01276121 Computer Programming Group Assignment 2023 Semester 1

1 Comma-separated values (CSV) files

The following excerpt is taken directly from https://en.wikipedia.org/wiki/Comma-separated_values

"**Comma-separated values (CSV)** is a text file format that uses commas to separate values. A CSV file stores tabular data (numbers and text) in plain text, where each line of the file typically represents one data record. Each record consists of the same number of fields, and these are separated by commas in the CSV file. If the field delimiter itself may appear within a field, fields can be surrounded with quotation marks."

2 Task requirements

Your task is to develop with Python a text-based menu-driven program that processes book data stored in CSV files. Your program needs to satisfy the following functionalities.

2.1 Basic functionalities [5 points]

2.1.1 Text-based menu-driven program [1 point]

Your program, once starts, shall display on the console the main text-based menu. The user may choose a desirable task to perform from the available options shown on the menu. Once the chosen task is done, the program should go back to the main menu.

2.1.2 Load books from a CSV file [1 point]

Your program must prompt a filename. If the specified filename exists, load all the books from the file to the active book collection. If the specified filename does not yet exist, your program must explicitly show an error message to indicate that the specified filename does not exist.

2.1.3 Save the active results to a CSV file [1 point]

Your program must allow the user to export all the books in the active book collection to a CSV file. Please make sure that the output is a valid CSV file.

2.1.4 List all books in the active book collection on the screen [1 point]

Your program must allow the user to list on the screen bookID, title, authors, average_ratings, language_code, num_pages, publication_date, and publisher of all the books in the active book collection. Please print the outputs in a nice tabular format.

2.1.5 Show information of a book on the screen [1 point]

Your program must ask the user to enter bookID/isbn13 and print all the fields of a corresponding book if such a book exists in the active book collection. Please make sure that the outputs are in human-readable format.

2.2 Data manipulation [15 points]

2.2.1 Insert a book into the active book collection [2 points]

Your program must allow the user to manually insert a book into the active book collection. Your program must incorporate at least one mechanism to avoid redundant records.

2.2.2 Delete books from the active book collection [7 points]

Your program must allow the user to delete books from the active book collection. Before deletion, the program shall first ask the user to specify a filter for deletion. At least, the program must allow the user to delete books from the active collection with the following conditions:

- Given a bookID, delete the book with specified bookID (1 point)
- Given an isbn13, delete the book with specified isbn13 (1 point)
- Given an average_ratings, the user may choose to delete all the books with greater than or less than specified average_ratings (1 point)
- Given a language_code, delete the books with specified language code (1 point)
- publication_date (2 points)
- Given a publisher name, delete the books with specified publisher (1 point)

2.2.3 Sort books in the active book collection [6 points]

Your program must allow the user to sort books in the active book collection, both ascending and descending orders. At least one, the program must allow the user to sort books by:

- bookID (1 point)
- title (1 point)
- average_ratings (1 point)
- num_pages (1 point)
- publication_date (2 points)

2.3 Searching and statistical summary [10 points]

2.3.1 Search books [2 points]

Your program must allow the user to search for books from the active book collection. At least, the program shall allow the user to search by their title and authors. Searching must not alter the active book collection. Rather than matching a substring, searching shall perform whole word matching. For instance, the word “island” should not match by the keyword “and”.

2.3.2 Statistical Information [8 points]

Your program must allow the user to view statistical information of the active book collection. The program must provide at least the following information:

- The number of books (1 point)
- The number of distinct authors (2 points)
- The total number of pages from all the books (1 point)
- The number of distinct publishers (1 point)
- The average number of pages per book (1 point)
- The average number of books per year (2 points)

3 Restrictions

- Your program is not allowed to import any library except the followings:
  - csv (https://docs.python.org/3/library/csv.html)
  - datetime (https://docs.python.org/3/library/datetime.html)
  - typing (https://docs.python.org/3/library/typing.html)
- Your program may use up to one global variable at most. Using more than one global variable is not allowed.
- Your program needs to make use of Python list and dictionary.
- Your program needs to be divided into 12 functions or more.
- Each function must not be more than 100 lines of code.
- The total length of the whole program must not exceed 2000 lines of code.

4 Report and submission

For submission, you need to turn in on Microsoft Teams Python source files as well as a report. The report must contain at least the following information:

- A call tree or call graph (https://en.wikipedia.org/wiki/Call_graph) that presents the overall structure of the program. Your call graph shall include function names and links between them. Other information is not mandatory.
- Description of each function including its IPO (input, process, output)
- Test cases of each function to validate function behavior.
- Responsibilities of each group member.
- Only functions whose details are present in the report will be scored.