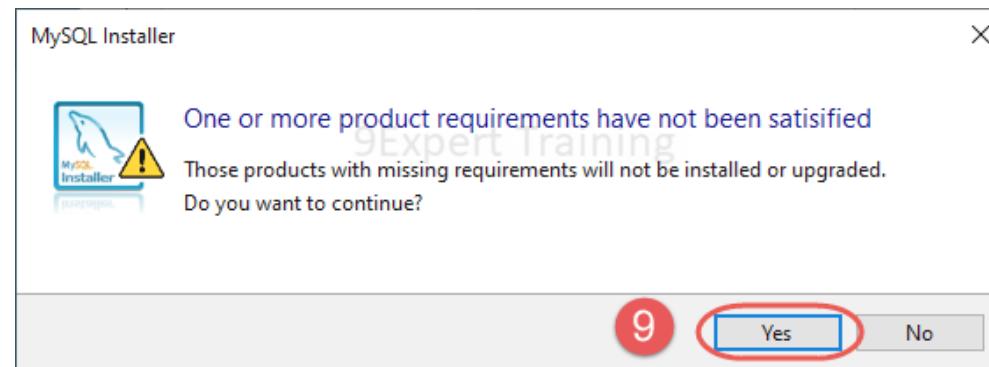
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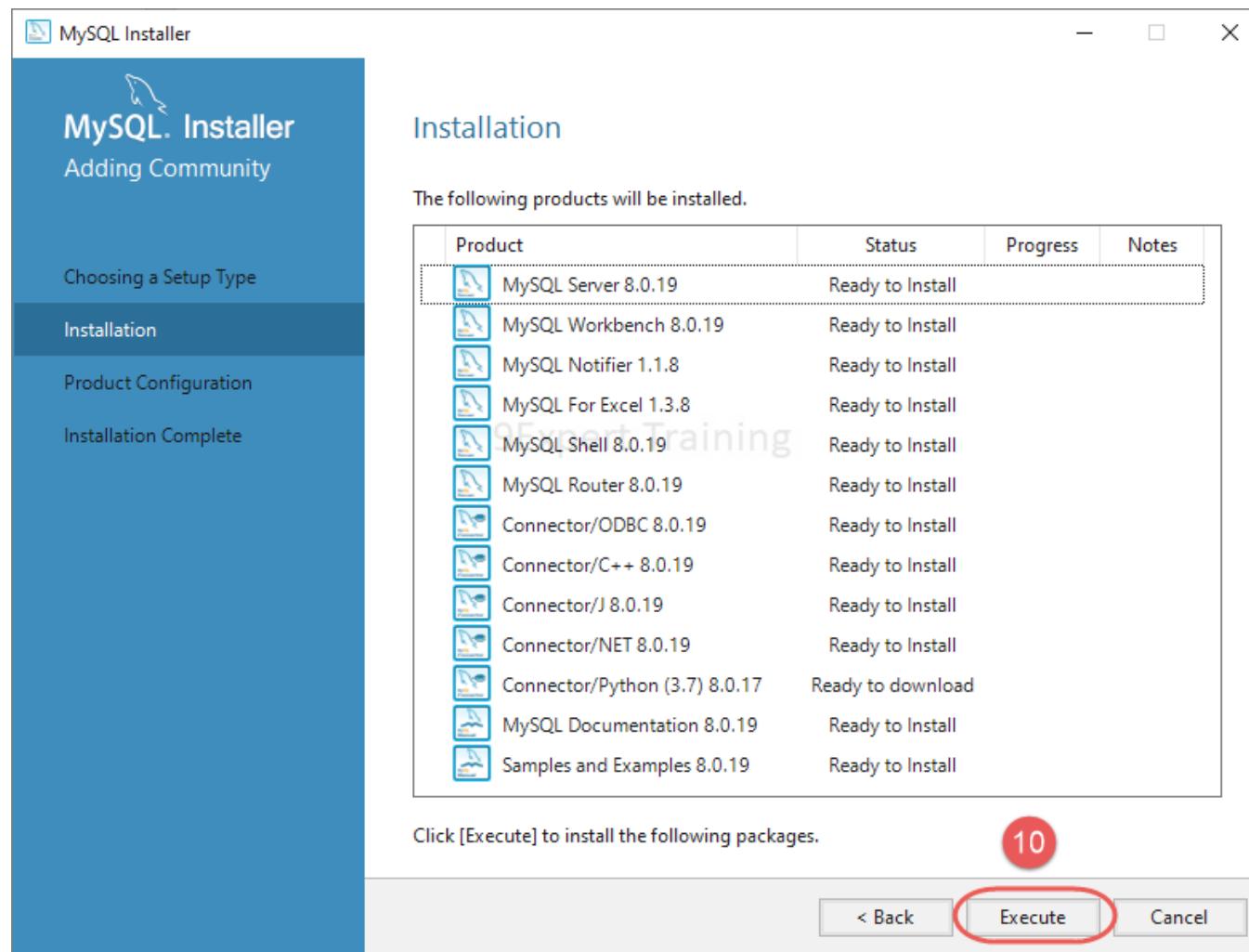
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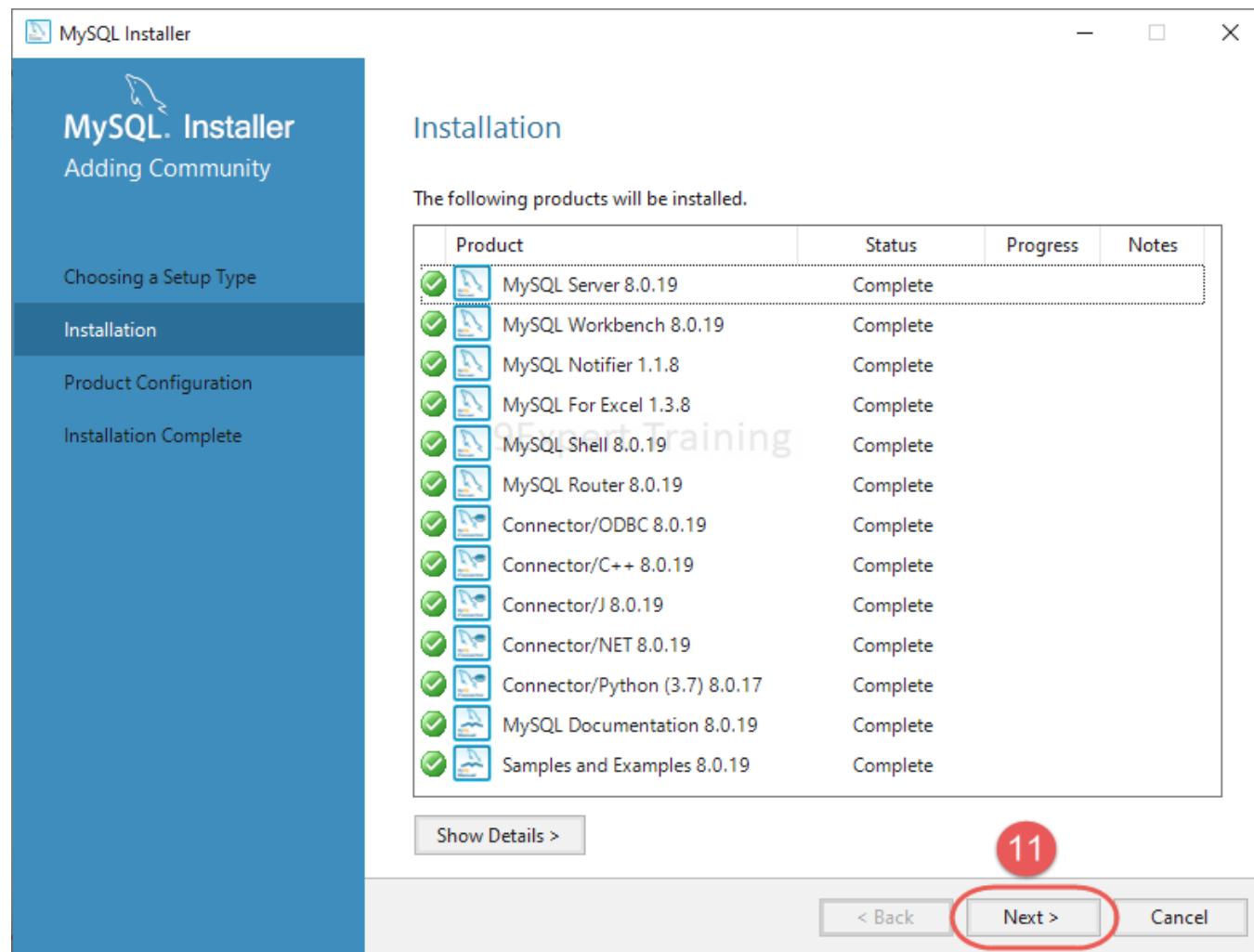


