Assignment-02

Deadline: 17th Oct, 2021

Submission guidelines:

1. Your code must include generics.

2. Assignment will be evaluated on test cases to assign marks.

3. In case of any discrepancy (test case failed, incomplete assignment, cheating case), you will be called for demo.

4. There is zero tolerance for the cheating cases so don't try for that.

{Implementation of Citizens Database System in java}

Develop a Database of Citizens for the Country. The System consists of following parts:

1. Citizens Basic Information Database (CBID).

2. Citizens Criminal Information Database (CCID).

3. Citizens Cell Network Database (CCND).

4. Aliens Database (AD).

Citizens Basic Information Database (CBID):

CBID is the centralized system which means CCID and CCND would be connected to it. Each record would be identified by CNIC in CBID, then further linked to CCID and CCND related record. CBID record contains following information of each citizen.

   i.   CNIC (4-digit unique number)

  ii.   Name

 iii.   Father Name

iv. Gender

v. Address

vi. Nationality

CBID must have following features:

i. Data Structure must be strongly connected that each node contains reference of its next node as well as previous node.

ii. List must be maintained in Ascending order based on CNIC upon new Record entry.

iii. Searching and Updating Record must be based on CNIC.

iv. Upon declaring a citizen 'Alien' by the state, citizen Nationality would be updated to "Alien" and Record should be moved from the CBID to a List named Aliens Database (AD).

Citizens Criminal Information Database (CCID):

CCID is to keep Citizens criminal record. Each record contains following information of each citizen.

i. CNIC (4-digit unique number)

ii. Crimes

    a. Details of each Crime.

    b. Charges

    c. Punishment

    d. Fine

CCID must have following features:

i. Data Structure must be strongly connected and also the last node can access head of the list

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ii. List must be maintained in Ascending order based on CNIC upon new Record entry.

iii. Locating and Updating Record must be based on CNIC.

iv. "Crimes" is a Singly Linked List, each Node of a List contains all the information related to that Crime/Case.

v. As, CBID is the centralized Database; So, Node in CBID and CCID having same CNIC must have a two-way relationship i.e. If we are at some Node in CBID and wants to access criminal record of that person, it should be able to directly access that Node in CCID without the need of searching the whole Criminal Database to locate and see criminal record against concerned CNIC and vice-versa.

vi. Upon declaring a citizen Alien by the state in CBID as it should be moved to a singly list named AD, the relationship between Node in CBID and CCID must remain intact.

Citizens Cell Network Database (CCND):

CCND is to maintain citizens cell number related data. Each record contains following information of each citizen.

i. CNIC (4-digit unique number)

ii. Numbers

    a. Network

    b. Activation Date

    c. Deactivation Date

    d. Status

CCND must have following features:

i.   Data Structure must be connected in a way that each node has address of next node and the last node of list can access head of list.

ii. List must be maintained in Ascending order based on CNIC upon new Record entry.

iii. Locating and Updating Record must be based on CNIC.

   a. Add, Delete and Update numbers.

iv. "Numbers" is a Singly Linked List, each Node of a List contains all the information related to that Number.

v.   Citizen can only have four numbers registered on his/her CNIC.

vi. As, CBID is the centralized Database; So, Node in CBID and CCND having same CNIC must have a two-way relationship i.e. If we are at some Node in CBID and wants to access cell numbers record of that person, it should be able to directly access that Node in CCND without the need of searching the whole Citizens Cell Network Database to locate and see cell numbers record against concerned CNIC and vice-versa.

vii. Upon declaring a citizen Alien by the state in CBID as it should be moved to a singly list AD, the relationship between Node in CBID and CCND must remain intact but the status of every number should be changed to Inactive and Deactivation date is to be updated.

Aliens Database (AD):

AD is to maintain data of citizens declared as Aliens by the state. It should be implemented by a singly linked list with an insert node function such that the node added first should be the last node while doing traversal and the last node added should be the first node during traversal of the linked list.

General Functionalities to Include:

Upon running the program, it should read data for each Database from related Data Files (you should give input to your program via files no console based input should be given to the program) and store the records in the appropriate data structure described above.

 i.   Search person by CNIC in CBID and display all Record from CBID, CCID, and CCND

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 iv.   Update record in CBID i.e. Getter and Setter functions for: Name, F. Name, Address, Nationality.

 v.   Upon changing Nationality to Alien, refer to CBID point "iv".

 vi.   Add new crime and related data into Crimes-List of CCID.

 vii. Delete crime from Crimes-List of CCID.

 viii. Update Crimes-List record data i.e. Details, Charges, Punishment, Fine. Identify it on CNIC and Crime.

 ix.   Add cell-number into Numbers-List, if number of registered cell-no. are 4, exception should be thrown that no more can be registered on this CNIC.

 x.   Upon adding a cell-number, display all available numbers in Database, and ask for a different number, when entered check whether it is already assigned to someone, if not allow to proceed otherwise ask for new number.

 xi.   Include functionality to swap ownership of two registered numbers. Take CNIC of 2-citizens and numbers to be exchanged, then proceed with functionality.

 xii. Print count of cell phone numbers registered on each network. For example:
       (Telenor= 10, Jazz= 5, Ufone= 8, Zong= 9, Total= 32)

 xiii. Print the Aliens Database linked list.

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