

**Gebze Technical University
Computer Engineering**

CSE 222 - 2018 Spring

HOMEWORK 3 REPORT

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1 INTRODUCTION

1.1 Problem Definition

Part-1:

Reading Gebze Technical University Computer Engineering courses from a file and programming new methods to create an easy way of extracting courses.

Part-2:

From all the courses in CSE, hide unnecessary courses, display hidden courses and enable hidden courses you want.

Part-3:

Efficient way to go through CSE courses and courses that are in the same semester.

1.2 System Requirements

Intellij, Java 8, Course.csv file.

If given file contains turkish characters, this program will not work! Also, i thought in csv files inputs were seperated by ',' but since the example file used ';' instead, the program works with ';' not ',' and the first line should be like the following line:

Semester;Course Code;Course Title;ECTS Credits;GTU Credits;H+T+L

Without this line, the first course will be ignored.

Note:It could and should work with ',' format but i haven't tested it yet.

File Format Example:

Semester	Course Code	Course Title	ECTS Credits	GTU Credits	H+T+L
1	XXX XXX	Teknik Olmayan Seçmeli (SSC)	2	1	2+0+0
1	CSE 101	Introduction To Computer Engineering	8	3	3+0+0
1	CSE 107	Introduction To Computer Science Laboratory	2	1	0+0+2
1	MATH 101	Calculus I	7	5	5+0+0
1	PHYS 121	Physics I	6	4	3+0+0
1	PHYS 151	Physics Laboratory I	1	1	0+0+2
1	SSTR 101	Principles Of Atatürk And The History Of Turkish Revolution I	2	2	2+0+0
1	TUR 101	Turkish I	2	2	2+0+0
2	XXX XXX	Teknik Olmayan Seçmeli (SSC)	2	1	2+0+0
2	CSE 102	Computer Programming	8	4	4+0+0
2	CSE 108	Computer Programming Laboratory	2	1	0+0+2
2	MATH 102	Calculus II	7	5	5+0+0
2	PHYS 122	Physics II	6	4	3+0+0
2	PHYS 152	Physics Laboratory II	1	1	0+0+2

GTUCourses class has 2 Constructors. 1 of them gets another course, other one gets all the information that a course should contain. Second constructor type:

```
GTUCourses(int semester, String courseCode, String courseTitle, int ectsCredit, int gtuCredit, String courseHTL)
```

GTUCSECourse class contains part1, **GTUCourseList** contains part2 and **MyLinkedList** contains part3.

GTUCSECourse class has only 1 constructor which gets a csv file mentioned above.

getByCode(String courseCode) gets a Course Code and returns a course.

listSemesterCourses(int semester) gets a semester and returns a linkedList of courses that are in the given semester.

getByRange(int index1, int index 2) gets two indexes and returns a linked list with courses between those indexes.

GTUCourseList class also has only 1 constructor which gets a Collection, Methods won't work without a data.

disable(int index) disables the course at given index, returns true if it was successful.

enable(String courseCode) Enables the course with given courseCode if it was disabled, returns true if it was successful.

showDisabled() Prints disabled courses.

MyLinkedList class also has only 1 constructor same as **GTUCourseList** but parameter is **LinkedList**. You can use methods from Part-1 to create **LinkedList** with course data.

add(GTUCourses course) Adds the course to the list.

remove(GTUCourses course) Delete the course from list

next() Move next node and returns the data.

nextInSemester() Move next node in same semester and returns the data. **This method does not work!** Reason is explained at **Problem Solution Approach Part-3**

size() Returns size of the list .

2 METHOD

2.1 Class Diagrams

Add class diagrams.

2.2 Use Case Diagrams

Add use case diagrams if required.

2.3 Other Diagrams (optional)

Add other diagrams if required.

2.4 Problem Solution Approach

Part-1:

When you create an object **GTUCSECourse**, it reads data from given file, holds the data inside the **LinkedList<GTUCourses> courseList**; All 3 methods go through the linked list via for loop and all of them have error check.

Part-2:

GTUCourseList has only 1 constructor that takes a **LinkedList** and stores data inside that list using **add()** method of **LinkedList**. **disabledNodes** data field is an **ArrayList** of **Pair<Integer, GTUCourses>** this variable stores the disabled courses and the locations of them

Part-3:

MyLinkedList has 2 inner classes. **Node** and an **courseliter** class.

Node class has 5 data fields. 1 of them contains course data, others are references to next course, previous course, next course in same semester and previous course in same semester. These references used to linking courses to create a linkedList.

courseliter class implements **java.util.Iterator** Interface. It has 2 data fields to store currentlitr and currentSemester and 4 methods, **hasNext()**, **hasNextInSemester()**, **next()** and **nextSemesterCourse()**. I've had problems with circular linking courses with same semester together so this method and **nextInSemester()** methods are not working.

