

# 102-1 生物資訊程式設計

## Bioinformatics Programming

### 2013

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# 生物資訊程式設計 2013

2

- 學分數：2
- 時間：週二, 週四, 上午10~12 下午 2~4
- 地點：圖資大樓401
- 授課系級：生物醫學資訊所
- 授課教師：黃宣誠(下午)、鍾翊方(上午)
- 課程內容：主要為 R, Python 與 Perl 程式語言及生物資訊分析程式實作
- 選修要求：具備初級程式設計能力及基本生物資訊知識，建議曾修習過程式設計及生物資訊相關課程的學生選修
- 助教資訊：(Python) 陳卓逸、(Perl) 許家郎

# Python Tutorials

Python 程式語言教學  
請參考去年課程內容

<http://u.csie.org/BioProg2012>

官方教學文件

<http://docs.python.org/2/tutorial/>

Python Quick Reference Card

<http://perso.limsi.fr/pointal/python:pqrc> (Python 2.4)

<http://rgruet.free.fr/PQR27/PQR2.7.html> (Python 2.7)

**Bioinformatics Programming 2012**  
課程內容 | 作業範例 | 作業上傳 | 聯絡助教

WHAT'S NEW

- 新增各組上傳的 Final Project 報告投影片於作業範例區，歡迎互相觀摩 --- 2012/08/08
- Poll results: Top languages for analytics/data mining programming --- 2012/08/02
- 今天的課程因颱風假取消，下星期二下午依原訂進度進行期末報告 --- 2012/08/02
- 新增 7/31 上課投影片 --- 2012/07/30
- 新增 7/26 上課投影片 --- 2012/07/26
- 新增 7/24 上課投影片 --- 2012/07/24
- 新增 hw4 測資 <hw4.9606.tsv> 於作業範例區 --- 2012/07/21
- 更新 hw4 FAQ --- 2012/07/21
- 新增 7/19 上課投影片 --- 2012/07/19
- 下次上課將回到 R401 電腦教室 --- 2012/07/17
- hw4 繳交期限延到下週二(7/24)早上9:00 --- 2012/07/17
- 新增 7/17 上課投影片 --- 2012/07/17
- 更新 hw3 FAQ --- 2012/07/15
- 新增 hw2, hw3, hw4 FAQ --- 2012/07/14
- 新增 7/12 上課投影片 --- 2012/07/12
- 新增 7/10 上課投影片 --- 2012/07/10

The first class is scheduled for Tuesday July 10th at 2pm. --- 2012/07/10

FAQ

Homework 2

Q: 真的有可能只用一行程式碼就完成作業二嗎?

A: 千真萬確。基於美觀與排版需要，可以使用反斜線(backslash)作為行接續(see PEP 8 -- Style Guide for Python Code)，但不得使用分號(semicolon)連接多個敘述(statements)。另外，直接將表格寫在程式碼中直接印出也是不被允許的。 --- 2012/07/14

Homework 3

Q: 名次相同的選手，其姓名的 lexical order 是以 LastName 為主還是以 FirstName 為主?

A: 名次相同的選手其姓名的 lexical order 自然是依照 output format 的順序: LastName, FirstName, and so on. 也就是先依 LastName 再