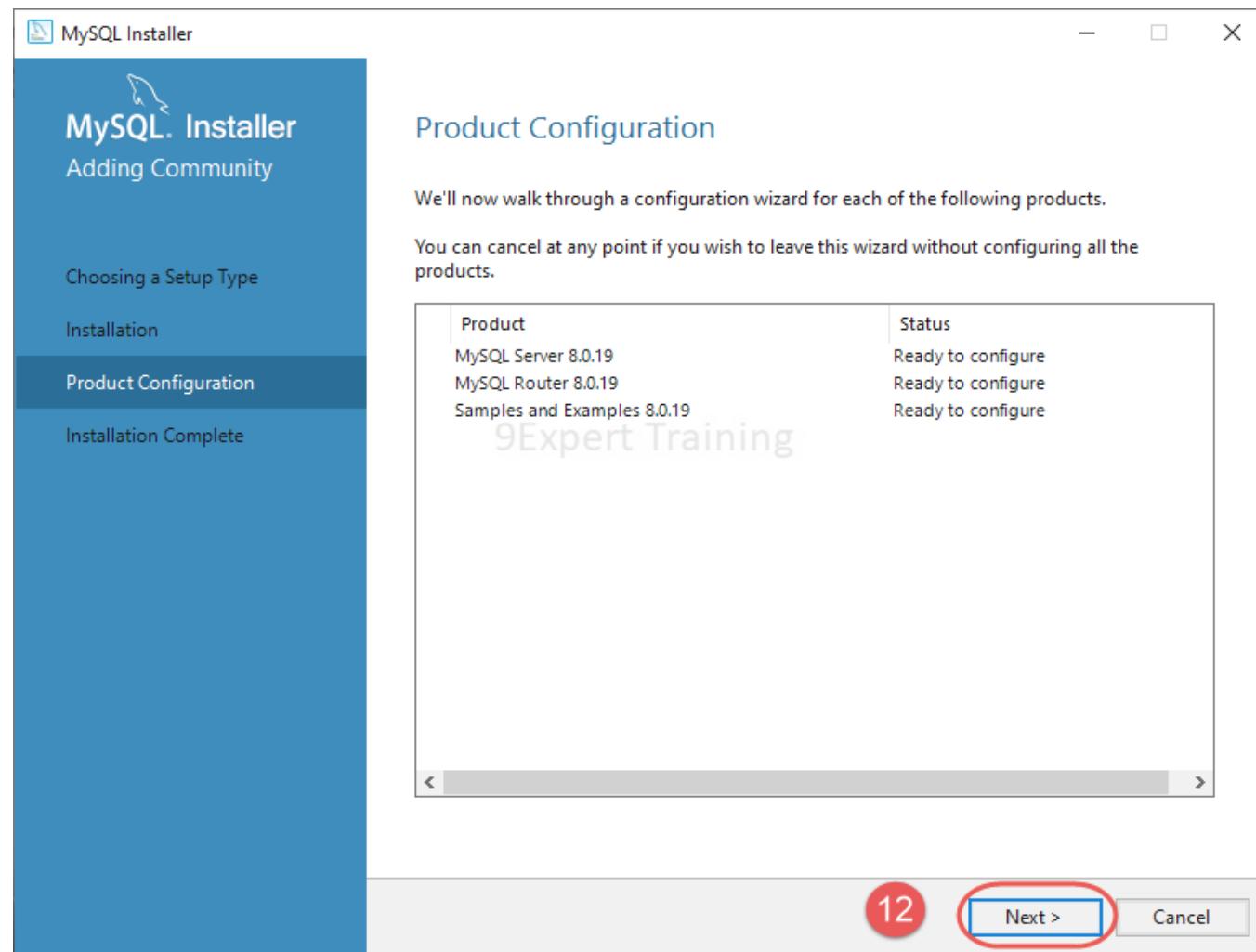


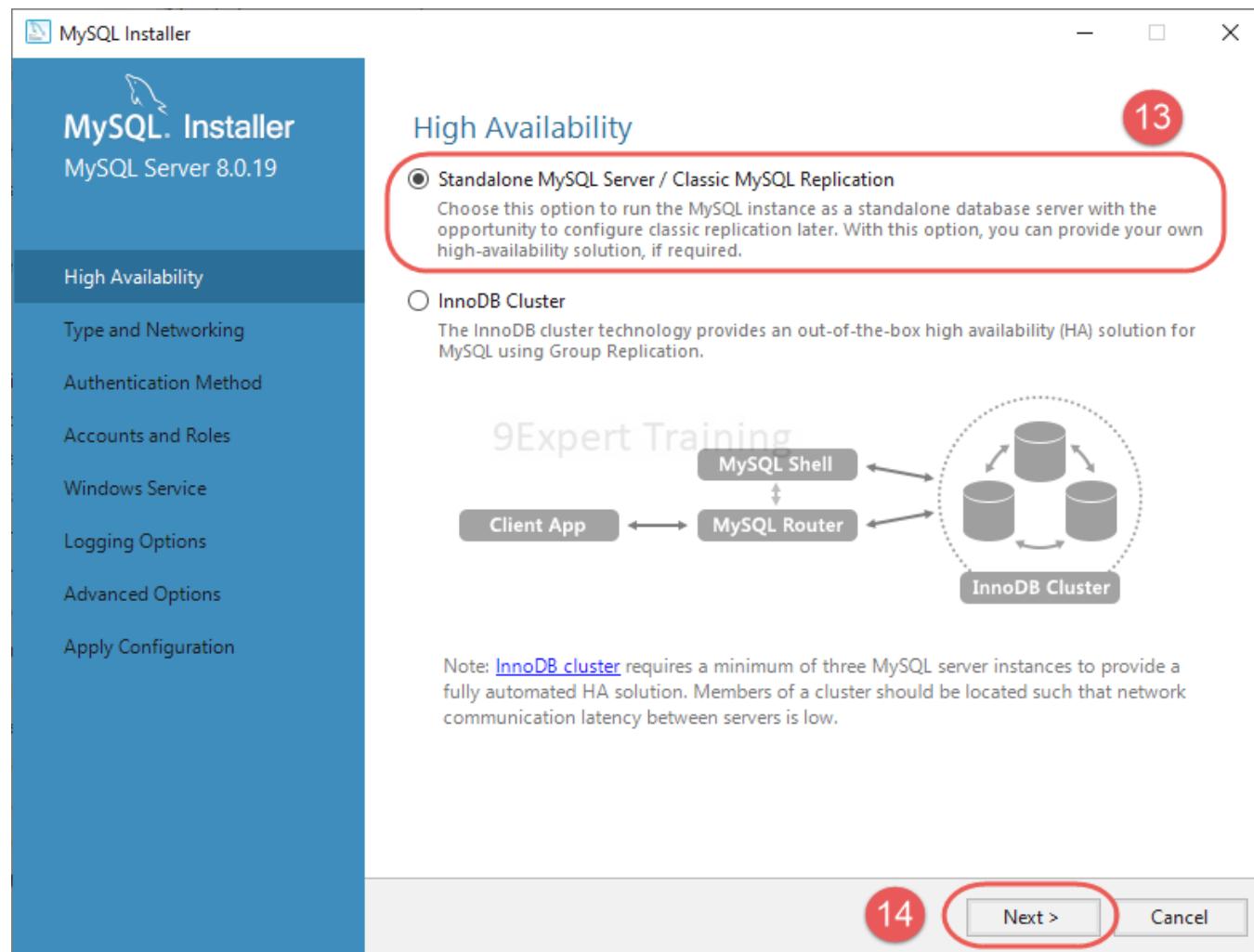


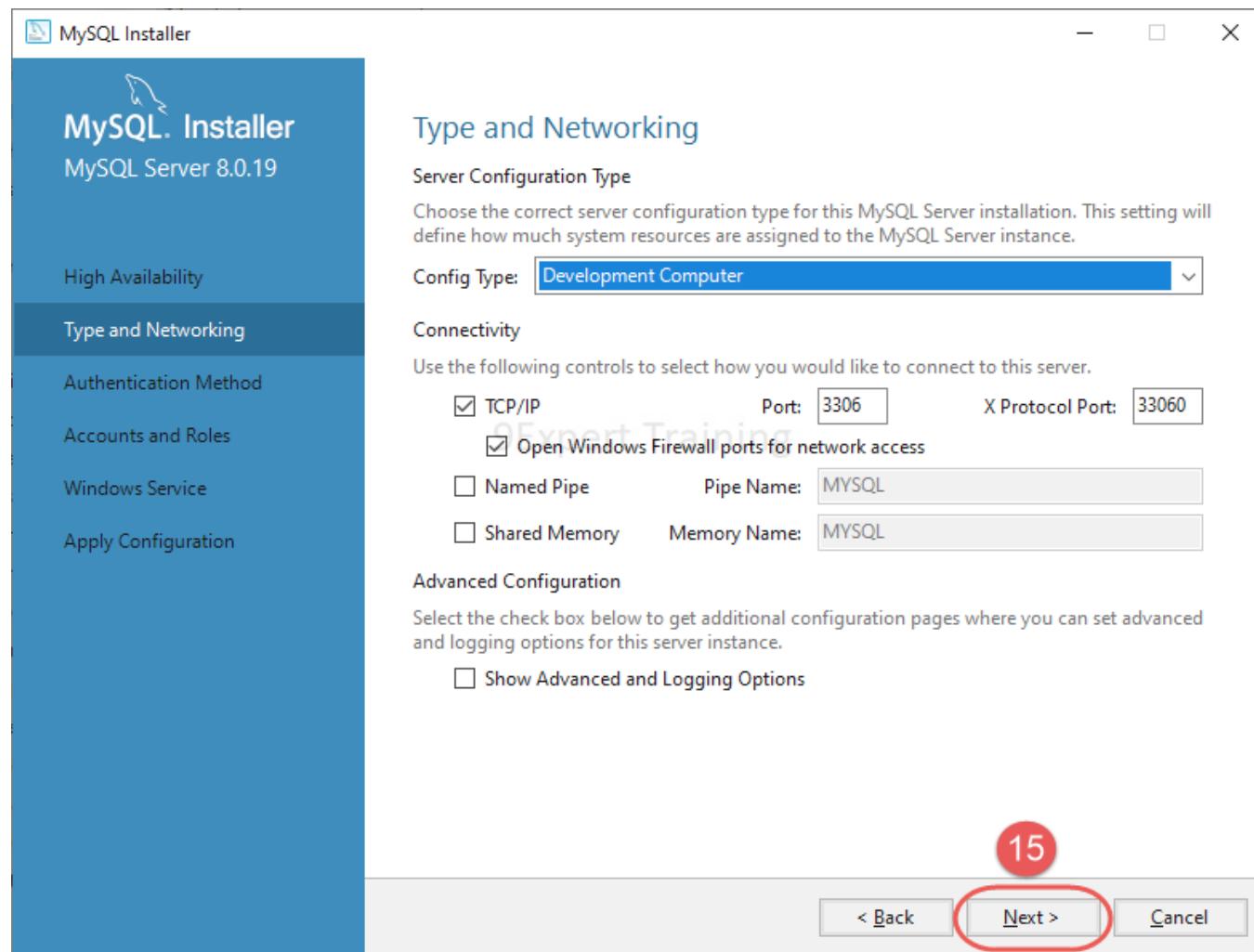


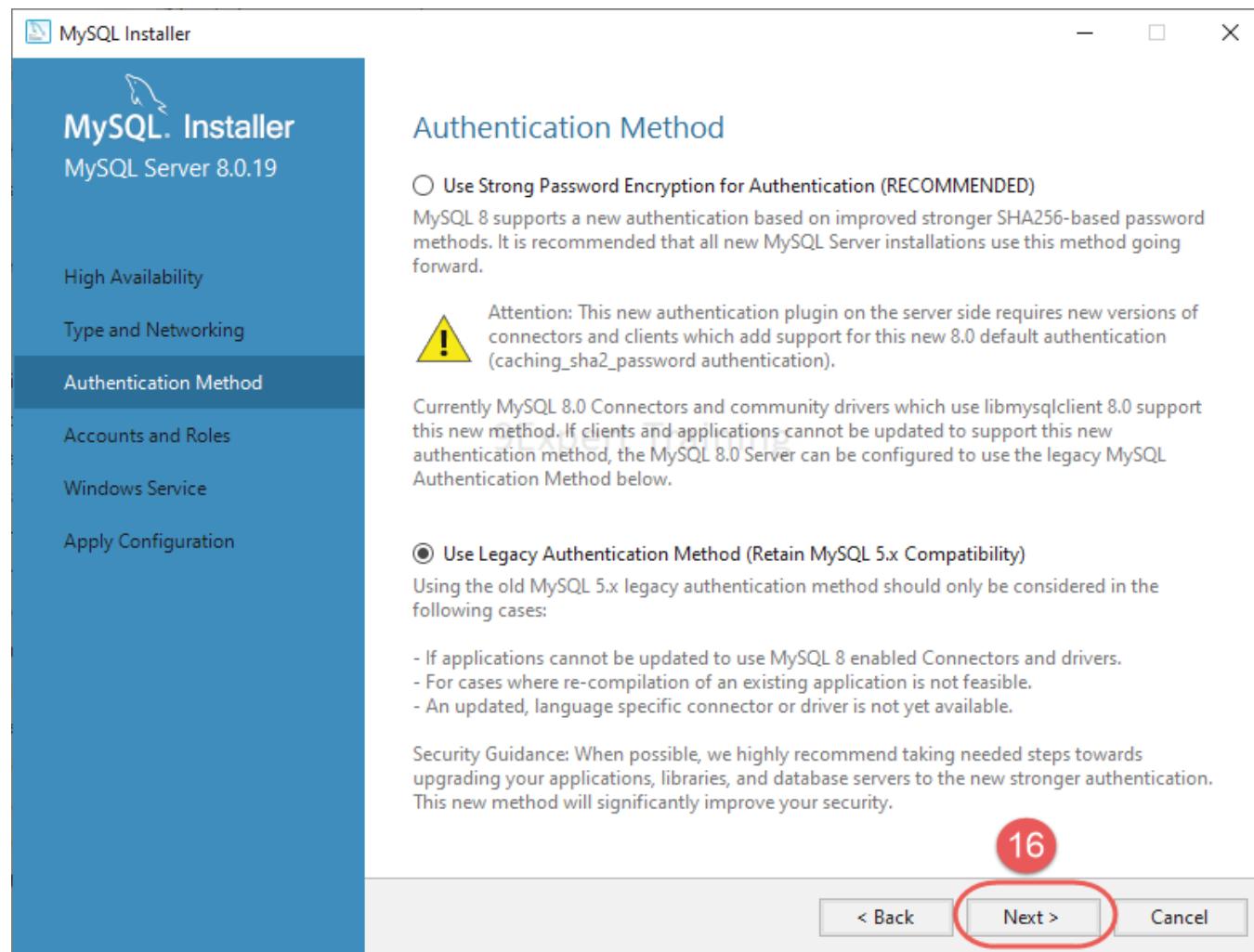


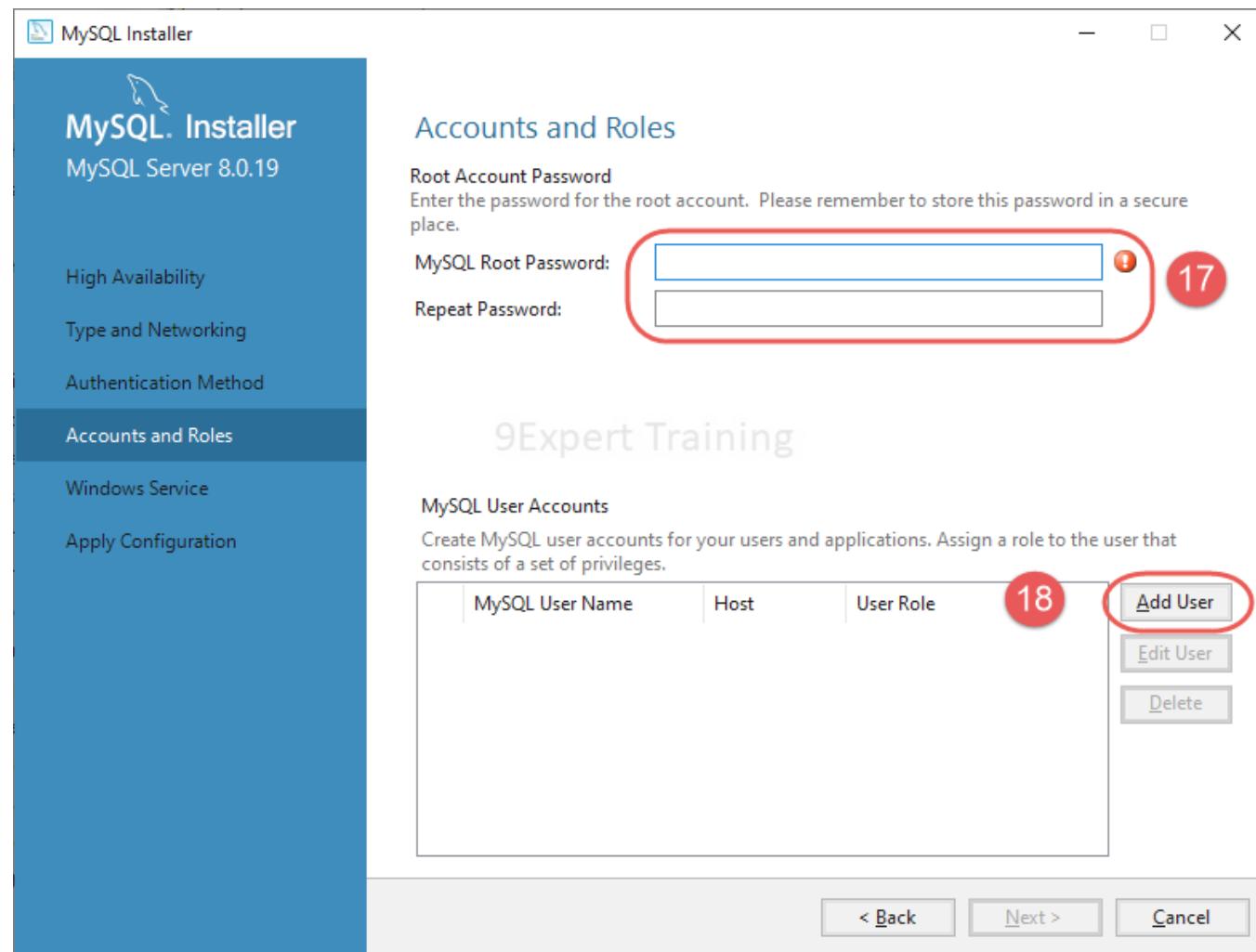


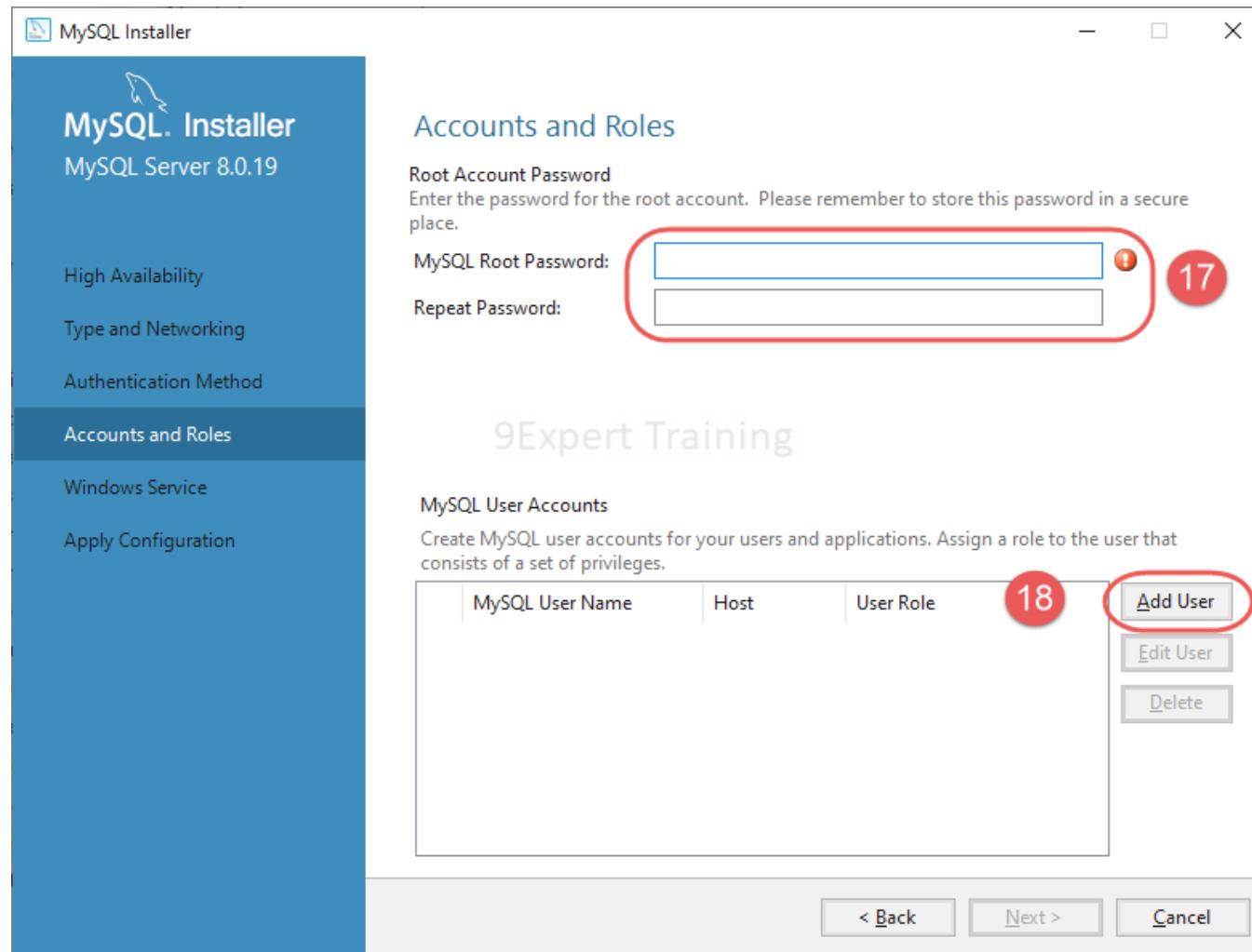






