

COVID-19 Vaccination Database Creation by using a Singly Linked List

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Abstract- This project presents the use of a linked list for the registration of the COVID19 vaccination campaign. Like arrays, linked lists are linear data structures, but unlike arrays, the elements stored in a linked list are linked using pointers. The reason for using linked lists instead of arrays is that arrays have size limits and linked lists do not.

Keywords- COVID-19, vaccination, linked list, data structure

I. INTRODUCTION

The SARS-CoV-2 virus causes Coronavirus Disease (COVID-19), an infectious disease. Vaccines for Covid-19 were produced utilizing science that has been around for a long time. These vaccines aren't being tested. They've gone through every stage of research and development for a new scientific breakthrough. Furthermore, because of the worldwide devastation that COVID-19 has wrought, many health agencies are constantly monitoring COVID-19 specific immunizations. As a result, every citizen must participate in vaccination programs established by their local government and other organizations that provide the vaccine on a formal basis.

Our government has taken many steps to make the immunization system available to residents. An online service is provided to provide more immunization information and to register vaccines. COVID-19 vaccinations were hastily deployed in India, making tracking extremely difficult. Several slow-running problems and crashes were caused by various input and output commands on the server. To allow the immunizations, the Aadhar details were used, hence it was done on a central server. To avoid using a central server for all commands, the vaccine-registered data will be placed onto a local server. Treatment data will be verified and completed locally and will be loaded locally back to the main server by the end of the day.

II. THEORY

Our project depends on many concepts based on the fundamentals of data structure. These concepts are explained in more detail below :

- Data Structure:

A data structure is a method of organizing data in a computer so that it can be accessed quickly when needed. Arrays, linked lists, binary trees, graphs, binary search trees, matrices, stack, heap, misc, queue, hashing, as well as other data structures are available, but we will only focus on linked lists in this project.[5]

- Linked list:

A linked list is a collection of data structures linked together via links. A Linked List is a list of items that are made up of a series of links. Each link is connected to a different link. After arrays, linked lists are the second most often used data structure.[4]

- Singly Linked List:

A singly linked list is a sort of unidirectional linked list that may only be traversed in one direction, from head to final node (tail). A node is a name for each element in a linked list. A single node contains data as well as a pointer to the next node, which aids in the list's structure. The head is the first node in the list; it points to the first node in the list and allows us to access all of the other elements in the list. The last node, commonly known as the tail, points to NULL, which aids in recognizing when the list comes to an end.[3]

- File Handling:

- File processing is the programmatic saving of data to a file. Programs written in the C programming language use file management to store program results and other data in files. You can also extract/retrieve data from files used by the program.
- In C, you may execute the following operations on a file:
 - Creating a new document
 - Using a previously saved file
 - Data is read from an existing file.

- Adding information to a file
- Data is moved to a specific spot on the file.[2]

III. EXECUTION

In this program, we have implemented the following functionalities:

- 1.Admin Login
- 2 .Creating a new account.
- 3.User Login
4. Show data statistics

When the software is run, the user is offered the options to a) login as admin, b) create a new account, c) login as a user, and d) show the statistics of the vaccination data in the system. If the user is unfamiliar with the software, the second option is chosen. The user is then prompted to enter his or her name, age, username for future logins, and a password after making their choice. The user is next asked if he or she has ever had a vaccination. If the user answers yes, he or she will be asked about the vaccine and how many doses they received. This information is preserved in the login ID of the user.

If the user chooses to log in, he or she will be prompted to provide a username. The user will be prompted for a password if the username has been saved in the database. The application will display a message stating that the user does not exist in the program's database if the username is not registered. Furthermore, if the user types the incorrect password three times after being requested for it, the application shows a notification stating that the user has typed the incorrect password three times and that the user must try again later. Once the user has successfully logged in, the information entered while creating the database account is displayed on the screen. The user can also log in as an administrator in the system.

The admin can view the list of all the users that have registered themselves in the system and along with their names, their vaccination status can also be seen.

A user can also search for his data through a search user option. For that, the user requires a valid username i.e. the username must be registered in the system.

After logging in, the user can check his/her vaccination status and availability of vaccine doses. Also, if the user wants to change some information related to him/her, it can be done as well.

The user can also see the statistics of the users on the system such as the effectiveness of vaccines and how many people take which vaccine.

IV. RESULTS

On the execution of the program, we obtained the following results:

```

1
CREATE ADMIN:
Enter name: Akanksha Mohite
Enter age: 23
Enter gender(male/female): f
Enter num of doses:(0/1/2): 1
Enter name of vaccine: covaccine
Enter date of fist vaccination: 2/2/22
Enter username: a10
Enter password m10
Were you infected by COVID-19 before taking vaccination:yes
Were you infected by COVID-19 after taking fisrt vaccination:no

```

Fig 5.1: Registering Admin:

```

1)ADMIN LOGIN
2)CREATE NEW ACCOUNT
3)USER LOGIN
4)VIEW STATISTICS ON EFFECTIVENESS OF VACCINATION
2
Create a new account by entering all th below information
Enter name: Nikita Salunkhe
Enter age: 26
Enter gender(male/female): f
Enter num of doses:(0/1/2): 0
Where you infected with covid-19 before vaccination?
yes
Enter username: nikita10
Enter password salunkhe10