<http://u.csie.org/BioProg2012>

Enthought Canopy

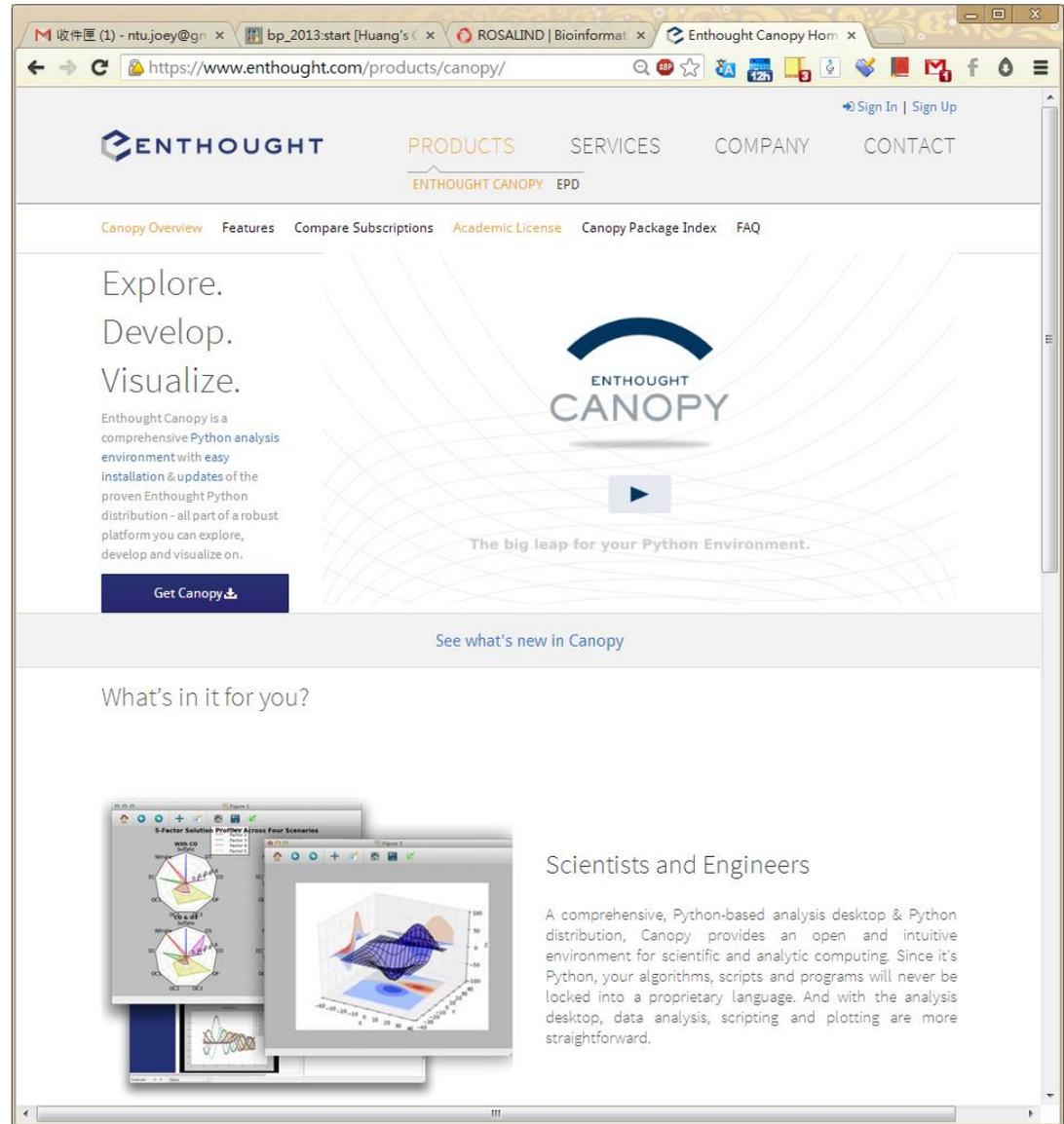
Install Python analysis environment

# Enthought Canopy

Enthought Canopy is a comprehensive Python analysis environment

It includes a Python distribution with **over 100 packages** to install

The analysis environment features an **editor, package manager, and document browser**