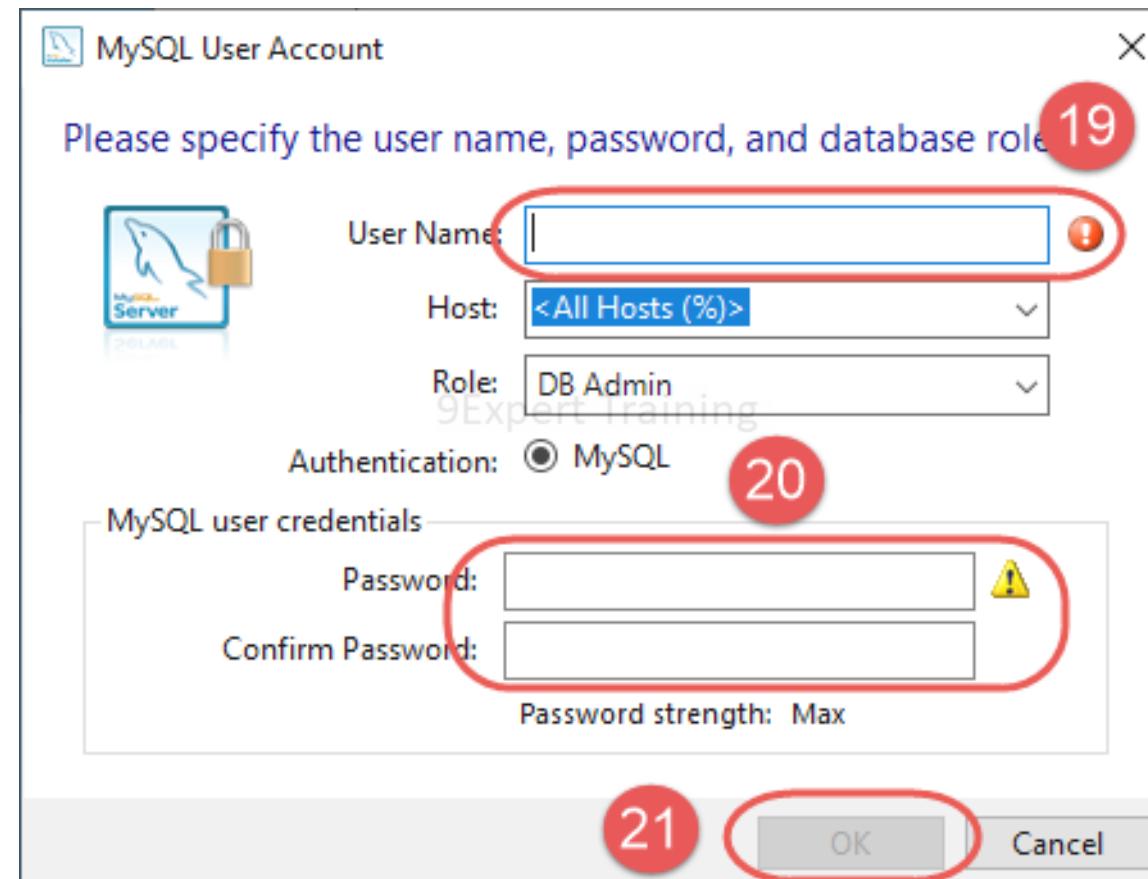


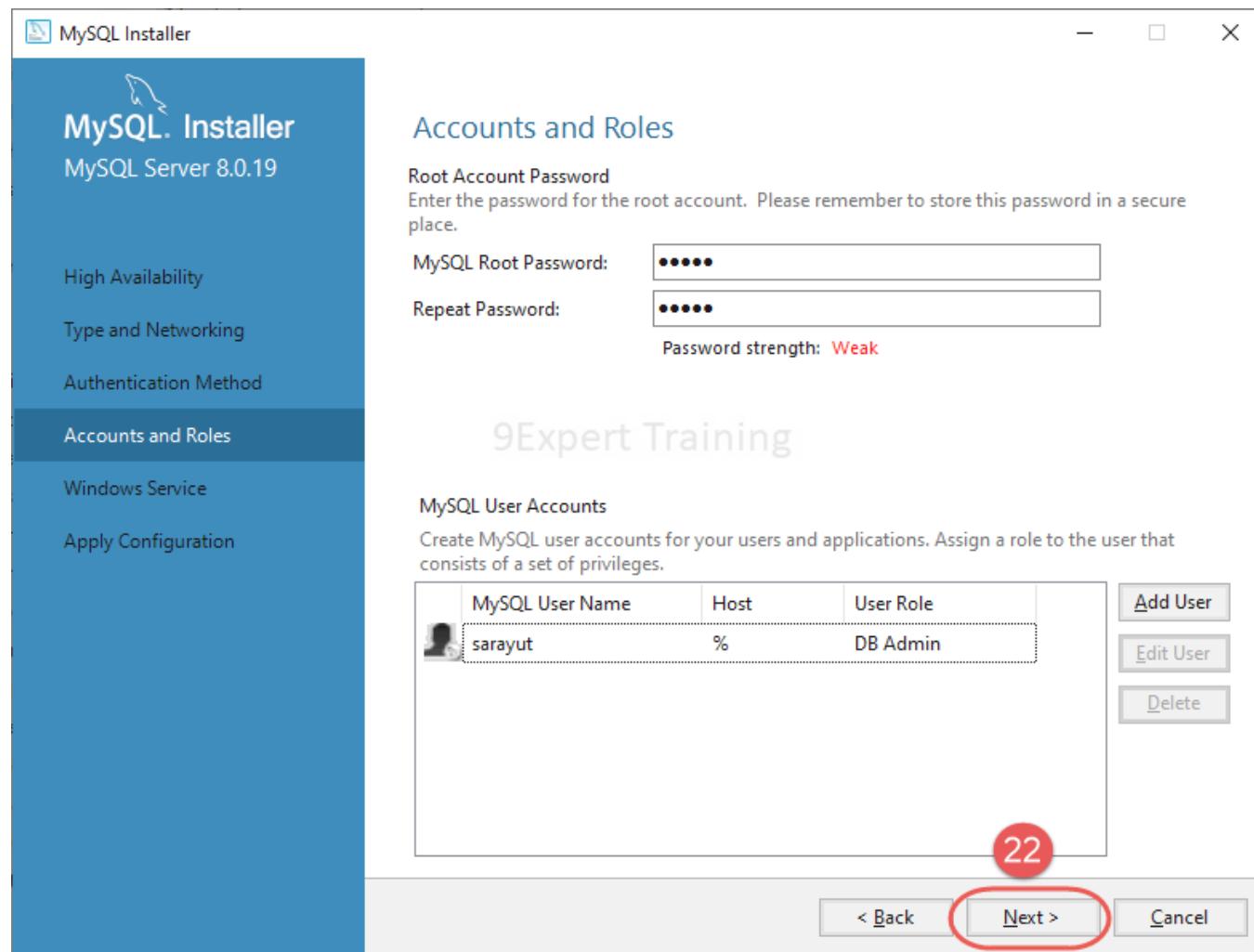


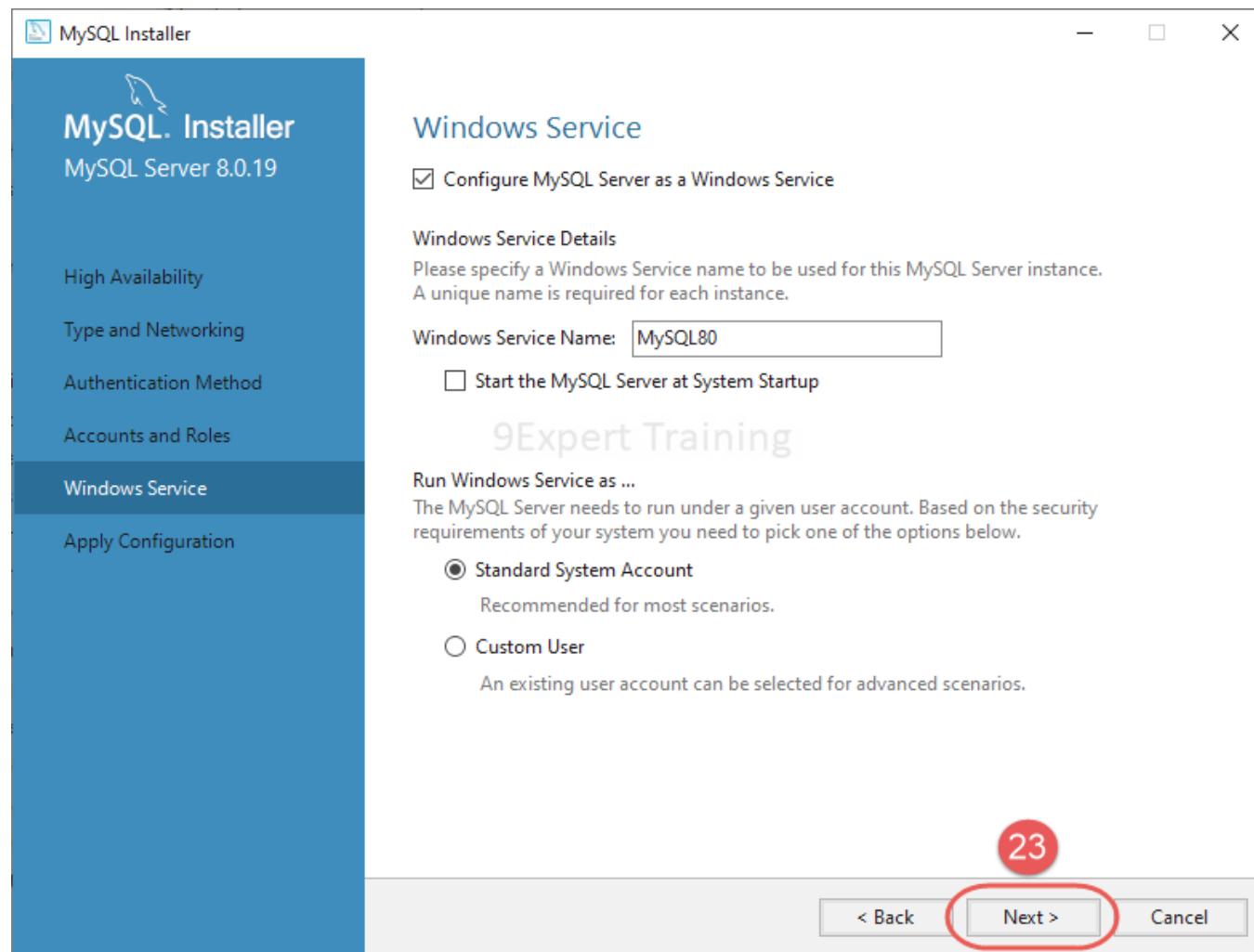


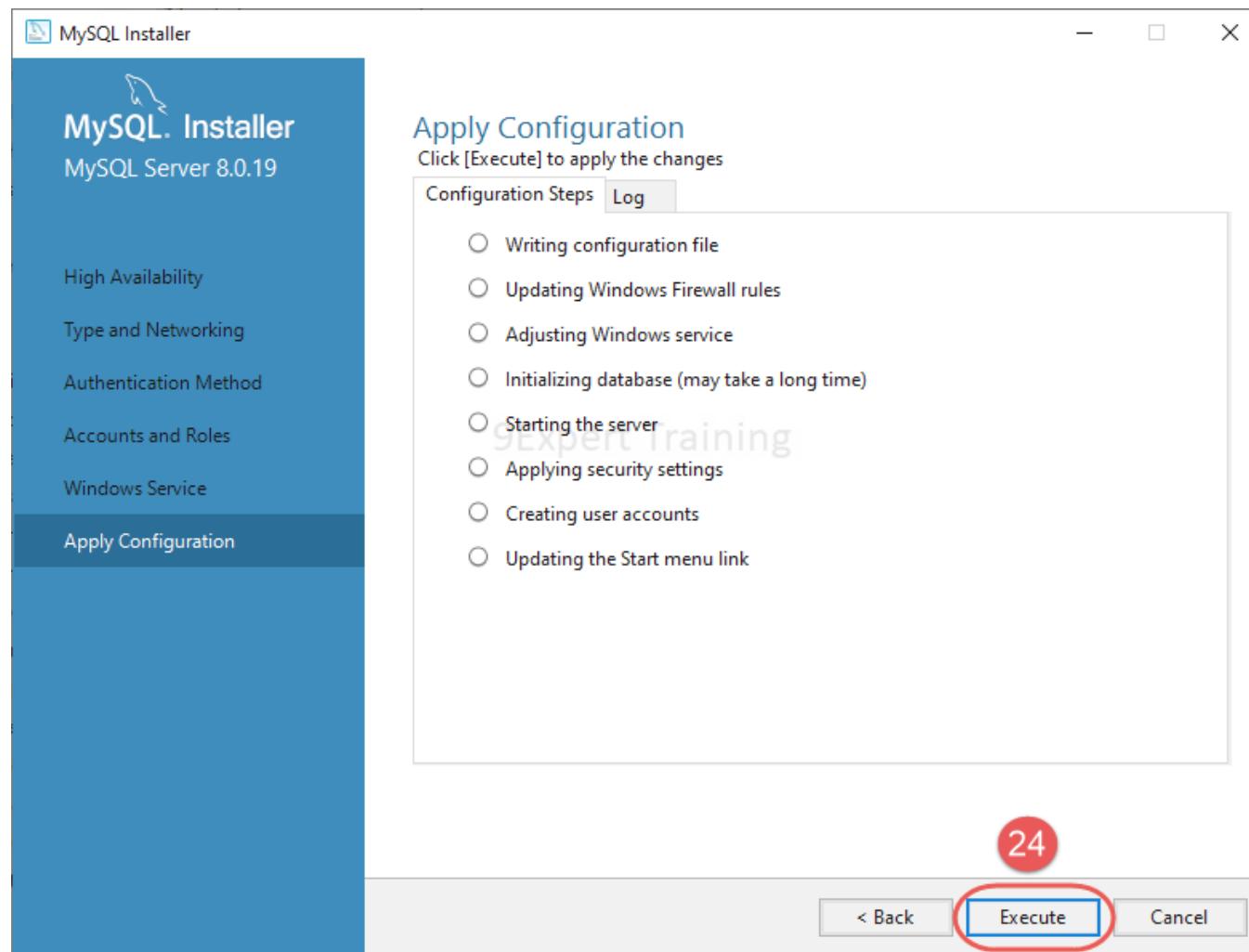


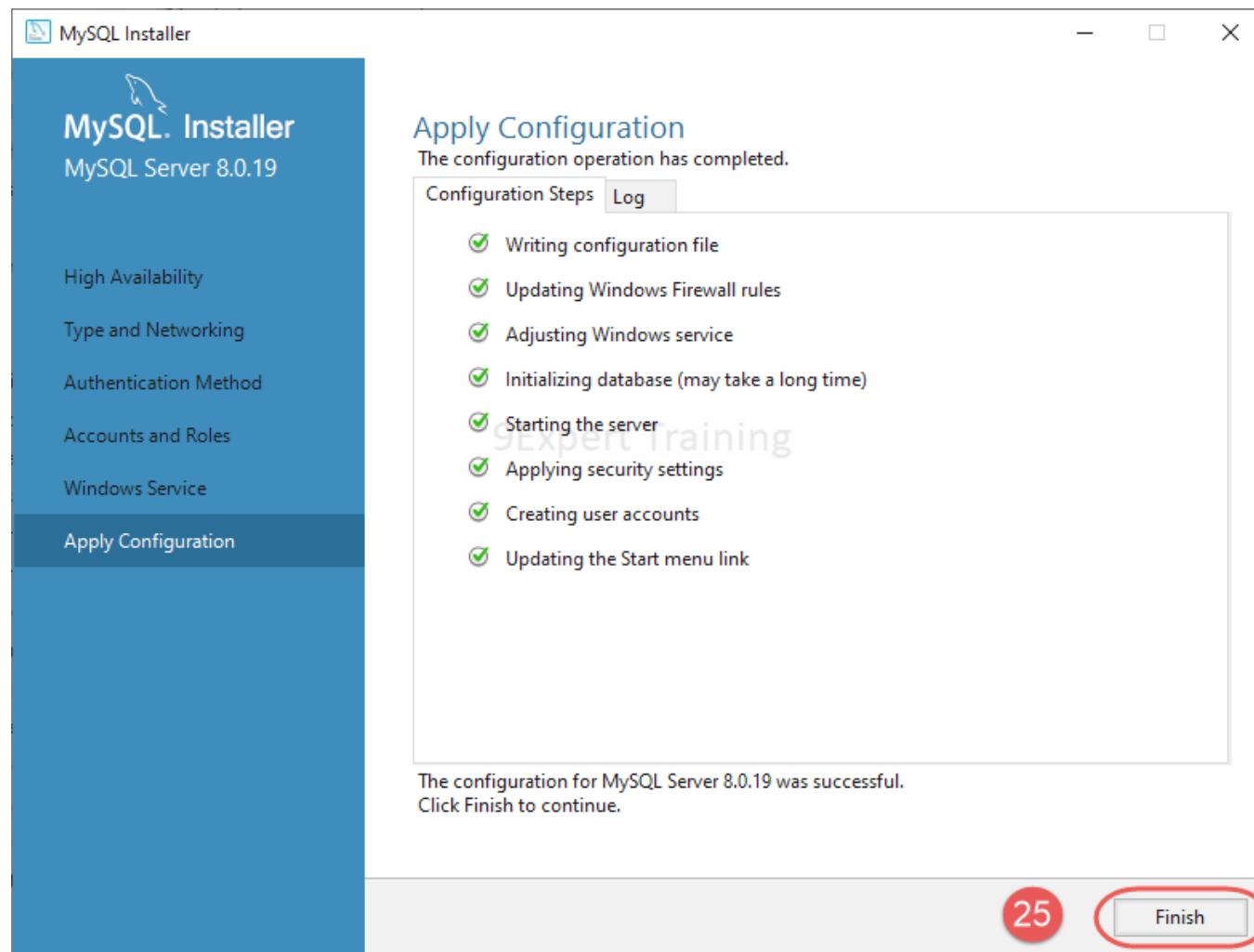
กรอก User Name และ Password สำหรับบัญชีผู้ใช้งานใหม่

