



程式設計概論 PROGRAMMING 101

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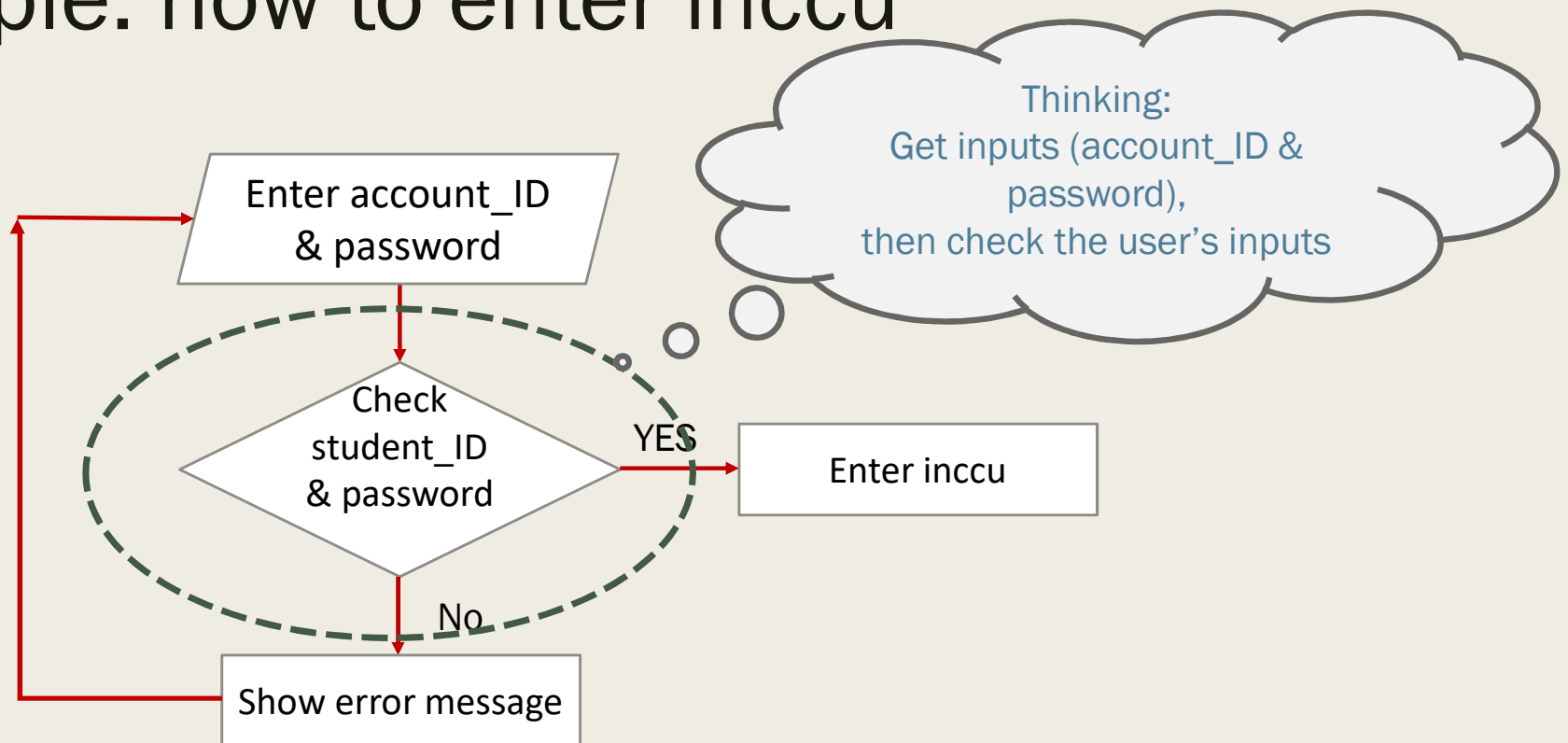
Outline

- Objective
- About this course
- Content
 - *About Python*
- Grading
- Teaching Assistant (TA)
- About this field
- Grouping
- Q & A

Objective

- 邏輯的訓練
 - 運算思維
 - 邏輯推理
- 資訊化的時代需兼具的資訊能力
- 具備分析資料的能力
- 提供多元化的發展
- 具備跨領域的能力

Example: how to enter inccu



This course

- 課堂練習題(exercises)
- 回家作業(HW)
- 隨堂測驗(quizzes)
- 期中考
- 分組討論 (group discussion)
- 期末報告 (group project)
- Textbook: Starting Out With Python, Second Edition