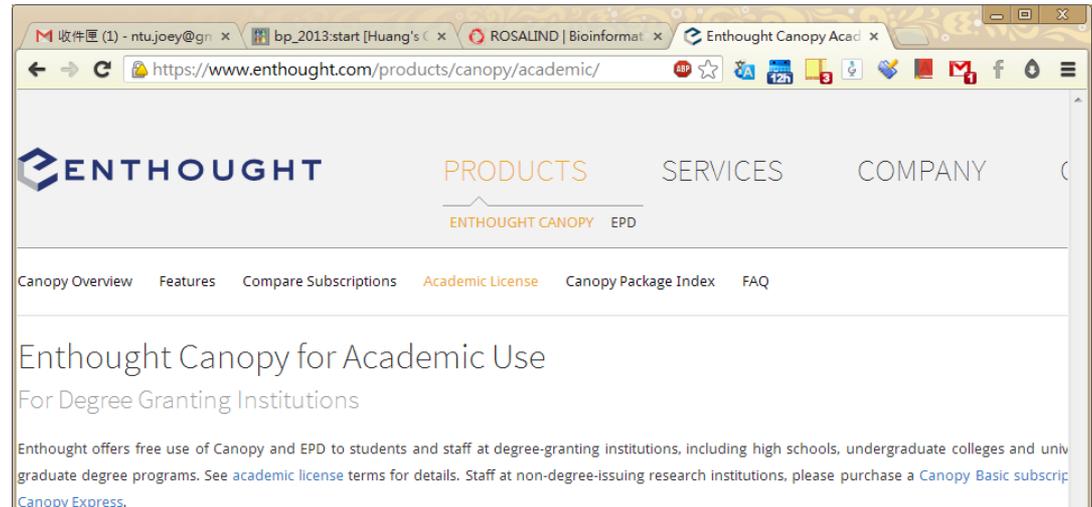
The screenshot shows the Enthought Canopy website in a browser window. The browser tabs include 'ntu.joey@gm', 'bp\_2013:start [Huang's C', 'ROSALIND | Bioinformat', and 'Enthought Canopy Hom'. The address bar shows 'https://www.enthought.com/products/canopy/'. The website header has the Enthought logo and navigation links for 'PRODUCTS', 'SERVICES', 'COMPANY', and 'CONTACT'. Below the header, there are sub-links for 'ENTHOUGHT CANOPY' and 'EPD'. A secondary navigation bar includes 'Canopy Overview', 'Features', 'Compare Subscriptions', 'Academic License', 'Canopy Package Index', and 'FAQ'. The main content area features the text 'Explore. Develop. Visualize.' and the Enthought Canopy logo with a play button. Below this is a 'Get Canopy' button and a link to 'See what's new in Canopy'. The section 'What's in it for you?' displays several software interface windows, including one titled '5-Factor Solution Priorities Across Four Scenarios' and another showing a 3D surface plot. To the right of these images is the text 'Scientists and Engineers' and a paragraph describing Canopy as a comprehensive Python-based analysis desktop.

# Request your Academic License

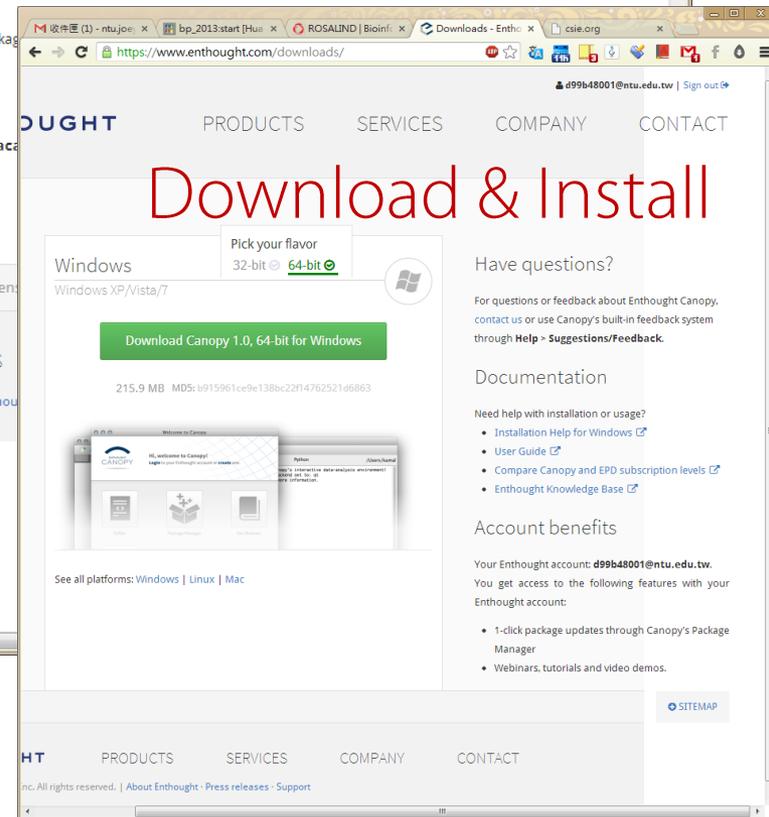
Students at Degree-Granting Institutions can get an academic License with their **edu** email address