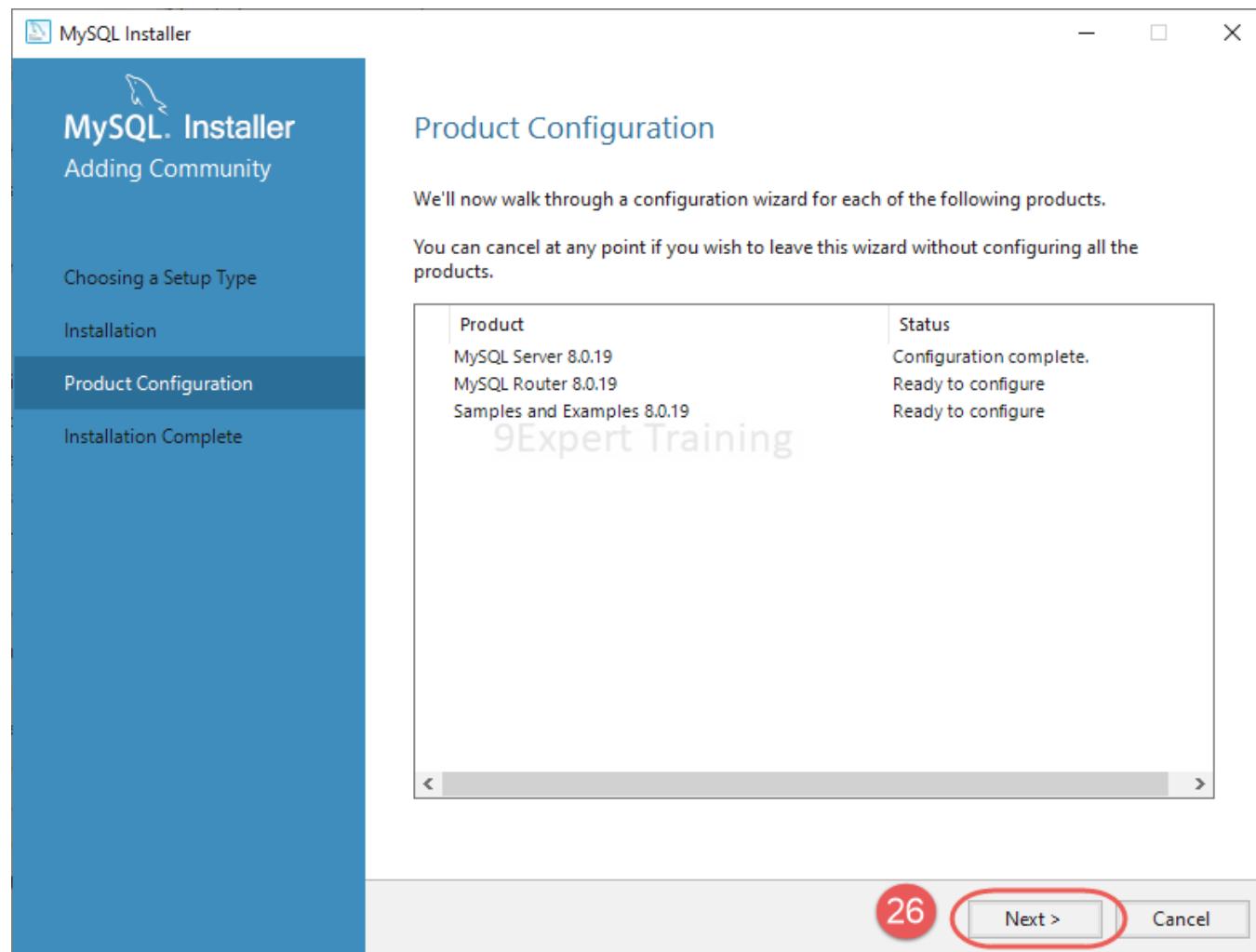


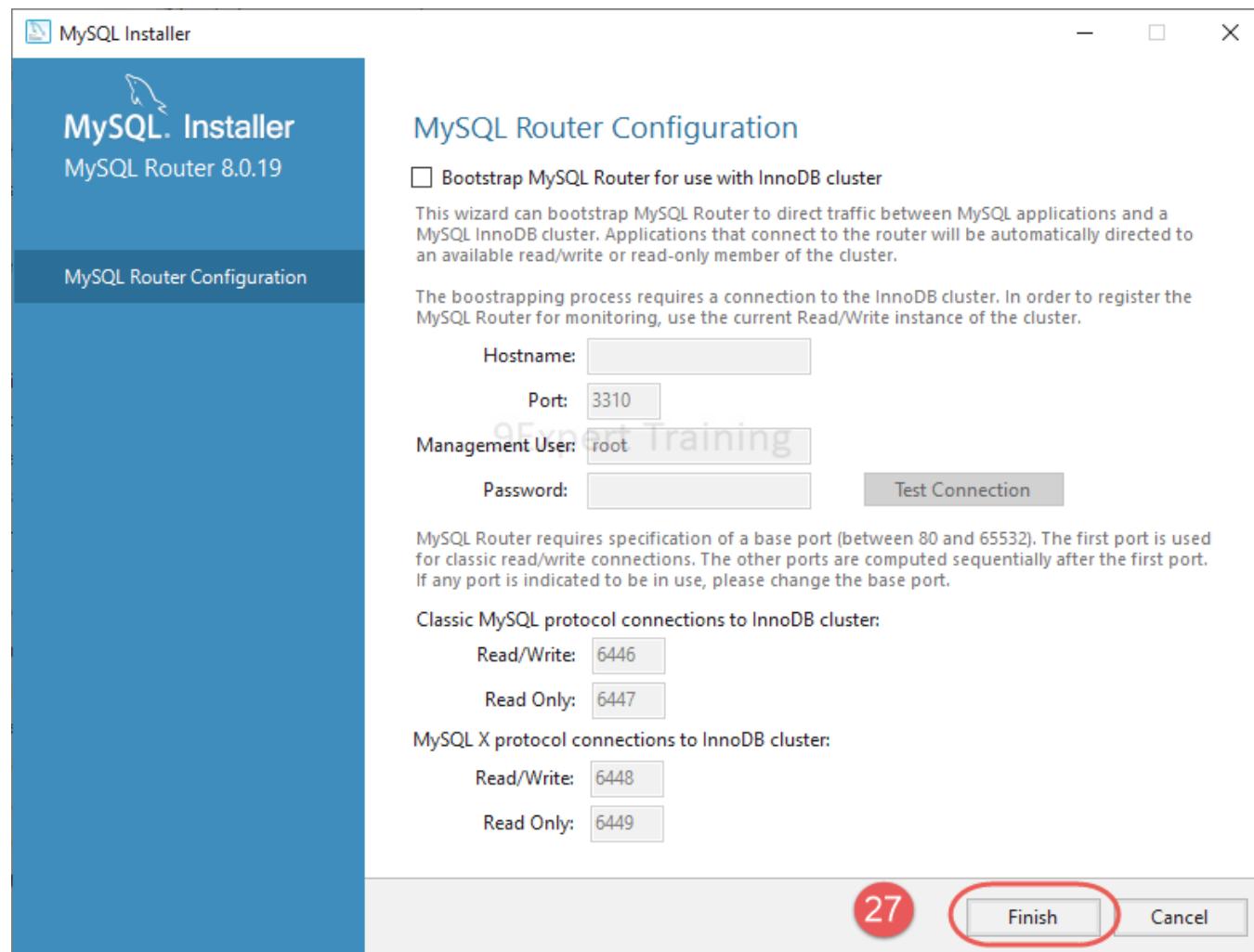


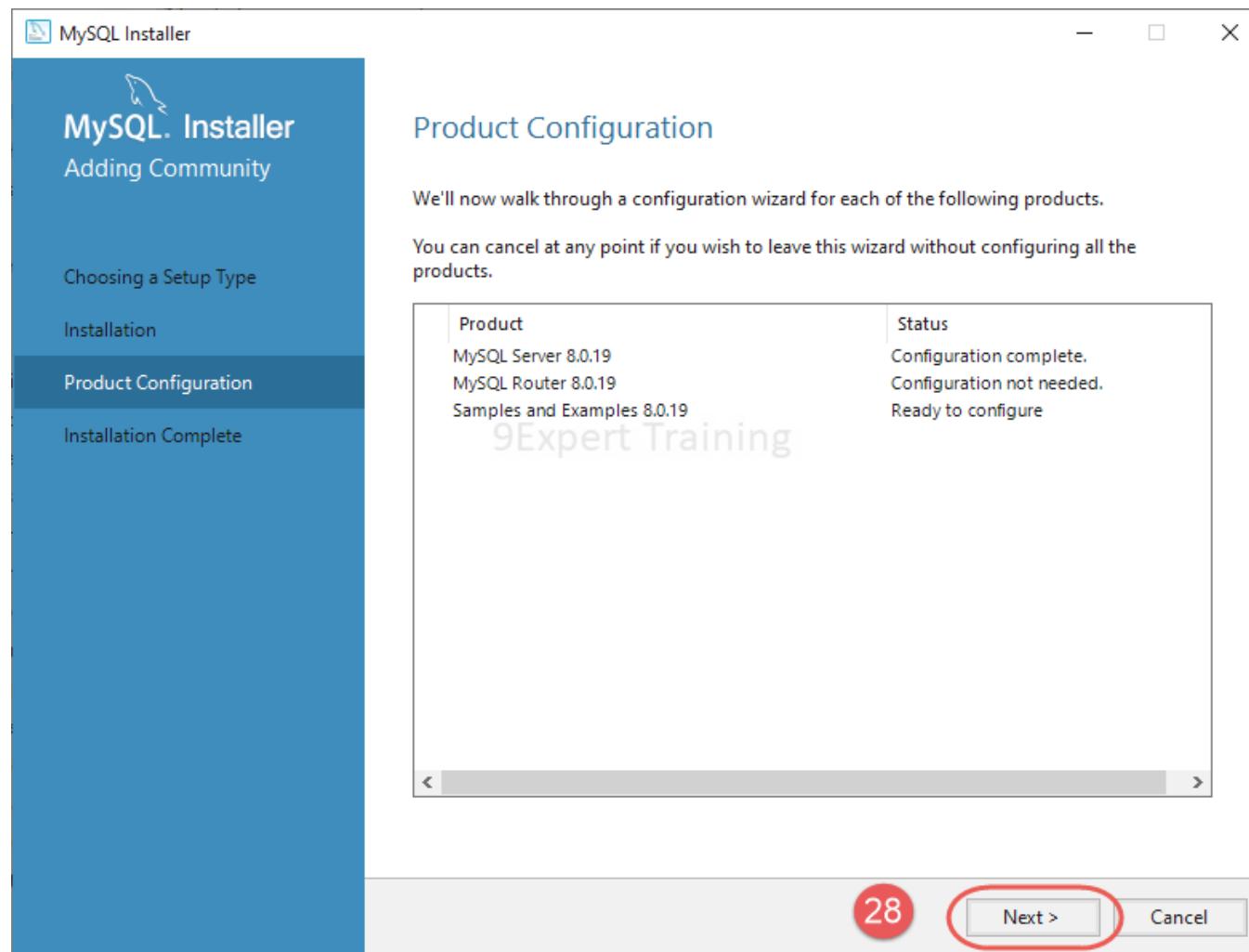


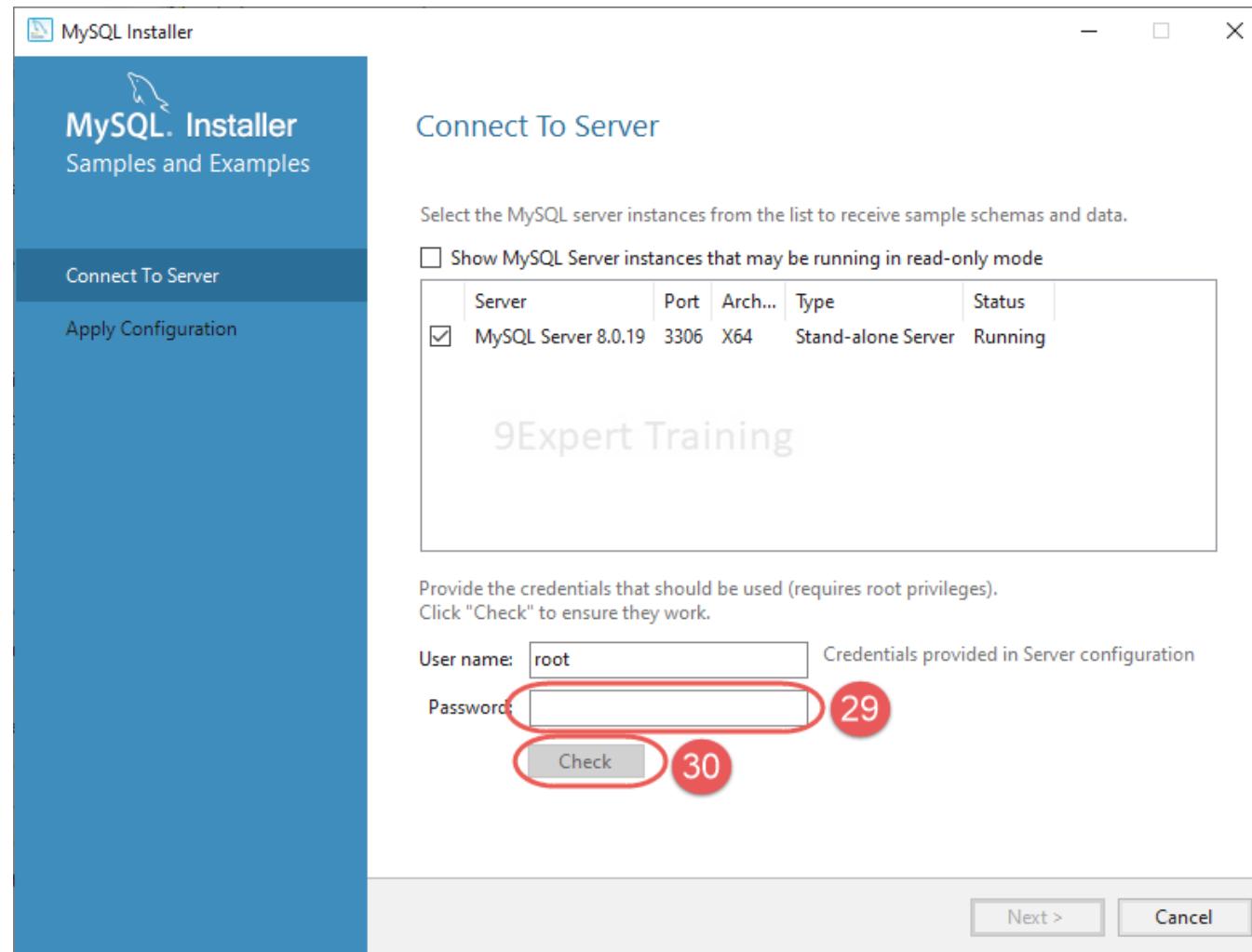




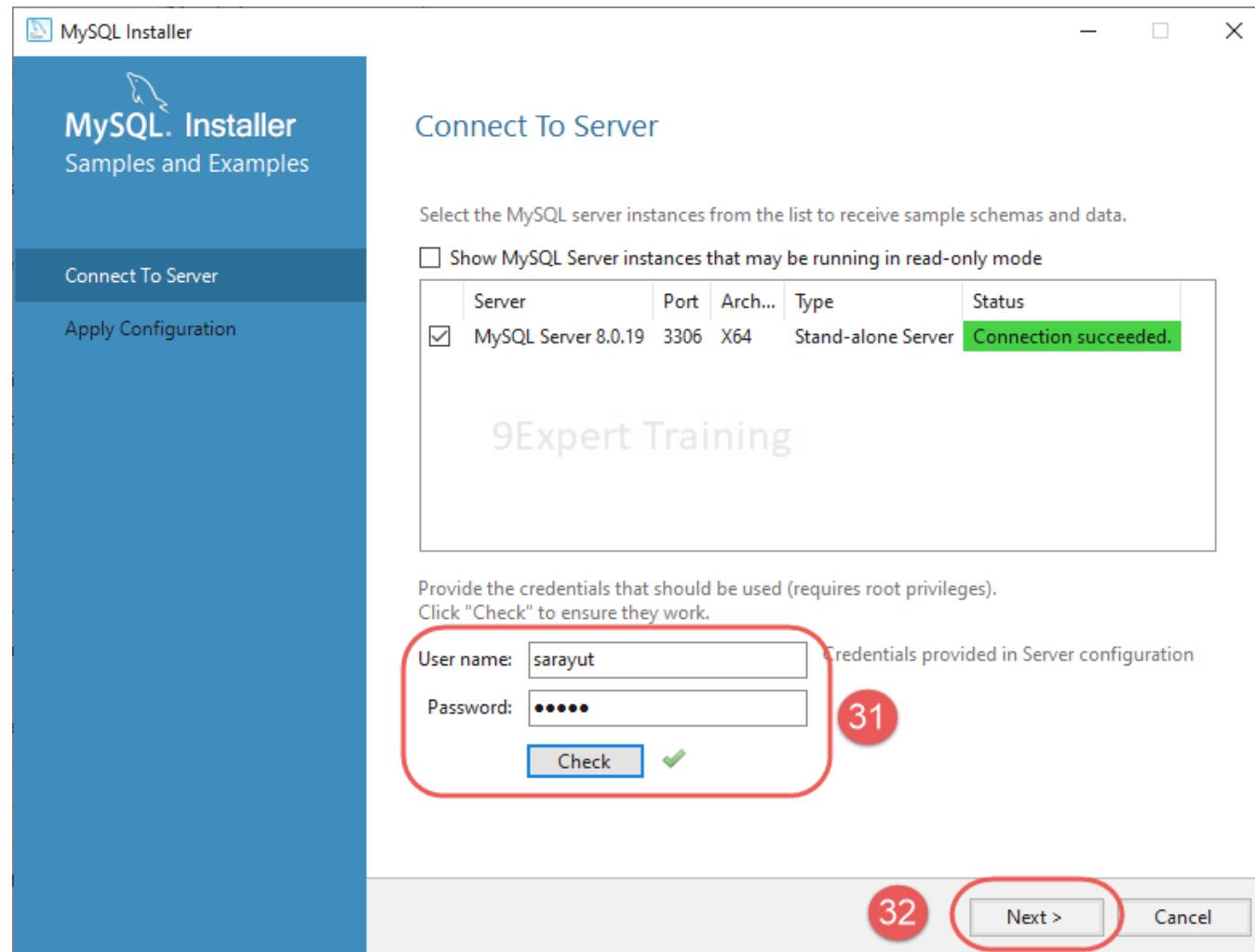


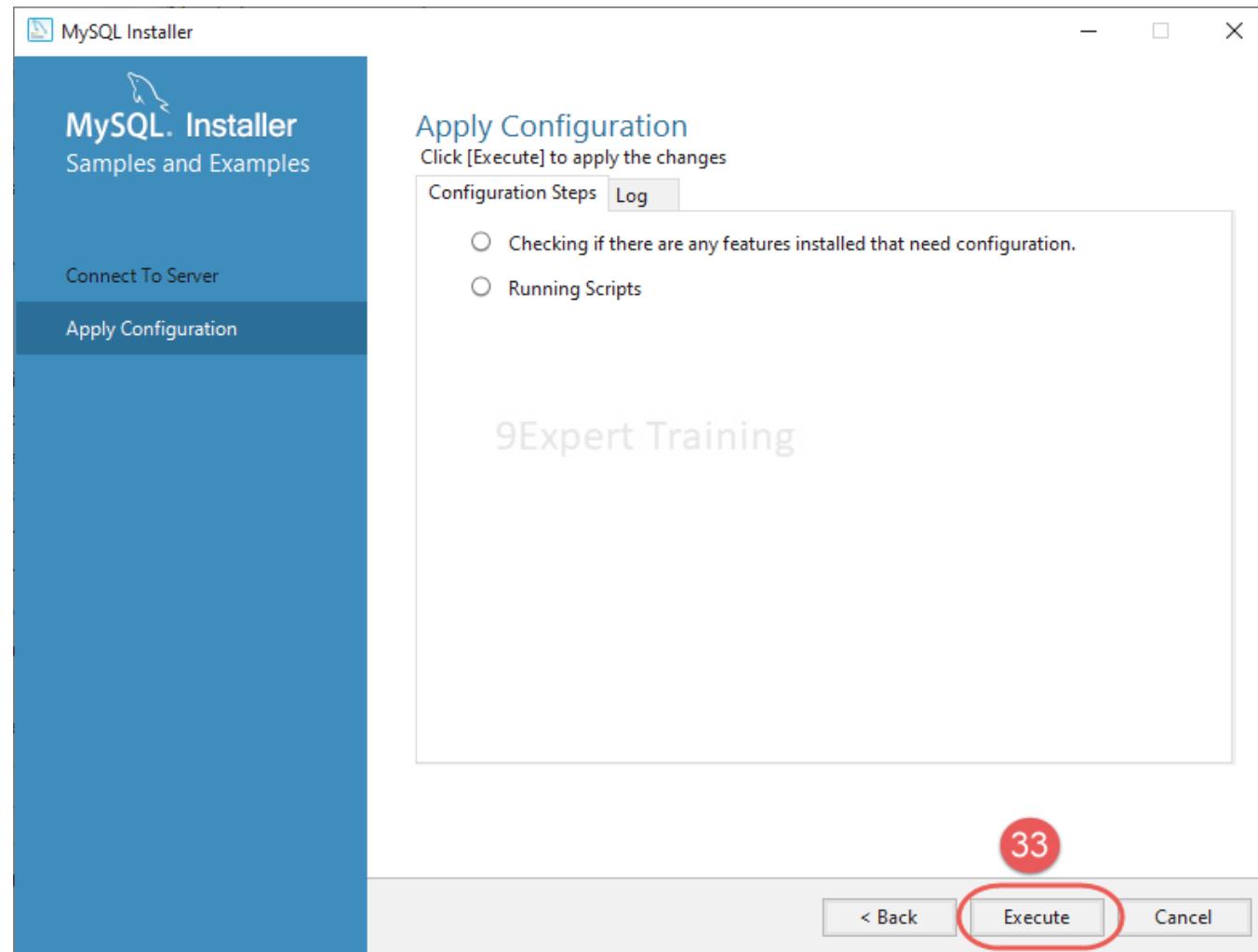


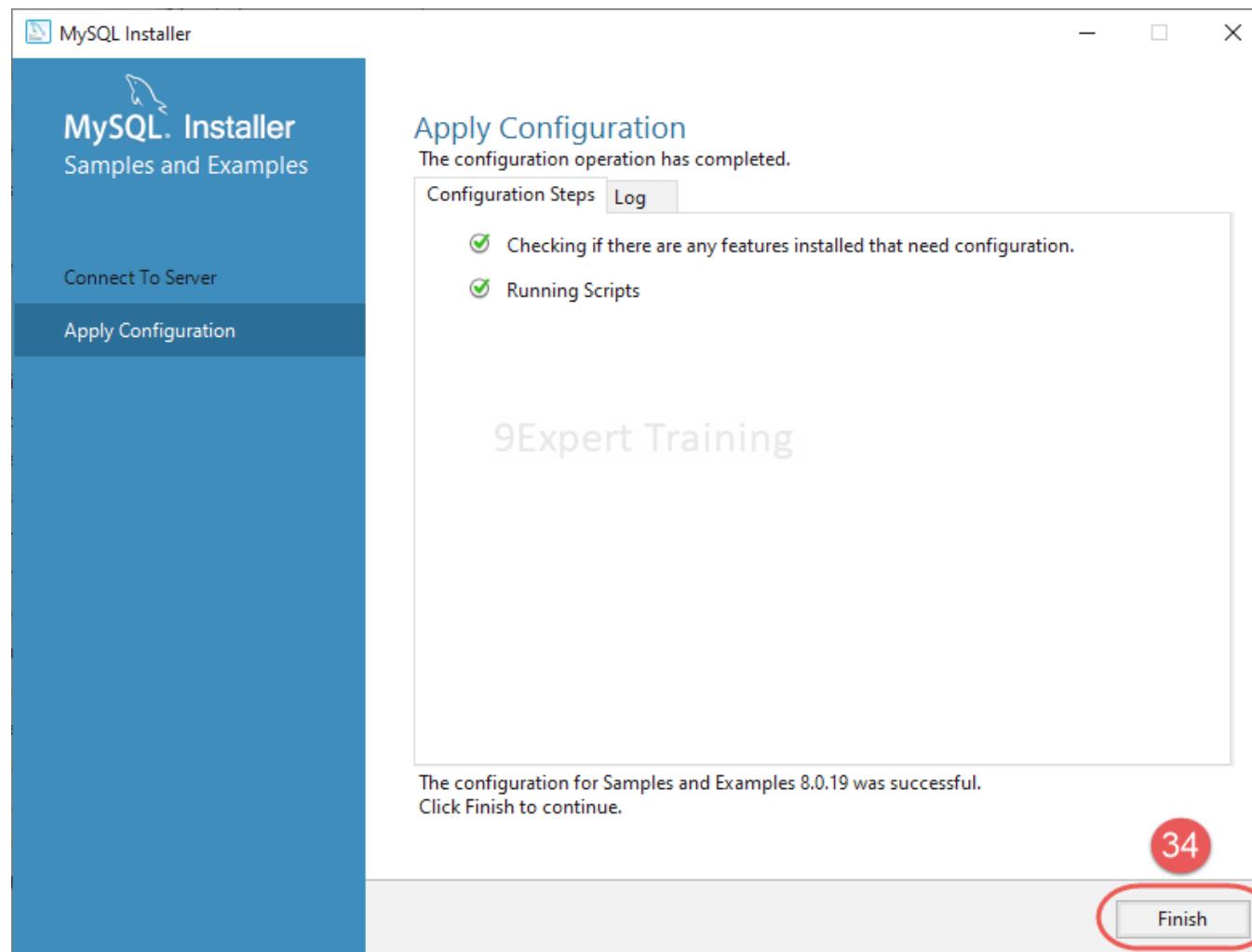


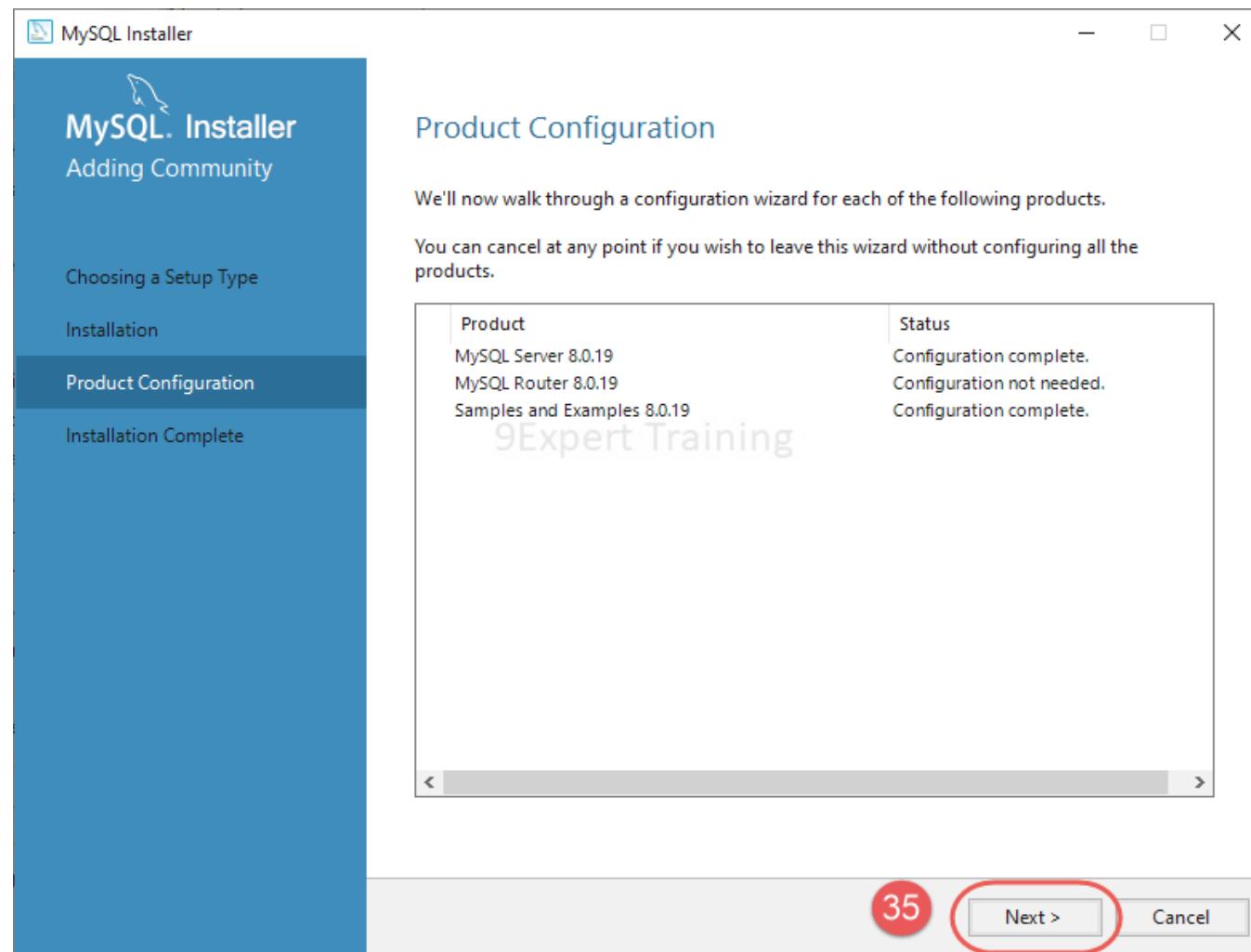


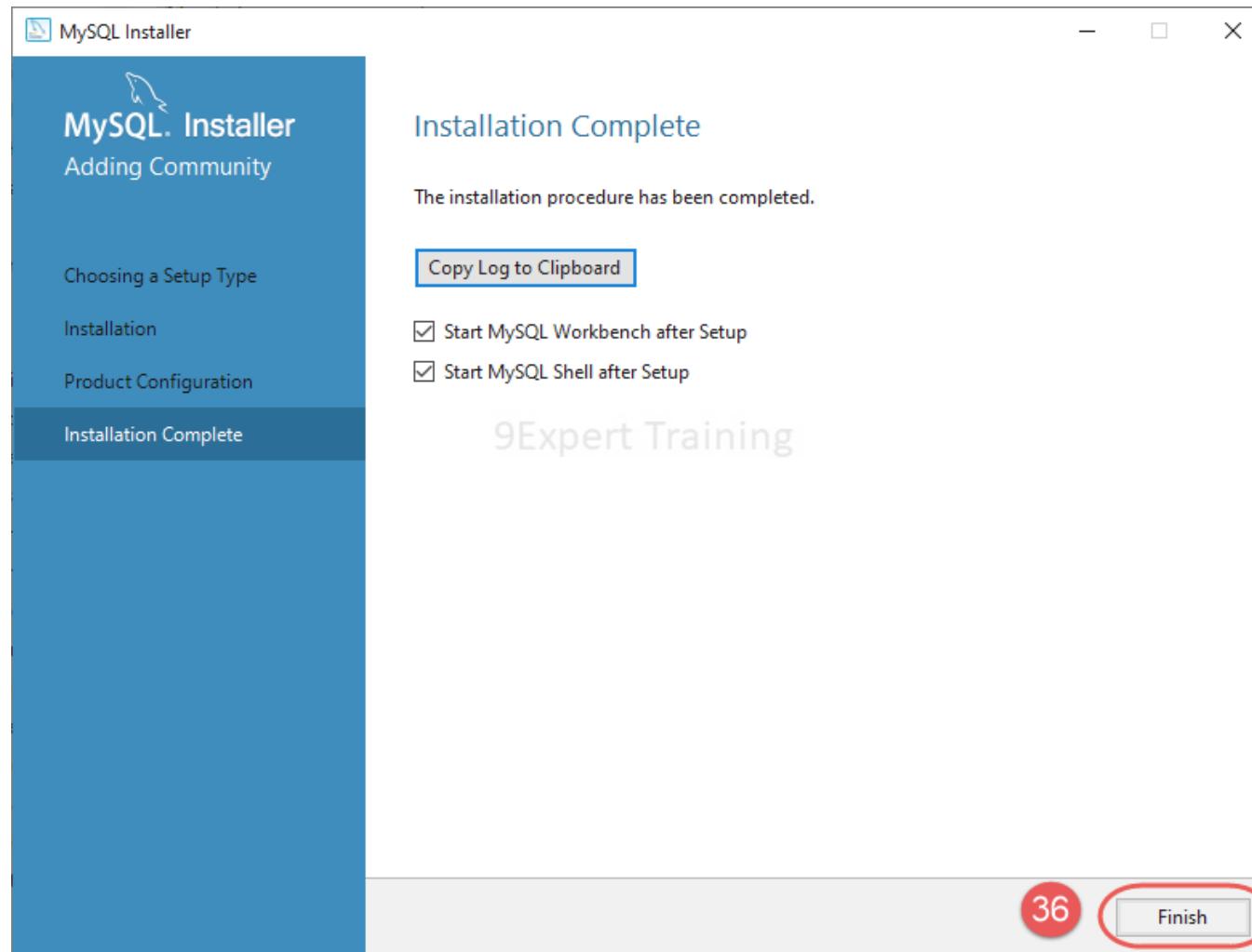
ทดสอบการเชื่อมต่อกับ Server (new user account)













C:\Program Files\MySQL\MySQL Shell 8.0\bin\mysqlsh.exe

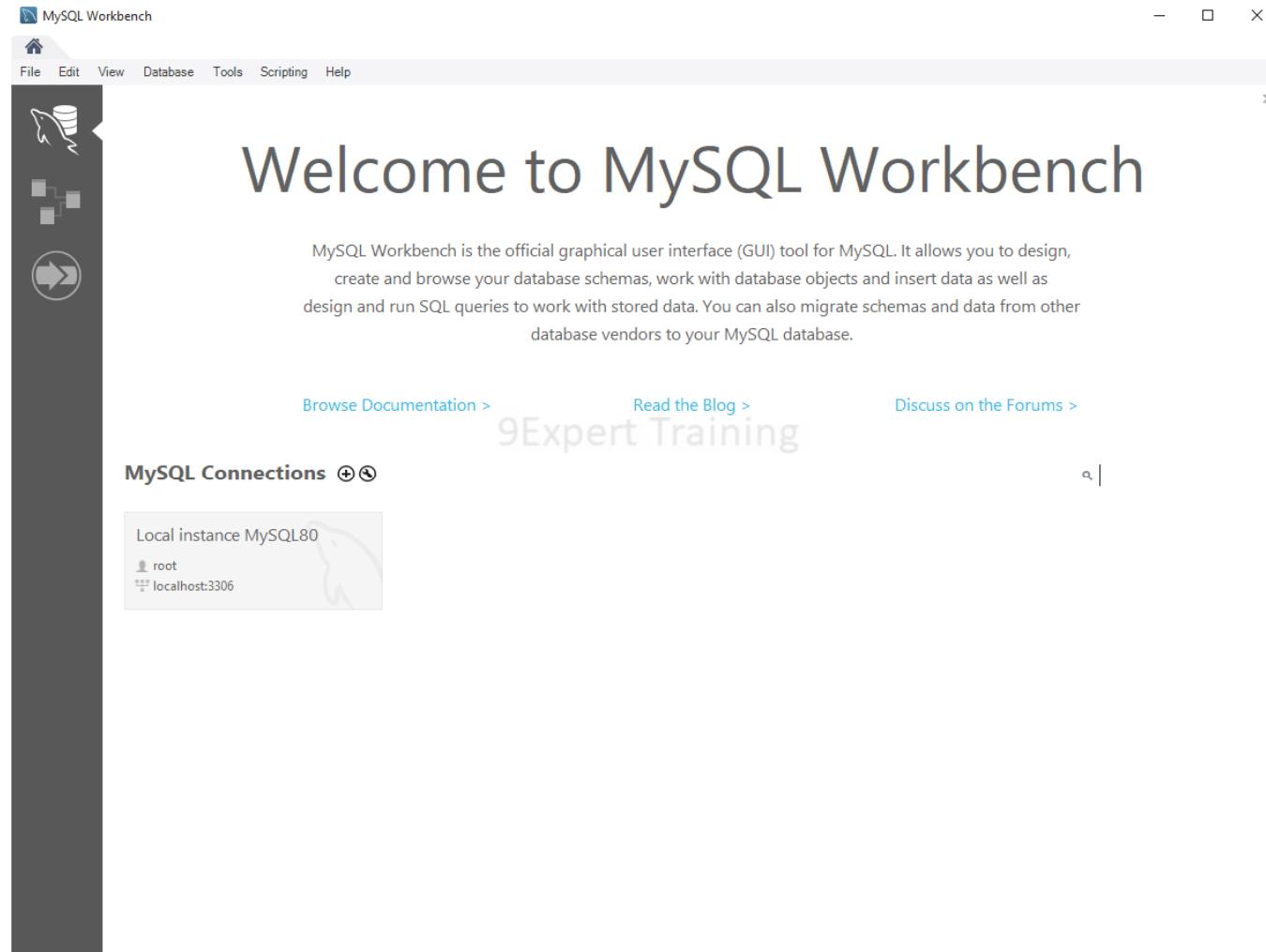
MySQL Shell 8.0.19

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Other names may be trademarks of their respective owners.

Type '\help' or '\?' for help; '\quit' to exit.

MySQL JS > -

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The screenshot shows the MySQL Workbench interface. On the left, there's a sidebar with icons for Home, File, Edit, View, Database, Tools, Scripting, Help, and a search bar. Below the sidebar, the main area has a title bar with the MySQL Workbench logo and window controls. The main content area features a large "Welcome to MySQL Workbench" heading. Below it is a descriptive paragraph about the tool's features. To the right of the paragraph is a "Connect to MySQL Server" dialog box. The dialog has