```

Fig 5.2: Create a new account:

NAME	AGE	VACCINE	NUMDOSES	first_dose	s_dose	infected_before_y	infected_after_y	After_y2
Akanksha Mohite	23	covaccine	1	2/2/22	00/00/00	yes	no	NULL
Nikita Salunke	23	NULL	0	00/00/00	00/00/00	yes	NULL	NULL
Ruchika Shinde	34	covishield	1	2/6/22	00/00/00	no	yes	NULL
Parth Rath	22	covaccine	1	2/6/7	00/00/00	yes	no	NULL
Prachi Shinde	22	covaccine	2	2/3/21	2/5/21	no	yes	yes
PRIYA BOLAKE	21	covishield	2	2/8/21	2/6/7	yes	no	NULL
Sejal Kumar	22	covaccine	2	8/9/21	6/7/22	yes	no	NULL

Fig 5.3:Display list:

```
Enter username: ruchika10
```

NAME	AGE	VACCINE	NUMDOSES	first_dose	s_dose	infected_before_y	infected_after_y	After_y2
Ruchika Shinde	34	covishield	1	2/6/22	00/00/00	no	yes	NULL

Fig 5.4: Searching for a member:

```
1)Display list
2)Vaccination doses Status
3)Search a person
2

Enter no. of doses available for covaccine:
30

Enter no. of doses available for covishield:
10

1)Display list
2)Vaccination doses Status
3)Search a person
2

VACCINE NAME      QUANTITY
covaccine          30
covishield         10

Do you want to update slots of:
1)Covishield
2)Covaccine
3)EXIT2

Enter slots available of covaccine:15

1)Display list
2)Vaccination doses Status
3)Search a person
2

VACCINE NAME      QUANTITY
covaccine          15
covishield         10
```

Fig 5.5: Checking status of doses:

```
Enter username
parth10

Enter password
rathi10

1)Display Info
2)Book vaccination slot
3)Display slots available
4)Modify
1

*****USER INFO*****
NAME: Parth Rath
AGE: 22
vaccine name: covaccine
NO OF DOSES: 1
Date of vaccination: First) 2/6/7 Second) 00/00/00

Covid infected: 1)Before vaccination: no 2)After first vaccination: no 2)After second vaccination: no
```

Fig 5.6: User login and display info.

```
4)Modify
4

Enter name: PRIYA BOLAKE

Enter gender: F

Enter age: 22

Enter num of doses:(0/1/2): 1

Enter name of vaccine: covishield

Enter date of fist vaccination: 2/8/21

Where you infected with covid-19 before vaccination?
yes

Where you infected with covid-19 after first vaccination?
no

Enter username: priya10

Enter password priya10
```

Fig 5.7:Modifying Members.

```
Enter password priya10

1)Display Info
2)Book vaccination slot
3)Display slots available
4)Modify
1

*****USER INFO*****
NAME: PRIYA BOLAKE
AGE: 22
vaccine name: covishield
NO OF DOSES: 1
Date of vaccination: First) 2/8/21 Second) 00/00/00

Covid infected: 1)Before vaccination: yes 2)After first vaccination: no 2)After second vaccinat
```

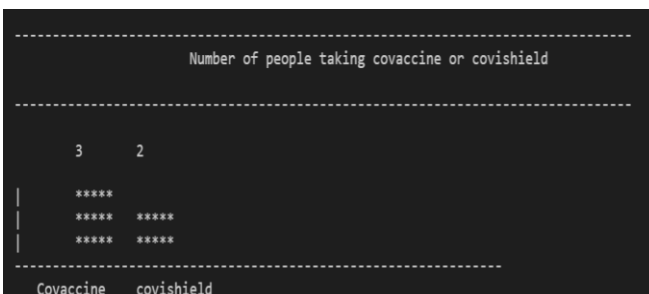
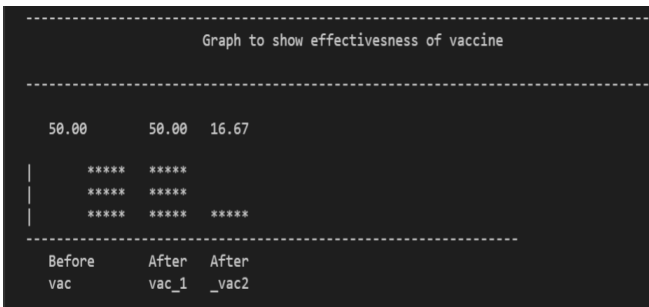


Fig 5.8:Statistics of data:

The program was executed smoothly and no difficulties were encountered during the execution. All the required information was obtained in the output without any errors.

V. APPLICATIONS AND FUTURE USE

Linked lists can be used to create stacks, queues, and graphs. It's also capable of allocating dynamic memory. The program of this project can be modified to provide an application-based software for registering for the COVID-19 vaccination, checking for available slots for vaccine recipients, providing certificates to those who have been vaccinated, and tracking their vaccination status. Furthermore, the principles used in this study can be used to track a person's medical history, which can help doctors prescribe the right medication to patients. It can also be used in a variety of industries, such as banking (to keep track of a bank account's transaction history), corporate offices (to keep track of employees' attendance), medical stores (to keep track of the availability of drugs in the store), and so on.

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