Origin of Python

- The founder of Python is Guido van Rossum (吉多·范羅蘇姆, born 31 January 1956)
- Van Rossum received a master's degree in mathematics and computer science from the University of Amsterdam in 1982
- During the Christmas season of 1989, Van Rossum, in order to pass the time, decided to develop a new scripting language interpreter.
- Van Rossum remains the primary developer of Python.
- His goal is “Computer Programming for everyone”
- Python 2.0 was released on Oct. 16, 2000.
- Python 3.0 was released on Dec. 3, 2008.
- Now, Python 3.12.5: the release date is Aug. 8, 2024



Python

- Easy to learn
 - Powerful
 - Interpreter language
 - Cross-platform
 - Free and open source
 - Portability(可移植性)
 - Embeddability(可嵌入性)
 - ...
- **Various modules**
 - Artificial Intelligence (AI)
 - Data science
 - Machine learning/deep learning
 - Web crawler
 - Big data
 - Object-oriented programming (OOP)
 -



Cross-platform (作業系統的平台)

- *Windows 11/10/ 7*
- *Apple MacOS*
- *Linux*
 - Red hat
 - Ubuntu
 - CentOS
 - ...
- ...

Python執行環境架構示意圖



What is a library?(函式庫or程式庫)

- Library (函式庫): provide some functions and classes for programmers
- Python Library (函式庫是模組和套件的統稱)
 - Built-in function (內建函式): 安裝Python時一併安裝的 functions , **啟動python開發環境便可使用**
 - Built-in Modules (or standard library): 安裝Python時一併安裝的模組與套件 , **但使用時必須先進行匯入的動作**
 - External library(外部函式庫): 需安裝的模組和套件 , 再匯入才能使用 , 又稱第三方函式庫 , 網路上針對不同用途所推出的外部函式庫

常見第三方函式庫

- numpy: 矩陣與資料運算，線性代數、傅立葉轉換
- matplotlib: 2D 視覺化工具
- scipy: 科學計算，最佳化與求解、矩陣運算、傅立葉轉換
- pandas: 資料處理及分析
- flask: web框架，開發網站
- tkinter, PyQt: Graphical user interface(GUI)程式開發
- pygame: 多媒體與遊戲軟體開發
- requests: 存取網際網路資料
- BeautifulSoup: 網路爬蟲
- scikit-learn, tensorflow, keras, pytorch: 機器學習與深度學習

How to write and run our python programs?

1. Colaboratory (簡稱Colab): need google account
2. Install Python and applications (Jupyter notebook or Pycharm)
 1. Install python (<https://www.python.org/>)
 2. Install applications

Google Colab：雲端的開發平台

Colaboratory 簡稱Colab，是由 Google 所提供，一個支援Python的雲端開發平台，主要目的是想要幫助人工智慧、機器學習和資訊教育的推廣。

- ． 開發者不需下載、不需安裝，只需要瀏覽器就可以運作，完全免費。
- ． 在Colab 中撰寫的程式碼預設是儲存在使用者的Google 雲端硬碟中，執行時由虛擬機器提供強大的運算能力，不會用到本機的資源，而且還提供免費的GPU。
- ． Colab 預設安裝了一些機器學習時常用的模組，像是TensorFlow、scikit-learn、pandas 等，讓你可以直接使用！

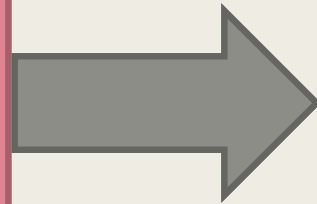


How to write Python programs?(2 steps)

Step 1:

Install Python from the
Website (3.12.5)

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



Step 2:

Install Python
environment system



Teacher: The quickest way to learn a language
is to speak with natives
Me trying to learn Python:



- Jupyter Notebook(install anaconda)
- Pycharm community
- Visual studio code (VS code)

Grading

- Course participation: 30%
 - *Exercises in class*
 - *Quizzes in class*
 - *Discussion in class*
- Homework: 20%
- Midterm : 30%
- Final project : 20%