If you don't have one, try Canopy Express instead

Select your platform & start the download



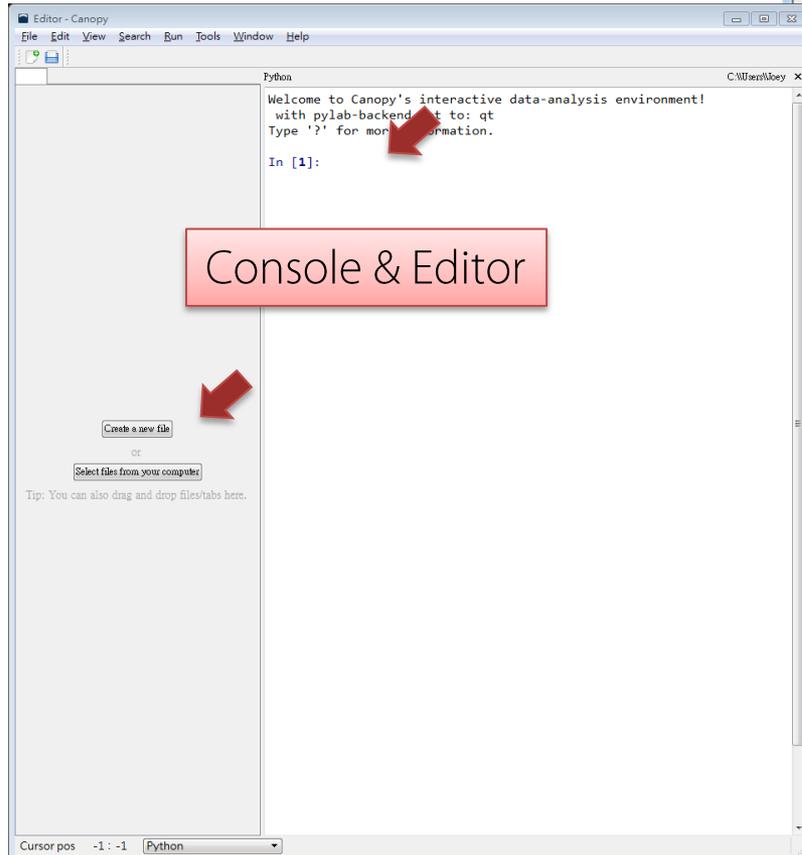
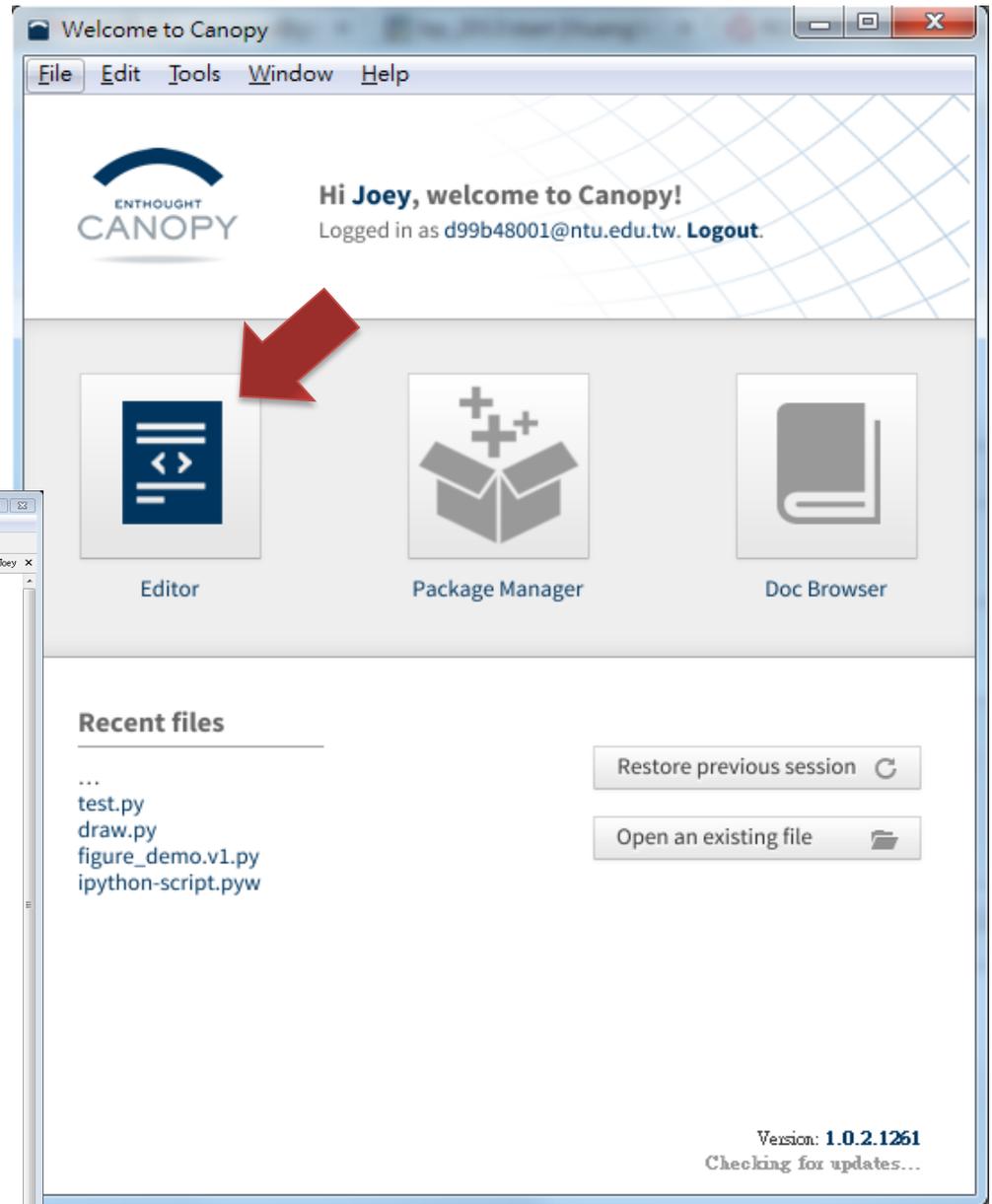
The screenshot shows the Enthought website's 'Academic License' page. The URL is <https://www.enthought.com/products/canopy/academic/>. The page title is 'Enthought Canopy for Academic Use For Degree Granting Institutions'. It explains that Enthought offers free use of Canopy and EPD to students and staff at degree-granting institutions. A green button labeled 'Request your Academic License' is highlighted with a yellow box and a red arrow pointing to it.



