COVID 19 TRACKING System

PROJECT REPORT

Report Sketch

Covid-19 Tracking System

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1.Introduction

With the spread of covid-19 in Sri Lanka, we came up with the idea of creating a new technological tool for managing covid 19 using the latest technology and programming knowledge we have learned to prevent the spread of covid-19.
Here we looked at different ideas for it and the main thing we found was that what needs to be done here is to track patients with covid-19 and find their associates and prevent them from spreading to them through quarantine. It seems that this will make the work of the public service much easier in practical.

2. Scenario

The main problem we can find in the world these days is the covid -19 virus.
In a typical system, for example, when you go to an institution, there is a pen with a book on the front of the institution. We write our name, address, and National Identity Card number on it. But one problem there is now is that everyone who comes uses the same pen. This increases the risk of contracting the covid 19 virus. Also, it is not easy to get the relevant information through this type of hard copy if you want to know some information as a primary problem here. The efficiency of this process is low.
In fact, with the normal system, we can only get information in one place
This process is not efficient. Because it's hard for people to go. You have to go there and stay for a long time. Also, if several members of a family come, only one person represents several members of the family. Then everyone's information will not be available.

3. solution

What happens in this normal system is that people are made aware of a certain place. Our newly created system is really about awareness of places through people.
If a person is infected with the Covid 19 virus, when we insert it into our system, we can track all places where he went through our system data. Our system really does is store data so that we can get the data. This can prevent the Covid-19 virus from infecting individuals.

4. processing system

This system allows PHIs to obtain covid-19 information about individuals within their Grama Niladhari domain.so We selected Galigammuwa divisional Secretariat for this system. We have included all the Grama Niladhari Divisions in Galigamuwa Divisional Secretariat in this system.

The main role here is done by PHI. The process itself takes place under 4 parts.

- Registering people in the system is the main part of this
- registering places in the system
- PHI's Procedure
- tracking system

Every company has a username and password. Also, the relevant person must be pre-registered in the system. After the relevant person registers with the system, when a company starts in the morning, the relevant person has to log in to the system first. In this way, the system records the information of the people who come to the institution on a daily basis.

What usually happens in a system is that the person's ID number is written in a book. But what happens here is that the NIC number is typed in the system. Once it is entered, the relevant person will automatically record the time of entry into the organization and all other databases in this manner.

Each domain has a PHI. Domain information can only be viewed by PHIs in the relevant domain. PHI can find Data on vaccinations of persons in PHI's domain and all their other information here.

Its other convenience is that when it finds out that someone in their domain is infected with covid-19, PHI can log in to the system and track and find all places where the he went of the covid-19 infected person through the tracking system. After that, this information to the institutions and places where the person has gone will be informed.

The first function of our system is to register people in this system. Only those who are registered in the system can work in the system. When the person enters the ID number, the system will check if the relevant person is a previously registered person. If that person has not registered before, the person will need to register anew at that time.

As for the registration part, we take the person's name and ID number. The system checks the ID number to see if it has been registered before. It checks if the ID number is under the relevant conditions. If it is not a valid ID number, it will be re-entered. Then check the password. The password will be entered twice. Then the password entered twice will be checked to see if it matches. If it does not match, the password will be entered again.

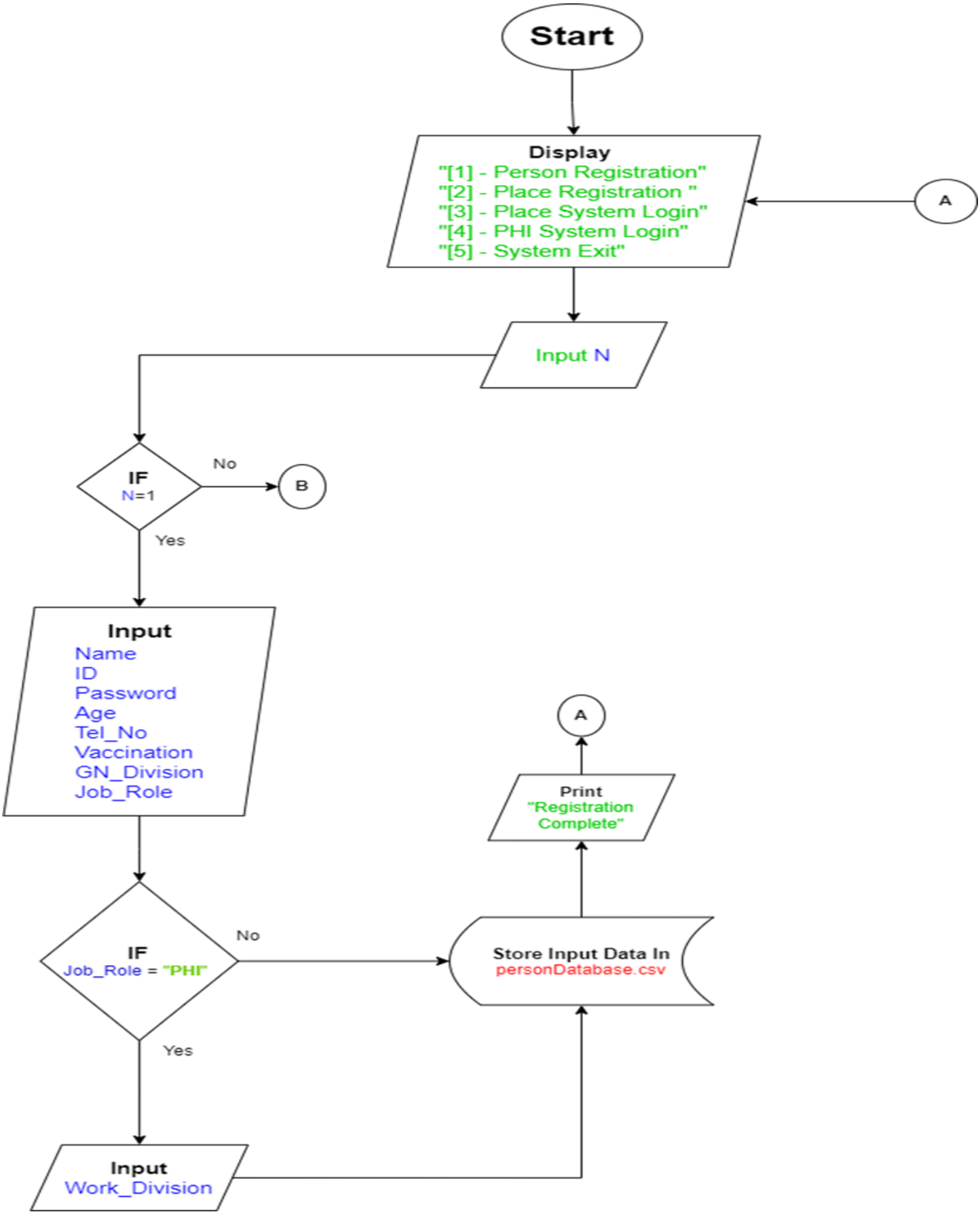
Next, get the age and phone number into the system. Then check the information about the vaccination. Then select the Grama Niladhari Division where relevant persons reside. This system shows only a few domains pertaining to the Galigamuwa Divisional Secretariat.

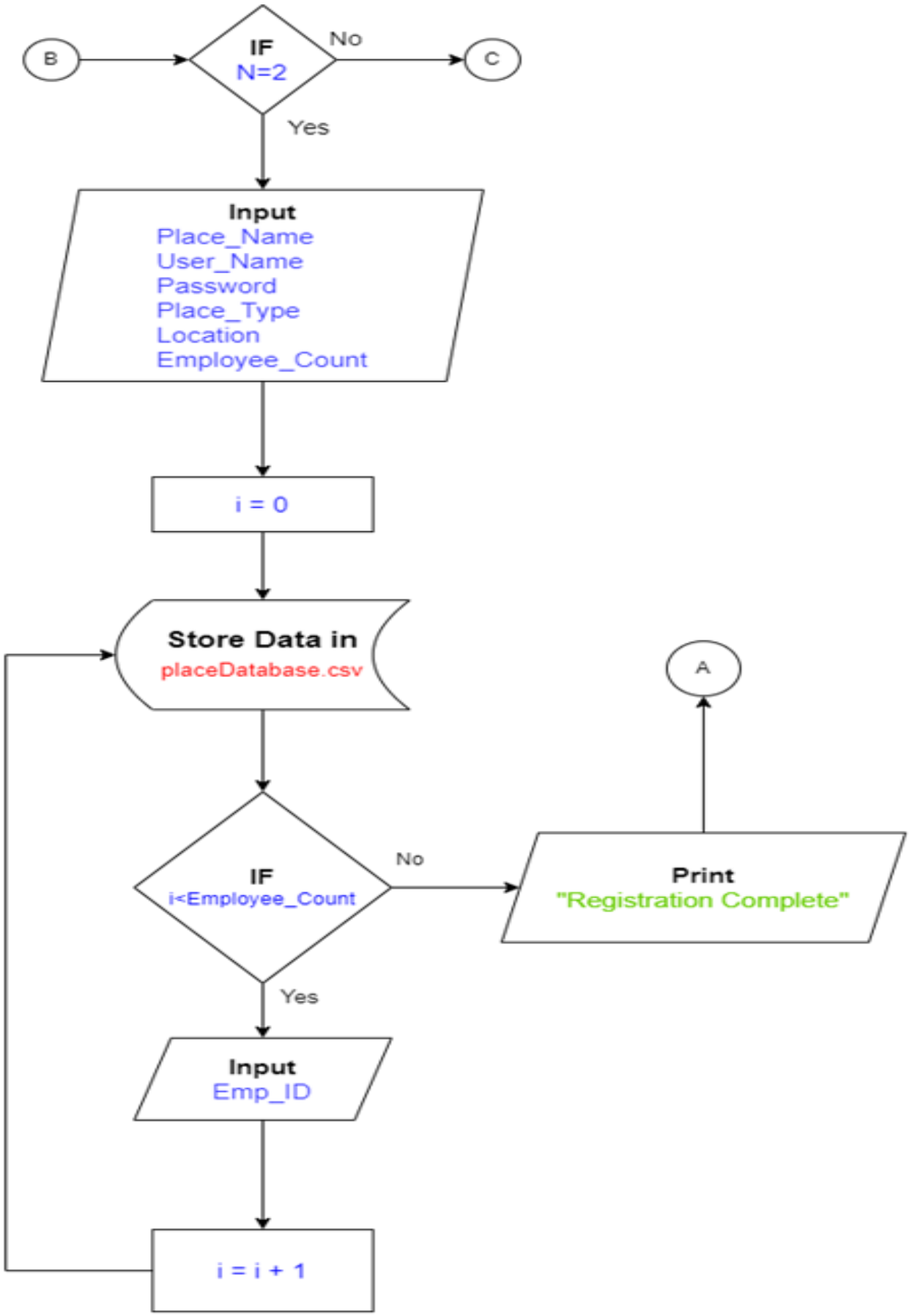
next need to select the job role. Here it's basically PHI and some other type. Later, with the aim of improving this system, we have added the police and Grama Niladhari to this system. Here, only the PHI has to add their working division to the system.