MyLinkedList has 1 constructor it does the same thing as **GTUCourseList's** constructor but instead of adding them using **add()** method of **LinkedList**, this one creates nodes and do the linking manually.

Asymptotic Notations of methods

getByCode -> $O(n)$

listSemesterCourses -> $\Theta(n)$

getByRange -> $\Theta(n)$

disable -> $\Theta(1)$

printList -> $\Theta(n)$

enable -> $O(n)$

showDisabled -> $\Theta(n)$

MyLinkedList get-> $O(n)$

add -> $\Theta(1)$

remove -> $O(n)$

hasNext -> $\Theta(1)$

hasNextInSemester -> $\Theta(1)$

next-> $\Theta(1)$

nextInSemester -> $\Theta(1)$

size-> $\Theta(1)$

3 RESULT

3.1 Test Cases

```
//Part1
System.out.println(coursesTest.getByCode("CSE 101").toString());
coursesTest.listSemesterCourses(5)
coursesTest.getByRange(8, 15);
//Part2
modifiedList.disable(2);
modifiedList.showDisabled();
modifiedList.enable("CSE 107");
//Part3
newNode = this.add(newNode.courseData); //Inside the constructor of MyLinkedList.
myList.remove(coursesTest.getByCode("CSE 107"));
System.out.println("List Size: " + myList.size());
while(myList.hasNext()){
    System.out.println(myList.next().toString());
}
```

