Algorithmic Methods of Data Mining
Homework 1

Due: 15/10/2023, 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 have to create a public Github repository, that you are going to share with using a google form. You can find instructions at:
`https://github.com/Sapienza-University-Rome/ADM/tree/master/2023`

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

Problem 1. The goal of the first assignment focuses on building up your skills on Python. The assignment is done electronically using the HACKERRANK online service available from the following URL:
`https://www.hackerrank.com`
You must create 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 HACKERRANK; 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:

- Introduction (all – total: 7 - max points: 75)
  `https://www.hackerrank.com/domains/python/py-introduction`

- Data types (all – total: 6 - max points: 60)
  `https://www.hackerrank.com/domains/python/py-basic-data-types`

- Strings (all – total: 14 - max points: 220)
  `https://www.hackerrank.com/domains/python/py-strings`

- Sets (all – total: 13 - max points: 170)
  `https://www.hackerrank.com/domains/python/py-sets`

- Collections (all – total: 8 - max points: 220)
  `https://www.hackerrank.com/domains/python/py-collections`

- Date and Time (all – total: 2 - max points: 40)
  https://www.hackerrank.com/domains/python/py-date-time

- Exceptions (only 1 - max points: 10)
  https://www.hackerrank.com/challenges/exceptions

- Built-ins (only 3 - max points: 80)
  https://www.hackerrank.com/challenges/zipped
  https://www.hackerrank.com/challenges/python-sort-sort
  https://www.hackerrank.com/challenges/ginorts

- Python Functionals (only 1 - max points: 20)
  https://www.hackerrank.com/challenges/map-and-lambda-expression

- Regex and Parsing challenges (all – total: 17 - max points: 560)
  https://www.hackerrank.com/domains/python/py-regex

- XML (all – total: 2 - max points: 40)
  https://www.hackerrank.com/domains/python/xml

- Closures and Decorations (all – total: 2 - max points: 60)
  https://www.hackerrank.com/domains/python/closures-and-decorators

  Numpy (all – total: 15 - max points: 300)
  https://www.hackerrank.com/domains/python/numpy

Problem 2. We continue in this question with the implementation of some algorithms in Python.

As before, 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.

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

- https://www.hackerrank.com/challenges/birthday-cake-candles

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

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

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

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

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

Problem 3. The goal of the first assignment focuses on building up your skills on Cloud Computing using the AWS ecosystem. The assignment is done electronically using the AWS Academy online service and the course Cloud Foundations available from the following URL:

`https://awsacademy.instructure.com/courses/27346`

You must complete the knowledge check of the modules listed below:

- Module 1 (Global Infrastructure)

- Module 2 (Structures of the Cloud)

- Module 3 (AWS Console)

- Module 4 (Virtual Servers)

- Module 7 (Security)

- Module 13 (Emerging Technologies in the Cloud)

- Module 14 (Billing and Support)