UECM3033 Assignment #1 Report

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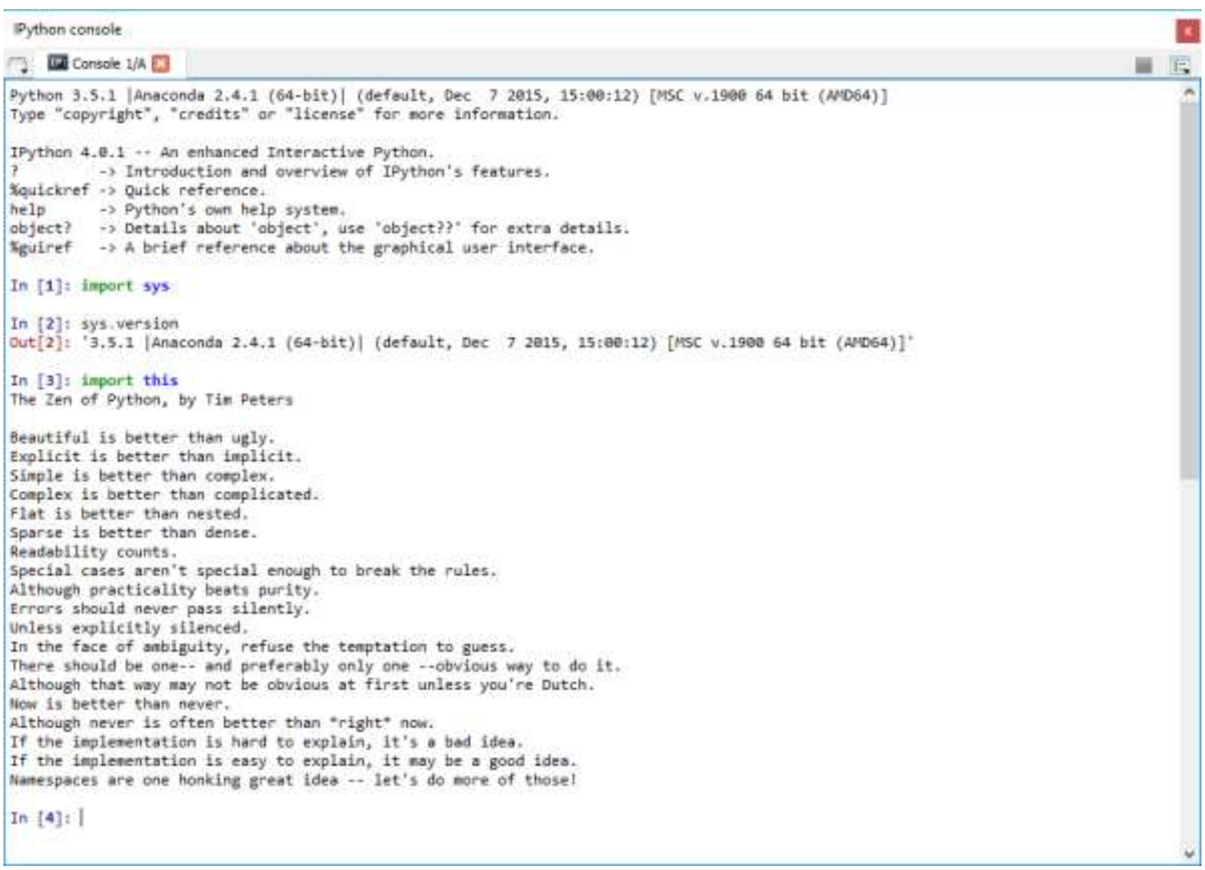
Task 1 -- setup a github repository

The reports, codes and supporting documents are uploaded to Github at:

https://github.com/chingjunetaoUTAR/UECM3033_assign1

Task 2 -- setup python

Put here the screen shot of file (python.png)



```
IPython console
Console 1/A

Python 3.5.1 |Anaconda 2.4.1 (64-bit)| (default, Dec  7 2015, 15:00:12) [MSC v.1900 64 bit (AMD64)]
Type "copyright", "credits" or "license" for more information.

IPython 4.0.1 -- An enhanced Interactive Python.
?         -> Introduction and overview of IPython's features.
%quickref -> Quick reference.
help      -> Python's own help system.
object?   -> Details about 'object', use 'object??' for extra details.
%guiref   -> A brief reference about the graphical user interface.

In [1]: import sys

In [2]: sys.version
Out[2]: '3.5.1 |Anaconda 2.4.1 (64-bit)| (default, Dec  7 2015, 15:00:12) [MSC v.1900 64 bit (AMD64)]'

In [3]: 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 [4]:
```

