BIL 105E – Introduction to Scientific and Engineering Computing (C)

Spring 2016-2017

Homework 7 Students Average Grade Calculation with files

Assignment Date: 14.05.2017

Due Date:23.05.2017 - 23:59

Duration 9 days

In this homework you will implement a simple database system consisting of multiple sequential and random access files. In order to make distinction clearer, random access files are named with extention .bin where sequential access files with .txt.

StudentsXX.txt : This is a base file keeping Student ID, Student Name and Course Code in a single line of record. Note that Student ID, which is a unique value, will be considered as the key field, i.e., key value to access respective records in other files. XX in the file name could be any two numerical character to produce any file name from Students00.txt to Students99.txt. Two sample files are given in Fig1 and Fig2. When a single line in StudentsXX.txt is considered as a record, The first field is representing ID; the second Name and the third Course Code.

```
7 Seda BLG241
1 Emre BLG108
3 Oktay BLG342
5 Abdurrahman BLG108
2 Nur BLG342
6 Akın BLG241
4 Merve BLG342
```

Figure 1: Content of **`Student00.txt`** file.

```
7 Seda BLG108
7 Seda BLG342
3 Oktay BLG108
5 Abdurrahman BLG241
2 Nur BLG241
```

Figure 2: Content of **`Student01.txt`** file.

BLGXXX.txt: This is a course file which includes a Student ID and three grades of the relevant student in a single line of record. Note that Student ID is the key field. XXX in the file name could be any three numerical characters to form any course name from BLG000.txt to BLG999.txt. These sample files are given in Fig3 Fig4 and Fig5. When a single line in BLGXXX.txt is considered as a record, the first field (string) represents Student ID; the second, the third and the fourth represent grades.

Example content of BLG241.bin

ID	First exam	Second exam	Third exam
1	60	50	90
7	80	90	70
5	60	50	90
2	65	65	65

```
7 59 50 50
5 70 100 65
4 40 40 40
```

Figure 3: **BLG342.txt f**ile.

```
1 60 50 90
7 80 90 70
5 60 50 90
```

Figure 4: Content of **BLG241.txt** file.

```
1 60 60 90
7 80 90 65
5 60 50 70
```

Figure 5: Content of **BLG108txt** file.

After reading a record of a student from Students01.txt , students's grades have to be searched in the relevant course file with Student ID as a key. Note that the coursen file is also taken from the this student file. Therefore, different files may be searched for different records. (Eg:) Once you read the grades, the average of these grades for each student has to be computed. This operation has to be performed for all students in Students00.txt. After completing the operations for all records, a sorting operation has to be performed with respect to the computed average grades. The sorted list has to be written into sortedlist.bin.

You will store the records to a file named sortedlist.bin. If an update operation is required your code should update the records in a descending order

```
7 seda BLG241 80
1 Emre BLG108 70
5 Yasin BLG108 60
7 Seda BLG342 50
```

Figure 6: **sortedlist.bin f**ile.

In case a new student file has to be processed, the previous output file has to be updated. Since the output file is going to be kept in sorted order, instead of creating another file and merging with the old one, it is suggested to read the output file first, to sort after adding or changing the records and write into out file from scratch. Note that the maximum record in output.bin is going to be 200.

Example case: If a new record's average grade is 65 you should insert it to appropriate place

```
7 Seda BLG241 80
1 Emre BLG108 70
2 Nur  BLG241 65
5 Yasin BLG108 60
7 Seda BLG342 50
```

Figure 7: **sortedlist.bin f**ile.

While writing to sortedlist.bin if an error occurs you should generate an error.bin file and you will write the error details.

Errorlog.bin:

ID	Name	Course	Error type	Time Stamp
1	Emre	BLG108	0	10.05.2017 19:41
3	Oktay	BLG221	1	10.05.2017 19:42
5	Yasin	BLG108	3	10.05.2017 19:42

Figure 8: **Error.bin f**ile.

Error types :

0 : there is not any student record in the course file file (if you cannot match the student ID taken from StudentsXX file with the students' IDs in course files.

1: There is not any file for this course name(if you cannot find any file for the selected course)

2: A student has a dublicate record at sortedlist.bin file

3: Warning about update of student grade(when you are updating a student's grade)

Note: All the assignments are considered individual assignments and you are expected to do it by yourself. Any form of plagiarism, even partial, will not be tolerated. It is subject to serious disciplinary actions. Note that professionals help in any form or shape is considered as an act of plagiarism.