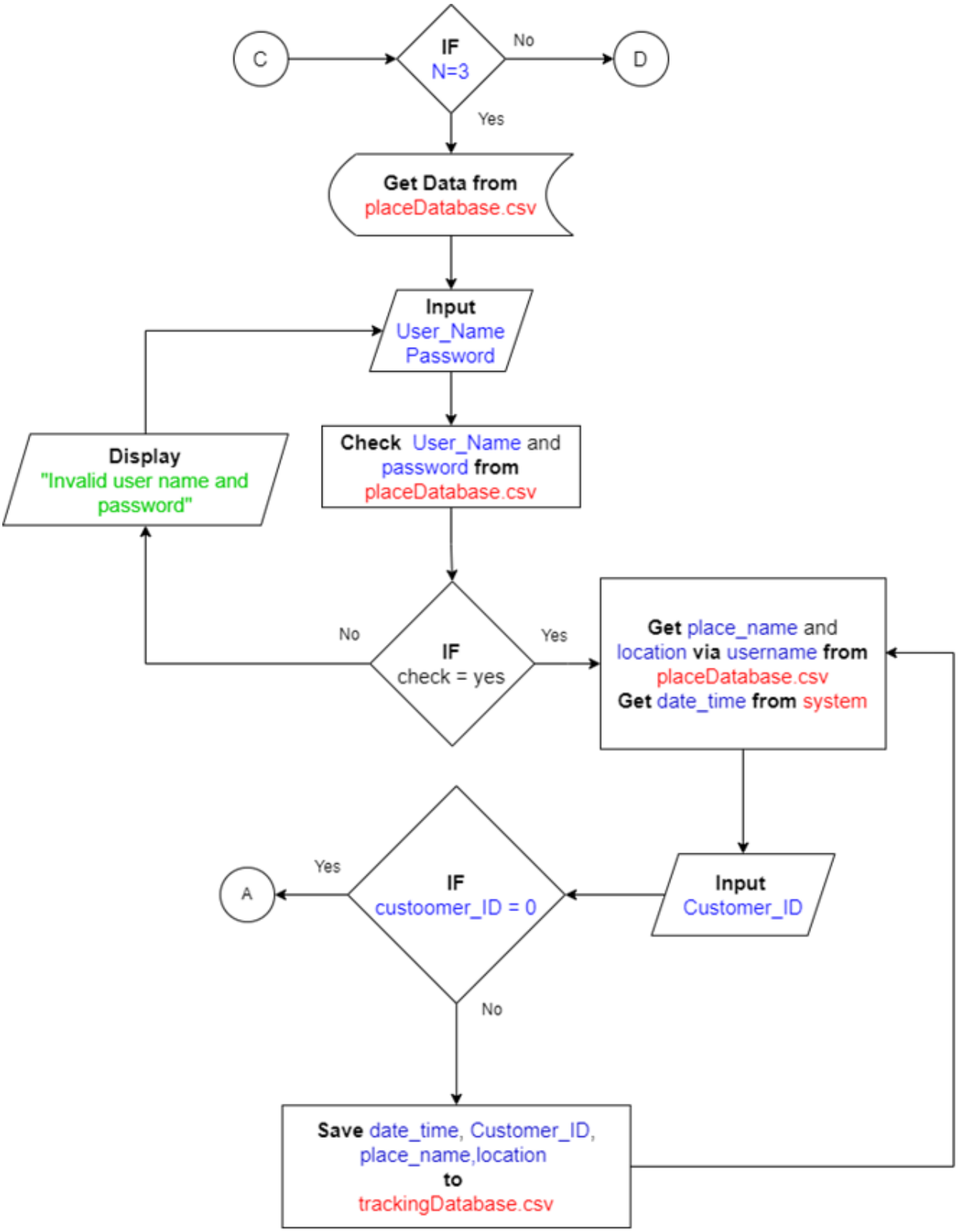
Consider place registration. Here first enter the name of the place. Next, we need to provide the user name there. When giving a user name, you need to type it without space. And it should be no one else has used before. As above, after entering the username, the system checks if it has been used before. If it has been used, it will come back to enter.

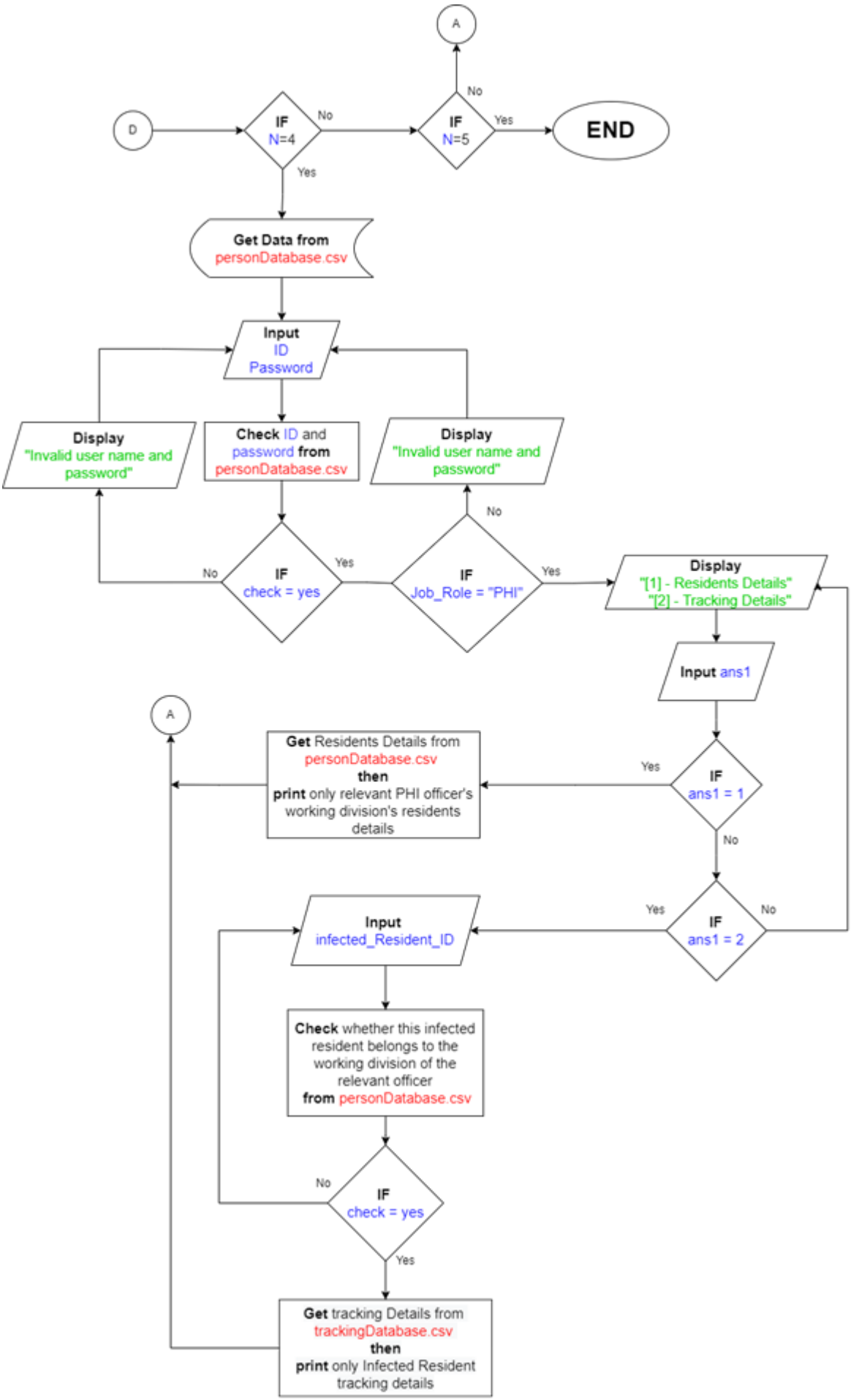
Next we need to select the type of place. We recently added to the system to select whether it is a bank, a restaurant, a grocery shop, a supermarket, a liquor shop, a pharmacy, a textile shop or a saloon. You need to select the relevant type from these. Then we need to select the location. There you have to select what is the Grama Niladhari Division where the relevant place is located.

5.Flow Chart


Start
Display
"[1] - Person Registration"
"[2] - Place Registration "
"[3] - Place System Login"
"[4] - PHI System Login"
"[5] - System Exit"
A
Input N
IF
N=1
No
B
Yes
Input
Name
ID
Password
Age
Tel_No
Vaccination
GN_Division
Job_Role
A
Print
"Registration
Complete"
IF
Job_Role = "PHI"
No
Store Input Data In
personDatabase.csv
Yes
Input
Work_Division


B
IF
N=2
No
C
Yes
Input
Place_Name
User_Name
Password
Place_Type
Location
Employee_Count
i = 0
Store Data in
placeDatabase.csv
A
IF
i<Employee_Count
No
Print
"Registration Complete"
Yes
Input
Emp_ID
i = i + 1


C
IF
N=3
No
D
Yes
Get Data from
placeDatabase.csv
Input
User_Name
Password
Display
"Invalid user name and password"
Check User_Name and password from placeDatabase.csv
No
IF
check = yes
Yes
Get place_name and location via username from placeDatabase.csv
Get date_time from system
Yes
A
IF
custoomer_ID = 0
Input
Customer_ID
No
Save date_time, Customer_ID, place_name,location to trackingDatabase.csv


A
No
D
IF
N=4
No
IF
N=5
Yes
END
Yes
Get Data from
personDatabase.csv
Input
ID
Password
Display
"Invalid user name and password"
Check ID and password from personDatabase.csv
Display
"Invalid user name and password"
No
No
IF
check = yes
Yes
IF
Job_Role = "PHI"
Yes
Display
"[1] - Residents Details"
"[2] - Tracking Details"
Input ans1
A
Get Residents Details from personDatabase.csv then print only relevant PHI officer's working division's residents details
Yes
IF
ans1 = 1
No
Yes
IF
ans1 = 2
No
Input
infected_Resident_ID
Check whether this infected resident belongs to the working division of the relevant officer from personDatabase.csv
No
IF
check = yes
Yes
Get tracking Details from trackingDatabase.csv then print only Infected Resident tracking details

6.Pseudo code

```
START
        PRINT "[1] - Person Registration"
        PRINT "[2] - Place Registration"
        PRINT "[3] - Place System Login"
        PRINT "[4] - PHI System Login"
        PRINT "[5] - System Exit"

        PRINT "select"
        INPUT N

        IF N=1 THEN
                INPUT Name
                INPUT ID
                INPUT Password
                INPUT Age
                INPUT Tel_No
                INPUT Vaccination
                INPUT GN_Division
                INPUT Job_Role



                IF Job_Role = "PHI" THEN
                        INPUT Work_Devision
                ENDIF

                SAVE all data that got as input TO personDatabase.csv

                PRINT "Registration Complete"

        ELSE IF N=2 THEN
                INPUT Place_Name
                INPUT User_Name
                INPUT Password
                INPUT Place_Type
                INPUT Location
                INPUT Employee_Count

SAVE all data that got as input TO
                placeDatabase.csv
                i = 0
                WHILE i < Employee_Count
```

```
            INPUT Emp_ID
            i = i + 1
            SAVE Emp_ID TO
            placeDatabase.csv
        END WHILE
        PRINT "Registration Complete"

    ELSE IF N = 3 THEN
        INPUT User_Name
        INPUT Password

        CHECK User_Name AND Password
            FROM placeDatabase.csv

        IF User_Name and Password correct  THEN
            GET place_name and Location VIA
                username FROM plceDatabase.csv
            REPEAT
                GET date_time FROM system
                INPUT Customer_ID
                SAVE date_time,Customer_ID,
                    place_name, location TO
                    trackingDatabase.csv
            UNTIL Customer_ID = 0
        ELSE
            PRINT "Invalid User Name and Paassword"
        ENDIF



    ELSE IF N = 4 THEN
        INPUT ID
        INPUT Password
        CHECK ID and Password FROM
            personDatabase.csv
        IF ID AND Password correct THEN
            GET Job_Role via ID from
                personDatabase.csv
            IF job_Role = "PHI" THEN
                DISPLAY "[1] - Residents Details"
                DISPLAY "[2] - Tracking Details"
                INPUT ans1
                IF ans1 = 1 THEN
                    GET Residents Details FROM
                        personDatabase.csv THEN
                        PRINT only relevant PHI officer's residents details
```

```
                    ELSE IF ans1 = 2 THEN
                        INPUT  infected_Resident_ID
                        CHECK whether this infected resident belongs to the working
                        division of the relevant officer
                            FROM personDatabase.csv
                        IF checking pass THEN
                            GET tracking Details FROM trackingDatabase.csv
                            PRINT only infected Resident tracking  details
                        ENDIF
                    ENDIF
                ENDIF
            ELSE
                PRINT "Invalid user name and password"
            ENDIF
        ENDIF
END
```