3.2

3.3 Running Results

```
-----Testing Part1-----
Complete list of courses:
Semester: 1 Course Code: XXX XXX Course Title: Teknik Olmayan Secmeli (SSC) ECTS Credit: 2 GTU Credit: 1 Course H+T+L: 2+0+0
Semester: 1 Course Code: CSE 101 Course Title: Introduction To Computer Engineering ECTS Credit: 8 GTU Credit: 3 Course H+T+L: 3+0+0
Semester: 1 Course Code: CSE 107 Course Title: Introduction To Computer Science Laboratory ECTS Credit: 2 GTU Credit: 1 Course H+T+L: 0+0+2
Semester: 1 Course Code: MATH 101 Course Title: Calculus I ECTS Credit: 7 GTU Credit: 5 Course H+T+L: 5+0+0
Semester: 1 Course Code: PHYS 121 Course Title: Physics I ECTS Credit: 6 GTU Credit: 4 Course H+T+L: 3+0+0
Semester: 1 Course Code: PHYS 151 Course Title: Physics Laboratory I ECTS Credit: 1 GTU Credit: 1 Course H+T+L: 0+0+2
Semester: 1 Course Code: SSIR 101 Course Title: Principles Of Ataturk And The History Of Turkish Revolution I ECTS Credit: 2 GTU Credit: 2 Course H+T+L: 2+0+0
Semester: 1 Course Code: TUR 101 Course Title: Turkish I ECTS Credit: 2 GTU Credit: 2 Course H+T+L: 2+0+0
Semester: 2 Course Code: XXX XXX Course Title: Teknik Olmayan Secmeli (SSC) ECTS Credit: 2 GTU Credit: 1 Course H+T+L: 2+0+0
Semester: 2 Course Code: CSE 102 Course Title: Computer Programming ECTS Credit: 8 GTU Credit: 4 Course H+T+L: 4+0+0
Semester: 2 Course Code: CSE 108 Course Title: Computer Programming Laboratory ECTS Credit: 2 GTU Credit: 1 Course H+T+L: 0+0+2
Semester: 2 Course Code: MATH 102 Course Title: Calculus II ECTS Credit: 7 GTU Credit: 5 Course H+T+L: 5+0+0
Semester: 2 Course Code: PHYS 122 Course Title: Physics II ECTS Credit: 6 GTU Credit: 4 Course H+T+L: 3+0+0
Semester: 2 Course Code: PHYS 152 Course Title: Physics Laboratory II ECTS Credit: 1 GTU Credit: 1 Course H+T+L: 0+0+2
Semester: 2 Course Code: SSIR 102 Course Title: Principles Of Ataturk And The History Of Turkish Revolution II ECTS Credit: 2 GTU Credit: 2 Course H+T+L: 2+0+0
Semester: 2 Course Code: TUR 102 Course Title: Turkish II ECTS Credit: 2 GTU Credit: 2 Course H+T+L: 2+0+0
Semester: 3 Course Code: CSE 241 Course Title: Object Oriented Programming ECTS Credit: 9 GTU Credit: 5 Course H+T+L: 3+2+0
Semester: 3 Course Code: CSE 211 Course Title: Discrete Mathematics ECTS Credit: 6 GTU Credit: 3 Course H+T+L: 3+0+0
Semester: 3 Course Code: CSE 231 Course Title: Circuits And Electronics ECTS Credit: 8 GTU Credit: 4 Course H+T+L: 4+0+0
Semester: 3 Course Code: CSE 233 Course Title: Circuits And Electronics Laboratory ECTS Credit: 2 GTU Credit: 1 Course H+T+L: 0+0+2
Semester: 3 Course Code: XXX XXX Course Title: Teknik Olmayan Secmeli (SSB) ECTS Credit: 3 GTU Credit: 2 Course H+T+L: 2+0+0
Semester: 3 Course Code: EN 111 Course Title: English For Business Life ECTS Credit: 2 GTU Credit: 2 Course H+T+L: 2+0+0
Semester: 4 Course Code: CSE 222 Course Title: Data Structures And Algorithms ECTS Credit: 9 GTU Credit: 5 Course H+T+L: 4+2+0
Semester: 4 Course Code: MATH 217 Course Title: Linearr Algebra And Differential Equations ECTS Credit: 8 GTU Credit: 5 Course H+T+L: 4+2+0
Semester: 4 Course Code: CSE 232 Course Title: Logic Circuits And Design ECTS Credit: 6 GTU Credit: 3 Course H+T+L: 3+0+0
Semester: 4 Course Code: CSE 234 Course Title: Logic Circuits And Design Laboratory ECTS Credit: 2 GTU Credit: 1 Course H+T+L: 0+0+2
Semester: 4 Course Code: XXX XXX Course Title: Teknik Olmayan Secmeli (SSB) ECTS Credit: 3 GTU Credit: 2 Course H+T+L: 2+0+0
Semester: 4 Course Code: EN 112 Course Title: Academic English ECTS Credit: 2 GTU Credit: 2 Course H+T+L: 2+0+0
Semester: 5 Course Code: CSE 343 Course Title: Software Engineering ECTS Credit: 8 GTU Credit: 4 Course H+T+L: 3+2+0
Semester: 5 Course Code: CSE 341 Course Title: Programming Languages ECTS Credit: 6 GTU Credit: 3 Course H+T+L: 3+0+0
Semester: 5 Course Code: CSE 331 Course Title: Computer Organizations ECTS Credit: 7 GTU Credit: 4 Course H+T+L: 3+2+0
Semester: 5 Course Code: CSE 321 Course Title: Introduction To Algorithm Design ECTS Credit: 6 GTU Credit: 3 Course H+T+L: 3+0+0
Semester: 5 Course Code: XXX XXX Course Title: Teknik Olmayan Secmeli (SSA) ECTS Credit: 3 GTU Credit: 2 Course H+T+L: 2+0+0
Semester: 5 Course Code: ENG 300 Course Title: Career Internship I ECTS Credit: 1 GTU Credit: 1 Course H+T+L: 0+6+0
Semester: 6 Course Code: CSE 396 Course Title: Computer Engineering Project ECTS Credit: 5 GTU Credit: 2 Course H+T+L: 1+2+0
Semester: 6 Course Code: CSE 312 Course Title: Operating Systems ECTS Credit: 6 GTU Credit: 3 Course H+T+L: 3+0+2
Semester: 6 Course Code: MATH 118 Course Title: Probability and Statistics ECTS Credit: 6 GTU Credit: 3 Course H+T+L: 3+0+0
Semester: 6 Course Code: CSE 344 Course Title: System Programming ECTS Credit: 3 GTU Credit: 2 Course H+T+L: 0+0+0
Semester: 6 Course Code: CSE 351 Course Title: Signals and Systems ECTS Credit: 6 GTU Credit: 3 Course H+T+L: 0+0+0
Semester: 6 Course Code: XXX XXX Course Title: Teknik Olmayan Secmeli (SSA) ECTS Credit: 3 GTU Credit: 0 Course H+T+L: 2+0+0
Semester: 7 Course Code: CSE 495 Course Title: Graduation Project I ECTS Credit: 6 GTU Credit: 1 Course H+T+L: 4+0+0
Semester: 7 Course Code: CSE 4XX Course Title: Department Elective I ECTS Credit: 6 GTU Credit: 3 Course H+T+L: 3+0+0
Semester: 7 Course Code: CSE 4XX Course Title: Bolun Secmeli II ECTS Credit: 6 GTU Credit: 3 Course H+T+L: 3+0+0
Semester: 7 Course Code: CSE 4XX Course Title: Bolun Secmeli (Temel Alan) I ECTS Credit: 6 GTU Credit: 3 Course H+T+L: 3+0+0
Semester: 7 Course Code: ENG 401 Course Title: Occupational Health and Safety ECTS Credit: 1 GTU Credit: 1 Course H+T+L: 0+0+0
Semester: 7 Course Code: XXX XXX Course Title: Teknik Olmayan Secmeli (SSB) ECTS Credit: 3 GTU Credit: 2 Course H+T+L: 2+0+0
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