The screenshot shows the Enthought website's 'Download & Install' page. The URL is <https://www.enthought.com/downloads/>. The page title is 'Download & Install'. It offers two flavors: 32-bit and 64-bit. A green button labeled 'Download Canopy 1.0, 64-bit for Windows' is visible. The page also includes a 'Have questions?' section with links to 'Installation Help for Windows', 'User Guide', 'Compare Canopy and EPD subscription levels', and 'Enthought Knowledge Base'. The footer includes 'HT PRODUCTS SERVICES COMPANY CONTACT' and 'nc. All rights reserved. | About Enthought | Press releases - Support'.

# Start Canopy

Happy Programming!



Console & Editor

ROSALIND

# Online-judgment system

# Couse Website

Now you can access our course website & start to solve the problem list

## WARNING

**Do not** click on “**Leave**” button unless you are REALLY sure about dropping the course!



The screenshot shows a web browser window with the URL [rosalind.info/classes/68/](http://rosalind.info/classes/68/). The page features the Rosalind logo and the course title "Bioinformatics Programming 2013". A red hand icon with a stop sign is overlaid on the "Leave" button, with a red arrow pointing to it. Below the title, there are buttons for "Print all problems", "Announcements", "All classes", and "Leave". The course is by Hsuan-Cheng Huang at National Yang-Ming University. A list of course details is provided, including credit hours, schedule, location, and instructor. A "What's New" section states that the first class is on Tuesday, July 16th. A table lists the course topics, XP, cost, due dates, and solution availability.

Num	Title	XP	Cost	Due Date	Questions	Solutions
1	Installing Python	0	1	七月 17, 2013	🗨	
2	Variables and Some Arithmetic	0	1	七月 17, 2013	🗨	
3	Strings and Lists	0	1	七月 17, 2013	🗨	
4	Conditions and Loops	0	1	七月 17, 2013	🗨	
5	Working with Files	0	1	七月 17, 2013	🗨	
6	Dictionaries	0	1	七月 17, 2013	🗨	
7	Counting DNA Nucleotides	0	1	七月 18, 2013	🗨	
8	Transcribing DNA into RNA	0	1	七月 19, 2013	🗨	

# Exercise 1: Installing Python

Read the background  
knowledge & the  
problem information



The screenshot shows a web browser window with the URL `rosalind.info/problems/ini1/?class=68`. The page title is "Installing Python" and the subtitle is "Problem 1 @ Bioinformatics Programming 2013". The page is dated "十二月 8, 2012, 2:42 a.m. by Rosalind Team" and has topics "Introductory Exercises, Programming". A red arrow points to the "Why Python?" section, which is currently collapsed. The text in this section explains that Rosalind problems can be solved using any programming language, but Python is chosen for its simplicity and power. It instructs users to download and install Python 2.x (not 3.x) and to launch IDLE. A code block shows `>>>` in a terminal window. The text continues to explain that the three arrows indicate interactive mode and that users should type `1+1` to see the result. It also instructs users to write a program with `print "Hello, World!"` and to save it as `hello.py`. Finally, it tells users to run the program by selecting `Run -> Run Module`.

