



# **Covid Identification and Probability**

## **CS3002- Object Oriented Programming**

**By**

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**2020-2021**

## **1. Problem statement**

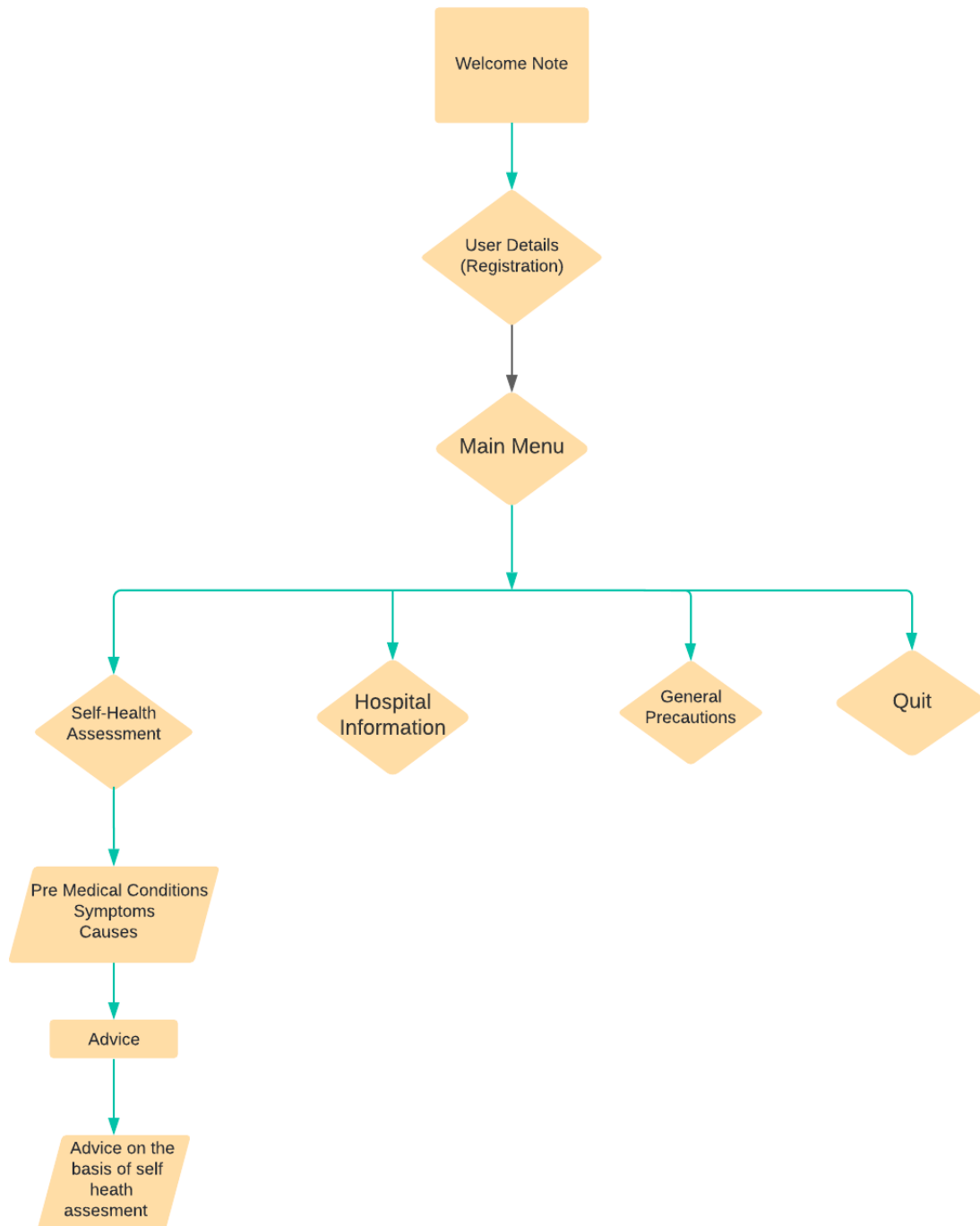
To develop an application for Covid-19 identification and probability. The aim of the application is to assess the users for Covid-19 and identify the risk level of the user. The self- health assessment will help the user to take the necessary steps for his treatment. As the best practice to avoid risk is taking care of oneself and check for health issues.

