*Question 1:* (20 points)

1. **Concept Application:** Suppose a linked list contains the following information about the health practitioner. Write the steps to delete the nodes of **“Left” status**. Your answer must indicate:

* The **position of the pointer** and
* The status of the **linked list** after every step.

**Head**

ID: 1120

First Name:Sami

Last Name: Alghamdi

Center : 2

Status: Moved

ID: 1130

First Name:Samar

Last Name: Alshehri

Center : 1

Status: Left

ID: 1160

First Name:Omar

Last Name: Akmutairi

Center : 3

Status: Exist

Next

ID: 1150

First Name:Sara

Last Name: Hamdan

Center : 2

Status: Exist

Next

ID: 1140

First Name:Bassma

Last Name: Tarek

Center : 3

Status: Moved

Next

ID: 1110

First Name:Rayyan

Last Name: Alzahrani

Center : 1

Status: Exist

**Null**

Next

Next

Next

Steps:

* Creat a help pointer to finde the node with Left status, help pointer will start frome the head.
* Chek the status of the next node if not equls Left status move pointer to the next node.

helpointer

**Head**

ID: 1120

First Name:Sami

Last Name: Alghamdi

Center : 2

Status: Moved

ID: 1130

First Name:Samar

Last Name: Alshehri

Center : 1

Status: Left

ID: 1160

First Name:Omar

Last Name: Akmutairi

Center : 3

Status: Exist

Next

ID: 1150

First Name:Sara

Last Name: Hamdan

Center : 2

Status: Exist

Next

ID: 1140

First Name:Bassma

Last Name: Tarek

Center : 3

Status: Moved

Next

ID: 1110

First Name:Rayyan

Last Name: Alzahrani

Center : 1

Status: Exist

**Null**

helpointer

**Head**

ID: 1120

First Name:Sami

Last Name: Alghamdi

Center : 2

Status: Moved

ID: 1130

First Name:Samar

Last Name: Alshehri

Center : 1

Status: Left

ID: 1160

First Name:Omar

Last Name: Akmutairi

Center : 3

Status: Exist

Next

ID: 1150

First Name:Sara

Last Name: Hamdan

Center : 2

Status: Exist

Next

ID: 1140

First Name:Bassma

Last Name: Tarek

Center : 3

Status: Moved

Next

ID: 1110

First Name:Rayyan

Last Name: Alzahrani

Center : 1

Status: Exist

**Null**

* The status of the next node is equl Left status, so we will delet the next node by :
* helpointer= helpointer.next.next.

helpointer

**Head**

ID: 1120

First Name:Sami

Last Name: Alghamdi

Center : 2

Status: Moved

ID: 1160

First Name:Omar

Last Name: Akmutairi

Center : 3

Status: Exist

Next

ID: 1150

First Name:Sara

Last Name: Hamdan

Center : 2

Status: Exist

Next

ID: 1140

First Name:Bassma

Last Name: Tarek

Center : 3

Status: Moved

Next

ID: 1110

First Name:Rayyan

Last Name: Alzahrani

Center : 1

Status: Exist

**Null**

helpointer

**Head**

ID: 1120

First Name:Sami

Last Name: Alghamdi

Center : 2

Status: Moved

ID: 1160

First Name:Omar

Last Name: Akmutairi

Center : 3

Status: Exist

Next

ID: 1150

First Name:Sara

Last Name: Hamdan

Center : 2

Status: Exist

Next

ID: 1140

First Name:Bassma

Last Name: Tarek

Center : 3

Status: Moved

Next

ID: 1110

First Name:Rayyan

Last Name: Alzahrani

Center : 1

Status: Exist

**Null**

garbage

helpointer

**Head**

ID: 1120

First Name:Sami

Last Name: Alghamdi

Center : 2

Status: Moved

ID: 1130

First Name:Samar

Last Name: Alshehri

Center : 1

Status: Left

ID: 1160

First Name:Omar

Last Name: Akmutairi

Center : 3

Status: Exist

Next

ID: 1150

First Name:Sara

Last Name: Hamdan

Center : 2

Status: Exist

Next

ID: 1140

First Name:Bassma

Last Name: Tarek

Center : 3

Status: Moved

Next

ID: 1110

First Name:Rayyan

Last Name: Alzahrani

Center : 1

Status: Exist

**Null**

garbage

helpointer

* If the next node is null end loop.

*Question 2:*(20 points)

1. **Algorithm Write up**: Suppose a **linked list** contains all health practitioners’ information for all centers. The vaccination management employee wants to display all information of health practitioners in any required center.

**Write an algorithm** that display all information of health practitioners in the linked list for any required center.

For example, an employee of vaccination management would like to display all information of health practitioners of center 2. If the linked list contains the following nodes

**Head**

ID: 1120

First Name:Sami

Last Name: Alghamdi

Center : 2

Status: Moved

ID: 1130

First Name:Samar

Last Name: Alshehri

Center : 1

Status: Left

ID: 1160

First Name:Omar

Last Name: Akmutairi

Center : 3

Status: Exist

Next

ID: 1150

First Name:Sara

Last Name: Hamdan

Center : 2

Status: Exist

Next

ID: 1140

First Name:Bassma

Last Name: Tarek

Center : 3

Status: Moved

Next

ID: 1110

First Name:Rayyan

Last Name: Alzahrani

Center : 1

Status: Exist

**Null**

**The output of the algorithm should print**

The information of health practitioners in center 2 are:

1: ID: 1120, Name: Sami Alghamdi Status: Moved.

2: ID: 1150, Name: Sara Hamdan Status: Exist.

**Algorithm**

**Input:**

Center ID

**Output:**

Display all information of health practitioners in a specified center

**Method:**

Algorithm :

Step 1:

Check list is not empty

Step 2:

Read ID for a specified center from user.

Step 3:

Create a pointer to traverse through the linked list.

Step 4:

While the pointer doesn't point to null, get next in linked list.

Step 5:

Check if the center ID is equal to the ID given.

Step 6:

If true we will print all information of practitioners in a center and count number of practitioners.

Method:

public static void display(ArrayList<Center> LLOfCenter , int specifiedCenterID ) {

if (!isEmpty()){

Practitioner pointer = head;

int count=0;

while (forDisplayPractitioner != null) {

if (specifiedCenterID==this.centerID)) {

count++;

//print.

System.out.println("The information of health practitioners in center " + specifiedCenterID + " are:");

System.out.println(count +": ID: " + pointer.getID()+", Name: "+ pointer.getfname()+ " "+pointer.getlname()+" Status: "+ pointer.getStatus());

}

pointer = pointer.getNext();

}

}

}