ROSALIND

## Installing Python

### Problem 1 @ Bioinformatics Programming 2013

十二月 8, 2012, 2:42 a.m. by Rosalind Team Topics: Introductory Exercises, Programming

**Why Python?** click to collapse

Rosalind problems can be solved using any programming language. Our language of choice is **Python**. Why? Because it's simple, powerful, and even funny. You'll see what we mean.

If you don't already have **Python** software, please [download and install the appropriate version for your platform](#) (Windows, Linux or Mac OS X). Please install **Python** of version 2.x (not 3.x) — it has more libraries support and many well-written guides.

After completing installation, launch **IDLE** (default **Python** development environment; it's usually installed with **Python**, however you may need to install it separately on Linux).

You'll see a window containing three arrows, like so:

```
>>>
```

The three arrows are **Python's** way of saying that it is ready to serve you every need. You are in interactive mode, meaning that any command you type will run immediately. Try typing `1+1` and see what happens.

Of course, to become a Rosalind pro, you will need to write programs having more than one line. So select **File** → **New Window** from the **IDLE** menu. You can now type code as you would into a text editor. For example, type the following:

```
print "Hello, World!"
```

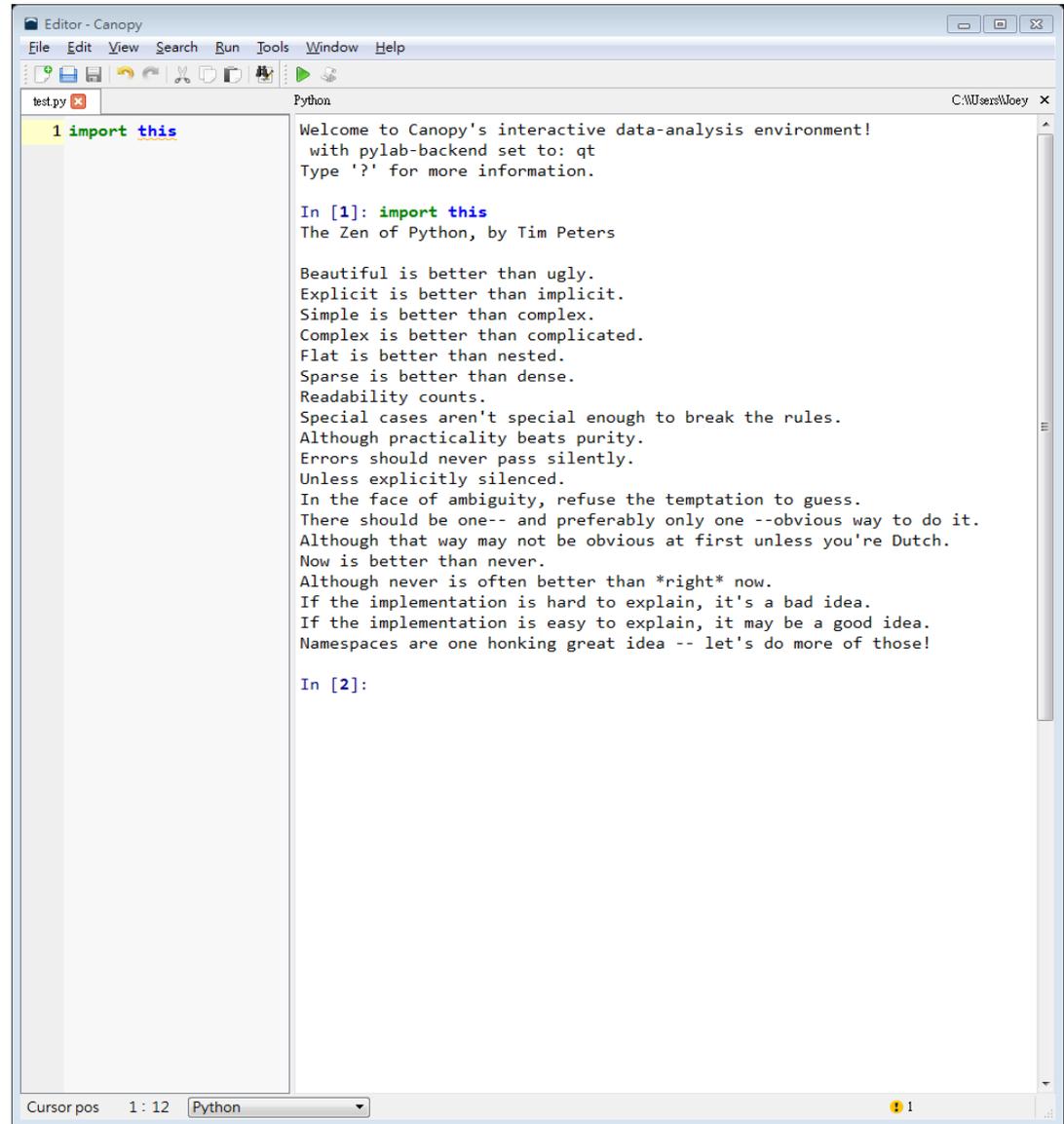
Select **File** → **Save** to save your creation with an appropriate name (e.g., `hello.py`).