Task 3 -- modify and run Python script

In this section, please report:

1. The hexadecimal value of your student ID.

Hexadecimal representation of 1202462 is 0x12591e.

2. Write down the definite integrals that you have chosen.

$$\int_0^{\pi} \frac{\sin x \cos x}{\sin x + 1} dx = 0 .$$

3. Write down your system of 10 linear equations.

My system of 10 linear equations:

$$\begin{aligned}
&x_1 + x_2 + x_3 + x_4 + x_5 + x_6 + x_7 + x_8 + x_9 + x_{10} = 55 , \\
&5x_1 + 2x_2 + x_3 + x_4 + x_5 + x_6 + x_7 + x_8 + x_9 + x_{10} = 61, \\
&x_1 + 3x_2 + x_3 + 4x_4 + x_5 + x_6 + 2x_7 + x_8 + x_9 + 2x_{10} = 88 , \\
&x_1 + x_2 + x_3 + 5x_4 + x_5 + 8x_6 + x_7 + 6x_8 + x_9 + 3x_{10} = 173 , \\
&x_1 + 7x_2 + x_3 + 7x_4 + x_5 + 4x_6 + x_7 + x_8 + 2x_9 + x_{10} = 118 , \\
&x_1 + 6x_2 + x_3 + 6x_4 + x_5 + 2x_6 + x_7 + 3x_8 + x_9 + 5x_{10} = 147 , \\
&x_1 + 4x_2 + x_3 + 5x_4 + x_5 + 9x_6 + x_7 + 2x_8 + x_9 + 6x_{10} = 183 , \\
&5x_1 + x_2 + 3x_3 + x_4 + 6x_5 + x_6 + x_7 + x_8 + 4x_9 + x_{10} = 117 , \\
&x_1 + 2x_2 + x_3 + 2x_4 + x_5 + 4x_6 + x_7 + 6x_8 + x_9 + 2x_{10} = 129 , \\
&x_1 + 2x_2 + x_3 + 5x_4 + x_5 + 2x_6 + x_7 + 7x_8 + x_9 + 9x_{10} = 207.
\end{aligned}$$

Answer:

$$\begin{aligned}
&x_1 = 1,\ x_2 = 2, x_3 = 3,\ x_4 = 4, x_5 = 5, \\
&x_6 = 6,\ x_7 = 7,\ x_8 = 8, x_9 = 9, x_{10} = 10.
\end{aligned}$$

Appendices – python code

```
import sympy as sy
import numpy as np

def fun_1( your_id ):
    ans = hex(your_id)
    return ans

def my_integral():
    x = sy.Symbol('x')
    ans = sy.integrate( (sy.sin(x)*sy.cos(x))/(sy.sin(x)+1), (x,0,sy.pi ))
    return ans

def my_solution():
    A = np.array( [[1,1,1,1,1,1,1,1,1,1],[5,2,1,1,1,1,1,1,1,1],
[1,3,1,4,1,1,2,1,1,2],[1,1,1,5,1,8,1,6,1,3],[1,7,1,7,1,4,1,1,2,1],[1,6,1,6,1,2,1,3,1,5],[1,4,1,5,
1,9,1,2,1,6],[5,1,3,1,6,1,1,1,4,1],[1,2,1,2,1,4,1,6,1,2],[1,2,1,5,1,2,1,7,1,9]] )
    b = np.array([55,61,88,173,118,147,183,117,129,207])
    x = np.linalg.solve(A,b) # Solve Ax = b
    return x



if __name__ == '__main__':
    your_id = 1202462
    print('Hexadecimal representation of %d is %s'%( your_id, fun_1( your_id) ))
    print('Integral = ', my_integral())
    print('Solution = ', my_solution())
```