fields for "Service" (Mysql@localhost:3306), "User" (root), and "Password". A red circle labeled "1" points to the "Local instance MySQL80" connection in the "MySQL Connections" list. A red circle labeled "2" points to the "Password" field in the dialog. Other visible elements include a "Browse Documentation" link, a "Filter connections" search bar, and a "343" notification badge in the bottom right corner.

MySQL Workbench

File Edit View Database Tools Scripting Help

Welcome to MySQL Workbench

MySQL Workbench is the official graphical user interface (GUI) tool for MySQL. It allows you to design, create and browse your database schemas, work with database objects and insert data as well as design and run SQL queries to work with stored data. You can also migrate schemas and data from other database vendors to your MySQL database.

MySQL Connections +

Local instance MySQL80 ①

②

Connect to MySQL Server

Please enter password for the following service:

Service: Mysql@localhost:3306

User: root

Password: ②

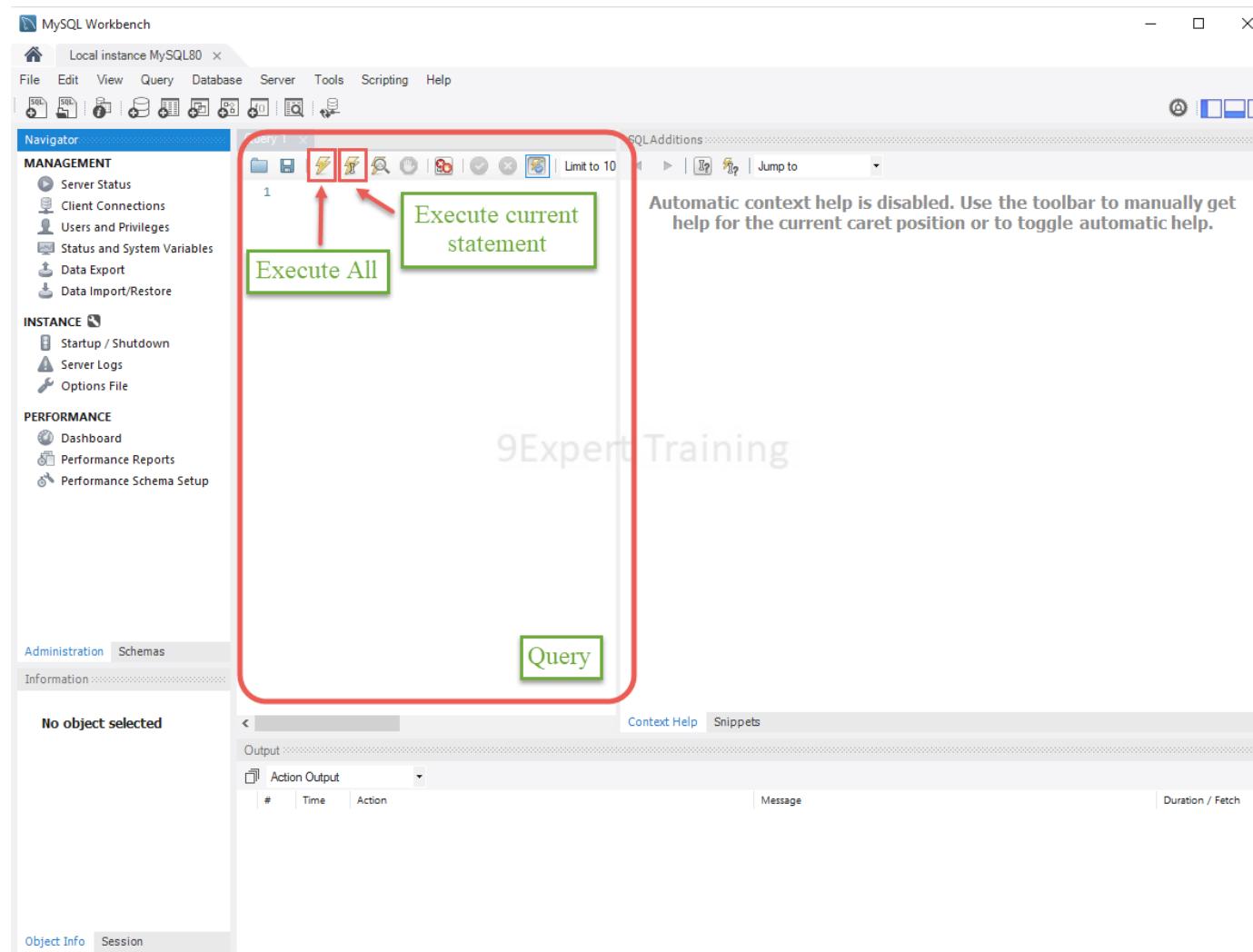
Save password in vault

OK Cancel

Browse Documentation >

Filter connections

343





- show databases;
- create database MyDataBase;
- use MyDataBase;
- create table Products(Id int primary key, Name varchar(20), Price float);