To run your program, select **Run** → **Run Module**. You'll see the result in the interactive mode window (**Python Shell**).

Congratulations! You just ran your first program in **Python**!

# Start Programming

Start up your Canopy  
and have fun



The screenshot shows the Canopy Python IDE interface. The top menu bar includes File, Edit, View, Search, Run, Tools, Window, and Help. Below the menu is a toolbar with icons for file operations and execution. The main window is split into two panes. The left pane is a code editor with a single line of code: `1 import this`. The right pane is an interactive console showing the output of the code execution. The output includes a welcome message, the Zen of Python, and the start of a second code block.

```
Python
Welcome to Canopy's interactive data-analysis environment!
  with pylab-backend set to: qt
Type '?' for more information.

In [1]: import this
The Zen of Python, by Tim Peters

Beautiful is better than ugly.
Explicit is better than implicit.
Simple is better than complex.
Complex is better than complicated.
Flat is better than nested.
Sparse is better than dense.
Readability counts.
Special cases aren't special enough to break the rules.
Although practicality beats purity.
Errors should never pass silently.
Unless explicitly silenced.
In the face of ambiguity, refuse the temptation to guess.
There should be one-- and preferably only one --obvious way to do it.
Although that way may not be obvious at first unless you're Dutch.
Now is better than never.
Although never is often better than *right* now.
If the implementation is hard to explain, it's a bad idea.
If the implementation is easy to explain, it may be a good idea.
Namespaces are one honking great idea -- let's do more of those!

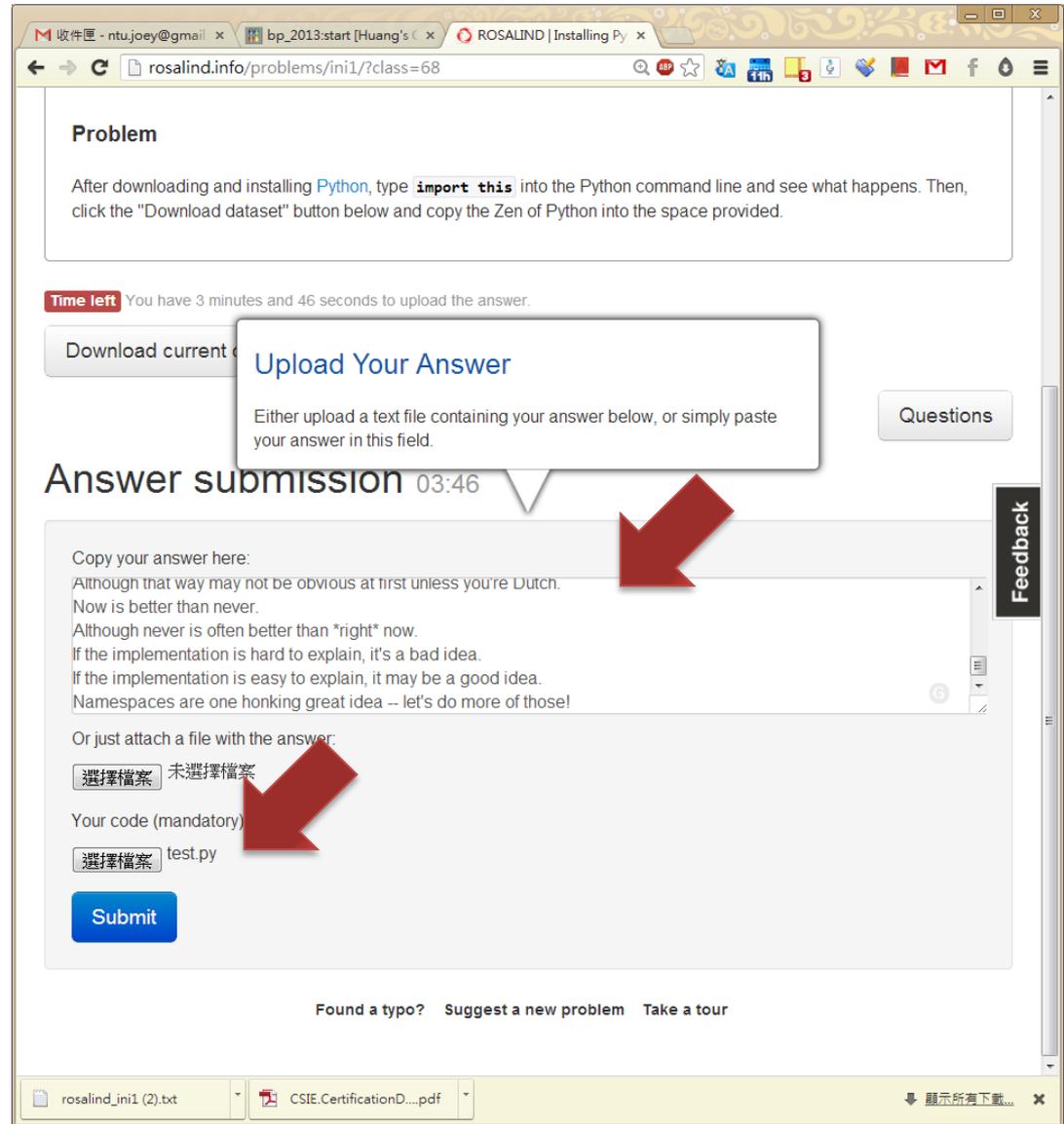
In [2]:
```