7.Demonstration (Source-Code)

Source Code

Project files

1. main.c
2. reusingfunctions.h
3. personDatabase.csv
4. placeDatabase.csv
5. trackingDatabase.csv
6. banner.txt

Header file of main.c

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <ctype.h>
#include <time.h>
#include "reusingfunctions.h"
```

In main.c file we used above header files.

<stdio.h >

This header file contains standard input and output functions. It contains many functions, but we used only 9 of them for our programme. we used the following functions for our code.

- printf()
  - It is used to print the strings, integer, character, etc on the output screen
- scanf()
  - It reads the character, string, integer etc from the keyboard.
- getc()
  - It reads the character from the file.
- getchar()
  - It reads characters from the keyboard
- putchar()
  - It writes a character to the screen
- fopen()
  - opened file

- fclose()
  - closes file
- fpritnf()
  - writes formatted data to a file
- fscanf()
  - reads formatted data from a file

<stdlib.h>

This header file contains standard library functions. It contains many functions, but we used only 2 of them for our programme. we used the following functions for our code.

- system()
  - Perform Operating System Command
- atoi()
  - Convert String to Long Integer

<string.h>

This header file defines one variable type, one macro, and various functions for manipulating arrays of characters. It contains many functions,
we used the following functions.

- strcpy( )
  - Copies a string into another
- strcmp()
  - Compares two strings
- strlen()
  - calculates the length of string

- strtok()
    - splits a string into the token

<ctype.h>

The ctype.h header file of the C Standard Library declares several functions that are useful for testing and mapping characters.
we used the following functions.

- isalpha()
    - This function checks whether the passed character is alphabetic.
- isdigit()
    - This function checks whether the passed character is a decimal digit.
- isspace()
    - This function checks whether the passed character is white-space.

<reusingfunctions.h>

This header is a user-defined header file that we defined for our use. This header file include the following user-defined functions.

- ➔ banner()
    - ◆ This function is used to display the character-banner that we design in a text file (banner.txt).

```c
void banner()
{
    char *filename = "banner.txt";
    FILE *fp = fopen(filename, "r");

    if (fp == NULL){
        printf("\nFile not found!\n %s", filename);
    }
    // read one character at a time and
    // display it to the output
    char ch;
    while ((ch = fgetc(fp)) != EOF)
        putchar(ch);

    fclose(fp);

    printf("\n\t\t\t\tCovid19 Tracking System\n\n");
}
```

➔ selectDivisions()

- This function is used to select one of the grama niladhari divisions from the end-user. It returns the selected Grama Nildhari Division to the main function as a string.

```c
void selectDivisions(char* str){
    int ans;
    char devisions[11][11]={"Palapoluwa", "Arandara", "Kobbewala", "Hathnagoda",
        "Pindeniya", "Yattogoda", "Nawagamuwa", "Dewalegama", "Bisowela", "Ballapana"};
    for(int i=0;i<10;i++){
        printf("\t\t\t[%d] - %s\n",i+1,devisions[i]);
    }
    printf("\n");
    while (1){
        printf("Answer : ");
        scanf("%d",&ans);
        if (ans>=1 && ans<=10){
            break;
        }
        printf("\t\tINVALID INPUT..!\tTry Again\n");
    }
    //return string value
    strcpy(str, devisions[ans-1]);
}
```

➔ selectJobRoles()

- This function is used to select one of the Job Roles from the end-user. It returns the selected Job Role to the main function as a string.

```c
void selectJobRoles(char* str){
    int ans;
    char jobroles[5][16]={"PHI", "Police", "Grama Niladhari", "Other"};
    for(int i=0;i<4;i++){
        printf("\t\t\t[%d] - %s\n",i+1,jobroles[i]);
    }
    printf("\n");
    while (1)
    {
        printf("Answer : ");
        scanf("%d",&ans);
        if (ans>=1 && ans<=4){
            break;
        }
        printf("\t\tINVALID INPUT..!\tTry Again\n");
    }
    //return string value
    strcpy(str, jobroles[ans-1]);
}
```

➔ selectPlaceTypes()

- ◆ This function is used to select one of the Place-Type from the end-user. It returns the selected Place-Type to the main function as a string.

```c
void selectPlaceTypes(char*  str){
    int ans;
   char placetypes[9][16]={"Bank", "Restaurant", "Grocery", "Supermarket",
        "Liquor shop", "Pharmacy", "Textile shop", "Saloon"};
   for(int i=0;i<8;i++){
        printf("\t\t\t[%d] - %s\n",i+1,placetypes[i]);
    }
    printf("\n");
    while (1)
    {
        printf("Answer : ");
        scanf("%d",&ans);
        if (ans>=1 && ans<=8){
            break;
        }
        printf("\t\tINVALID INPUT..!\tTry Again\n");
    }
    //return string value
    strcpy(str, placetypes[ans-1]);
}

```

Structs

We have used five structs in this project.
In here we used the “typedef” function. “typedef” function used to give a name to data type. We can define new data types as our needs.

1. person struct

```
typedef struct person{
    char name[50],id[13],pass[6],gnDev[11],jbRole[16],wrkDev[11],tel[11],vaci[4];
    int age;

}personDict;
```

2. place struct

```
typedef struct place{
    char name[50],userName[30],plctype[16],pass[6],location[11];
    int empCount;

}placeDict;

```

3. workplace struct

```
typedef struct workplace{
    char id[13];
    char placeUsername[20];
}workplaceDict;
```

4. data struct

```
typedef struct data{
    char name[50],id[13],pass[6],gnDev[11],jbRole[16],wrkDev[11],tel[11],
    vaci[4],placeName[50],placeUsername[20],location[11],plctype[16];
    int age,empCount;

}fullDataDict;
```

5. tracking struct

```
typedef struct tracking{
    char time[30],id[13],placename[50],username[20],placetype[16],location[11];
}trackingDict;
```

Structure Variables Arrays

```
//Strcuture variable arrays
personDict personVal[1000];
placeDict placeVal[1000];
workplaceDict workVal[1000];
fullDataDict dataval[1000];
trackingDict trackVal[1000];
```

Functions

- Update Structure functions

    - updatePersonDict()

```c
void updatePersonDict(){

    FILE *fp = fopen("personDatabase.csv","r");
  if (!fp)
    {
        printf("Can't find file");
    }

    char buff[1000]; //store the first 1024 lines into buff
    int row_count = 0;
    int filed_count = 0;

    int i=0;
    while(fgets(buff,1000, fp))
    {
        //printf("%s\n", buff);
        filed_count =0;
        row_count++;
        if(row_count==1)
            continue;

        char *field = strtok(buff, ",");
        while (field)
        {
            if(filed_count==0)
                strcpy(personVal[i].name, field);
            if(filed_count==1)
                strcpy(personVal[i].id, field);
            if(filed_count==2)
                strcpy(personVal[i].pass, field);
            if(filed_count==3){
                int cfield = atoi(field);
                personVal[i].age = cfield;
            }
            if(filed_count==4)
                strcpy(personVal[i].tel, field);
            if(filed_count==5)
                strcpy(personVal[i].vaci, field);
            if(filed_count==6)
                strcpy(personVal[i].gnDev,field);
            if(filed_count==7)
                strcpy(personVal[i].jbRole,field);
            if(filed_count==8)
                strcpy(personVal[i].wrkDev,field);

            field = strtok(NULL, ",");
            filed_count++;
        }
        i++;
    }
    fclose(fp);

    //printValues(values,count);
}
```

The personDatabase.csv file contains all of the data of registered persons. The data in the person database.csv file puts into the person structure by 'updatePersonDict' function. when the program working all of the data in the CSV file copies to structure using this function. this whole process is similar to the process of RAM.

- updatePlaceDict()

```c
//Update CSV to Place Dict
void updatePlaceDict(){
    FILE *fp = fopen("placeDatabase.csv","r");
  if (!fp)
    {
        printf("Can't find file");
    }
    //find line count
    //int count= count_lines("personDatabase.csv");


    char buff[1000]; //store the first 1024 lines into buff
    int row_count = 0;
    int filed_count = 0;

    //personDict values[1000]; //array to structs to store values

    int i=0;
    while(fgets(buff,1000, fp))
    {
        //printf("%s\n", buff);
        filed_count =0;
        row_count++;
        if(row_count==1)
            continue;

        char *field = strtok(buff, ",");
        while (field)
        {
            if(filed_count==0)
                strcpy(placeVal[i].name, field);
            if(filed_count==1)
                strcpy(placeVal[i].userName, field);
            if(filed_count==2)
                strcpy(placeVal[i].pass, field);
            if(filed_count==3)
                strcpy(placeVal[i].plctype, field);
            if(filed_count==4)
                strcpy(placeVal[i].location, field);
            if(filed_count==5){
                int empcount = atoi(field);
                placeVal[i].empCount = empcount;
            }

            field = strtok(NULL, ",");
            filed_count++;
        }
        i++;
    }
    fclose(fp);
}
```

It simply reads the data in the placeDatabase.csv file and loads it into place struct. Like the data on the hard disk stored in the ram. These are taken whenever the program is running. Here we read the data one by one through the while loop. This way we can add information about the number of people we need.

- updateWorkPlaceDict()

```c
//Update Work Place Dict from place database
void updateWorkPlaceDict(){
    FILE *fp = fopen("placeDatabase.csv","r");
    if (!fp)
    {
        printf("Can't find file");
    }
    //find line count
    //int count= count_lines("personDatabase.csv");


    char buff[1000]; //store the first 1024 lines into buff
    int row_count = 0;
    int filed_count = 0;

    //personDict values[1000]; //array to structs to store values

    int i=0;
    while(fgets(buff,1000, fp)){
        char username[20],id[13];
        int empCount=0;
        //printf("%s\n", buff);
        filed_count =0;
        row_count++;
        if(row_count==1)
            continue;

        char *field = strtok(buff, ",");
        while (field){
            int found = 0;
            if (filed_count == 1) {

                strcpy(username,field);
            }
            if (filed_count == 5){
                empCount = atoi(field);

            }
            if((filed_count > 5) && (filed_count <= (5+empCount))){
                strcpy(id,field);
                found = 1;
            }
            field = strtok(NULL, ",");
            filed_count++;

            if(found == 1){
                // drawLinesM();
                // //print values
                // printf("\nID : %s\t User Name : %s\n",id,username);
                strcpy(workVal[i].id,id);
                strcpy(workVal[i].placeUsername,username);
                i++;
            }
        }

    }
    fclose(fp);

}
```

while reading the Data of placeDatabase.csv, it is adding the ID of the relevant person and his working place username to the workplace struct. In This way, everyone's details are made like a list. Using this list we can make a relation between person struct and place struct.

- updateFullDataDict()

