Title:

Python Programming in non-English Language to improve readability for non-native English speaker ~ using a Set of 18 Turtle Demo Programs Translated into Traditional Chinese as an Example

Author:

Renyuan Lyu, Chang Gung University
renyuan.lyu@gmail.com,
https://plus.google.com/+RenyuanLyu

Abstract:

In this project, a set of 18 turtle demo programs has been translated into traditional Chinese (tc) as an example to show the possibility to write Python code conveniently in non-English language. In such a way, it will improve code clarity and readability for non-native English speaker, according to Python PEP 3131. In personal belief, this will definitely attract more people without English fluency to programming world. This project has been done by providing a full list of tc alias (turtle_tc.py) for the official python turtle module and also a tc document file for on-line help functions. A viewer program is also provided to browse them for convinience. The whole set of programs can be found in github.

[https://github.com/renyuanL/pythonTurtleInChinese/tree/master/examples/tcExamples2015]

Description:

As a researcher using programming as an aid for more than 2 decades, I found the Pyhton (version 3) programming language in 2011, about 4 years ago. At beginning, I just used it to replace Perl which was used to glue some of my research programs in C/C++. Little by little, I have been attracted by the Python language itself more and more. It is so simple, friendly, beautiful, and elegant. It is also so powerful in many aspects. At last, I found it is far more than just as a glue language. It is itself the total

solution for my research career. Last year (2014), after 3 years of experience of Python, I successfully implemented a real-time audio spectrogram in Python 3 and gave a talk about it in Pycon APAC 2014.
[https://tw.pycon.org/2014apac/zh/program/45]
[https://github.com/renyuanL/realTimeSpectrogram]
[http://youtu.be/bjISlxO93Ns]

One of the most attractive features of Python (version 3) is that it allows me to use Chinese as identifiers to name variables, functions and classes in the codes. As a learner of English as a second language for more than 3 decades, I have to confess that I am not still as fluent in English as I am in Chinese. This is partially due to the difference of the vocabulary capability of mine in these 2 languages. While programming, I am often struggled in finding a good English word or phrase to name a function or variable. This usually hinders me much from thinking and coding fluently.

In fact, not only Python (version 3) has such a feature, many modern computer programming languages adopt Unicode as the source coding, such as Java, Ruby, Javascript, or even the new Swift language proposed by Apple Corp last year (2014). This means that programmers can use non-English like Chinese as identifiers. In other words, we can almost directly use Chinese to write programs, except for a small number of keywords, which is usually not a literate problem since those keywords are usually simple, short, and common grammatically functional words in English, such as “for”, “while”, “class”, “import”, …, etc. All of a sudden, I thought this would be a key point to make the programming education more widespread globally, especially for those kids in high schools or even those adults who are not fluent (like me) in English as their second language.

In this project, we will choose Python-3 programming language for its Unicode source coding, with one of the famous turtle graphic module as an example. By adding Chinese alias for functions and classes in the module, we will create a Chinese coding environment, which will be compatible with current and future versions of Python. If this has been done, it will really help programming education to more people in Chinese-speaking areas.

Some previous efforts for similar purpose have been done in Python 2, which is in ASCII source coding. “ChinesePython” and “zhpy” are two of them. [http://www.chinesepython.org/] [https://code.google.com/p/zhpy/] Compared

with these efforts, the major goal of this project is to create a more concise, simpler Chinese Python environment, including a set of 18 translated official sample programs, with a complete program description, and ultimately provides the online help function.

The methodology is to dive into the source code of “turtle.py” , a famous module included in the standard library of the official Python distribution. By fully understanding the “turtle” module, we created an accompanied module called “turtle_tc” , where we provided a full list of alias in traditional Chinese for all identifiers used in “turtle”. By this way, as long as the programmer “import turtle_tc”, he can use all Chinese names of functions or classes in his/her programs. By providing additional document files, the programmers are also allowed to use on-line help functions, all in traditional Chinese. Here is an example. It is translated from "yinyang.py" distributed as a demo program in official python distribution.

Code Example:

```
from turtle_tc import *

def 陰(半徑, 顏色1, 顏色2):
    筆寬(3)
    顏色(黑, 顏色1)
    開始填()
    畫圓(半徑/2., 180)
    畫圓(半徑, 180)
    左轉(180)
    畫圓(-半徑/2., 180)
    結束填()
    左轉(90)
    提筆()
    前進(半徑*0.35)
    右轉(90)
    下筆()
    顏色(顏色1, 顏色2)
    開始填()
    畫圓(半徑*0.15)
    結束填()
```

```
    左轉(90)
    提筆()
    後退(半徑*0.35)
    下筆()
    左轉(90)

def 主函數():
    重設()
    陰(200, 黑, 白)
    陰(200, 白, 黑)
    藏龜()
    return "完成！"

if __name__ == '__main__':
    主函數()
    主迴圈()
```

Help online:

```
>>> help(前進)
Help on function 前進 in module turtle_tc:
前進(distance)
    『0053  中文說明』
    龜前進指定的距離。
            別名: 前進 | forward | fd
            參數:
            距離, distance - 一個數字(整數或浮點數)
            龜前進指定的距離, 往龜的頭之方向。
            示例(物件名為「小龜」的實例):
            >>> from turtle_tc import *
            >>> 小龜= 龜類()
            >>> 小龜.位置()
            (0.00,0.00)
            >>> 小龜.前進(25)
            >>> 小龜.位置()
            (25.00,0.00)
```

```
>>> 小龜.前進(-75)
>>> 小龜.位置()
(-50.00,0.00)
```

In this project, we will present the whole set of 18 turtle demo programs in the official python distribution translated into traditional Chinese with a convenient viewer program. With such a initial study, we hope to extend such a task to help teach Python programming to a wider audience. For those who learn reading, writing and math in their native language, usually not English, they can also learn Python programming in such a similar way.

Keywords:

Chinese programming, Python, Programming education, Turtle Graphics.

Reference:
---

[1] The whole set of 18 turtle demo programs
https://github.com/renyuanL/pythonTurtleInChinese/tree/master/examples/tcExamples2015

Demo on youtube
http://youtu.be/sQFKjlxw2mw

[2] renyuanL/pythonTurtleInChinese
https://github.com/renyuanL/pythonTurtleInChinese

[3] ChinesePython
http://www.chinesepython.org/

[4] Zhpy
https://code.google.com/p/zhpy/

[5] Computer Programming for Everybody
https://www.python.org/doc/essays/cp4e/

[6] PEP 3131 - Supporting Non-ASCII Identifiers
https://www.python.org/dev/peps/pep-3131/