Cursor pos 1 : 12 Python 1

# Submit your answer

You may also ask a question by clicking on the **“Questions”** button

Finally, download the problem dataset and submit your **answer output & source code**



# Judgments

You may see the judgment results after a while

If you don't get admitted, just try again later

ROSA LIND

## Installing Python

### Problem 1 @ Bioinformatics Programming 2013

十二月 8, 2012, 2:42 a.m. by Rosalind Team Topics: [Introductory Exercises](#), [Programming](#)

**Why Python?** click to expand

**Problem**

After downloading and installing [Python](#), type `import this` into the Python command line and see what happens. Then, click the "Download dataset" button below and copy the Zen of Python into the space provided.

**Please wait** You may make another attempt in 32 seconds.

**Congratulations** You solved this problem (attempt #2).

[Questions](#) [Solutions](#) [Explanation](#)

### Attempts

#	Begin Time	Submit Time	Result	Dataset	Submission	Code
1	七月 6, 2013, 10:21 p.m.	—	Time out	⊕	—	—
2	七月 7, 2013, 1:13 a.m.	七月 7, 2013, 1:14 a.m.	Correct	⊕	⊕	⊕

[Found a typo?](#) [Suggest a new problem](#) [Take a tour](#)

rosalind\_ini1 (2).txt CSIE.CertificationD...pdf 顯示所有下載...

# Updated Status

You've earned a XP point

Go on & challenge next one!



ROSALIND

## Bioinformatics Programming 2013 solved 1 of 9

Print all problems Announcements All classes Leave

by Hsuan-Cheng Huang at National Yang-Ming University

- 學分數：2
- 時 間：週二, 週四, 上午1012 下午 24
- 地 點：圖資大樓401
- 授課系級：生物醫學資訊所
- 授課教師：黃宣誠(下午)、鍾翊方(上午)
- 課程內容：主要為 R, Python 與 Perl 程式語言及生物資訊分析程式實作
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- 助教資訊：(Python) 陳卓逸 ntu.joey@gmail.com (Perl) 許家郎 aumyle@gmail.com

**What's New**

The first class is scheduled for Tuesday July 16th.

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6	Dictionaries	0	1	七月 17, 2013	🗨	
7	Counting DNA Nucleotides	0	1	七月 18, 2013	🗨	
	Transcribing DNA			七月 19, 2013	🗨	

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