```c
//update full Data Dcit
void updateFullDataDict(){
    for(int k=0; k<1000;k++){
        strcpy(dataval[k].id,personVal[k].id);
        strcpy(dataval[k].name,personVal[k].name);
        strcpy(dataval[k].pass,personVal[k].pass);
        strcpy(dataval[k].gnDev,personVal[k].gnDev);
        strcpy(dataval[k].jbRole,personVal[k].jbRole);
        strcpy(dataval[k].wrkDev,personVal[k].wrkDev);
        strcpy(dataval[k].tel,personVal[k].tel);
        strcpy(dataval[k].vaci,personVal[k].vaci);
        dataval[k].age = personVal[k].age;

        int p = checkWorkPosition(dataval[k].id); //check workplace dict to find place user_name of relevent user id
        int r = checkPlacePosition(workVal[p].placeUsername); //find position of relevant place_username


        strcpy(dataval[k].placeName,placeVal[r].name); //find place name using place_username
        strcpy(dataval[k].placeUsername,placeVal[r].userName);
        strcpy(dataval[k].location,placeVal[r].location);
        strcpy(dataval[k].plctype,placeVal[r].plctype);
        dataval[k].empCount=placeVal[r].empCount;

    }

}
```

Previously we got a person's workplace user name and person's ID into the workplace structure. In this **updateFullDataDict** function, we use those details to connect the other two structures. Here ID is the unique variable. Here this function gets details about a person from person Struct using his ID and gets details about his workplace using his workplace user name from place struct. And then put those details into the data struct. Then we can easily find some person's all details using this. We mainly use this structure in the program to find the person's details.

- updatetrackingDict()

```c
//update tracking Dict
void updatetrackingDict(){

    FILE *fp = fopen("trackingDatabase.csv","r");

    if (!fp){
            printf("Can't find file");
        }


    char buff[1000]; //store the first 1024 lines into buff
    int row_count = 0;
    int filed_count = 0;

    int i=0;
    while(fgets(buff,1000, fp))
    {
        //printf("%s\n", buff);
        filed_count =0;
        row_count++;
        if(row_count==1)
            continue;

        char *field = strtok(buff, ",");
        while (field)
        {
            if(filed_count==0)
                strcpy(trackVal[i].time, field);
            if(filed_count==1)
                strcpy(trackVal[i].id, field);
            if(filed_count==2)
                strcpy(trackVal[i].placename, field);
            if(filed_count==3)
                strcpy(trackVal[i].location,field);
            if(filed_count==4)
                strcpy(trackVal[i].placetype,field);
            if(filed_count==5)
                strcpy(trackVal[i].username, field);

            field = strtok(NULL, ",");
            filed_count++;
        }
        // printf("\n%s\n",trackVal[i].time);
        i++;
    }
    fclose(fp);

}
```

updateTrackingDict function does input the data to tracking structure from the 'tracking Database.CSV' file.

Check Position functions

- checkPersonPosition()

```c
//check position from Person Dict
int checkPersonPosition(char id[20]){

    for(int i=0;i<1000;i++){
         if(strcmp(id,personVal[i].id)==0){
             return i;
         }
    }return -1;
}
```

The **checkPersonPosition()** function returns the position of the required ID in the person structure as an integer value. If the ID is not in the structure, it returns the **-1**.

- checkPlacePosition()

```c
//check position from Place Dict
int checkPlacePosition(char id[20]){

    for(int i=0;i<1000;i++){
         if(strcmp(id,placeVal[i].userName)==0){
             return i;
         }
    }return -1;
}
```

The **checkPlacePosition()** function returns the position of the required username in the place structure.
When we call the **checkPlacePosition()** function and give the username of the place we want to find in the place structure, it will auto-check and return the position of the username we gave. If the username is not inside of the structure, it returns the **-1**.

- checkWorkPosition()

```c
//check position from Work Place Dict
int checkWorkPosition(char id[20]){

    for(int i=0;i<1000;i++){
         if(strcmp(id,workVal[i].id)==0){
             return i;
         }
    }
}
```

The **checkWorkPosition()** function returns the position of the required ID in the workplace structure. If the ID is not in the structure, it returns the -1.

Special functions

- count_lines()

```c
//Count line numbers in CSV file
int count_lines(char csvfile[20]){

FILE *fp = fopen(csvfile,"r");
  if (!fp)
    {
        printf("Can't find file");
        return 0;
    }
    int count = 0;
     char c;
     for (c = getc(fp); c != EOF; c = getc(fp)){
        if (c == '\n') // Increment count if this character is newline
            count = count + 1;}
    //printf("count of lines : %d\n\n", count);
    fclose(fp);
    return count;
}
```

When we call the **countline** function with entering the name of the CSV file, it returns the number of the row's count in the relevant CSV file.

- stringcompare()

```c
// Comparing both the strings using pointers
int stringcompare(char *a,char *b) {
   int flag=0;
    while(*a!='\0' && *b!='\0')  // while loop
    {
        if(*a!=*b){
            flag=1;
        }
        a++;
        b++;
    }

    if(flag==0)
    return 0;
    else
    return 1;
}
```

This function is used to compare two strings. We only use this function to compare two strings in the same or different two structures, not to compare other strings. We created this function especially because the "strcmp()" function can't use to compare two strings in the same or different structructures.

- drawLines()

```c
//Draw LInes in Main.c
void drawLines(){
    for(int k=0;k<110;k++){
            printf("_");}
        printf("\n");
}
```

drawLines functions draw a vertical line in the user interface. This is used to display the list in a user-friendly way.

- refresh()

```c
//Refresh
void refresh(){
    updatePersonDict();
    updatePlaceDict();
    updateWorkPlaceDict();
    updatetrackingDict();
    updateFullDataDict();

}
```

In this **refresh()** function, it call all update-functions at once. Calling of this function is mandatory after adding new data to the CSV files.

Main functions

1. regPerson()
2. regPlace()
3. tracking()
4. PHI()

(1) **regPerson()**

This function's main role is to register new persons to the Covid-19 Tracking System. It gets user details as inputs from the end-user then stores those in a personDatabase.csv file.
To use this system All residents have to register in this system. Here only can register Galigamuwa divisional secretariat area residents, Because this system made for that particular division.

Variables Which are included in regPerson() function

```
char name[50],id[13],pass1[6],pass2[6],gnDev[11],jbRole[16],wrkDev[11],tel[11];
int age,vaci;
```

Following codes are used to display user interface as clean and clear

```
system("cls");
banner();
printf("\t\t\t       [@]-Person Registration-[@]\n\n");
```

Here get the name from the user as string data and also we have the ability to input names with space.

```
//name
    printf("Name : ");
    scanf("%[^\n]s",name);
```

Here we get the user's ID number as a string. Then we check if this ID number is in the person struct. If this id number is available in the system, an error will be displayed. Then display a message re-entering the ID number. If the id number provided is a newcomer who does not have the system, it will check that ID number to see if it is a standard ID number. If the ID number given is a standard one, it will be stored as an ID number. If it is not a standard ID number then display a message re-entering the ID number.

```c
//ID
while(1){
    printf("ID : ");
    scanf("%s",id);

    int s = checkPersonPosition(id);
    if (s!=-1){
    printf("\t\t\n*This is user is already in the system*\n\n");

    }
   else if(strlen(id)==10){
       if(id[9]=='v'||id[9]=='V'){
           int findAlpha=0;
           for(int i=0;i<9;i++){
               if(isalpha(id[i]))
                   findAlpha=1;
           }
           if (findAlpha!=1)
               break;
       }

   }else if(strlen(id)==12){
           int findAlpha=0;
           for(int i=0;i<12;i++){
               if(isalpha(id[i]))
                   findAlpha=1;
   }if (findAlpha!=1)
               break;
   }
   printf("\t\t\tInvalid ID! Re-Enter\n");
}
```

Now we consider the part of inputting the password. the password in a string data type. the password entered here must have five characters. user must input the password twice to the system. It then checks that the two passwords entered are identical and that the password has 5 characters. otherwise, it will display the entered password wrong and after that display re-entering the password.

```c
//pasword
printf("\t\tEnter password (*password should be contain 5 character*)\n");
while(1){

printf("Password : ");
scanf("%s",pass1);
printf("Re-Enter Password : ");
scanf("%s",pass2);
if((strcmp(pass1,pass2))==0 && strlen(pass1)==5){
    break;}
    printf("\t\t\tInvalid Password! Re-Enter\n");
}
```

Now consider the age data. we input age as an INTEGER data type. Age data save as a variable. when input the age, age is considered as a between 15 - 100 age otherwise system display a message as an ' invalid input re-enter the age'.

```c
//Age
 while(1){
     printf("Age : ");
     scanf("%d",&age);
     if(age>=15 && age<100)break;

     printf("\t\tINVALID INPUT..!\tRe-Enter\n");
 }
```

Here we take the phone number as a string and put it in the "tel" string. Here we check whether the given input is of ten characters. Then we check whether each of the characters here is a digit. Only if both these factors are satisfied will the system obtain this as a valid phone number. Otherwise, you will see a message asking you to enter the phone number again.

```c
//Telephone Numebr
    while(1){
        printf("Tel No : ");
        scanf("%s",tel);
        if(strlen(tel)==10){
            int findAlpha=0;
               for(int i=0;i<10;i++){
                   if(isalpha(tel[i]))
                       findAlpha=1;
               }
               if (findAlpha!=1)
                   break;
        }
        printf("\t\tINVALID INPUT..!\tRe-Enter\n");
    }
```

Here we first put the two strings 'no' and 'yes' in a string 2D array. Then here we show the user to enter number 1 if you have been vaccinated and number 0 if you have not been vaccinated. Then we get the input from the integer data type. We get it for an integer variable. Then we check whether the input we get is 1 or 0 and if it is one of the two we get one valid input. Otherwise, we will show this as invalid income and display it as input again.

```c
//Vacination Status
 char vaciF[3][10]={"no","yes"};
 printf("\nVaccination Status :=> \n");
 printf("\t\t[1] - Yes\n\t\t[0] - No\n");
 while (1)
 {
     printf("Answer : ");
     scanf("%d",&vaci);
     if (vaci==1 || vaci==0)break;
     printf("\t\tINVALID INPUT..!\tRe-Enter\n");
 }
```

Here the details of the person's residence are obtained. And store that information in the “gnDev” string. Also here “selectDivision” function gets the user's residence information as described above in “reusefunction.h” and out that residence information as a return. Then that information is stored in the “gnDev” string.

```
//select devision
    printf("\nSelect your division :=> \n");
    selectDivisions(gnDev);
```

Here the details of the person's Job Role are obtained. And store that information in “jbRole” character array. Also here the “selectJobRoles” function gets the user's job role information as described above in “reusefunction.h” and outputs that information as a return. Then that information is stored in the “jbRole” character array. If that job role is “PHI” then get the user’s working division using selectDivision function and get that output to “wrkDev” string. If the job role is not “PHI” then “wrkDev” assigned as none.

```
//select jobrole
printf("\nSelect your Jobrole :=> \n");
selectJobRoles(jbRole);

    //if PHI --> get his Working Deivision
    if(strcmp(jbRole,"PHI")==0){
        printf("\nSelect your working division :=> \n");
        selectDivisions(wrkDev);
    }else strcpy(wrkDev, "None");
```

The following code prints the data stored in the above variable at once. drawLines() function used to get user-friendly output from the system. We explain about drawLines() function under the above **special function** area.