Contact

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分組說明

- 每組3-4人
- 加退選結束後進行分組
 - 自行分組、協助分組

Course in progress

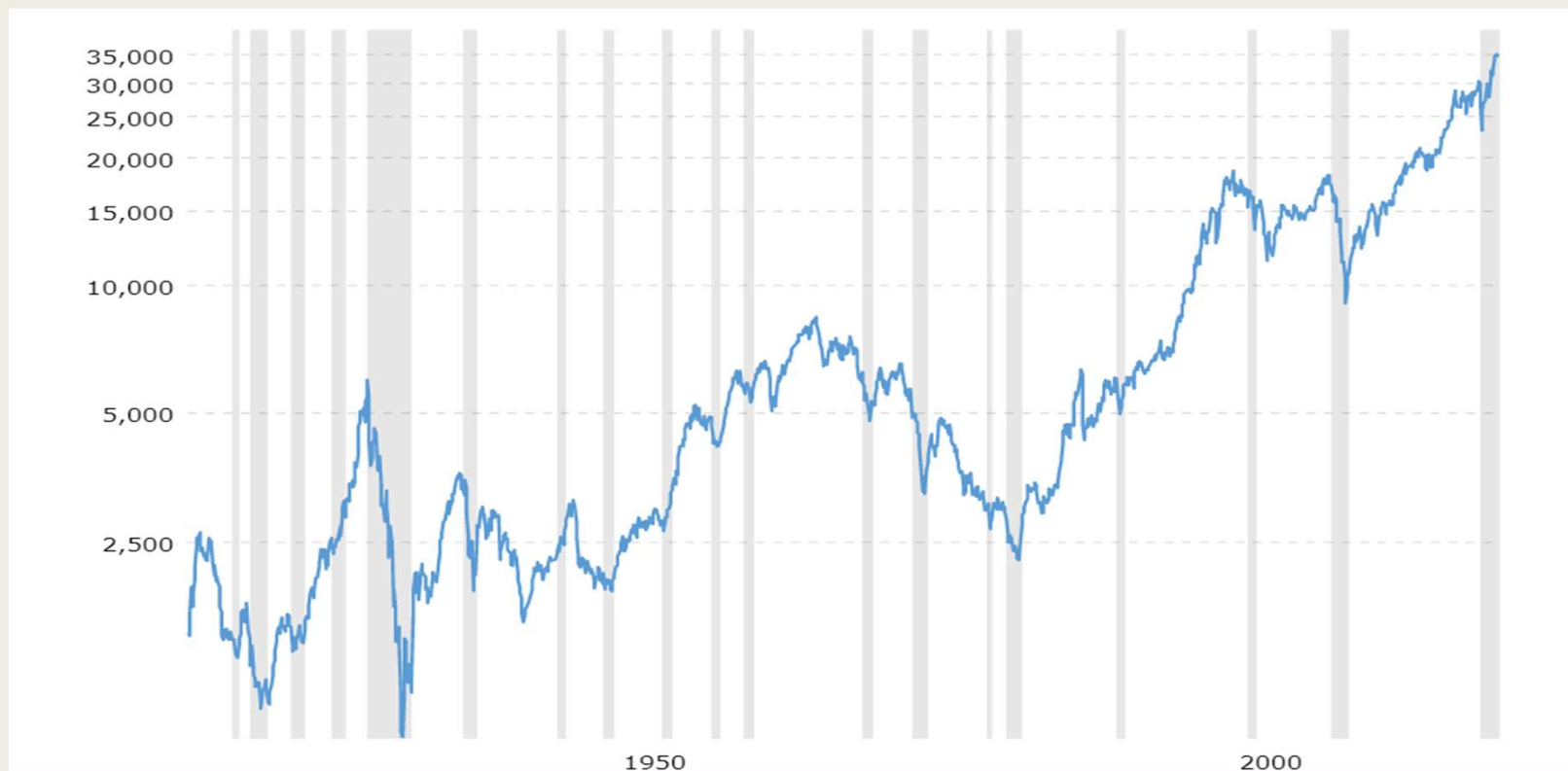
- Do exercises every week
- Results of Group discussion
- Upload Python programs or results

ABOUT THE FUTURE

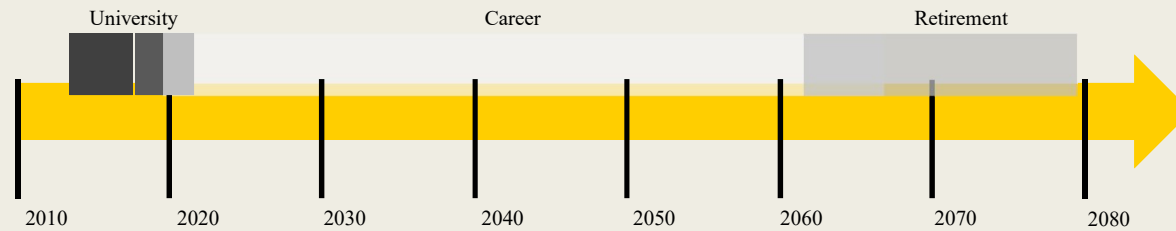


Dow Jones Index – 100 Year Chart

What does the history tell us?

