

Overview

The task of this assignment is to create a recommendation system for a new student who wants to know which courses to choose based on courses opted by other students.

The class **CourseSelector** will have following methods:

Integer read(String filename): This method will take a file from user which will contain the courses that students had taken. And it will return number of rows read from the file.

ArrayList<String> recommend(String taken, int support, int recommendations): This method will take 3 parameters i.e. in “taken” the new student will enter the courses he has taken or the courses he wants to check with other students. In support new student will mention the number which means that courses mentioned in “taken” must be at least present in the students of that support count. And in recommendation the new student will give number of courses to be recommended.

Boolean showCommon (String courses): This method will take list of courses as parameter and will print a 2d array on console of the courses that are mentioned in parameters.

Boolean showCommonAll(String filename): This method will take a file as parameter and will print a 2d array in the file of all the courses that has been read from the file.

Files

There are two files for the program:

1. CourseSelector.java – It consists of class and above-mentioned methods which will recommend courses based on the input file.
2. mainUI.java – It consists of main method that prompts user to input the command and arguments.

Data Structure Used

Following are the data structures used in my program:

- To store the courses of each student I have created ArrayList of ArrayList in which each student courses will have its own ArrayList and all the students data will be stored in one common ArrayList.
- To count the number of times a course has appeared I have used a HashMap which will store the courses and the frequency of each courses.

Methods Implemented

- **Integer read (String filename):** Created rowsReturned and myFileName as a global variable which will be used throughout the class. To read the file I have used BufferedReader() and used a while loop to iterate through each line of the file. This method will return the total number of rows read.
- **ArrayList<ArrayList<String>> myNewExtraMethod():** This method is user defined in which I am creating an ArrayList of ArrayList where courses of each student will be stored inside it. I created this method because it is commonly used in other methods such as recommend(), showCommon() and showCommonAll().
- **ArrayList<String> recommend(String taken, int support, int recommendations):** Firstly, the courses passed in "taken" will be stored in ArrayList coursesTakenNewStudent. Secondly, there will be another 2D ArrayList courseTakenByStudents which will hold all the student courses. Further, it will check both the ArrayList which contains the similar courses and it will store it in another ArrayList similarCourse. Next, I created a HashMap which will store the name of the course and will keep its count and every time it encounters the same course it will increment by one. Lastly, if there is a tie between courses then it will return those courses which satisfy recommendation parameters.
- **sortValues():** Once the values in HashMap are stored then it needs to be sorted in descending order based on their frequencies. To do the sorting I have used comparators and collections.sort() method.
- **Boolean showCommon (String courses):** This method will accept the courses from the user, and it will first create a 2d array of the size of the unique courses. Further, it will count the occurrence of courses which are passed in parameters and will print the matrix on the console.
- **Boolean showCommonAll (String filename):** This method does the same as showCommon() method does however, in this method it checks the occurrence of each course with all the other courses. Lastly, it prints the output in the file that has been passed as a parameter.

Assumptions

There are few assumptions for this program:

- In the input file each line can have maximum 10 courses.
- There should be no space provided between course names in the input file or in the parameters of the methods.
- The file names should include the complete file path including any extensions to the file name.
- Course numbers are case insensitive.
- To get any recommendations it requires a file to be read which will contain the list of courses of each student. If you call any method without reading a file, then it will display some message and you would need to re-enter.

References

To sort the list:

<https://stackoverflow.com/questions/21105413/java-java-util-map-entry-and-collection-sortlist-comparator>

To put the data from sorted list to HashMap:

<https://stackoverflow.com/questions/12184378/sorting-linkedhashmap>