```
drawLines();
printf("\n%s\t%s\t%s\t%d\t%s\t%s\t%s\t%s\t%s\n",name,id,pass1,age,tel,vaciF[vaci],gnDev,jbRole,wrkDev);
drawLines();
```

Here, the following codes write above data to personDatabase.csv file. Here we opened this CSV file in append mode(a+). That means when writing new data to the CSV file it will start to write from the end the existing data.

```
//write to the CSV
FILE* fp = fopen("personDatabase.csv", "a+");
    if (!fp) {
            // Error in file opening
            printf("Can't access Database\n");
        }
    fprintf(fp,"\n%s,%s,%s,%d,%s,%s,%s,%s,%s",name,id,pass1,age,tel,vaciF[vaci],gnDev,jbRole,wrkDev);
    printf("\nRegistration completed..\n\n");

    fclose(fp);
    system("pause");
```

(2)**regPlace()**

This function's main role is to register a new place to the Covid-19 Tracking System. It gets the place's details as inputs from the end-user then stores those in a placeDatabase.csv file.
Only can use this system place which is registered in this system. Here only can register Galigamuwa divisional secretariat area places, Because this system made for that particular division.

Variables Which are included in regPlace() function

```
char name[50],userName[30],plctype[16],pass1[6],pass2[6],location[11],empID[100][13];
int empCount,reg;
```

Following codes are used to display user interface as clean and clear

```
system("cls");
banner();
printf("\t\t\t       [@]-Place Registration-[@]\n\n");
refresh();
printf("\n");
```

We get the place name from the end-user as a String. Here we can input two parts or more of the name with space.

```
 //place name
printf("Name : ");
scanf("%[^\n]s",name);
```

Here we get the user name as a string. That username is the unique id used in this place. The system checks there is space in that user name. If there is space, you will see a message asking you to enter the user name again without space. If the user name is given without space then check that this user name has been used in the system before. This is stored as a valid user name only if it has not been used before. Otherwise, it will display as ‘already used user name’ and then display re-entering the user name.

```c
//place user name
printf("\n\t\tCreate User Name [*don't use space*]\n");
while(1){
    char temp;
    printf("User Name : ");
    scanf("%c",&temp); // temp statement to clear buffer
    scanf("%[^\n]s",userName);


    //check existing user name in place database
    int findspace=0;
    for(int i=0;i<strlen(userName);i++){
        if(isspace(userName[i]))
            findspace = 1;
    }
    int r=checkPlacePosition(userName);
        if (r==-1){

            if (findspace!= 1){
                break;
            }else{
                printf("\t\t\t*Invalid username! Re-Enter without space*\n");
            }

        }else printf("\n\t\t!!Error *This user name already used. Enter new user name*\n");
```

Now we consider the part of inputting the password. the password in a string data type. the password entered here must have five characters. user must input the password twice to the system. The two passwords entered are passed to the system as pass1 and pass2. It then checks that the two passwords entered are identical and that the password has 5 characters. otherwise, it will display the entered password wrong and after that display re-entering the password.

```c
//password
    printf("\n\t\tEnter password (*password should be contain 5 character*)\n");
    while(1){
    printf("Password : ");
    scanf("%s",pass1);
    printf("Re-Enter Password : ");
    scanf("%s",pass2);
    if((strcmp(pass1,pass2))==0 && strlen(pass1)==5){
        break;}
     printf("\t\t\tInvalid Password! Re-Enter\n");
    }
```

```
//place type
    printf("\nSelect place type :=> \n");
    selectPlaceTypes(plctype);
```

Here it gets the location where the place location from the end-user. The Grama Niladhari Division where the place is located is shown here. we used the selectDivision function here which use before. the obtained location is stored as a STRING in a location character array

```
//place Location
    printf("\nSelect place location :=> \n");
    selectDivisions(location);
```

Here we get the number of employees working in the relevant place or organization from the user. That number is obtained from the integer data type. Then it is assigned to the variable empCount.

```
//employee count
    printf("\nCount of employees : ");
    scanf("%d",&empCount);
```

Here Collect employees' IDs. In this function, we collect the IDs of employees. Earlier we collected the employee's count. Here we must get IDs according to the number of employees. Let's think like this. If the employee IDs are 5, then this program runs five times and collects those IDs. In this procedure, we checked the IDs while collecting IDs and we checked again are these IDs in the person structure or not. These IDs should be in the person structure. And also those employees should register to the system. Otherwise, we can't add them here. We check it definitely. If the employee is in this list they will add to the system automatically. Otherwise, a message will indicate "the employee isn't in this system, and do you like to register for the system? " In this situation, If the user chooses "yes" then we use the regPerson function to reg those persons who are not registered in the system to register.

```c
//collect employee IDs
    printf("\nEnter employees NIC Numbers one by one => \n");
    int i=0;
    while (i<empCount)
    {
        printf("\n\t\t[%d] employee NIC : ",i+1);
        scanf("%s",empID[i]);
        int s=checkPersonPosition(empID[i]);

        if (s!=-1){
            i++;
        }
        else {
            printf("\n\t!!Error. *This employee not registered in the system*\n");
            printf("\nDo you like to register him first :=> \n");
            printf("\t\t[1] - Yes\n\t\t[0] - No\n");
            while (1)
            {
                printf("Answer : ");
                scanf("%d",&reg);
                if (reg==1 || reg==0)break;
                printf("\t\tINVALID INPUT..!\tRe-Enter\n");
            }
            if (reg==1){
                char temp1;
                scanf("%c",&temp1); // temp statement to clear buffer
                regPerson();
                printf("\n\n\t\t*Back to the place registration*\n");
            }
        }

    }
```

Here, the following codes write above data to placeDatabase.csv file. Here we opened this CSV file in append mode(a+). That means when writing new data to the CSV file it will start to write from the end the existing data.

```
FILE* fp = fopen("placeDatabase.csv", "a+");
if (!fp) {
        // Error in file opening
        printf("Can't access Database\n");
    }
///write to csv
fprintf(fp,"\n%s,%s,%s,%s,%s,%d",name,userName,pass1,plctype,location,empCount);
//print
drawLines();
printf("\n%s\t%s\t%s\t%s\t%s\t%d\n",name,userName,pass1,plctype,location,empCount);
drawLines();
//employee IDs
for (int d = 0; d < empCount; d++)
{
    fprintf(fp,",%s",empID[d]); //write to csv
    printf("\t%s",empID[d]); //print
}
int end = 0;
fprintf(fp,",%d",end);
fclose(fp);
printf("\n");
printf("Registration completed..\n\n");

system("pause");
```

After writing input data up to the employee count, then write employee IDs. When we were coding this project we faced a problem at this point. Because since the number of columns count is depending on each place employee count. Then when the Program is reading data from this CSV file It couldn't identify the end of each row. For that, we put "0" at end of each raw. Then while the program read one by one element in each raw, when it finds "0" it identifies this is the end of this raw and then it goes to the next raw.

Covid-19-Tracking-System > placeDatabase.csv

```
,Employee Count,Emp1,Emp2
5,Supermarket,Yattogoda,3,992401800V,123587451V,998432184V,0
shop,Pindeniya,5,981234567V,974562184V,871385415V,893218712V,963218544V,0
nagoda,3,987236687V,200123654789,199922378511,0
345,Supermarket,Galigamuwa,5,992408956V,199723456789,954568712V,922563987V,200123654789,0
agoda,4,200023654896,986661859V,563874325681,992022280V,0
ewalegama,3,987960264V,978956245V,200023654896,0
```

(3)tracking()

In the tracking function, you have to log in to this system by giving your username and password at the time of starting the duties of the system registry.There it checks if this place is previously registered in the system.If you are not registered,you can not log in to the system.Then you have to enter the ID number of the customers who will come on that day.The data is then saved in the trackingDatabase.csv file.Here the data is saved along with the time and date.Also the data of the place is saved in the tracking database.The data of the place to be saved is obtained through the place structure.This makes it easier for us to read the data.
After when the day's duties are over and '0' is given as an input,the relevant place will be logged out by the tracking system.

```c
//Tracking
void tracking(){
    char user[13], pass[6];
    int place_p = 0;


    //system login
    while(1){

        system("cls");
        banner();
        printf("\n\t\t\t\t[@]-Place System Login-[@]\n\n");
        refresh();

        printf("\nUsername : ");
            scanf("%s",user);
            printf("Password : ");
            scanf("%s",pass);

        place_p =  checkPlacePosition(user); //in here,if checkplace functions couldn't
                                             //   find usesr name it will return -1

        // printf("\n%d\n",place_p);
        // printf("\n%s\n",placeVal[place_p].userName);
        // printf("\n%s\n",placeVal[place_p].pass);

        if((place_p!=-1)&&(strcmp(placeVal[place_p].pass,pass)==0)){
            printf("\nLogin Complete\n");
            break;
        }
        system("cls");
        banner();
        printf("\n\t\t\t\t[@]-Place System Login-[@]\n\n");

        printf("\n\t\tIncorrect user name or password.. Try again!\n\n");
    }

```

```c
    system("cls");
    banner();
    printf("\n\t\t\t\t[@]-Customer Attendence-[@]\n\n");

    printf("\n\t\t**Enter 0 for exit system**\n\n");
    //get customer id
    while(1){
        char customerTD[13];
        printf("Customer ID : ");
        scanf("%s",customerTD);

        if(strcmp(customerTD,"0")==0){
            printf("\n\t\tSystem Exit\n\n");
            break;
        }

        //check customer id in the person database
        int e = checkPersonPosition(customerTD);
        if (e!=-1){
            //get current date and time
            time_t currentTime;

            //remove \n from ctime()
            currentTime = time(NULL);
            char *c_time = ctime(&currentTime);
            c_time[strcspn(c_time, "\n")] = '\0'; //replace \0 instead of \n


            //write to the CSV
            FILE* fp = fopen("trackingDatabase.csv", "a+");
                if (!fp) {
                        // Error in file opening
                        printf("Can't access Database\n");
                    }
                fprintf(fp,"\n%s,%s,%s,%s,%s,%s",c_time,customerTD,placeVal[place_p].name,
                        placeVal[place_p].location,placeVal[place_p].plctype,placeVal[place_p].userName);
                printf("\n\t\tCompleted..\n\n");

                fclose(fp);
        }
        else if (e==-1){
            system("cls");
            banner();
            printf("\n\t\t\t\t[@]-Customer Attendence-[@]\n\n");

            printf("\n\t\tInvalid ID. This ID not in the system\n\n");
        }
    }
}
```

(4)PHI()

This function performs for PHI. To use this PHI have to log in first. In this function, PHI has many more facilities for doing his duty. The content hierarchy of this function is as follows,

1. Resident Details → residentsDetails()
    1.1. All Residents Details → allResidentsDetails()
    1.2. One Resident Details → oneResidentDetails()
2. Tracking Details → trackingDetails()
3. Main Menu

```c
char id[13], pass[6];
int PHI_Val=0;

printf("\n\t\t\t\t[@]-PHI System Login-[@]\n\n");

updatePersonDict();
```

System Login

```c
//System Loggin
while(1){

    printf("\nID : ");
    scanf("%s",id);
    printf("Password : ");
    scanf("%s",pass);

    int d = checkPersonPosition(id);

    int check1 =0;
    if(d!=-1){
        if((strcmp(personVal[d].id,id)==0) && (strcmp(personVal[d].pass,pass)==0) && (strcmp(personVal[d].jbRole,"PHI")==0)){
            check1=1;
            PHI_Val = d;
        }
    }

    if (check1==1){
        break;
    }

    system("cls");
    banner();
    printf("\n\t\t\t\t[@]-PHI System Login-[@]\n\n");

    printf("\n\t\t\tIncorrect user name or password.. Try again!\n\n");
}
```

It shows the options which PHI has. There are three options in PHI. Then user inputs the one number of three options. After that referrals to the function with the relevant number by the system.

