ITU COMPUTER ENGINEERING DEPARTMENT

BLG 233E DATA STRUCTURES

HOMEWORK -1

Due Date : 18th of October, 2016.

Your assignment is to write a program which simulates a record system for patients in a hospital. The program will be able to do some operations by using the patient records. The record of each patient has the following format:

```
struct patient_record {
    char name[20], doctorName[20], diagnosis[20];
    int patientNumber, polyclinicNumber;
    char branchName[10];
};
```

Program Work Flow

1. First, read the records from the file named "database.txt".

   An example "database.txt" was provided with the assignment. A screenshot of the file is given below. **Your program will be tested with this file.**

database.txt

```
Eugenia Mark→Corbin Pierce→gastric infection→2934→12→INTERNAL
Harvey Baker→Jerrold Daniel→cataract→2837→10→OPHTHALMOLOGY
Wilburn Reed→Sarah Hutson→ulcer→2944→13→INTERNAL
Otto Godfrey→Corbin Pierce→reflux→2334→12→INTERNAL
Sybil Harford→Jerrold Daniel→hypermetropia→4895→10→OPHTHALMOLOGY
Peter Martel→Corbin Pierce→gastritis→4958→12→INTERNAL
Dawn Woodhams→Jerrold Daniel→myopia→3456→10→OPHTHALMOLOGY
Flora Layton→Corbin Pierce→ulcer→5643→12→INTERNAL
Andra Sidney→Sarah Hutson→gastritis→3820→13→INTERNAL
Casey Stephens→Jerrold Daniel→astigmatism→4532→10→OPHTHALMOLOGY
Beatrice Close→Corbin Pierce→laryngitis→2012→12→INTERNAL
Dallas Delaney→Jerrold Daniel→dermatocyst→3475→10→OPHTHALMOLOGY
Brenton Reed→Corbin Pierce→enteric infection→1029→12→INTERNAL
Zachery Harvey→Jerrold Daniel→conjunctivitis→3213→10→OPHTHALMOLOGY
Racquel Kendal→Jerrold Daniel→allergic conjunctivitis→3498→10→OPHTHALMOLOGY
Gillian Stamp→Sarah Hutson→laryngitis→2831→13→INTERNAL
Gerald Putnam→Jerrold Daniel→keratitis→5423→10→OPHTHALMOLOGY
Linton Wilmer→Corbin Pierce→stomach insufficiency→1235→12→INTERNAL
Lacey Shepherd→Corbin Pierce→pharyngitis→2357→12→INTERNAL
Kerry Russel→Corbin Pierce→pneumonia→6789→12→INTERNAL
Chesley Waller→Jerrold Daniel→sty→4231→10→OPHTHALMOLOGY
Rolland Bennett→Jerrold Daniel→myopia→3827→10→OPHTHALMOLOGY
Trent Tennison→Sarah Hutson→gastric infection→3842→13→INTERNAL
```

In the file, each row corresponds to a different record. The parameters of each record are separated by a **single** tab character ("`\t`"). The columns correspond to the following data:

1) **`name`**: the patient's name
2) **`doctorName`**: the doctor's name
3) **`diagnosis`**: the diagnosed disease
4) **`patientNumber`**: the patient's ID
5) **`polyclinicNumber`**: the polyclinic's ID
6) **`branchName`**: the name of the hospital branch

2. Write the records into an **array of `patient_record` structs**. While doing so, the records must be ordered by **`branchName`**. Records with the same **`branchName`** must be ordered by **`polyclinicNumber`**.

   You must reserve **exactly 10 elements** for each **`polyclinicNumber`** in the array of **`patient_record`** structs. If there are fewer than 10 patient records in any polyclinic, the rest of the elements will be **NULL**.

3. Display the main menu of your program and poll for commands. After each operation, your program should keep bringing the menu until the user exits the program.

```
Please select the operation to perform and enter the operation code
(P) Print all of the patient records,
(B) Search the data by the branch name,
(C) Search the data by the polyclinic number,
(I) Insert a new patient record,
(R) Remove the patient record,
(E) Exit the program,
Your selection is:
```

The explanations of the commands that your program must include are given below:

Commands:

P: Prints all the patient records registered in the hospital.

B: Searches patients by branch. (In this command, the program should ask for the **branch name**, then print all matching records.)

C: Searches patients by polyclinic. (In this command, the program should ask for the **polyclinic number**, then print all matching records.)

I: Inserts the record as entered by the user. (In this command, the program should ask for each parameter of the record one by one.)

R: Removes the record specified by the user. (In this command, the program should ask for the **patient number**, then delete the corresponding record.)

