CS 6103D Software Systems Laboratory

PROBLEM 1A&1B Evaluation ***06.09.2022***

General Instructions

- The evaluation consists of two parts PART A and PART B. You will be allowed to proceed to PART B ONLY if you complete PART A and submit the code in EduServer.
- Design:
  - Write the design only for ***PART A*** in a text file and submit it in the ***EduServer before 9.45 AM***.
  - No need to write a design for PART B.
- Implementation:
  - Implement ***PART A,*** make sure that your program works correctly for the given sample I/O and submit code for PART A in the EduServer ***before 10.45 AM. If you need more time for completing PART A, you may request your instructor for the same***.
  - After submitting PART A, you may inform the instructor that you have submitted and then proceed with coding for PART B.
  - No need to submit the source code in EduServer for ***PART B***. You should complete the coding for PART B before ***11.45 AM*** and get the result verified by your evaluator before ***12.15 PM***.

Mark Distribution:

Maximum Marks - 10 marks

PART A

Design - 2 marks
Viva - 1 mark
Implementation - 3 marks

PART B

Viva - 1 mark
Implementation - 3 marks

PART A

Maintain the list of diseases as an array of structures, with each struct containing four fields- *serial number*(int), *disease*(string)- indicating the disease name, *vaccine_adults*(string)- indicating the vaccine for adults available to prevent the disease and *vaccine_child*(string)- indicating the vaccine for children available to prevent the disease.

Write a function ***listVaccines(A, v, n)*** which given the array *A* of diseases with size *n* and vaccine name *v*, writes the disease names prevented by the vaccine *v* into a text file. If there are no diseases for the given vaccine write 'NIL' to the text file. Note that the vaccines may be common for some diseases.

Design: Write algorithm (in pseudocode) for the ***listVaccines(A, v, n)*** function

Input format
The input contains multiple lines.

- The first line contains an integer '*n*' denoting the number of diseases.
- The subsequent '*n*' lines contain the details of diseases. Each of the '*n*' lines contains one int value(*serial number*) and three strings(*disease, vaccine_adults* and *vaccine_child*)(each separated by a space).
- The next line contains a string corresponding to the vaccine name *v* to be searched.

Output format
The output should be written to a file named '*diseases.txt*'. Each line should contain one disease name that can be prevented by the given vaccine.

Sample Input

3
1 DIPHTHERIA Tdap DTaP-HB-IPV-Hib
2 PNEUMOCOCCAL Pneu-P-23 Pneu-C-10
3 TETANUS Tdap DTaP-HB-IPV-Hib
Tdap

Output

Text file "*diseases.txt*" with the following contents:
DIPHTHERIA
TETANUS

PART B

Maintain the list of diseases in PART A as a singly linked list, with each node containing the *disease*(string), *vaccine_adults*(string) and *vaccine_child*(string) with provisions for adding and deleting diseases. Maintain the list in the sorted order of disease name by writing the ***insert()*** function appropriately.

Input/Output Format

- Each line may contain a character from {i, d, p, s} followed by zero or more string(s).

    - Character *i*: Character *i* followed by three strings disease name and vaccine name for adult and vaccine name for child respectively, separated by a space.
        - Call function *insert()* and insert the disease details to its correct sorted position in the list.
- Character *d*: Character *d* followed by a string corresponding to the disease name, separated by a space.
    - Call function *delete()* and delete the disease node from the list corresponding to the disease name, if the disease name is present in the list.
- Character *p*:
    - Print the disease names in the linked list from head to tail, separated by a space.
- Character s: Terminate the program.

Sample Input

```
i PNEUMOCOCCAL Pneu-P-23 Pneu-C-10
i TETANUS Tdap DTaP-HB-IPV-Hib
i DIPHTHERIA Tdap DTaP-HB-IPV-Hib
p
d TETANUS
p
s
```

Output

```
DIPHTHERIA PNEUMOCOCCAL TETANUS
DIPHTHERIA PNEUMOCOCCAL
```