```c
int run=1;
while(run){

    system("cls");
    banner();
    printf("\n\t\t\t\t\t   [@]-PHI System-[@]\n\n");

    printf("\nSelect :=> \n");
    printf("\t\t\t[1] - Residents Details\n");
    printf("\t\t\t[2] - Tracking Details\n");
    printf("\t\t\t[3] - Main Menu\n");

    int ans3;
    printf("\nAnswer : ");
    scanf("%d",&ans3);


    //Residents Details (****)
    if(ans3 == 1){
       residentsDetails(PHI_Val);
    }
    //See Tracking Details (****)
    if(ans3 == 2){
        trackingDetails(PHI_Val);
    }
    //system PHI exite
    if (ans3 == 3){
        break;
    }
    //system pause
    system("pause");
}
```

This is inside the resident details option in the main menu. Here we have two options to select whether we want All resident details or one resident details. Here the user can choose one of the two. This will direct you to the relevant function according to one of the two options.

1.ResidentsDetils()

```c
void residentsDetails(int PHI_Val){
    system("cls");
    banner();
    printf("\n\t\t\t\t[@]-Residents Details-[@]\n\n");
    printf("\n\nResidents Details :=>\n");
    printf("\t\t\t[1] - All Residents\n");
    printf("\t\t\t[2] - One Resident\n");

    int ans1;
    printf("\nAnswer : ");
    scanf("%d",&ans1);

    system("cls");
    banner();
    printf("\n\t\t\t\t[@]-All Residents Details-[@]\n\n");

    printf("\n\nPHI Working Devision : %s\n\n",personVal[PHI_Val].wrkDev);


    if (ans1 == 1){

        allResidentsDetails(PHI_Val);
    }
    if (ans1 == 2){
        oneResidentDetails(PHI_Val);
    }
}
```

1.1 allResidentDetails()

The main function of this work is to display the information of all the residents living in the relevant PHI working division. Here we get this information from a structure called a data structure. This data structure is a combination of person structure and place structure. All those details are displayed here. Those are details of the person and the details of the place where the person is working.

```c
void allResidentsDetails(int PHI_Val){
    int lineCount = count_lines("personDatabase.csv");
                //using this function print details of particular grama niladhari's working devision's residents
                for(int d=0;d<lineCount;d++){

                    if(stringcompare(personVal[PHI_Val].wrkDev,personVal[d].gnDev)==0){

                        //print line sperater
                        drawLines();
                        //print values
                        printf("\nName : %s\t ID : %s\t Age : %d\t Tel : %s\nVacination : %s\t GN Div : %s\n\nWork Place : %s\t Location : %s\t Type : %s\t Employee Count : %d\n",
                        dataval[d].name,dataval[d].id,dataval[d].age,dataval[d].tel,dataval[d].vaci,dataval[d].gnDev,dataval[d].placeName,dataval[d].location,dataval[d].plctype,dataval[d].empCount);

                    }
                }
                //draw line below last row
                drawLines();
                printf("\n");
}
```

1.2 oneResidentDetails()

The main task of this function is to collect details of people of the relevant public health inspectors division. In this function when we give the person's ID as input, then we can collect the personal details of the person and his occupation details as outputs. In this situation, we get the data from the data structure. Specially We must mention here that the public health inspector can only check the IDs of people in his own division.

```c
void oneResidentDetails(int PHI_Val){
    char R_ID[13];
    int wh=0;
    while(1){

        system("cls");
        banner();
        printf("\n\t\t\t\t[@]-One Resident Details-[@]\n\n");

        printf("\nEnter Resident ID : ");
        scanf("%s",R_ID);

        int n = checkPersonPosition(R_ID);
        if ((n!=-1) && (stringcompare(dataval[n].gnDev,dataval[PHI_Val].wrkDev)==0)){

            //print line sperater
            drawLines();
            //print values
            printf("\nName : %s\t ID : %s\t Age : %d\t Tel : %s\nVacination : %s\t GN Div : %s\n\nWork Place : %s\t Location : %s\t Type : %s\t Employee Count : %d\n",
            dataval[n].name,dataval[n].id,dataval[n].age,dataval[n].tel,dataval[n].vaci,dataval[n].gnDev,dataval[n].placeName,dataval[n].location,dataval[n].plctype,dataval[n].empCount);
            //draw line below last row
            drawLines();
            printf("\n");
            wh=1;
            break;
        }

        if(wh==1){
            break;
        }

        system("cls");
        banner();
        printf("\n\t\t\t\t[@]-One Resident Details-[@]\n\n");

        printf("\n\t\tInvalid ID..!\n");
        printf("\n\nDo you Need Try Again :=>\n");
        printf("\t\t\t[1] - YES\n");
        printf("\t\t\t[2] - NO\n");

        int ans2;
        printf("\nAnswer : ");
        scanf("%d",&ans2);

        if (ans2==2){
        break;
        }
    }
}
```

2. trackingDetails()

The main function of this function is that when a person in the PHI's working division becomes infected, PHI uses this function to input the infected person's ID number as an input, giving the person's personal information and information about his place of work as output. After that, the details of all the places where this person has traveled will be displayed below. Here you get information about the places where people have traveled through the tracking structure.

```c
void trackingDetails(int PHI_Val){
    char R_ID[13];
    while(1){

        system("cls");
        banner();
        printf("\n\t\t\t\t[@]-Tracking Details-[@]\n\n");

        printf("\nEnter Resident ID : ");
        scanf("%s",R_ID);

        drawLines();
        drawLines();
        int n = checkPersonPosition(R_ID);

        if ((n!=-1) && (stringcompare(dataval[n].gnDev,dataval[PHI_Val].wrkDev)==0)){

            printf("\nName : %s\t ID : %s\t Age : %d\t Tel : %s\nVacination : %s\t GN Div : %s\n\nWork Place : %s\t Location : %s\t Type : %s\t Employee Count : %d\n",
            dataval[n].name,dataval[n].id,dataval[n].age,dataval[n].tel,dataval[n].vaci,dataval[n].gnDev,dataval[n].placeName,dataval[n].location,dataval[n].plctype,dataval[n].empCount);
            drawLines();
            drawLines();
            printf("\n");

            printf("\t\t\t\t\t-Tracking Details-\n");
            for(int i=0; i<=1000; i++){

                if(strcmp(trackVal[i].id,R_ID)==0){

                    //print line sperater
                    drawLines();
                    //print values
                    printf("\n%s\t place : %s\t Location : %s\t Type : %s\n",trackVal[i].time,trackVal[i].placename,trackVal[i].location,trackVal[i].placetype);
                }

            }
            //draw line below last row
            drawLines();

            printf("\n");
            break;
        }

        system("cls");
        banner();
        printf("\n\t\t\t\t[@]-Tracking Details-[@]\n\n");


        printf("\n\t\tInvalid ID..!\n");
        printf("\n\nDo you Need Try Again :=>\n");
        printf("\t\t\t[1] - YES\n");
        printf("\t\t\t[2] - NO\n");

        int ans2;
        printf("\nAnswer : ");
        scanf("%d",&ans2);

        if (ans2==2){
            break;
        }

    }
}
```

main()

This is the main function of this program.
In this main function, it displays the main menu for the end-user and when the user selects one of the options from the menu it will direct to that particular function.

```c
int main()
{
    system("cls");
    //refresh data from databases
    refresh();
    //Print Banner
    banner();

    printf("\n\nSelect :=> \n");
        printf("\t\t\t[1] - Person Registration\n");
        printf("\t\t\t[2] - Place Registration\n");
        printf("\t\t\t[3] - Place System Login\n");
        printf("\t\t\t[4] - PHI System Login\n");
        printf("\t\t\t[5] - System Exit\n");

    int mainSelect;
    char temp;
    printf("\nAnswer : ");
    scanf("%d",&mainSelect);
    scanf("%c",&temp); //get temp character "\n"

    system("cls");
    banner();

    switch(mainSelect){

        case 1 :
            regPerson();
            main();
            break;
        case 2 :
            regPlace();
            main();
            break;
        case 3 :
            tracking();
            main();
            break;
        case 4 :
            PHI();
            main();
            break;
        case 5 :
            return 0;
            break;
        default :
            printf("\n\t\tInvalid Input..! Try Again.\n\n");
            main();
            break;
    }
    return 0;
}
```

CSV files

We used here CSV file instead of a text file as our database. Because CSV files are more advanced than text files for data storing and reusing them. In these CSV files, it identifies values separately using commas. That is the main advantage of using these files. Because we can store and read value with space as one value. In the text files, we can't do this.

personDatabase.csv

Covid-19-Tracking-System > personDatabase.csv

```csv
Name,ID,Password,Age,Tel Number,Vaccination Status,GN Division,Job Role,Working Division
Kavindra Weerasinghe,992401800V,78451,22,0774743603,yes,Kobbewala,PHI,Ballapana
Ruwan Kumara Pathirana,993525667V,12345,56,0713698521,no,Nawagamuwa,Other,None
Ashan Adithya,563874325681,56893,19,0712365874,yes,Ballapana,Police,None
Ishara Suvini,986661859V,45612,23,0771877337,yes,Nawagamuwa,PHI,Kobbewala
Kavinda Helitha,992511567V,78945,22,0701896381,yes,Ballapana,Other,None
Kavinu Manahara,200023654896,12345,21,0772368425,no,Nawagamuwa,Other,None
Sithara Dilshani,994563852V,12345,22,0715684234,yes,Kobbewala,Other,None
Anton Kumara,978956245V,12345,24,0718995823,no,Yattogoda,Other,None
Thilini Priyangika,987960264V,12345,32,0715698745,no,Ballapana,PHI,Dewalegama
Tharindu Romesh,992022280V,12345,22,0718963547,yes,Ballapana,PHI,Nawagamuwa
Sasan Dilantha,992589658V,12345,23,0718945216,yes,Ballapana,Police,None
```

placeDatabase.csv

Covid-19-Tracking-System > placeDatabase.csv

```csv
Name,User Name,Password,Place Type,Location,Employee Count,Emp1,Emp2
Athukorala Supermarket,AthukoralaSuper,12345,Supermarket,Yattogoda,3,992401800V,123587451V,998432184V,0
Sriyani Textile,Sriyani_Text,45612,Textile shop,Pindeniya,5,981234567V,974562184V,871385415V,893218712V,963218544V,0
City Pharmacy,city_phar,78956,Pharmacy,Hathnagoda,3,987236687V,200123654789,199922378511,0
Galigamuwa Food City,galigamuwa_foodCity,12345,Supermarket,Galigamuwa,5,992408956V,199723456789,954568712V,922563987V,200123654789,0
Helabojun ,helabojun,12345,Restaurant,Hathnagoda,4,200023654896,986661859V,563874325681,992022280V,0
Suvi Hardware,suvi_hardware,12345,Grocery,Dewalegama,3,987960264V,978956245V,200023654896,0
```

trackingDatabase.csv

Covid-19-Tracking-System > trackingDatabase.csv