E: Exits the program.

4. Before your program terminates, "database.txt" must be overwritten with the most recent versions of the records.

Requirements

1. You must use an **array** data structure to store your records, and make use of **pointer arithmetic** to access stored records.

2. While inserting a new patient record, the records must remain ordered first by branch, then by polyclinic number.

   A visualization of this array of structs is given below:

i	name	doctorName	diagnosis	patientNumber	polyclinicNumber	branchName
0	Eugenia Mark	Corbin Pierce	gastric infection	2934	12	INTERNAL
1	Otto Godfrey	Corbin Pierce	reflux	2334	12	INTERNAL
2	Peter Martel	Corbin Pierce	gastritis	4958	12	INTERNAL
3	Flora Layton	Corbin Pierce	ulcer	5643	12	INTERNAL
4	Beatrice Close	Corbin Pierce	laryngitis	2012	12	INTERNAL
5	Brenton Reed	Corbin Pierce	enteric infection	1029	12	INTERNAL
6	Linton Wilmer	Corbin Pierce	stomach insufficiency	1235	12	INTERNAL
7	Lacey Shepherd	Corbin Pierce	pharyngitis	2357	12	INTERNAL
8	Kerry Russel	Corbin Pierce	pneumonia	6789	12	INTERNAL
9						
10	Wilburn Reed	Sarah Hutson	ulcer	2944	13	INTERNAL
11	Andra Sidney	Sarah Hutson	gastritis	3820	13	INTERNAL
12	Gillian Stamp	Sarah Hutson	laryngitis	2831	13	INTERNAL
13	Trent Tennison	Sarah Hutson	gastric infection	3842	13	INTERNAL
14						
15						
16						
17						
18						
19						
20	Harvey Baker	Jerrold Daniel	cataract	2837	10	OPHTHALMOLOGY
21	Sybil Harford	Jerrold Daniel	hypermetropia	4895	10	OPHTHALMOLOGY
22	Dawn Woodhams	Jerrold Daniel	myopia	3456	10	OPHTHALMOLOGY
23	Casey Stephens	Jerrold Daniel	astigmatism	4532	10	OPHTHALMOLOGY
24	Dallas Delaney	Jerrold Daniel	dermatocyst	3475	10	OPHTHALMOLOGY
25	Zachery Harvey	Jerrold Daniel	conjunctivitis	3213	10	OPHTHALMOLOGY
26	Racquel Kendal	Jerrold Daniel	allergic conjunctivitis	3498	10	OPHTHALMOLOGY
27	Gerald Putnam	Jerrold Daniel	keratitis	5423	10	OPHTHALMOLOGY
28	Chesley Waller	Jerrold Daniel	sty	4231	10	OPHTHALMOLOGY
29	Rolland Bennett	Jerrold Daniel	myopia	3827	10	OPHTHALMOLOGY

   The original file will be **unsorted** and **without empty rows, row indices or headers**.

3. The patient number must be an integer with 4 digits.

4. Your program must implement all of the commands (**P**, **B**, **C**, **I**, **R**, **E**) in the main menu.

5. Your program must **check and make sure** that the following constraints are satisfied:
   a. Each branch can have at most 2 polyclinics.
   b. Each polyclinic is used for only one branch.

c. No more than 10 patients can get examined in one polyclinic.

Whenever the user wants to insert a new record that violates one of these constraints, that insertion **must be rejected** with a **warning message.**

Submission

1. Make sure you write your name and number in all of the files of your project, in the following format:

```
/* @Author
 * Student Name: <student_name>
 * Student ID : <student_id>
 * Date: <date>
 */
```

2. Use comments wherever necessary in your code to explain what you did.

3. **Compile the code in the Secure Shell Client (SSH) before you send your homework.**

4. After you make sure that everything is compiled smoothly, archive all files into a zip file. Submit this file through www.ninova.itu.edu.tr. Ninova enables you to change your submission before the submission deadline.

   Do not miss submission deadline. **Do not** leave your submission until the last minute. The submission system tends to become less responsive due to high network traffic.

   HOMEWORKS SENT VIA E-MAIL WILL NOT BE GRADED.

Academic dishonesty including but not limited to cheating, plagiarism and collaboration is unacceptable and subject to disciplinary actions. Your homeworks will be checked with a plagiarism checker system, any student found guilty will receive 0 as his/her grade for the homework and subject to disciplinary actions.

If you have any question about the homework, contact the teaching assistant Kübra ADALI via e-mail (kubraadali@itu.edu.tr) or in Research Lab 1.