

HY514 Problem Solving Environments

Assignment 1: Getting Started

Elias Houstis

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INTRODUCTION

Welcome to HY514: Problem Solving Environments, and welcome to your very first assignment for the course! There are four things to do: You'll register for eclass and [Piazza](#), you'll install the development Python and iPython environment for the course, and you'll use Python as a simple calculator to find a very special number. You must become familiar with the main resources of the course:

1. Houstis ebook: *Εγχειρίδιο Αριθμητικών Μεθόδων για Επιστημονικές Εφαρμογές με την Χρήση MatLab και Python* (download from eclass)
2. Python Scientific – (<https://python.gov.uk/node.org/python-autumnschool-2010/media/pythonscientific.pdf>)
3. Introduction to Python - www.kevinsheppard.com/images/0/09/Python_introduction.pdf
4. Scientific python lectures - <http://nbviewer.ipython.org/github/jrjohansson/scientific-python-lectures/tree/master/>
5. Python book - [PYTHON - Εισαγωγή στους υπολογιστές](#)

1. PIAZZA (10%)

Go to the [Piazza](#) website for the course and register/enroll as a student. Post a note introducing yourself to the rest of the class: include your name, school, year, (intended) major, programming background (if any) and why you are taking this course. Include a selfie if you'd

like. In your submission document, clearly state when (date/time) you registered/enrolled in the course on Piazza and when you posted your introduction.

2. PYTHON ENVIRONMENT (60%)

The recommended method to install the Python scientific stack is to use [Continuum Analytics' Anaconda](#).

In the “Introduction to Python” document found in the course resources in eclass you will find instruction on how to install this environment and others.

In your submission document, discuss how the installation process went for you, what problems you encountered and how you solved them and indicate the OS you are using. Don't write a long essay, keep your comments short and to the point.

3 FIND THE POWER (30%)

Consider the powers of 2, that is the integer numbers $2^0 = 1$, $2^1 = 2$, $2^2 = 4$, $2^3 = 8$, and so on. It turns out that the first power of 2 that contains the digit 0 four times is $2^{79} = 604462909807314587353088$. Fascinating, isn't it? Your task is to find the first power of 3 that contains exactly eight occurrences of the digit 5.

For now, the easiest way to approach this problem is to simply use Python as a calculator, just like we did in lecture. If you start IDLE, you can type expressions like

```
>>> 2 ** 79
```

into the Python Shell and Python will compute the integer result, namely

```
604462909807314587353088
```

in this case. What you should do is try out various exponents and see for which one you get a number that contains the digit 5 eight times.

In your submission document, clearly state the number itself as well as the exponent that goes along with it.

Hint: The number you're looking for is somewhere between 320 and 340 .