```csv
date & time,Customer ID,Place Name,location,plce type,place Username
Tue Jan 25 14:40:45 2022,992022280V,Sriyani Textile,Pindeniya,Textile shop,Sriyani_Text
Tue Jan 25 14:40:54 2022,993525667V,Sriyani Textile,Pindeniya,Textile shop,Sriyani_Text
Tue Jan 25 14:45:39 2022,992401800V,Athukorala Supermarket,Yattogoda,Supermarket,AthukoralaSuper
Tue Jan 25 14:45:53 2022,563874325681,Athukorala Supermarket,Yattogoda,Supermarket,AthukoralaSuper
Tue Jan 25 14:46:00 2022,986661859V,Athukorala Supermarket,Yattogoda,Supermarket,AthukoralaSuper
Tue Jan 25 18:46:26 2022,992022280V,Galigamuwa Food City,Palapoluwa,Supermarket,galigamuwa_foodCity
Tue Jan 25 18:46:47 2022,200023654896,Galigamuwa Food City,Palapoluwa,Supermarket,galigamuwa_foodCity
Tue Jan 25 18:46:53 2022,563874325681,Galigamuwa Food City,Palapoluwa,Supermarket,galigamuwa_foodCity
Tue Jan 25 18:46:58 2022,986661859V,Galigamuwa Food City,Palapoluwa,Supermarket,galigamuwa_foodCity
Tue Jan 25 18:47:06 2022,563874325681,Galigamuwa Food City,Palapoluwa,Supermarket,galigamuwa_foodCity
Tue Jan 25 18:47:11 2022,993525667V,Galigamuwa Food City,Palapoluwa,Supermarket,galigamuwa_foodCity
Tue Jan 25 18:58:09 2022,563874325681,City Pharmacy,Hathnagoda,Pharmacy,city_phar
Tue Jan 25 18:58:13 2022,992022280V,City Pharmacy,Hathnagoda,Pharmacy,city_phar
Tue Jan 25 18:58:22 2022,986661859V,City Pharmacy,Hathnagoda,Pharmacy,city_phar
Tue Jan 25 18:58:27 2022,992511567V,City Pharmacy,Hathnagoda,Pharmacy,city_phar
Tue Jan 25 23:27:56 2022,992401800V,Helabojun ,Hathnagoda,Restaurant,helabojun
Tue Jan 25 23:28:06 2022,992511567V,Helabojun ,Hathnagoda,Restaurant,helabojun
Tue Jan 25 23:28:12 2022,994563852V,Helabojun ,Hathnagoda,Restaurant,helabojun
Tue Jan 25 23:29:04 2022,994563852V,Helabojun ,Hathnagoda,Restaurant,helabojun
Fri Feb 04 11:43:49 2022,992401800V,Athukorala Supermarket,Yattogoda,Supermarket,AthukoralaSuper
Fri Feb 04 11:44:11 2022,992022280V,Athukorala Supermarket,Yattogoda,Supermarket,AthukoralaSuper
Fri Feb 04 11:44:46 2022,992511567V,Athukorala Supermarket,Yattogoda,Supermarket,AthukoralaSuper
```

Text files

In our program, we only used one text file here.

Banner.txt

This text file includes our banner. Using banner() function this banner.txt file content is displayed on the user interface.

Covid-19-Tracking-System > banner.txt

```
 ____ _____     _____ ____    _  ___    _____ ____     _    ____ _  _______ ____
/ ___/ _ \ \   / /_ _|  _ \  / |/ _ \  |_   _|  _ \    / \  / ___| |/ / ___|  _ \
| |  | | | \ \ / / | || | | | | | (_) |   | | | |_) |  / _ \| |   | ' /|  _| | |_) |
| |__| |_| |\ V /  | || |_| | | |\__, |   | | |  _ <  / ___ \ |___| . \| |___|  _ <
 \____\___/  \_/  |___|____/  |_|  /_/    |_| |_| \_\/_/   \_\____|_|\_\_____|_| \_\
```

8.User Manual

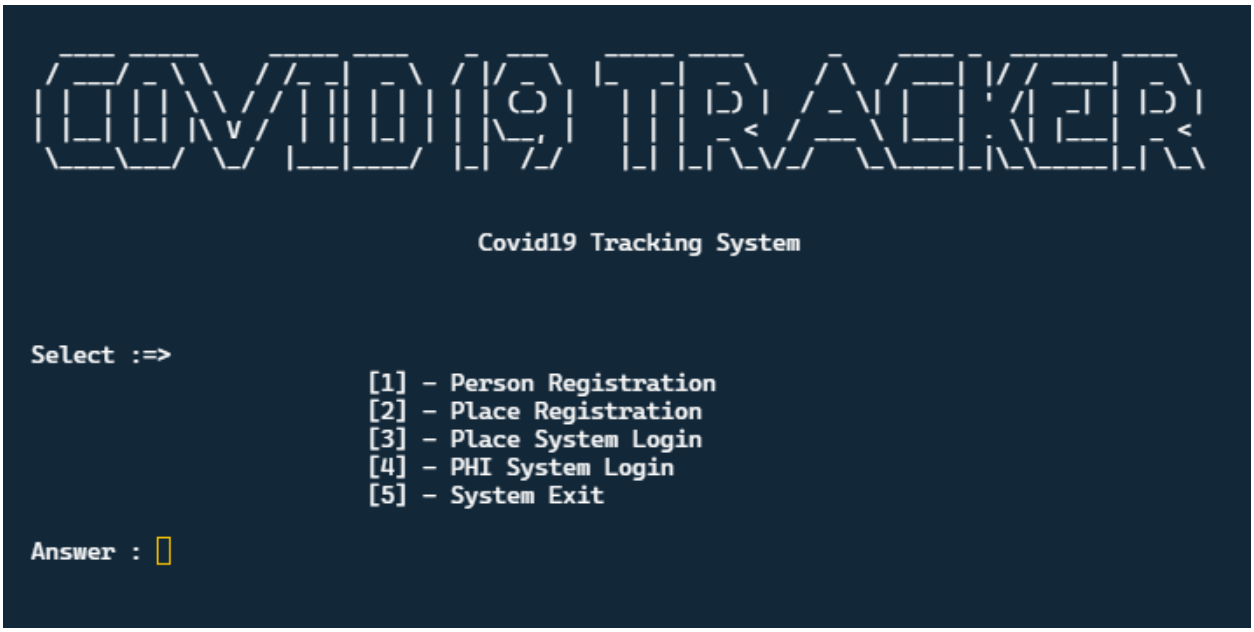
Covid-19 Tracking System
User Manual

Main Menu
1. Person Registration
2. Place Registration
3. Place System Login
4. PHI System Login
    1. Residents Details
        1. All Residents
        2. One Resident
    2. Tracking Details
    3. Main Menu
5. System Exit

Main Menu

(1)

This is the main interface of the programme. Here user can choose 5 options Depending on the needs of the user.



1. Person Registration

(2) This area used to register residents in the covid-19 tracking system.

```
 ____ _____     _____ ____    _  ___    _____ ____     _    ____ _  _______ ____
 / ___/ _ \ \   / /_ _|  _ \  / |/ _ \  |_   _|  _ \   / \  / ___| |/ / ___|  _ \
| |  | | | \ \ / / | || | | | | | (_) |   | | | |_) | / _ \| |   | ' /| |_| | |_) |
| |__| |_| |\ V /  | || |_| | | |\__, |   | | |  _ < / ___ \ |___| . \|  _|  _ <
 \____\___/  \_/  |___|____/  |_|  /_/    |_| |_| \_\/_/   \_\____|_|\_\_____|_| \_\


                              Covid19 Tracking System

                             [@]-Person Registration-[@]

Name : Kavindu Manahara
ID : 985687590V
                Enter password (*password should be contain 5 character*)
Password : 12345
Re-Enter Password : 12345
Age : 23
Tel No : 0718946852

Vaccination Status :=>
                [1] - Yes
                [0] - No
Answer : 1

Select your division :=>
                        [1] - Palapoluwa
                        [2] - Arandara
                        [3] - Kobbewala
                        [4] - Hathnagoda
                        [5] - Pindeniya
                        [6] - Yattogoda
                        [7] - Nawagamuwa
                        [8] - Dewalegama
                        [9] - Bisowela
                        [10] - Ballapana

Answer : 3
```

```
Select your Jobrole :=>
                        [1] - PHI
                        [2] - Police
                        [3] - Grama Niladhari
                        [4] - Other

Answer : 1
```

```
Select your working division :=>
                        [1] - Palapoluwa
                        [2] - Arandara
                        [3] - Kobbewala
                        [4] - Hathnagoda
                        [5] - Pindeniya
                        [6] - Yattogoda
                        [7] - Nawagamuwa
                        [8] - Dewalegama
                        [9] - Bisowela
                        [10] - Ballapana

Answer : 7
-------------------------------------------------------------------------------------------------------------
Kavindu Manahara      985687590V     12345   23     0718946852     yes     Kobbewala      PHI     Nawagamuwa
-------------------------------------------------------------------------------------------------------------

Registration completed..

Press any key to continue . . .
```

2. Place Registration

This area is used to register public places in the system.

```
 ____ _____    _____ ____   _ ___   _____ ____    _   ____ _ _______ ____
 / ___/ _ \ \  / /_ _|  _ \ / |/ _ \ |_   _|  _ \  / \ / ___| |/ / ___|  _ \
| | | | | \ \/ / | || |_| | | (_) |  | | | |_) |/ _ \| |   | ' /| _| | |_) |
| |__| |_| |\ V /  | || |_| | | \__, |  | | |  _ </ ___ \ |___| . \| |___|  _ <
 \____\___/ \_/  |___|____/ |_|  /_/   |_| |_| \_\/_/   \_\____|_|\_\_____|_| \_\

                              Covid19 Tracking System

                             [@]-Place Registration-[@]


 Name : Randinu Super

                 Create User Name [*don't use space*]
 User Name : randinu_super

                 Enter password (*password should be contain 5 character*)
 Password : 54321
 Re-Enter Password : 54321

 Select place type :=>
                         [1] - Bank
                         [2] - Restaurant
                         [3] - Grocery
                         [4] - Supermarket
                         [5] - Liquor shop
                         [6] - Pharmacy
                         [7] - Textile shop
                         [8] - Saloon

 Answer : 4
```

```
 Select place location :=>
                         [1] - Palapoluwa
                         [2] - Arandara
                         [3] - Kobbewala
                         [4] - Hathnagoda
                         [5] - Pindeniya
                         [6] - Yattogoda
                         [7] - Nawagamuwa
                         [8] - Dewalegama
                         [9] - Bisowela
                         [10] - Ballapana

 Answer : 6
```

```
Count of employees : 2

Enter employees NIC Numbers one by one =>

                [1] employee NIC : 992022280V

                [2] employee NIC : 992511567V

-------------------------------------------------------------------------------------------------------------

Randunu Super   randunu_super   54321   Supermarket     Yattogoda       2
        992022280V      992511567V
-------------------------------------------------------------------------------------------------------------

Registration completed..

Press any key to continue . . .
```

3. Place System Login

This area only can use in places that were registered in the system. Here when the public place is open, then the place has to log in to this area and enter the enrollment number of customers who enter the place during the day. After the end of the day, it can be logged out entering “0” instead of the customer ID.

```
 ____ _____    _____ ____   _  ___    _____ ____     _   ____ _  ______ ____
/ ___/ _ \ \  / /_ _|  _ \ / |/ _ \  |_   _|  _ \   / \ / ___| |/ / ___|  _ \
| |  | | | \ \/ / | || | | | | (_) |   | | | |_) | / _ \| |   | ' /| _| | |_) |
| |__| |_| |\ v /  | || |_| | |\__, |   | | |  _ < / ___ \ |___| . \| |___|  _ <
 \____\___/  \_/  |___|____/ |_|  /_/    |_| |_| \_\/_/   \_\____|_|\_\_____|_| \_\

                              Covid19 Tracking System

                              [@]-Customer Attendence-[@]

                 **Enter 0 for exit system**

Customer ID : 992401800V

                 Completed..