## **2. Problem analysis**

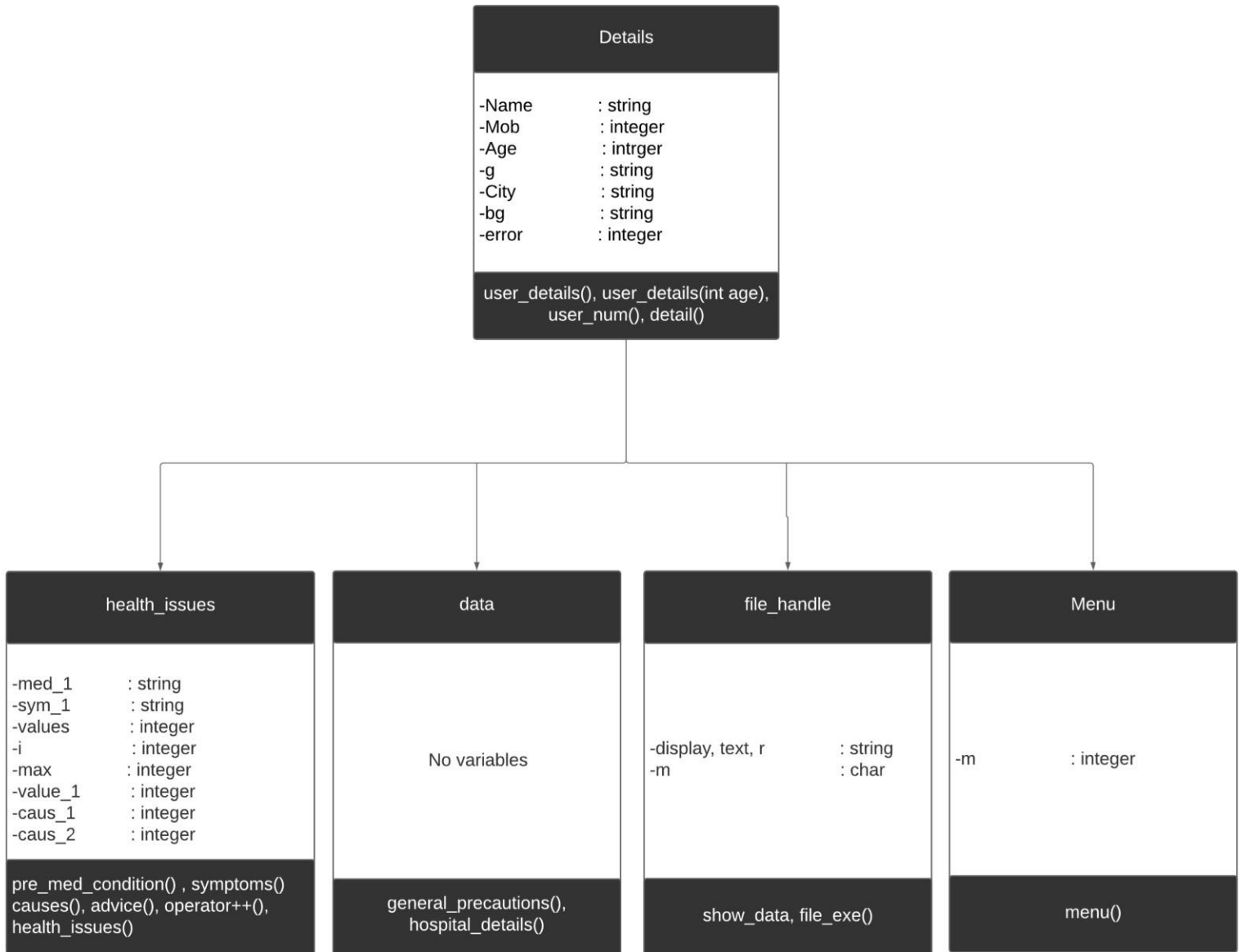
We analyzed the problems in following steps –

