Algorithmic Methods of Data Mining
Homework 2

Due: 12/11/2017, 23:59.

Instructions

You must hand in the homeworks electronically and before the due date and time.

The first homework has to be done by each **person individually**.

Handing in: You must hand in the homeworks by the due date and time by an email to fazzone@diag.uniroma1.it that will contain as attachment (**not links to some file-uploading server!**) a .zip file with your answers. The filename of the attachment should be
AMD_Homework_1__StudentID_StudentName_StudentSurname.zip;
for example:
AMD_Homework_1__1235711_Robert_Anthony_De_Niro.zip.
The email subject should be
[Algorithmic Methods for Data Mining] Homework_1 StudentID StudentName StudentSurname;
For example:
[Algorithmic Methods for Data Mining] Homework_1 1235711 Robert Anthony De Niro.
After you submit, you will receive an acknowledgement email that your project has been received and at what date and time. If you have not received an acknowledgement email within 2 days after you submit then contact Adriano.

The solutions for the theoretical exercises must contain your answers either typed up or hand written clearly and scanned.

For information about collaboration, and about being late check the web page.

Problem 1. We will compute the edit distance of two strings in three ways.

1. Write a Python function that implements the dynamic programming algorithm to compute the edit distance between two strings (as we defined it in class).

2. Here we will see why it is necessary to use dynamic programming to compute the edit distance. Implement the algorithm in 1 using recursion, instead of filling in the dynamic-programming table. After you check that the results are the same in small strings, run it on longer strings (say 15–16 characters). How do you explain the difference in speed?

Problem 2. In this second assignment you'll practice more on Python and on some algorithmic skills. The assignment is done electronically using the HACKERRANK online service available from the following URL:
https://www.hackerrank.com
You must have created an account and complete as many challenges as you can from the list included below. When you are finished and want to submit your assignment, from the hackerrank site, go to the *submissions* page under your profile and produce a PDF printout. This is available from the following url:
https://www.hackerrank.com/submissions/all
Your solutions must include as attachment:

- The pdf file that you created.

- The Python code of your solutions, clearly organized.

Don't forget to check the collaboration policy at the course web page. To summarize, you can discuss with each other, but the writing at the end should be yours. In addition, you should preferably not look at the solutions provided by HACKER-RANK; if you do so, you should explicitly mention it in the corresponding response.

Let's go to the homework. The Python challenges that you need to complete are the following:

- `https://www.hackerrank.com/challenges/kangaroo`

- `https://www.hackerrank.com/challenges/strange-advertising`

- `https://www.hackerrank.com/challenges/quicksort1`

- `https://www.hackerrank.com/challenges/quicksort2`

- `https://www.hackerrank.com/challenges/insertionsort1`

- `https://www.hackerrank.com/challenges/insertionsort2`

- `https://www.hackerrank.com/challenges/recursive-digit-sum`

- `https://www.hackerrank.com/challenges/jesse-and-cookies`