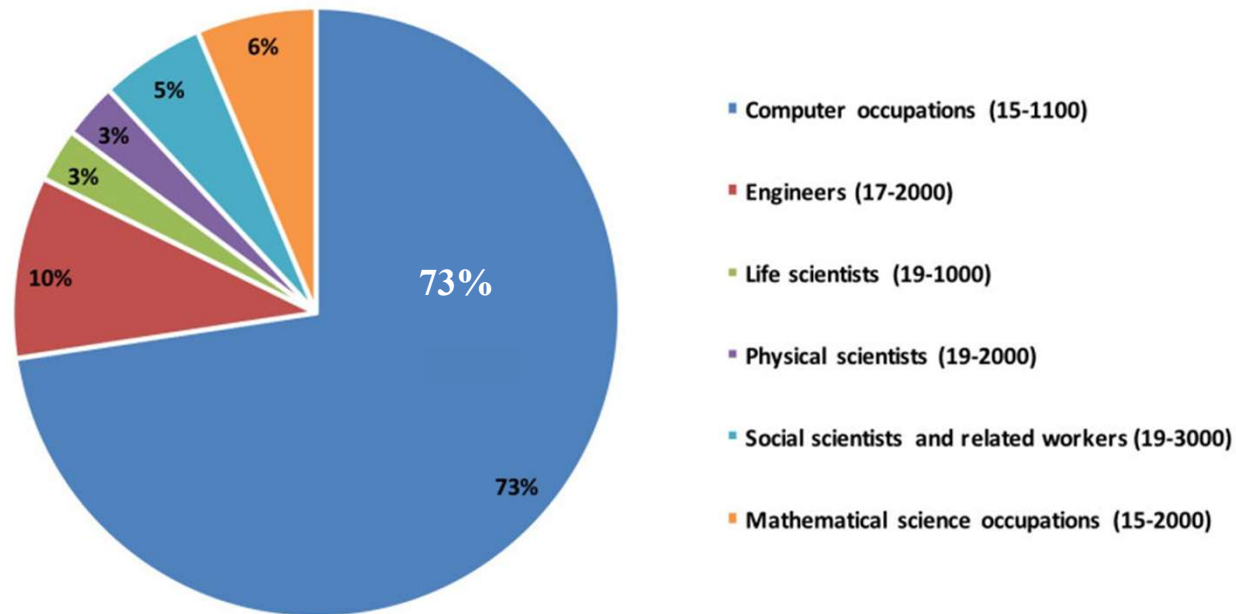


Role of Education = Prepare Students for the Future



Where the Jobs Are (USA)

Job Growth, 2014-24 - U.S. Bureau of Labor Statistics



Data from the spreadsheet at <http://www.bls.gov/emp/ind-occ-matrix/occupation.xlsx>

Market Cap (USA)

2001 Market Cap

1. General Electric
2. Microsoft
3. Exxon Mobile
4. Wal-Mart
5. Citigroup



2021 Market Cap

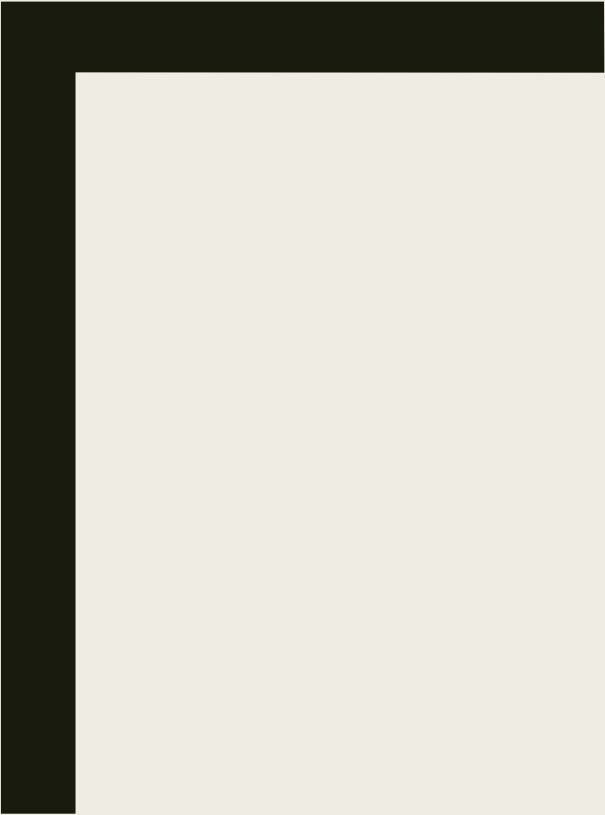
1. Apple
2. Alphabet, Inc.
3. Microsoft
4. Amazon
5. Tesla

ABOUT TA



Review

- Textbook Chapter1



Q & A