- Understanding the problem statement
- Understanding the needs of the application
- Real world scenario for Covid-19 identification
- Empathizing as a user to understand the user needs
- Research and data collection
- Generating ideas
- Flow charts and class diagrams to understand the coding part
- Implementing Object Oriented Programming features in code
- Optimizing the code part to make it short

### 3. Flow chart



#### 4. Class diagram



## 5. Concepts of OOP (Snippet of the code)

### - Class

```
class file_handle : public data { //derived class 3
    string display, text, r;
    char m;
    void show_data() {
        cout << "\nDo you want to see the stored data - (y/n) " << endl;
        cin >> m;
        if (m == 'y' || m == 'Y') {
            cout << "\n\n-----User details to be stored-----\n";
            cout << "\nName - " << name;
            cout << "\nGender - " << g;
            cout << "\nBlood group - " << bg;
            cout << "\nMobile number - " << a;
            cout << "\nCity - " << add;
            cout << "\n-----\n";
        }
    }
}
```

### - Methods

```
protected:
    void operator++() { //operator overloading - The operator calls
        pre_med_condition();
        symptoms();
        causes();
        advice();
    }
    ~health_issues() { //Destructor to delete the object
        cout << "\n\n-----Thank You for using our application-----\n";
    }
};
```

### - Constructors

```
};
class health_issues : public details { //derived class 1 - multilevel inheritance
public:
    health_issues() { //Constructor
        cout << " |-----|\n"
        cout << " | Welcome to the Covid Identification Application |\n"
        cout << " |-----|\n"
        cout << "\n\n << Please register your details before using the application >> \n\n";
    }
    //Encapsulation - Binding the hospital_details() and functions and hiding them from the outside world.
private:
    string med[9] = { "asthma", "chronic obstructive pulmonary disease (COPD)", "emphysema or bronchitis", "chroni
                    "kidney disease", "brain stroke", "A weakened immune system", "HIV and AIDS", "diabetes"
    };
};
```

## - Destructors

```
    }  
    ~health_issues() { //Destructor to delete the object  
        cout << "\n\n-----Thank You for using our application-----\n";  
    }  
};
```

## 6. Features of OOP (Snippet of the code)

### - Inheritance

```
};  
class health_issues : public details { //derived class 1 - multilevel inheritance  
public:  
    health_issues() { //Constructor  
        cout << "-----\n";  
        cout << "Welcome to the Covid Identification Application\n";  
        cout << "-----\n";  
        cout << "\n\n                << Please register your details before using the application >\n";  
    }  
    //Encapsulation - Binding the hospital_details() and functions and hiding them from the outside world  
private:  
    string med[9] = { "asthma", "chronic obstructive pulmonary disease (COPD)", "emphysema or bronchi",  
                     "kidney disease", "brain stroke", "A weakened immune system", "HIV and AIDS", " "  
    };  
};
```

### - Abstraction

```
protected:  
    void operator++() { //operator overloading - The operator calls  
        pre_med_condition();  
        symptoms();  
        causes();  
        advice();  
    }  
    ~health_issues() { //Destructor to delete the object  
        cout << "\n\n-----Thank You for using our application-----\n";  
    }  
};
```

## - Encapsulation

```
//Encapsulation - Binding the hospital_details() and functions and hiding them from the outside world.
private:
    string med[9] = { "asthma", "chronic obstructive pulmonary disease (COPD)", "emphysema or bronchitis",
                     "kidney disease", "brain stroke", "A weakened immune system", "HIV and AIDS", "diabetes", "hypertension", "heart disease" };
    string med_1, yes, no, y, n, Y, N;
    void pre_med_condition() {
        cout << "\nDo you have any pre medical conditions? Yes or No. Please Enter\n>> ";
        cin >> med_1;

        if (med_1 == "yes" || med_1 == "Y" || med_1 == "y" || med_1 == "Yes") {
            for (int i = 0; i < 9; i++) {
                cout << i + 1 << " " << med[i] << "\n";
            }

            int values;
            int i;
            int max = 0;
            cout << "Enter number of medical conditions you have - ";
            cin >> values;

            int arr[values];
            for (i = 0; i < values; i++) {
                cout << "Enter the index of medical conditions - ";
                cin >> arr[i];
            }
        } else if (med_1 != "yes" || med_1 != "Y" || med_1 != "y" || med_1 != "Yes") {
```