Id	Name	Price



- `insert into Products values(0001, 'MacBook Pro 13', 42900);`
`insert into Products values(0002, 'MacBook Pro 16', 75900);`
- `select * from Products;`
- `insert into Products values(0003, 'MacBook Air', 35900), (0004, 'Mac Mini', 27900), (0005, 'Mac Pro', 189900), (0006, 'iMac Pro 21.5 inch', 37900), (0007, 'iMac Pro 27 inch', 62900);`
- `select * from Products;`

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Products Table

Id	Name	Price
0001	MacBook Pro 13	42900
0002	MacBook Pro 16	75900
0003	MacBook Air	5900
0004	Mac Mini	27900
0005	Mac Pro	189900
0006	iMac Pro 21.5 inch	37900
0007	iMac Pro 27 inch	62900



```
> pip install mysql-connector
```

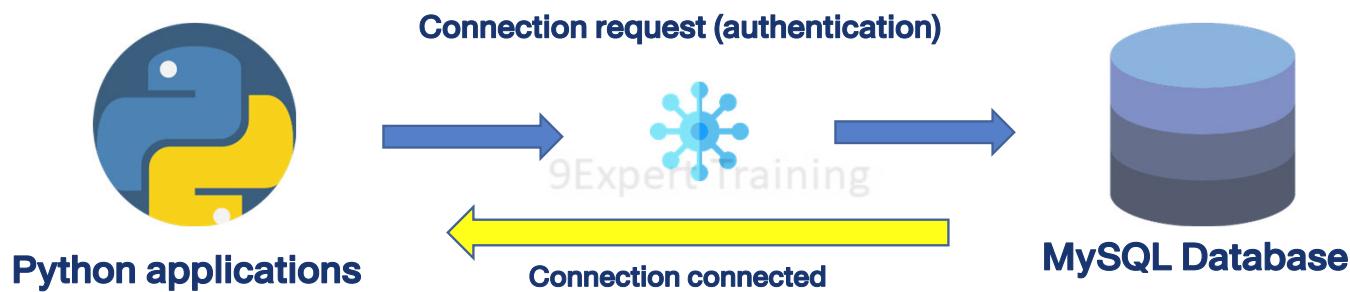
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- `mysql.connector.connect()`
- `connection.cursor()`
- `cursor.execute()`

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- This method sets up a connection, establishing a session with the MySQL server



```
mydb = mysql.connector.connect(host='localhost',
                               user='sarayut', passwd='admin', database='mydatabase')
```



- This method sets up a connection, establishing a session with the MySQL server





connection.cursor()

The MySQLCursor of mysql-connector-python (and similar libraries) is used to execute statements to communicate with the MySQL database.



```
my_cursor = mydb.cursor()  
mycursor.execute('show databases')
```



จงสร้างตารางสินค้า Apple ประกอบด้วยพิล์ดข้อมูลดังนี้

- Id
- Name
- Price

จงนำเข้าข้อมูลสินค้า Apple ดังต่อไปนี้

- 001, MacBook Air, 35900
- 002, MacBook Pro รุ่น 13, 42900
- 003, MacBook Pro รุ่น 16, 75900
- 004, iMac, 37900
- 005, iMac Pro, 62900
- 006, Mac Pro, 189900
- 007, Mac Mini, 27900

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NumPy Module

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NumPy is a library for the Python programming language, adding support for large, multi-dimensional arrays and matrices, along with a large collection of high-level mathematical functions to operate on these arrays.

Ref: www.wikipedia.org





0D	1D	2D	3D					
POINT	LINE	PLANE	SOLID	4D Combination of 3D Four-Dimension				
zero-dimensional	one-dimensional	two-dimensional	three-dimensional					

What are Dimensions Full Explained 0D, 1D, 2D, 3D and 4D

Ref: <https://gadgetsthink.com/>

```
$ pip install numpy
```

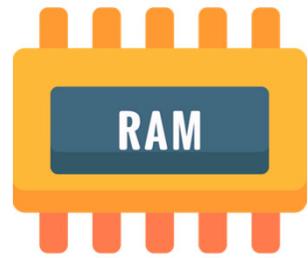
Importing Numpy

```
9Expert Training  
import numpy as np
```

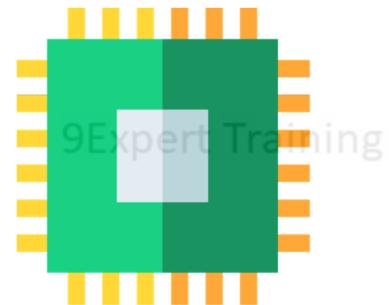
Numpy version

```
np.__version__
```

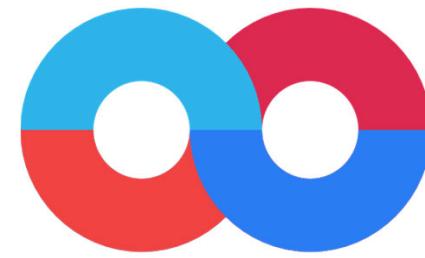
```
'1.17.0'
```



Less Memory



Processing Faster



No Loops





```
import sys
l = range(10000)
print(sys.getsizeof(5)*len(l))
```

Output console:

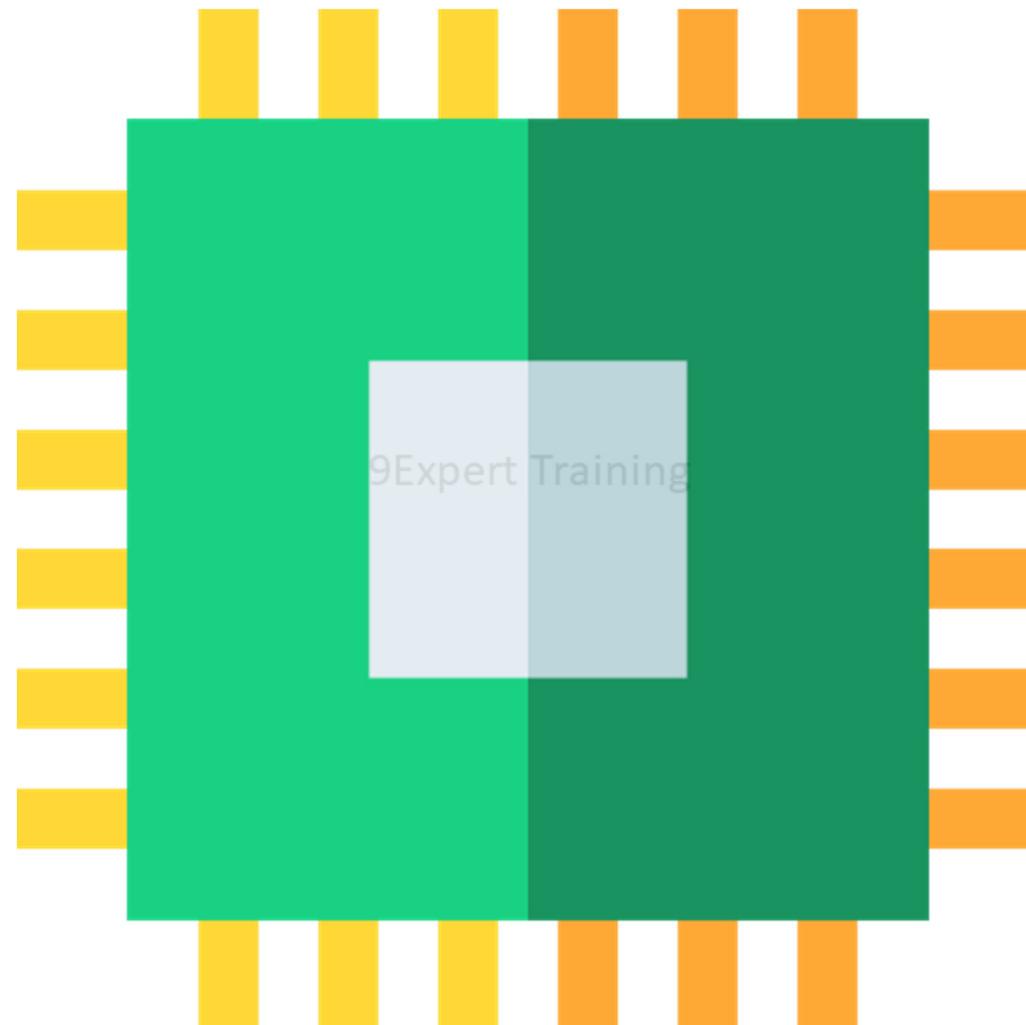
280000

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```
import numpy as np
a = np.arange(10000)
print(a.size*a.itemsize)
```

Output console:

40000





```
%%timeit
import random
import math
n = int(1e6) #n = 1000000
a = [random.random() for i in range(n)]
b = [math.log(x) for x in a]
```

Output console:

```
465 ms ± 10 ms per loop (mean ± std. dev. of 7 runs, 1 loop each)
```

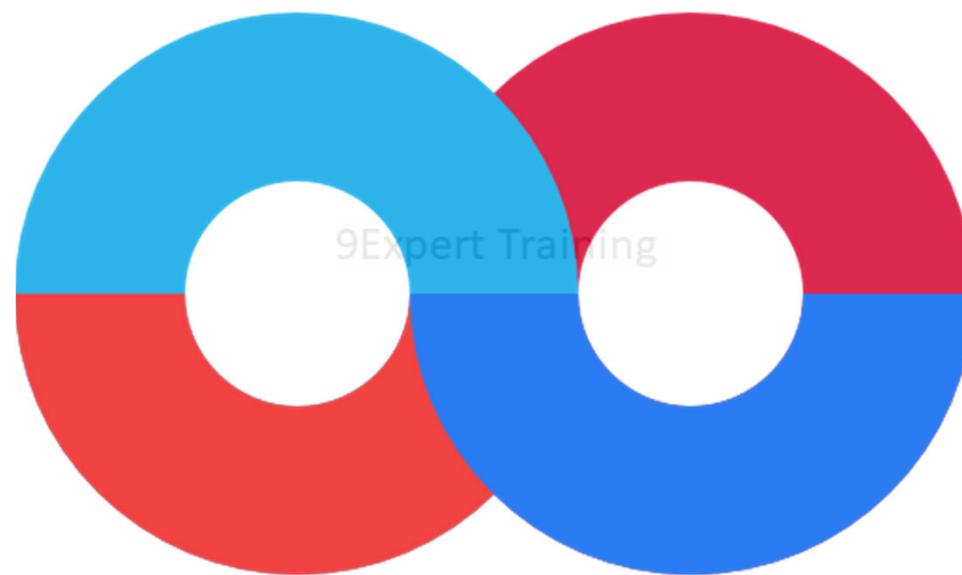


```
%%timeit
import numpy as np
n = int(1e6) #n = 1000000
a = [np.random.rand(n)]
b = np.log(a)
```

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Output console:

```
31.5 ms ± 348 µs per loop (mean ± std. dev. of 7 runs, 10 loops each)
```





```
list1 = [1,2,3,4,5]
list2 = [6,7,8,9,10]
print(list1*list2)
```

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Output console:

```
TypeError: can't multiply sequence by non-int of type 'list'
```



```
a = [1,2,3,4,5,6]
b = [e + 1 for e in a]
print(b)
```

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Output console:

```
[2, 3, 4, 5, 6, 7]
```



```
import numpy as np  
a = np.array([1,2,3,4,5,6])  
print(a + 1)
```

1+1

2+1

3+1

4+1

5+1

6+1

Output console:

```
[2,3,4,5,6,7]
```



```
import numpy as np
a = np.array([1,2,3,4,5,6])
print(a * 2)
```

1x2 | 2x2 | 3x2 | 4x2 | 5x2 | 6x2

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Output console:

```
[ 2  4  6  8 10 12]
```



```
py_arr = [1,2,3] * 2
```

Output console:

```
[1,2,3,1,2,3]
```



```
import numpy as np
a = np.array([1,2,3,4,5,6])
b = np.array([1,2,3,4,5,6])
print(a + b)
```



Output console:

```
[ 2  4  6  8 10 12]
```



```
a = np.array([[[1, 2],[3, 4]],[[5, 6],[7, 8]]])
b = np.array([[[2, 4],[6, 8]],[[1, 3],[5, 7]]])
print(a + b)
```

Output console:

```
[[[ 3  6]
  [ 9 12]]

 [[ 6  9]
  [12 15]]]
```

1	2	5	6	a
3	4	7	8	
2	4	1	3	b
6	8	5	7	
3	6	6	9	a + b
9	12	12	15	

```
import numpy as np
arr = np.array([1,2,3,4,5,6]) #List
print(arr)
```

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1	2	3	4	5	6
---	---	---	---	---	---

```
import numpy as np  
arr = np.array((1,2,3,4,5,6)) #Tuple  
print(arr)
```

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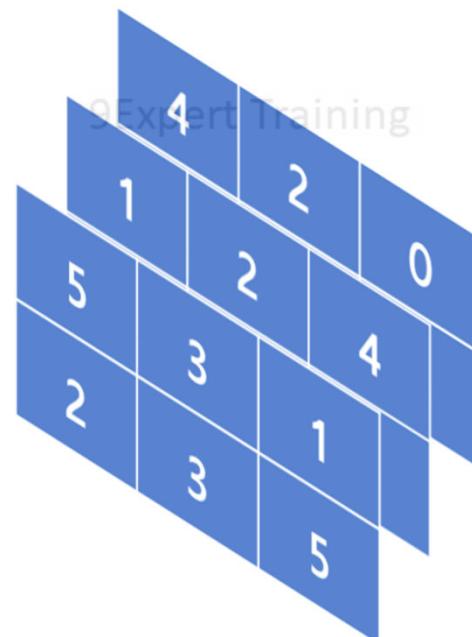
1	2	3	4	5	6
---	---	---	---	---	---

```
import numpy as np  
arr = np.array([[1,2,3],[4,5,6]])  
print(arr)
```

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1	2	3
4	5	6