Customer ID : 0
```

4. PHI System Login

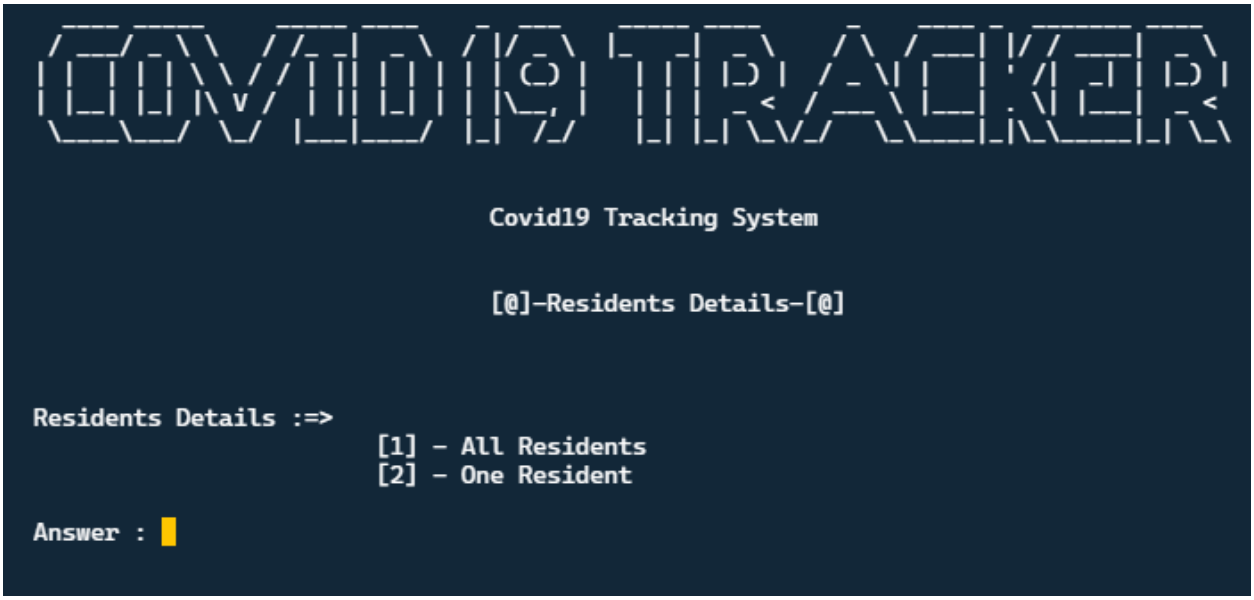
This area is for PHI officer. This can only use PHI officers who are registered in the system.

```
 ____ _____    _____ ____   _ ___   _____ ____    _   ___ _ ______ ____
 / __/ _ \ \  / /_ _|  _ \ / |/ _ \ |_   _|  _ \  / \ / __| |/ / ___|  _ \
| | | | | \ \/ / | || | | | | (_) |  | | | |_) |/ _ \| |  | ' /| _| | |_) |
| |__| |_| |\ v /  | || |_| | |\__, |  | | |  _ </ ___ \ |__| . \| |___|  _ <
 \____\___/ \_/  |___|____/ |_|  /_/   |_| |_| \_\/_/  \_\____|_|\_\_____|_| \_\

                          Covid19 Tracking System

                          [@]-PHI System Login-[@]

ID : 992022280V
Password : 12345
```

```
 ____ _____    _____ ____   _ ___   _____ ____    _   ___ _ ______ ____
 / __/ _ \ \  / /_ _|  _ \ / |/ _ \ |_   _|  _ \  / \ / __| |/ / ___|  _ \
| | | | | \ \/ / | || | | | | (_) |  | | | |_) |/ _ \| |  | ' /| _| | |_) |
| |__| |_| |\ v /  | || |_| | |\__, |  | | |  _ </ ___ \ |__| . \| |___|  _ <
 \____\___/ \_/  |___|____/ |_|  /_/   |_| |_| \_\/_/  \_\____|_|\_\_____|_| \_\

                          Covid19 Tracking System

                             [@]-PHI System-[@]

Select :=>
                    [1] - Residents Details
                    [2] - Tracking Details
                    [3] - Main Menu

Answer :
```

1. Residents Details

Using this option PHI can get details of residents who are living in his working division.



1. All Residents

Using This option PHI can get all details at once

```
 ____ _____    _____ ____   _  ___   _____ ____    _   ____ _ _______ ____
 / ___/ _ \ \  / /_ _|  _ \ / |/ _ \ |_   _|  _ \  / \ / ___| |/ / ___|  _ \
| | | | | \ \ / / | || | | | | (_) |  | | | |_) |/ _ \| |   | ' /| |_| | |_) |
| |__| |_| |\ V /  | || |_| | | |\__, |  | | |  _ </ ___ \ |___| . \|  _| |  _ <
 \____\___/ \_/  |___|____/ |_|  /_/    |_| |_| \_\/_/   \_\____|_|\_\_____|_| \_\

                              Covid19 Tracking System

                              [@]-All Residents Details-[@]


PHI Working Devision : Nawagamuwa


-------------------------------------------------------------------------------------------------------------

Name : Ruwan Kumara Pathirana    ID : 993525667V        Age : 56        Tel : 0713698521
Vacination : no  GN Div : Nawagamuwa

Work Place : Athukorala Supermarket      Location : Yattogoda    Type : Supermarket      Employee Count : 3
-------------------------------------------------------------------------------------------------------------

Name : Ishara Suvini     ID : 986661859V        Age : 23        Tel : 0771877337
Vacination : yes         GN Div : Nawagamuwa

Work Place : Helabojun   Location : Hathnagoda   Type : Restaurant       Employee Count : 4
-------------------------------------------------------------------------------------------------------------

Name : Kavinu Manahara   ID : 200023654896       Age : 21        Tel : 0772368425
Vacination : no  GN Div : Nawagamuwa

Work Place : Helabojun   Location : Hathnagoda   Type : Restaurant       Employee Count : 4
-------------------------------------------------------------------------------------------------------------

Press any key to continue . . .
```

2. One Resident

Using this option PHI can get individual resident information using an ID number.

```
 ____ _____    _____ ____   _  ___   _____ ____    _   ____ _ _______ ____
 / ___/ _ \ \  / /_ _|  _ \ / |/ _ \ |_   _|  _ \  / \ / ___| |/ / ___|  _ \
| | | | | \ \ / / | || | | | | (_) |  | | | |_) |/ _ \| |   | ' /| |_| | |_) |
| |__| |_| |\ V /  | || |_| | | |\__, |  | | |  _ </ ___ \ |___| . \|  _| |  _ <
 \____\___/ \_/  |___|____/ |_|  /_/    |_| |_| \_\/_/   \_\____|_|\_\_____|_| \_\

                              Covid19 Tracking System

                              [@]-One Resident Details-[@]


Enter Resident ID : 986661859V
-------------------------------------------------------------------------------------------------------------

Name : Ishara Suvini     ID : 986661859V        Age : 23        Tel : 0771877337
Vacination : yes         GN Div : Nawagamuwa

Work Place : Helabojun   Location : Hathnagoda   Type : Restaurant       Employee Count : 4
-------------------------------------------------------------------------------------------------------------

Press any key to continue . . .
```

2. Tracking Details

Using this option PHI can get tracking details of infected residents who are in his working division using an ID number.

```
 ____ _____    _____ ____   _  ___   _____ ____    _   ____ _  ______ ____
 / ___/ _ \ \  / /_ _|  _ \ / |/ _ \ |_   _|  _ \  / \ / ___| |/ / ___|  _ \
| |  | | | \ \/ / | || | | | | (_) |  | | | |_) |/ _ \| |   | ' /| _| | |_) |
| |__| |_| |\ v /  | || |_| | | |\__, |  | | |  _ </ ___ \ |___| . \| |___|  _ <
 \____\___/  \_/  |___|____/ |_|  /_/   |_| |_| \_\/_/   \_\____|_|\_\_____|_| \_\

                              Covid19 Tracking System

                              [@]-Tracking Details-[@]

Enter Resident ID : 986661859V
--------------------------------------------------------------------------------------------------------------
--------------------------------------------------------------------------------------------------------------

Name : Ishara Suvini     ID : 986661859V        Age : 23        Tel : 0771877337
Vacination : yes         GN Div : Nawagamuwa

Work Place : Helabojun   Location : Hathnagoda   Type : Restaurant       Employee Count : 4
--------------------------------------------------------------------------------------------------------------
--------------------------------------------------------------------------------------------------------------

                                       -Tracking Details-
--------------------------------------------------------------------------------------------------------------

Tue Jan 25 14:46:00 2022        place : Athukorala Supermarket  Location : Yattogoda    Type : Supermarket
--------------------------------------------------------------------------------------------------------------

Tue Jan 25 18:46:58 2022        place : Galigamuwa Food City    Location : Palapoluwa   Type :
--------------------------------------------------------------------------------------------------------------

Tue Jan 25 18:58:22 2022        place : City Pharmacy   Location : Hathnagoda   Type : Pharmacy
--------------------------------------------------------------------------------------------------------------

Press any key to continue . . .
```

9.Time Line

Activity	Time																						
	2022 January / February																						
	January															February							
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	01	02	03	04	05	06	07	08
Identifying the problem																							
Find a solution																							
Drawing Flowchart																							
Write Pseudocode																							
Write code and take output.																							
Check mistakes																							
Create presentation																							
Create project report																							
Ready for presentation																							

10.Acknowledgment

The success of this project and the result required a lot of guidance, contribution and support from the team members and we are extremely fortunate to be able to achieve this.

We respect and thank the lecture Mr. Nisal Nandasena for giving us an opportunity to do this project and providing us all support and guidance which made us complete the project on time. We are extremely grateful to him for providing such nice support and guidance.

This project cannot be completed without the effort and support of our team members. Team members,

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T.R.G.Warnasuriya (UWU/CST/20/038)
H.M.W.G.I.S.L.Herath (UWU/CST/20/087)
A.M.T.P.Adikari (UWU/CST/20/089)
E.D.K.Helitha (UWU/CST/20/070)

11. Conclusion

Our system has many advantages over the measures used to prevent the spread of covid-19 virus in the normal way in an organization or place. when you go to an institution, there is a pen with a book on the front of the institution. We write our name, address, and National Identity Card number on it. But one problem there is now is that everyone who comes uses the same pen. This increases the risk of contracting the covid 19 virus. But our system does not cause this kind of problem. Also another advantage of this system is that once an infected person is identified, they can know all the places where the person has gone and be informed quickly. This allows us to obtain information about people who visit an organization/ location quickly and accurately at any time.

12. Individual Contribution

Name & Enrollment No.	Contribution
W.D.K.Weerasinghe (UWU/CST/20/068)	Flow chart Pseudo code Writing source code Assemble all function together in main function Demonstration explanation
T.R.G.Warnasuriya (UWU/CST/20/038)	Pseudo code Presentation slide edit Idea & solution Flow chart & pseudo code explanation
H.M.W.G.I.S.L.Herath (UWU/CST/20/087)	Report writing Preparing presentation Intro & time line explanation
A.M.T.P.Adikari (UWU/CST/20/089)	Report writing Preparing presentation Demonstration explanation
E.D.K.Helitha (UWU/CST/20/070)	Idea & solution Report writing Demonstration explanation