## - Polymorphism

```
//Polymorphism - the condition of occurring in several different forms.
public:
    void detail() { //method to call user details
        //function overriding
        user_details();
        user_num();
        user_details(1); //method with different signature
    }
```

## 7. Advanced features of OOP (Snippet of the code)

### - File handling

```
protected:
void file_exe() //File Handling
//File handling is used to display the user details that user inputs whean the program asks for details.
{
    fstream file;
    file.open("user_details.txt", ios_base::app); //ios_base::app is used to append data in the file

    file << name << "\n" << a << "\n" << g << "\n" << add << "\n" << bg << "\n" << endl;

    //closing the file
    file.close();

    file.open("user_details.txt", ios::ate);
    //closing the file
    while (getline(file, text)) {
        cout << text;
    }
    file.close();

    show_data(); //function call to show data
}
```

### - Exceptions

```
// exception handling
char a[10];
int error;
void user_num() {

    do {
        cout << "Enter your number -> ";
        cin >> a;
        try {
            if (strlen(a) != 10)

                throw "\nPlease enter a valid 10 digit number example - 9826945611\n";
            error = 0;
            //cout<<"your number - "<<a;
        } catch (const char* b) {
            cout << "\nInvalid number" << b;
            error = 1;
        }
    } while (error);
}
```



/\*

Problem statement:

## 7. Overall code of the problem statement

For the assigned key area, a fully redesigned code with the appropriate input parameters and the expected output with all the concepts of the object-oriented programming to be done.

Task to be performed:

Apply the concepts of OOP for the given problem statement.

Apply the features of OOP for the given problem statement.

Apply the advanced feature of OOP for the problem statement.

Fully functioning application with the appropriate input parameter and the expected output.\*/

```
#include <iostream>
#include <conio.h>
#include <fstream>
#include <string.h>
#include <stdlib.h>
using namespace std;
class details { //base class for details
public:
    string name, g, add, bg, mob;
    void user_details() { //Details of the user
        system("Color F9");
        cout << "Enter your name -> ";
        cin >> name;
        cout << "Gender -> ";
        cin >> g;
        cout << "Enter city name -> ";
        cin >> add;
        cout << "Enter blood group -> ";
        cin >> bg;
    }
    void user_details(int age) {
        cout << "Enter Age -> ";
        cin >> age;
    }
    // exception handling
    char a[10];
    int error;
    void user_num() {

        do {
            cout << "Enter your number -> ";
            cin >> a;
            try {
                if (strlen(a) != 10)

                    throw "\nPlease enter a valid 10 digit number example - 9826945611\n";
                error = 0;
                //cout<<"your number - "<<a;
            } catch (const char* b) {
                cout << "\nInvalid number" << b;
                error = 1;
            }
        } while (error);
    }
}
```

//Polymorphism - the condition of occurring in several different forms.

public:

void detail() { //method to call user details

//function overriding

user\_details();

user\_num();