```
import numpy as np
arr = np.random.randint(6, size=(3, 2, 3))
print(arr)
```





Web scraping

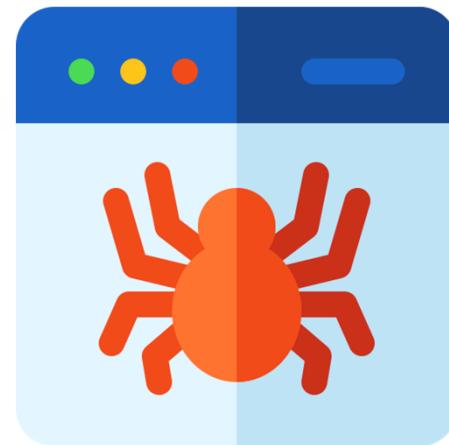
9Expert Training

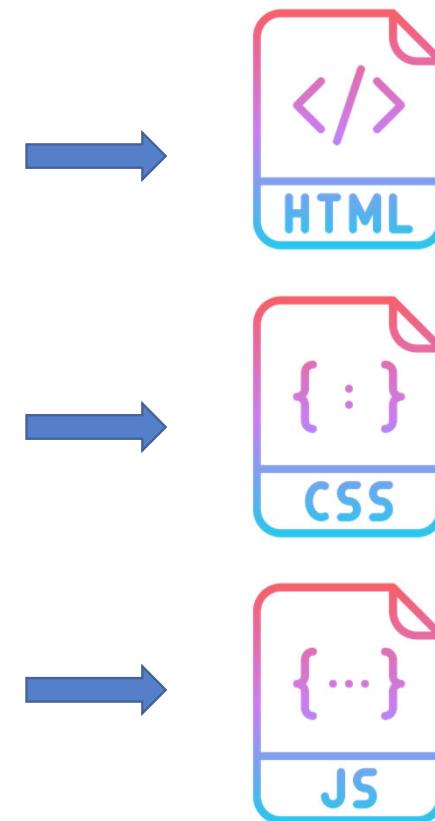
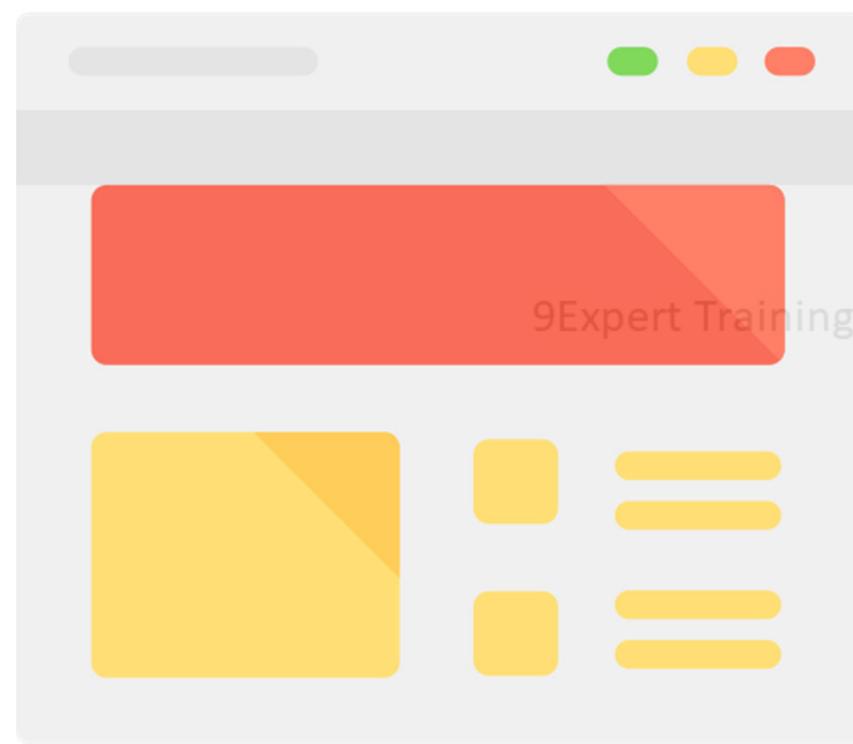
9EXPERT TRAINING

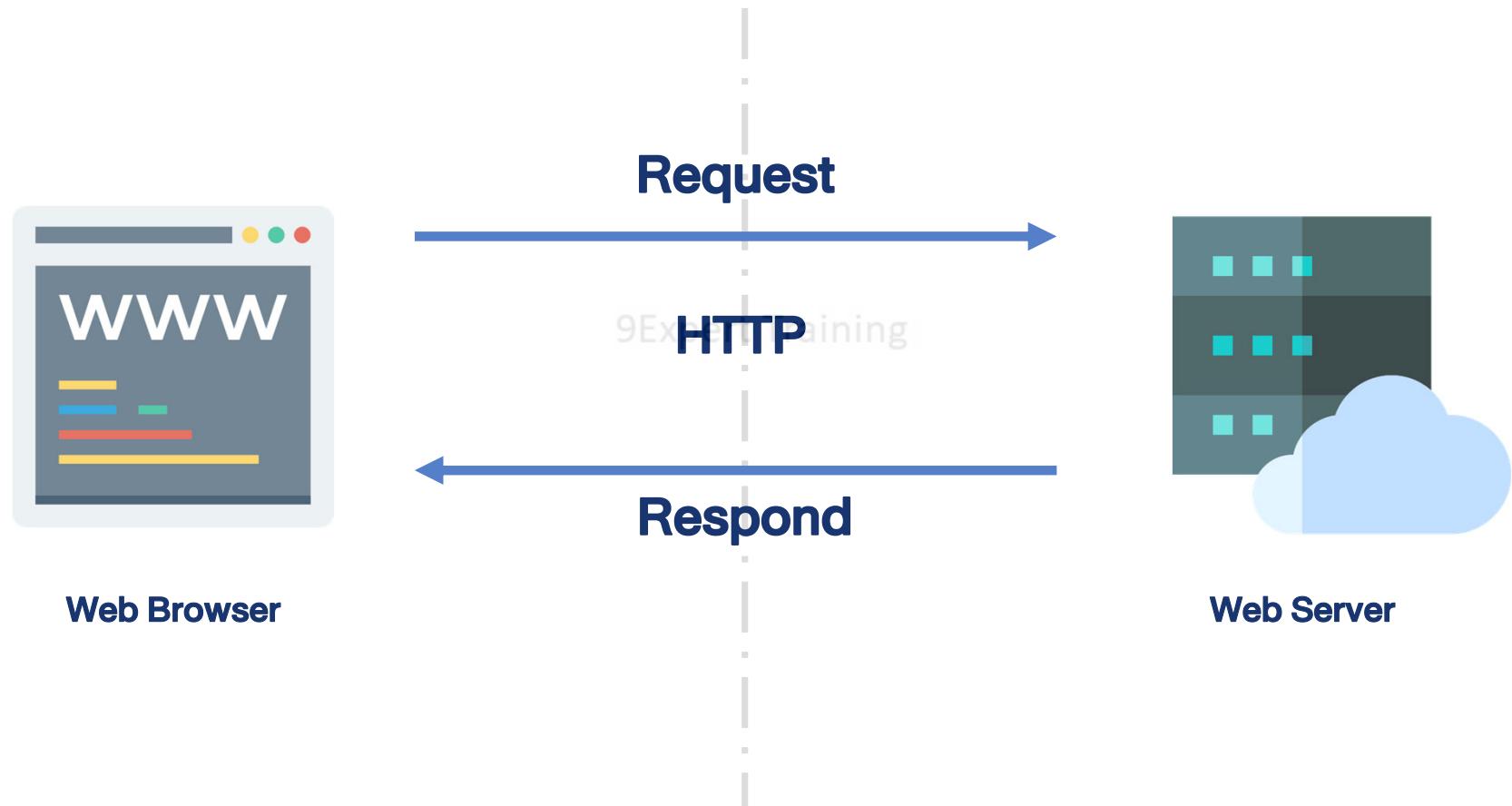


Web scraping is a process of extracting, copying, screening, or collecting data from the web that is suitable for certain requirements.

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- **200 (OK, request succeeded)**
- **404 (Not found; requested resource cannot be found)**
- **500 (Internal server error)**
- **204 (No content to be sent)**
- **401 (Unauthorized request was made to the server)**

```
● ● ●  
1 import requests  
2 url = 'https://google.com/'  
3 response = requests.get(url)  
4 print(response)
```

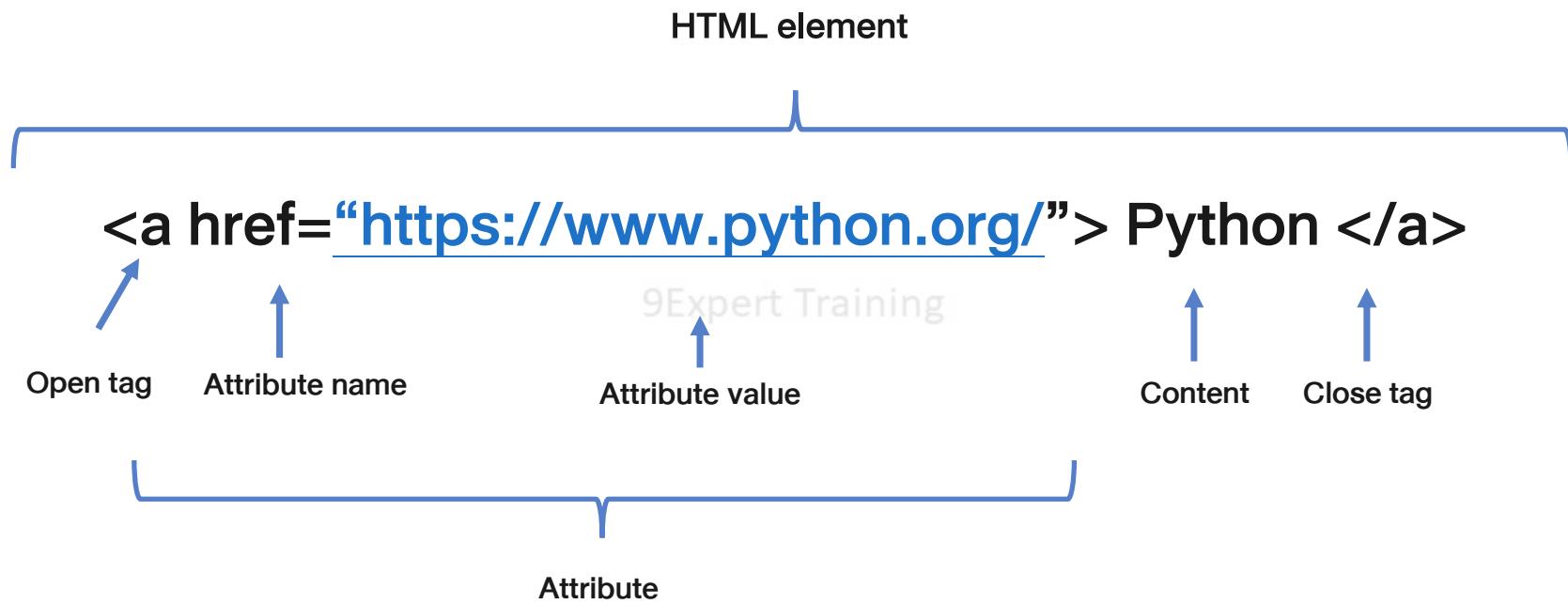
<Response [200]>



Tags	Description
<head> </head>	Defines information about the document
<body> </body>	Defines the document's body
<p> </p>	Defines a paragraph
<h1> </h1>	Defines HTML headings
 	Defines an image
<a> 	Defines a hyperlink
<link> </link>	Defines the relationship between a document and an external resource
<nav> </nav>	Defines navigation links
<div> </div>	Defines a section in a document

Reference: https://www.w3schools.com/tags/ref_byfunc.asp

```
● ● ●  
1 <!DOCTYPE html>  
2 <html>  
3   <head>  
4     <title> My title </title>  
5   </head>9Expert Training  
6   <body>  
7     <h1> My First Heading </h1>  
8     <p> My first paragraph </p>  
9   </body>  
10 </html>  
11
```





```
<article>
```

```
    <h1> This is a headline </h1>
    <p> This is the first paragraph </p>
    <p> This is the second paragraph </p>
    <p> This is the third paragraph </p>
```

```
</article>
```

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- Beautiful Soup
- Selenium
- Scrapy

Beautifulsoup



Scrapy



- <https://www.wongnai.com/robots.txt>
- <https://www.lazada.co.th/robots.txt>
- <https://shopee.co.th/robots.txt>
- <https://www.amazon.com/robots.txt>
- <https://www.netflix.com/th-en/robots.txt>
- <https://www.ebay.com/robots.txt>
- <https://www.google.com/robots.txt>

- <https://quotes.toscrape.com/>
- https://scrapingclub.com/exercise/list_basic/

“The world as we have created it is a process of our thinking. It cannot be changed without changing our thinking.”

by [Albert Einstein](#) (about)

Tags: [change](#) [deep-thoughts](#) [thinking](#) [world](#)

“It is our choices, Harry, that show what we truly are, far more than our abilities.”

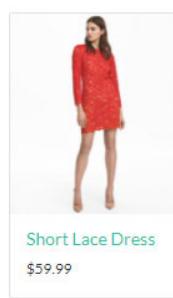
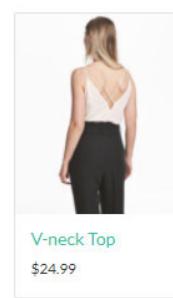
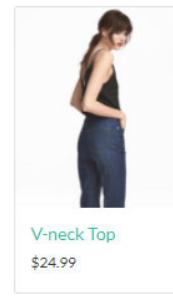
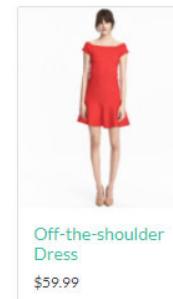
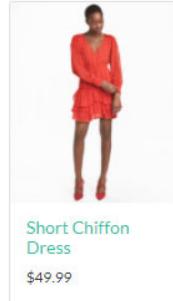
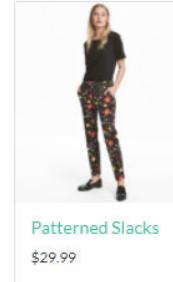
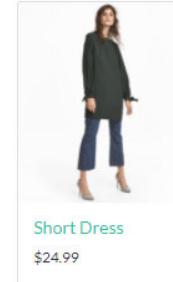
by [J.K. Rowling](#) (about)

Tags: [abilities](#) [choices](#)

“There are only two ways to live your life. One is as though nothing is a miracle. The other is as though everything is a miracle.”

by [Albert Einstein](#) (about)

Tags: [inspirational](#) [life](#) [live](#) [miracle](#) [miracles](#)



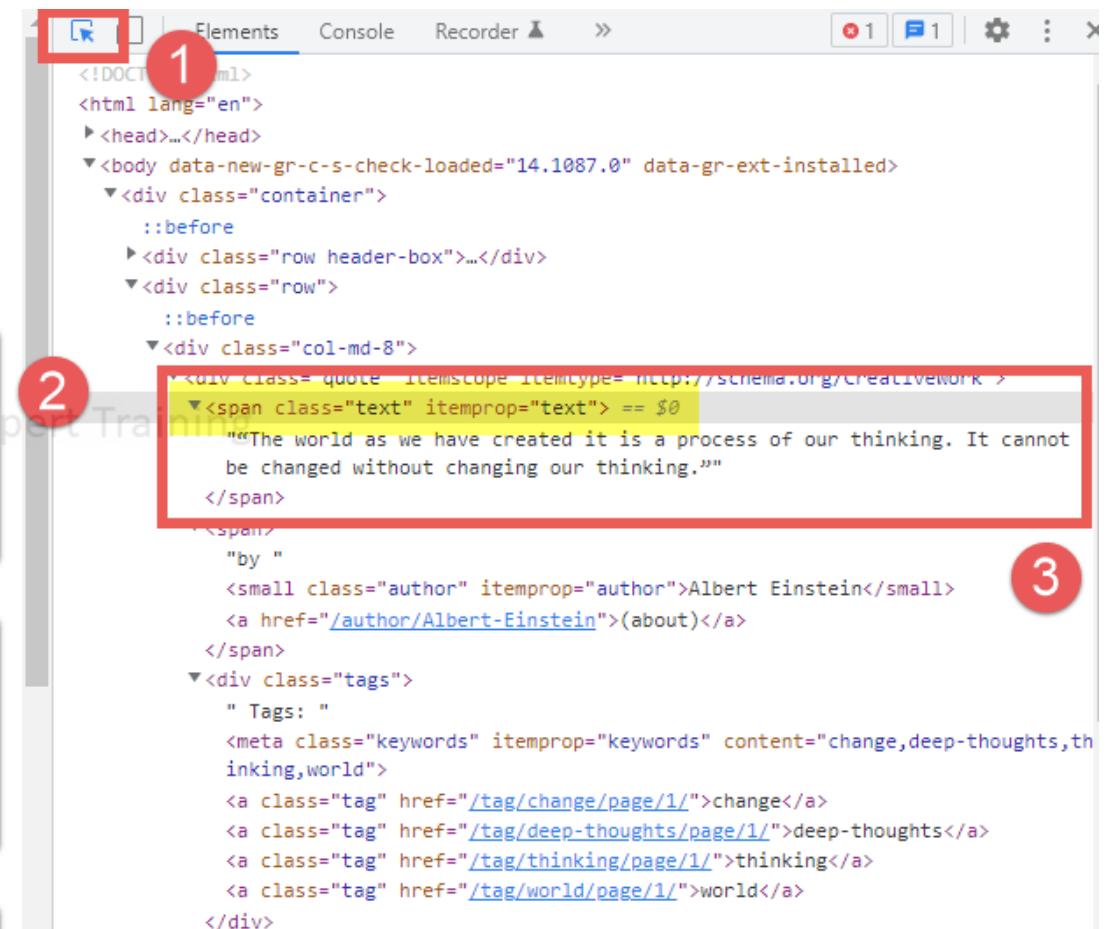
Quotes to Scrape

Login

*"The world as we have created it is a process of our thinking.
It cannot be changed without changing our thinking."*

span.text 485 × 51.41
 Color ■ #333333
 Font 18px sans-serif
 Margin 0px 0px 5px

 ACCESSIBILITY
 Contrast Aa 12.63 ✓
 Name
 Role generic
 Keyboard-focusable ⓘ
 Tags: abilities choices



```

<!DOCTYPE html>
<html lang="en">
  <head>...</head>
  <body data-new-gr-c-s-check-loaded="14.1087.0" data-gr-ext-installed>
    <div class="container">
      <div class="row header-box">...</div>
      <div class="row">
        <div class="col-md-8">
          <div class="quote itemtype="http://schema.org/CreativeWork">
            <span class="text" itemprop="text"> == $0
              "The world as we have created it is a process of our thinking. It cannot
              be changed without changing our thinking."
            </span>
            <span>
              "by "
              <small class="author" itemprop="author">Albert Einstein</small>
              <a href="/author/Albert-Einstein">(about)</a>
            </span>
            <div class="tags">
              " Tags: "
              <meta class="keywords" itemprop="keywords" content="change,deep-thoughts,
              thinking,world">
              <a class="tag" href="/tag/change/page/1/">change</a>
              <a class="tag" href="/tag/deep-thoughts/page/1/">deep-thoughts</a>
              <a class="tag" href="/tag/thinking/page/1/">thinking</a>
              <a class="tag" href="/tag/world/page/1/">world</a>
            </div>
          </div>
        </div>
      </div>
    </div>
  </body>
</html>

```

tag class attribute



```
1 <span class="text" itemprop="text">
2   "The world as we have created it is a process of our thinking.
3   It cannot be changed without changing our thinking."
4 </span>
```

```
● ● ●  
1 <html>  
2   <body>  
3     <a href="/author/Albert-Einstein">(about)</a>  
4     <a class="tag" href="/tag/change/page/1/">change</a>  
5     <a class="tag" href="/tag/deep-thoughts/page/1/">deep-thoughts</a>  
6     <a class="tag" href="/tag/thinking/page/1/">thinking</a>  
7     <a class="tag" href="/tag/world/page/1/">world</a>  
8     <a href="/author/J-K-Rowling">(about)</a>  
9     <a class="tag" href="/tag/abilities/page/1/">abilities</a>  
10    <a class="tag" href="/tag/choices/page/1/">choices</a>  
11  </body>  
12 </html>
```



```
1 tag_a = soup.find('a')
2 print(tag_a)
```

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```
1 <a href="/author/Albert-Einstein">(about)</a>
```



```
1 tag_a = soup.find_all('a')
2 print(tag_a)
```



```
1 [<a href="/author/Albert-Einstein">(about)</a>,
2 <a class="tag" href="/tag/change/page/1/">change</a>,
3 <a class="tag" href="/tag/deep-thoughts/page/1/">deep-thoughts</a>,
4 <a class="tag" href="/tag/thinking/page/1/">thinking</a>,
5 <a class="tag" href="/tag/world/page/1/">world</a>,
6 <a href="/author/J-K-Rowling">(about)</a>,
7 <a class="tag" href="/tag/abilities/page/1/">abilities</a>,
8 <a class="tag" href="/tag/choices/page/1/">choices</a>]
```



```
1 tag_a = soup.find_all('a', class_ = 'tag')
2 print(tag_a)
```

