ITD62-123 COMPUTER PROGRAMMING

IMI62-122 FUNDAMENTAL OF COMPUTER PROGRAMMING

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Chapter 4
Functions

python™

Recursion Functions

- Python also accepts function recursion, which means a defined function can call itself.
- Recursion is a common mathematical and programming concept.
- That a function calls itself. This has the benefit of meaning that you can loop through data to reach a result.
- The developer should be very careful with recursion as it can be quite easy to slip into writing a function which never terminates, or one that uses excess amounts of memory or processor power.
- However, when written correctly recursion can be a very efficient and mathematically-elegant approach to programming.

Recursion Functions

In this example, tri_recursion() is a function that we have defined to call itself ("recurse"). We use the k variable as the data, which decrements (-1) every time we recurse. The recursion ends when the condition is not greater than 0 (i.e. when it is 0).

- Example

```
def tri_recursion(k):
  if(k > 0):
    result = k + tri_recursion(k - 1)
    print(result)
  else:
    result = 0
  return result

print("\n\nRecursion Example Results")
tri_recursion(6)
```

```
Recursion Example Results
1
3
6
10
15
21
```

Python Modules

- Consider a module to be the same as a code library.
- A file containing a set of functions you want to include in your application.

Create a Module

- To create a module just save the code you want in a file with the file extension .py
- Example
  - Save this code in a file named mymodule.py

```
def greeting(name):
    print("Hello, " + name)
```

Use a Module

- Now we can use the module we just created, by using the import statement:
- Example
  - Import the module named mymodule, and call the greeting function:

```
import mymodule

mymodule.greeting("Jonathan")
```

Naming a Module

- You can name the module file whatever you like, but it must have the file extension .py
- Re-naming a Module
  - You can create an alias when you import a module, by using the as keyword:
- Example
  - Create an alias for mymodule called mx:

```
import mymodule as mx

a = mx.person1["age"]
print(a)
```

Built-in Modules

- There are several built-in modules in Python, which you can import whenever you like.
- Example
  - Import and use the platform module:

```
import platform

x = platform.system()
print(x)
```

Built-in Modules

- import datetime
- import math
- import json
- import re
- import numpy
- import scipy
- and more……..

Python PIP

- **What is PIP?**
  - PIP is a package manager for Python packages, or modules if you like.
- **What is a Package?**
  - A package contains all the files you need for a module.
  - Modules are Python code libraries you can include in your project.

Python PIP

- **Download a Package**
  - Downloading a package is very easy.
  - Open the command line interface and tell PIP to download the package you want.
  - Navigate your command line to the location of Python's script directory, and type the following:
- **Example**
  - Download a package named "camelcase":

pip install camelcase

Python PIP

- **Using a Package**
  - Once the package is installed, it is ready to use.
  - Import the "camelcase" package into your project.
- **Example**
  - Import and use "camelcase":

```
import camelcase

c = camelcase.CamelCase()
txt = "hello world"
print(c.hump(txt))
```

Python PIP

- **Remove a Package**
  - Use the uninstall command to remove a package:
- **Example**
  - Uninstall the package named "camelcase":

pip uninstall camelcase

Python PIP

- **List Packages**
  - Use the list command to list all the packages installed on your system:
- **Example**
  - List installed packages:

pip list

Special thanks to W3Schools

Class activity 7

เขียน Function แบบ Recursion ทำงานดังนี้

1. รับค่าตัวเลขจำนวนเต็มจากผู้ใช้งาน 3 ค่า
2. คำนวณค่าเฉลี่ยของตัวเลขจำนวนเต็มทั้ง 3
3. หากค่าเฉลี่ยที่คำนวณได้ มีค่ามากกว่าผลรวมของค่าที่ 1 และค่าที่ 2 ให้แสดงข้อความว่า "The end" แล้วจบการทำงาน
4. แต่หากเงื่อนไขในข้อ 3 ไม่เป็นจริง ให้เรียกใช้งานฟังก์ชันซ้ำไปเรื่อย ๆ