user\_details(1); //method with different signature

```

}
};
class health_issues : public details { //derived class 1 - multilevel inheritance
public:
health_issues() { //Constructor
cout << "          |-----|\n";
cout << "          |      Welcome to the Covid Identification Application      |\n";
cout << "          |-----|\n";
cout << "\n\n          << Please register your details before using the application >>          \n\n";
}
//Encapsulation - Binding the hospital_details() and functions and hiding them from the outside world.
private:
string med[9] = { "asthma", "chronic obstructive pulmonary disease (COPD)", "emphysema or bronchitis", "chronic heart
disease",
                "kidney disease", "brain stroke", "A weakened immune system", "HIV and AIDS", "diabetes"
                };
string med_1, yes, no, y, n, Y, N;
void pre_med_condition() {
cout << "\nDo you have any pre medical conditions? Yes or No. Please Enter\n>> ";
cin >> med_1;

if (med_1 == "yes" || med_1 == "Y" || med_1 == "y" || med_1 == "Yes") {
for (int i = 0; i < 9; i++) {
cout << i + 1 << " " << med[i] << "\n";
}
int values;
int i;
int max = 0;
cout << "Enter number of medical conditions you have - ";
cin >> values;

int arr[values];
for (i = 0; i < values; i++) {
cout << "Enter the index of medical conditions - ";
cin >> arr[i];
}
} else if (med_1 != "yes" || med_1 != "Y" || med_1 != "y" || med_1 != "Yes") {
cout << "Continue to Symptoms";
}
}

string sym[6] = { "fever", "dry cough", "tiredness", "difficulty breathing or shortness of breath",
                "chest pain or pressure", "loss of speech or movement"
                };
string sym_1;
int value_1;
void symptoms() {
{
cout << "\nDo you have any symptoms? Yes or No. Please Enter\n";
cin >> sym_1;

if (sym_1 == "yes" || sym_1 == "Y" || sym_1 == "y" || sym_1 == "Yes")

{
for (int j = 0; j < 6; j++) {
cout << j + 1 << " " << sym[j] << "\n";
}
int j;
int max = 0;
cout << "Enter the number of symptoms - ";
cin >> value_1;

int arr[value_1];
for (j = 0; j < value_1; j++) {
cout << "Enter the index of Symptoms - ";
cin >> arr[j];
}
}
}
}
}

```

```

    }
} else if (sym_1 != "yes" || sym_1 != "Y" || sym_1 != "y" || sym_1 != "Yes") {
    cout << "Continue to causes\n";
}
}
}
string caus_1, caus_2;
void causes() {
    cout << "\nWhat are the causes?\n";
    cout << "\n1- Have you travelled anywhere internationally in the last 14 days? y/n\n>> ";
    cin >> caus_1;
    cout << "Which of the following applies to you?\n";
    cout << "1 - I have recently interacted or lived with someone who has tested positive for COVID-19\n2 - I am a healthcare worker and I examined a COVID-19 confirmed case without protective gear.\n3 - None of the above\n>> ";
    cin >> caus_2;
    {
        cout << "\n-----Health Assessment Completed ----- \n\n\nAdvice is given on the basis of your assessment and we will be forwarding your details to government.\n";
    }
}

void advice() {
    // inner if condition for symptoms
    if (value_1 <= 2) {
        cout << "\nYou are at low risk but you can take doctor's consultation." << endl;
        cout << "\nYou can find our hospital details from the main menu." << endl;
    } else if ((value_1 >= 3 && value_1 <= 6)) {
        cout << "\nYou are at high risk. You need to get treatment ASAP!" << endl;
        cout << "\nYou can see our hospital branches from main menu in the hospital details." << endl;
    }

    else if (sym_1 == "no" || sym_1 == "N" || sym_1 == "n" || sym_1 == "No") {
        cout << "\nYou don't have any risk but you should follow general precautions to avoid risks." << endl;
    }
}

protected:
void operator++() { //operator overloading - The operator calls
    pre_med_condition();
    symptoms();
    causes();
    advice();
}
~health_issues() { //Destructor to delete the object
    cout << "\n\n-----Thank You for using our application ----- \n";
}
};

class data : public health_issues { //derived class 2 for hospital details
public:
    //Hospital branches
    void general_precautions() {
        cout << "\n-----General Advice that you should follow ----- \n";

        cout << "\n1. Regularly and thoroughly clean your hands with an alcohol-based hand rub or wash them with soap and water.\n";
        cout << "\n2. Maintain at least 1 metre (3 feet) distance between yourself and others.\n";
        cout << "\n3. Avoid going to crowded places.\n";
        cout << "\n4. Stay home and self-isolate even with minor symptoms such as cough, headache, mild fever, until you recover. Have someone bring you supplies. If you need to leave your house, wear a mask to avoid infecting others.\n";
        cout << "\n5. Make sure you, and the people around you, follow good respiratory hygiene. This means covering your mouth and nose with your bent elbow or tissue when you cough or sneeze. Then dispose of the used tissue immediately and wash your hands. \n";
        cout << "\n6. If you have a fever, cough and difficulty breathing, seek medical attention, but call by telephone in advance if possible and follow the directions of your local health authority. \n";
    }
}