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```
1 [<a class="tag" href="/tag/change/page/1/">change</a>,
2 <a class="tag" href="/tag/deep-thoughts/page/1/">deep-thoughts</a>,
3 <a class="tag" href="/tag/thinking/page/1/">thinking</a>,
4 <a class="tag" href="/tag/world/page/1/">world</a>,
5 <a class="tag" href="/tag/abilities/page/1/">abilities</a>]
```

“The world as we have created it is a process of our thinking. It cannot be changed without changing our thinking.”

by Albert Einstein (about)

Tags: change deep-thoughts thinking world

tag class

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```
1 <span class="text" itemprop="text">
2   “The world as we have created it is a process of our thinking.
3   It cannot be changed without changing our thinking.”
4 </span>
```

```
● ● ●  
1 <span class="text" itemprop="text">  
2   “The world as we have created it is a process of our thinking.  
3   It cannot be changed without changing our thinking.”  
4 </span>
```

.text



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```
● ● ●  
1 quotes = soup.find_all('span', class_ = 'text')  
2 for quote in quotes:  
3   print(quote.text)
```

"The world as we have created it is a process of our thinking. It cannot be changed without changing our thinking."

by [Albert Einstein](#) (about)

Tags: [change](#) [deep-thoughts](#) [thinking](#) [world](#)

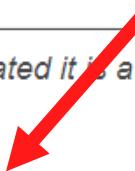


```
1 <small class="author" itemprop="author">
2     Albert Einstein
3 </small>
```

"The world as we have created it is a process of our thinking. It cannot be changed without changing our thinking."

by [Albert Einstein](#) (about)

Tags: [change](#) [deep-thoughts](#) [thinking](#) [world](#)

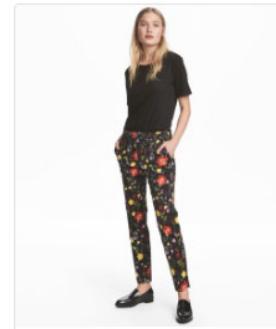


```
1 <div class="tags"> Tags:  
2   <meta class="keywords" itemprop="keywords" content="abilities,choices">  
3   <a class="tag" href="/tag/abilities/page/1/">abilities</a>  
4   <a class="tag" href="/tag/choices/page/1/">choices</a>  
5 </div>
```



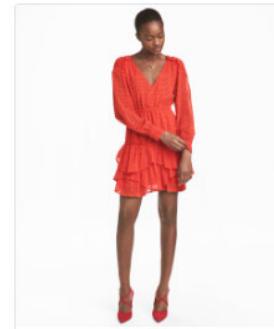
Short Dress

\$24.99



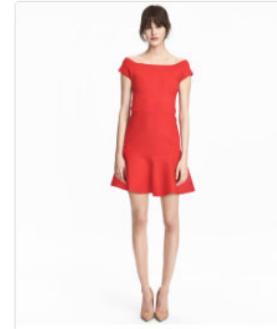
Patterned Slacks

\$29.99



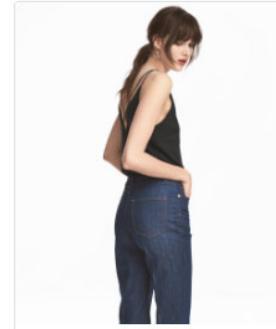
Short Chiffon Dress

\$49.99



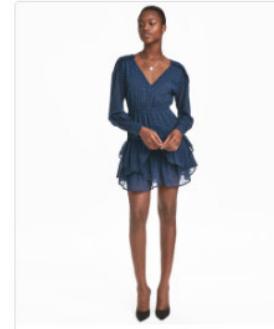
Off-the-shoulder Dress

\$59.99



V-neck Top

\$24.99



Short Chiffon Dress

\$49.99

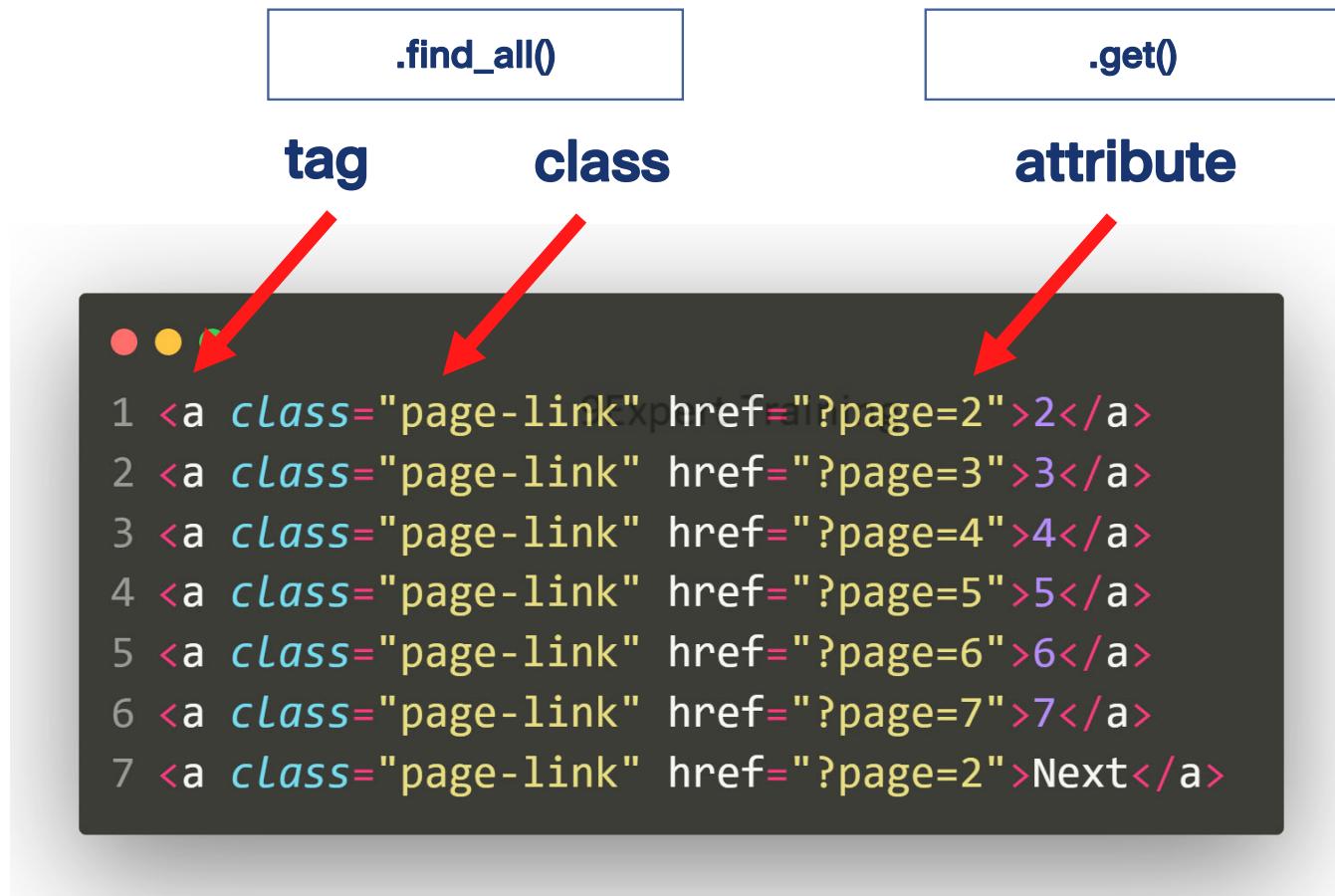


1 2 3 4 5 6 7 Next



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- 1 https://scrapingclub.com/exercise/list_basic/?page=2
- 2 https://scrapingclub.com/exercise/list_basic/?page=3
- 3 https://scrapingclub.com/exercise/list_basic/?page=4
- 4 https://scrapingclub.com/exercise/list_basic/?page=5
- 5 https://scrapingclub.com/exercise/list_basic/?page=6
- 6 https://scrapingclub.com/exercise/list_basic/?page=7





Getting Information from the Web API

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- Gold Price
- Gas Price
- Currency rates
- Bitcoin Price
- Covid19 (Thailand)

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```
1 url = "https://api.chnwt.dev/thai-gold-api/latest"
2 r = requests.get((url))
3 data = r.json()
4 data
```

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	gold	gold_bar
buy	33,150.00	32,650.00
sell	31,957.28	32,550.0





Gas Price



```
1 url = "https://api.chnwt.dev/thai-oil-api/latest"
2 r = requests.get((url))
3 df = pd.read_json(r.text)
4 df
```

No	Gas station
1	ptt
2	bcp
3	shell
4	esso
5	caltex
6	irpc
7	pt
8	susco
9	pure
10	suscodealers

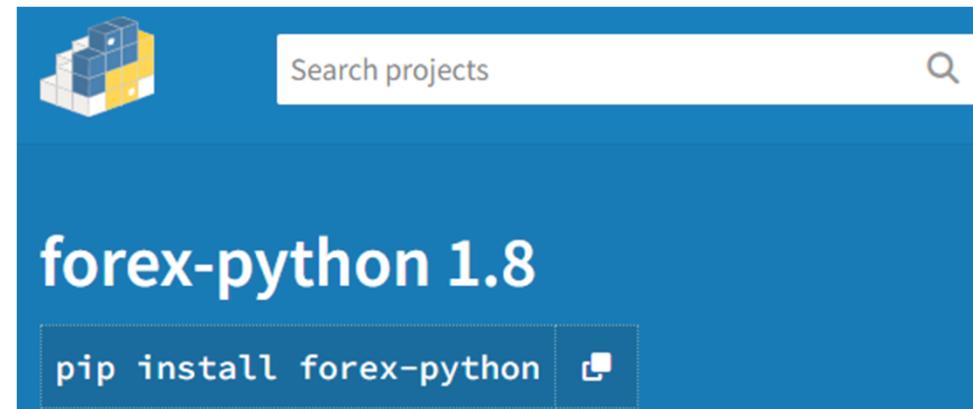
	Name	Price
gasohol_95	แก๊สโซชอล 95	35.65
gasohol_91	แก๊สโซชอล 91	35.38
gasohol_e20	แก๊สโซชอล E20	33.34
diesel	ดีเซล	32.44
diesel_b7	ดีเซล B7	32.44
premium_gasohol_95	แก๊สโซชอล 95 พรีเมี่ยม	46.64
premium_diesel	ดีเซลพรีเมี่ยม	43.16





```
1 from forex_python.converter import CurrencyRates  
2 c = CurrencyRates()  
3 c.get_rates('USD')  
4 c.get_rate('USD', 'THB')  
5 c.convert('USD', 'THB', 10)
```

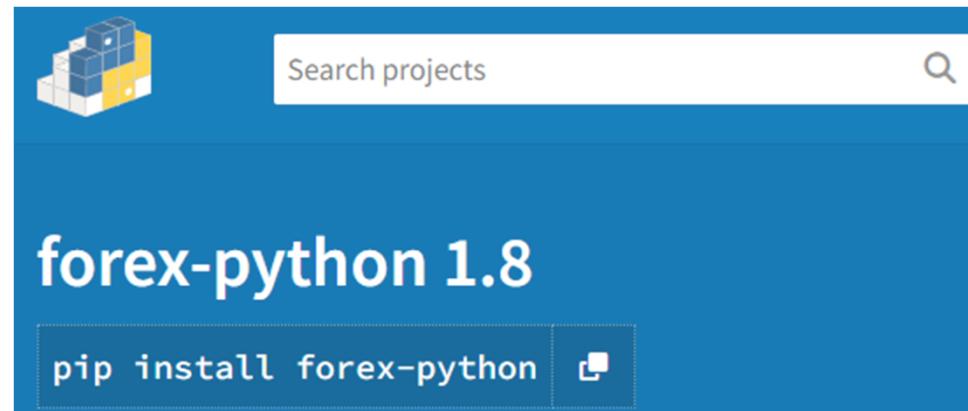
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```
1 from forex_python.bitcoin import BtcConverter
2 b = BtcConverter()
3 b.get_latest_price('THB')
4 b.convert_to_btc(993588.3464, 'THB')
5 b.convert_btc_to_cur(2, 'THB')
```

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```
1 url = 'https://covid19.ddc.moph.go.th/api/Cases/today-cases-by-provinces'
2 r = requests.get(url)
3 data = r.json()
4 data
```

year	weeknum	province	new_case	total_case	new_case	total_case	new_death	total_death	update_date
2023	17	บุรีรัมย์	15	217	15	217	0	3	2023-05-01 07:37:15
2023	17	ปัตตานี	2	6	2	6	0	1	2023-05-01 07:37:15
2023	17	อ่างทอง	3	31	3	31	0	5	2023-05-01 07:37:15
2023	17	สตูล	1	3	1	3	0	0	2023-05-01 07:37:15
2023	17	สิงห์บุรี	2	30	2	30	0	4	2023-05-01 07:37:15
2023	17	บึงกาฬ	0	4	0	4	0	0	2023-05-01 07:37:15
2023	17	หนองคาย	2	26	2	26	0	0	2023-05-01 07:37:15
2023	17	สมุทรสาคร	30	68	30	68	0	4	2023-05-01 07:37:15
2023	17	芭堤雅	112	368	112	368	1	4	2023-05-01 07:37:15
2023	17	นครศรีธรรมราช	27	106	27	106	0	7	2023-05-01 07:37:15
2023	17	นราธิวาส	8	12	8	12	0	0	2023-05-01 07:37:15



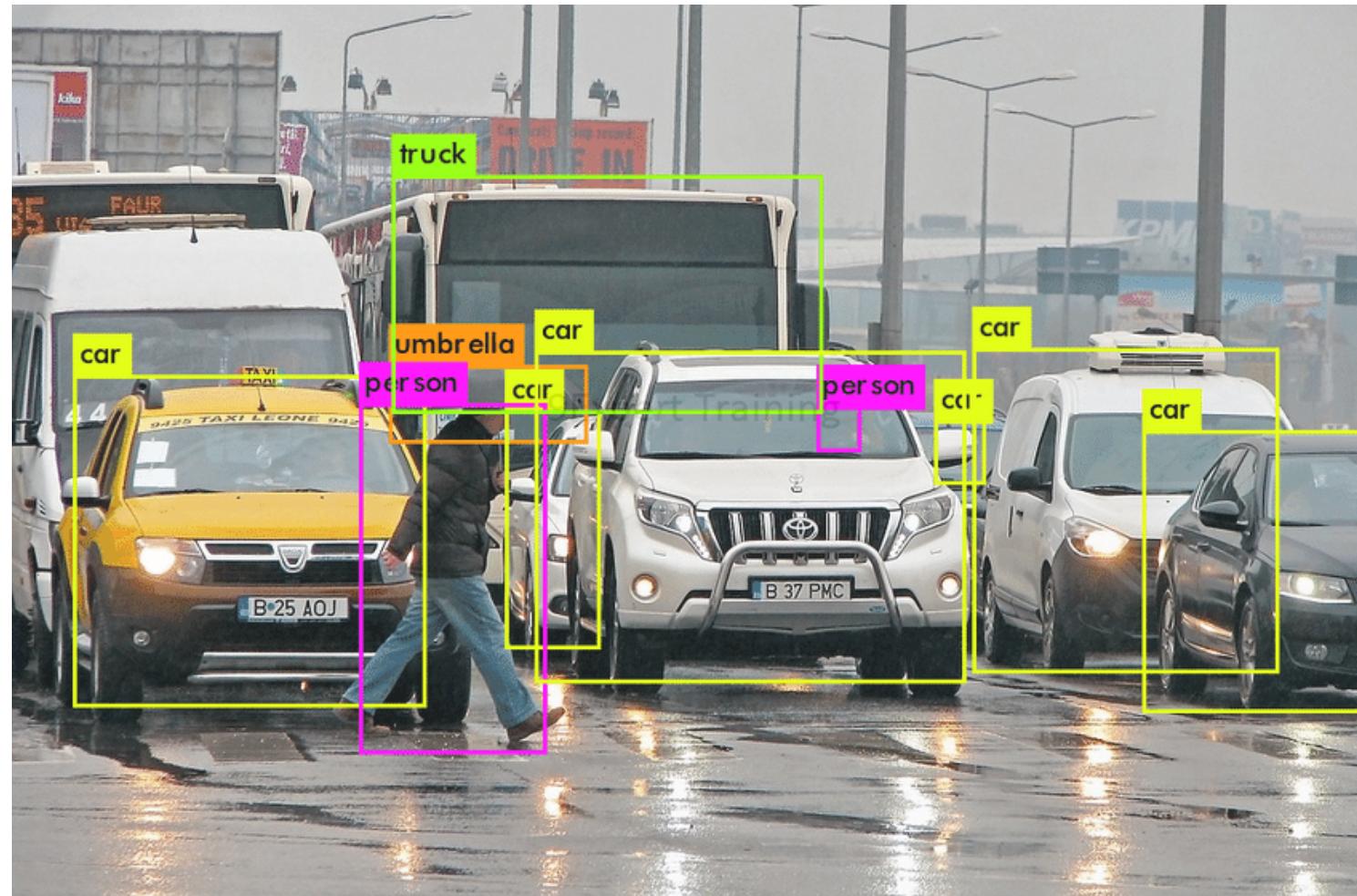
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ANY QUESTIONS?

“ หากมีคำถามสามารถสอบถามได้ ”



Classroom

ใช้สำหรับที่ห้องอบรมที่ 9Expert เก่าบ้าน



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Inhouse

ใช้สำหรับที่ห้องอบรม Inhouse ของผู้อบรม
เก่าบ้าน



Virtual Training

ใช้สำหรับการอบรมผ่าน Microsoft
Teams กับ Public และ Inhouse



หมายเหตุ : กรณีผู้อบรมมาอบรมในรูปแบบ Hybrid ถ้าเป็นผู้อบรมที่ห้องอบรม หรือ Classroom ให้ทำการสแกนที่ แบบประเมินสำหรับการอบรม Classroom แต่ถ้าผู้อบรมที่อยู่ใน Microsoft Teams ให้สแกนที่ แบบประเมินสำหรับการอบรม Virtual Training



รับของที่ระลึก Sticker LINE

1



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โค้ดได้รางวัล Scan เลย >>



4

เลือกรับรางวัลเป็น Sticker LINE 1 ชุด



Ver.1



Ver.2



Ver.3



Ver.4



Ver.5



Ver.6 Together we can!



Ver.7 I'm DBA Expert



Ver.8 Practical Training





Thank You



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