TFL115 - Mandatory Assignment

Jonas Heer, Einar Johnsen

Oktober 2018

Information

- In order to take the exam you must pass this mandatory assignment.
- Your answers must be delivered on your Bitbucket repository and approved on Bamboo.
- Seven out of eight tasks must be approved in it's entirety in order to pass.
- Each task must be placed in a folder named *assignment_x* (replace x with current task number). And each python file must be named *main.py*.
- Each folder (*assignment_x*) may contain multiple files, but it requires exactly one file called main.py in order for the tests to work.

Preparation

Please clone the new Repository TFL115G18H on Bitbucket - tools.uia.no. If you haven't configured Git for your machine (as you should have done in DAT111/113-G), please follow Christian Aubys tutorial here: git config.

Task 1

Print the sum of all multiples of 7 below a given limit. The limit must be read from the file *limit.txt*.

Task 2

Print the largest palindrome made from the product of two numbers with a given number of digits. The number of digits must be read from the file *digits.txt*.

Task 3

Print the value of the *n-th* number in the Fibonacci sequence (1 is both the first and second value). The number n must be read from the file *fibonacci.txt*.

Task 4

- Use Newton's method to find all three roots of the function: $x^3 - 3x + 1$
- The roots should be presented with three decimal places. E.g. if one solution was 1.23456789, you should print 1.234.

Task 5

- Read the file of integers, *numbers.txt*, and generate a 6×6 numpy array.
- Calculate the sum of the third row.
- Calculate the sum of the last row.
- Print the sum of the two numbers you have calculated.

Task 6

Solve the following system of linear equations:

- $2y + 3y - 3z - 8 + 20 = -7x + 8 + 20$
- $-5y + 2z - 4z + 3z - 1z + 8 = -2z - 3x$
- $5x - 15x + 3y - 7z - 2 - 3 - 2z = -5 - 3y - 2z - 15x + 3y$

The solution should be rounded to zero decimal places and printed in the following format:

```
(X, Y, Z)
```

Task 7

The task involves three equations in the following format $ax + by + cz = n$

- Read the **a**, **b**, and **c** values from *equations.txt*.
- Read the **n** values from *answers.txt*.
- Solve the system of linear equations.

The solution should be rounded to the nearest integer and printed in the following format:

```
(X, Y, Z)
```

Task 8

- Read the equation from *limits.txt*.
- Print the limit of the equation when `x` approaches 2.