```

```

    cout << "\n7. Avoid touching eyes, nose and mouth.\n";
}

void hospital_details() {
    cout << "      \n-----Hospital Details ----- ";

    cout << "\nName - Narayana Multispeciality Hospital\nAddress: Police Station, Nr. Chakudiya Mahadev, Cross Rd, opp.
Rakhial, Rakhial, Ahmedabad, Gujarat 380023\nPhone: 080675 06878\n";
    cout << "\nName - SANNIDHYA MATERNITY & MULTISPECIALITY HOSPITAL IN AHMEDABAD\nAddress: 4th Floor,
Orchid Centre, opp. Safal Parisar Road, South Bopal, Ahmedabad, Gujarat 380058\nPhone: 091575 03000\n";
    cout << "\nName - Zydus Hospitals\nAddress: Zydus Hospitals Road, Nr. Sola Bridge, Sarkhej - Gandhinagar Hwy,
Ahmedabad, Gujarat 380054\nPhone: 079 6619 0201\n";
    cout << "\nName - Sterling Hospital\nAddress: Sterling Hospital Road near Maharaja Agrasen Vidhyalaya, Memnagar,
Ahmedabad, Gujarat 380052\nPhone: 079 4001 1111\n";
    cout << "\nName - CIMS Hospital\nAddress: Science City Rd, Science City, Panchamrut Bunglows II, Sola, Ahmedabad,
Gujarat 380060\nPhone: 098250 66664\n";
}
};

class file_handle : public data { //derived class 3
string display, text, r;
char m;
void show_data() {
    cout << "\nDo you want to see the stored data - (y/n) " << endl;
    cin >> m;
    if (m == 'y' || m == 'Y') {
        cout << "\n\n-----User details to be stored----- \n";
        cout << "\nName - " << name;
        cout << "\nGender - " << g;
        cout << "\nBlood group - " << bg;
        cout << "\nMobile number - " << a;
        cout << "\nCity - " << add;
        cout << "\n ----- \n";
    }
}

protected:
void file_exe() //File Handling
//File handling is used to display the user details that user inputs whean the program asks for details.
{
    fstream file;
    file.open("user_details.txt", ios_base::app); //ios_base::app is used to append data in the file

    file << name << "\n" << a << "\n" << g << "\n" << add << "\n" << bg << "\n" << endl;

    //closing the file
    file.close();

    file.open("user_details.txt", ios::ate);
    //closing the file
    while (getline(file, text)) {
        cout << text;
    }
    file.close();

    show_data(); //function call to show data
}
};

class Menu : public file_handle { //derived class 4
public:
int m;
void menu() {
    while(1) {
        cout << "\n\n We provide the following services ~\n" << endl;
        cout << "      1. Self- Health Assesment\n" << endl;
        cout << "      2. Hospital Details\n" << endl;
        cout << "      3. General Precautions\n" << endl;

```

```
cout << "    4. Quit\n" << endl;
cout << " Please select the type of help you want (1/2/3/4)\n>> ";
cin >> m;
if (m <= 0 || m > 4) {
    cout << "Invalid input" << endl;
    return;
} else if (m == 1) {
    ++(*this);
    file_exe();
} else if (m == 2) {
    hospital_details();
    file_exe();
} else if (m == 3) {
    general_precautions();
    file_exe();
} else if (m == 4)
    break;
}
}
};
```

```
int main() { //Main function containing all the methods
    Menu object;
    object.detail();
    object.menu();
    return 0;
}
```

