Recommender Systems

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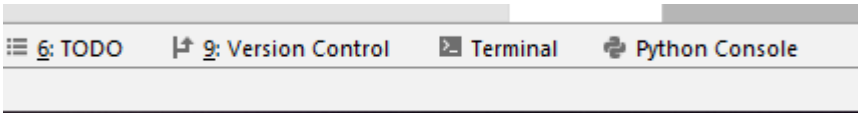
Assignment 1

Task 1) Installing and running Python

- Download and install the latest version of the community edition of the *PyCharm IDE* with *Python version 3.8* (https://www.jetbrains.com/pycharm/).[1]
- Open a terminal window in the IDE, use the button on the lower end of the screen.



Type "`python`" to start the interactive interpreter. Type "`print('Hello World')`" in the terminal.

```
Python 3.6.3 |Anaconda custom (64-bit)| (default, Oct 15 2017, 03:27:45) [MSC v.1900 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> print('hello world')
hello world
>>>
```

- Create a file called "`hello.py`" and type "`print('Hello World')`". Run the file.

Task 2) Basic language concepts[2]

Task 2.1) Opening files[3], list data structure, loops

Download the "MovieLens - recommended for education and development - Small[4]" dataset from https://grouplens.org/datasets/movielens/.

Write a program that determines the mean rating in the dataset in the following way.

- Create a list of data type "float" to store all ratings in memory.
- Open the file "ratings.csv" and read the contents line by line.
- Store each rating in the list.
- Close the file.
- Iterate through the resulting list, sum up the values and calculate the average at the end.
- Print the result.

Task 2.2) Functions and error handling

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[1] You can use https://www.instructables.com/id/Python-Hello-World/ for Python Hello World in PyCharm.
[2] You can use https://www.w3schools.com/python/ as a starting point.
[3] You can use https://python4mpia.github.io/pure_python/files.html for file handling in plain Python.
[4] http://files.grouplens.org/datasets/movielens/ml-latest-small.zip

All calculations from Task 2.1 should now be done within a function called “computeMeanRating”, which takes a file name as an input and returns a float as a result.

Define this function, implement appropriate error handling procedures (including exception handling in case the file cannot be read or found), and write a main function that invokes the method.

Task 2.3) Functions and return values

Extend the function from Task 2.2 so that it returns not only the mean value, but also the mode and the median[5]. Write a corresponding test method.

Task 2.4) More data structures and file handling

Our next goal is to analyze the genres that are appearing in the file “movies.csv”.

Write a procedure that takes the file name as a parameter and prints the following on the screen:

- All distinct genre names that appear in the file. You can use the Python *csv* module.
- For each genre, determine to how many movies it was assigned. Use a dictionary (genre -> counter) to save the number of genre assignments.
    - Print the number of movies per genre
    - Determine and print out the most popular genre.
- Optional: Sort the genres by the number of movies they are assigned to in descending order. Use a suitable library function.

Task 2.5) Modules and classes

Define a Python module “utilityModule” including a class “Statistics” and add the function defined in Task 2.2 as a method to this class.

Write a test program that invokes the method (and thus prints the mean rating in the dataset).

[5] Must be done in plain Python, without using any libraries.