## 9. Output of the code.

```

|-----|
| Welcome to the Covid Identification Application |
|-----|

<< Please register your details before using the application >>

Enter your name -> Akshat
Gender -> Male
Enter city name -> Ahmedabad
Enter blood group -> B+
Enter your number -> 9328812925
Enter Age -> 20

We provide the following services ~

    1. Self- Health Assesment
    2. Hospital Details
    3. General Precautions
    4. Quit

Please select the type of help you want (1/2/3/4)
>> 1

Do you have any pre medical conditions? Yes or No. Please Enter
```

```

Do you have any pre medical conditions? Yes or No. Please Enter
>> y
1 asthma
2 chronic obstructive pulmonary disease (COPD)
3 emphysema or bronchitis
4 chronic heart disease
5 kidney disease
6 brain stroke
7 A weakened immune system
8 HIV and AIDS
9 diabetes
Enter number of medical conditions you have - 2
Enter the index of medical conditions - 1
Enter the index of medical conditions - 3

Do you have any symptoms? Yes or No. Please Enter
y
1 fever
2 dry cough
3 tiredness
4 difficulty breathing or shortness of breath
5 chest pain or pressure
6 loss of speech or movement
Enter the number of symptoms - 3
Enter the index of Symptoms - 1
Enter the index of Symptoms - 3
Enter the index of Symptoms - 5

What are the causes?
```

What are the causes?

1- Have you travelled anywhere internationally in the last14 days? y/n

>> y

Which of the following applies to you?

1 - I have recently interacted or lived with someone who has tested positive for COVID-19

2 - I am a healthcare worker and I examined a COVID-19 confirmed case without protective gear.

3 - None of the above

>> 3

-----Health Assesment Completed-----

Advice is given on the basis of your assesment and we will be forwarding your details to government.

You are at high risk. You need to get treatment ASAP!

You can see our hospital branches from main menu in the hospital details.

Do you want to see the stored data - (y/n)

yes

-----User details to be stored-----

Name - Akshat

Gender - Male

Blood group -B+

Mobile number - 9328812925

City - Ahmedabad

We provide the following services ~

1. Self- Health Assesment

2. Hospital Details

3. General Precautions

4. Quit

Please select the type of help you want (1/2/3/4)

>> 2

-----Hospital Details-----

Name - Narayana Multispeciality Hospital

Address: Police Station, Nr. Chakudiya Mahadev, Cross Rd, opp. Rakhial, Rakhial, Ahmedabad, Gujarat 380023

Phone: 080675 06878

Name - SANNIDHYA MATERNITY & MULTISPECIALITY HOSPITAL IN AHMEDABAD

Address: 4th Floor, Orchid Centre, opp. Safal Parisar Road, South Bopal, Ahmedabad, Gujarat 380058

Phone: 091575 03000

Name - Zydus Hospitals

Address: Zydus Hospitals Road, Nr. Sola Bridge, Sarkhej - Gandhinagar Hwy, Ahmedabad, Gujarat 380054

Phone: 079 6619 0201

Name - Sterling Hospital

Address: Sterling Hospital Road near Maharaja Agrasen Vidhyalaya, Memnagar, Ahmedabad, Gujarat 380052

Phone: 079 4001 1111

Name - CIMS Hospital

Address: Science City Rd, Science City, Panchamrut Bunglows II, Sola, Ahmedabad, Gujarat 380060

Phone: 098250 66664

Do you want to see the stored data - (y/n)

n

```
Please select the type of help you want (1/2/3/4)
```

```
>> 3
```

```
-----General Advice that you should follow-----
```

1. Regularly and thoroughly clean your hands with an alcohol-based hand rub or wash them with soap and water.
2. Maintain at least 1 metre (3 feet) distance between yourself and others.
3. Avoid going to crowded places.
4. Stay home and self-isolate even with minor symptoms such as cough, headache, mild fever, until you recover. Have someone bring you supplies. If you need to leave your house, wear a mask to avoid infecting others.
5. Make sure you, and the people around you, follow good respiratory hygiene. This means covering your mouth and nose with your bent elbow or tissue when you cough or sneeze. Then dispose of the used tissue immediately and wash your hands.
6. If you have a fever, cough and difficulty breathing, seek medical attention, but call by telephone in advance if possible and follow the directions of your local health authority.
7. Avoid touching eyes, nose and mouth.

```
Do you want to see the stored data - (y/n)
```

```
n
```

```
We provide the following services ~
```

1. Self- Health Assesment
2. Hospital Details
3. General Precautions
4. Quit

```
Please select the type of help you want (1/2/3/4)
```

```
>> 4
```

```
-----Thank You for using our application-----
```

```
-----
```

```
Process exited after 21.01 seconds with return value 0
```

```
Press any key to continue . . . █
```