



**Bachelor Of Engineering Computer System and Communication
Faculty of Engineering
Universiti Putra Malaysia**

ECC 3112 Engineering Algorithms

Project report

Title : Health Risk Management of Covid-19

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Abstract

Health risk assessments (HRAs) have the potential to be crucial in the promotion of health and the prevention of disease for both individuals and populations. The concept has been established since the 1950s, and HRAs are often used in the workplace today. Before HRAs can be used more widely in clinical treatment, a number of issues need to be resolved, including influence on health outcomes, impact on patient-entered data quality, and usability for both patients and clinicians[1].

According to Brian Schilling, a health risk assessment (sometimes called a health risk appraisal) is a tool used to gather health information and is frequently used in conjunction with a procedure that involves biometric testing to evaluate a person's health condition, risks, and behaviors [2]. The project's users of the health risk evaluations will be the people of Malaysia. Therefore, the primary goal of this project is to build an online health risk assessment tool in order to significantly reduce the danger of spreading the most current COVID-19 infection.

Introduction

The disease, known as the novel coronavirus, is caused by the SARS-CoV-2 virus and is spread from person to person in a variety of ways.

When an infected person coughs, sneezes, speaks, sings, or takes a deep breath, tiny liquid particles from the mouth or nose are released, allowing the virus to spread. These liquid particles range in size from large 'breath droplets' to small 'aerosols'.

According to current evidence, the virus is primarily transmitted between people who are in close (usually within 1 metre (short distance)) contact with one another. Infection can occur when virus-containing aerosols or droplets are inhaled or come into direct contact with a person's eyes, nose, or mouth.

The virus can also spread in poorly ventilated and/or crowded indoor environments where people tend to spend more time. This is due to the fact that aerosols can remain suspended in the air or float up to one metre away (long distances).

People can also become infected by touching their eyes, nose, or mouth without first washing their hands after touching a virus-infected surface.

Further research is being conducted to better understand the virus's spread as well as the highest risk environments and their causes. Emerging virus variants are also being researched, as well as why certain variants are more likely to spread.

Any situation where people are in close proximity to each other for long periods of time can exacerbate the risk of transmission. The risk is higher in indoor premises, especially in poorly ventilated environments, than in outdoor premises. Activities such as singing or deep breathing during exercise, which expel higher amounts of particles from the mouth, can also increase the risk of transmission.

In this regard, three characteristics can help in determining this and they describe environments that are more conducive to the spread of COVID-19 virus.

Crowded places.

Environments where people are in close contact, especially very close conversations.

Enclosed spaces with poor ventilation.

The risk of COVID-19 transmission is particularly high in places where all three of these characteristics are present.

In health care facilities where people are treated with COVID-19, so-called aerosol-generating medical operations can elevate the risk of infection. These operations produce very small droplets that can remain suspended in the air for long periods of time and spread beyond a conversational distance (usually 1 m). Therefore, health workers performing these medical operations or in the environment in which they are performed should take protective measures against airborne transmission, including wearing appropriate personal protective equipment such as respirators. Furthermore, visitors should not be allowed to enter the area where such medical operations are being carried out.

Problem Statement

COVID-19 is a highly infectious and potentially deadly disease caused by the SARS-CoV-2 virus. It has spread rapidly around the globe since its emergence in late 2019, leading to a global pandemic.

The virus is primarily transmitted through respiratory droplets produced when an infected person talks, coughs, or sneezes, and can also be spread by touching a surface or object contaminated with the virus and then touching one's face. It can cause a range of symptoms, including fever, cough, difficulty breathing, and body aches, and can lead to severe respiratory illness and death, especially in older adults and people with underlying health conditions.

The rapid spread of COVID-19 has had significant public health and societal impacts. Governments around the world have implemented measures such as lockdowns, travel restrictions, and mask mandates to try to slow the spread of the virus and protect public health. These measures have disrupted normal life, led to job losses and economic downturns, and had other social and psychological impacts on individuals and communities.

Efforts to contain and mitigate the spread of COVID-19 have been a top priority for governments and health organizations around the world. This has included efforts to develop and distribute vaccines, as well as efforts to increase testing capacity and improve contact tracing efforts.

Overall, the COVID-19 pandemic has presented a major challenge to public health and society, and continues to require significant resources and efforts to address. It is important for individuals to follow public health guidelines and recommendations to protect themselves and others from the virus.

Literature Review

Chinese health authorities reported the first case of COVID-19 to the World Health Organization on December 31, 2019, according to MSN News. A team of researchers later released evidence that the first person to test positive had symptoms on December 8, the date of the first confirmed case, according to the WHO. The outbreak was declared a global pandemic on 11 March 2020, and as of 30 May 2020, a total of 5,899,866 positive cases, including 364,891 deaths, have been registered. [3]

On 25 January 2020, the first case of COVID-19 was detected in Malaysia, and three Chinese nationals who were in close previous contact with an infected person in Singapore were traced. They traveled to Malaysia via Singapore on 24th January 2020. They were treated at Sungai Hebro Hospital in Selangor, Malaysia. MOH rapidly developed standard guidelines for the management of COVID-19 and 34 hospitals and screening centers had been specially designated in each state of Malaysia [including Kuala Lumpur Hospital (Kuala Lumpur), Sungai Buloh Hospital (Selangor), Tuanku Jaafar Hospital (Negeri Sembilan), Sultanah Aminah Hospital (Johor Bahru), Miri Hospital (Sarawak), Tawau Hospital (Sabah)]. The first Malaysian was confirmed with COVID-19 on February 4, 2020. A 41-year-old man recently returned from Singapore when he started developing a fever and cough. He was quarantined at Sungai Buloh Hospital in Selangor. [4]

Since the start of the third wave in Malaysia, the distribution of COVID-19 infections across the country has varied, with several states including Selangor (30.2%), Johor (8.7%) and Kuala Lumpur (8.3%). Infections are spreading in states. Reported far more COVID-19 infections compared to other states. [5]

Objectives

1. To know the type of risks that the users might bring upon to the headed destination.
2. To decrease the spreading of COVID-19 via using hardware items such as the same pen when filling the form manually.
3. To decrease unnecessary expense on hardware items.
4. To decrease the possibility number of covid-19 cases.
5. To save users' time.

Methodology

Flowchart:

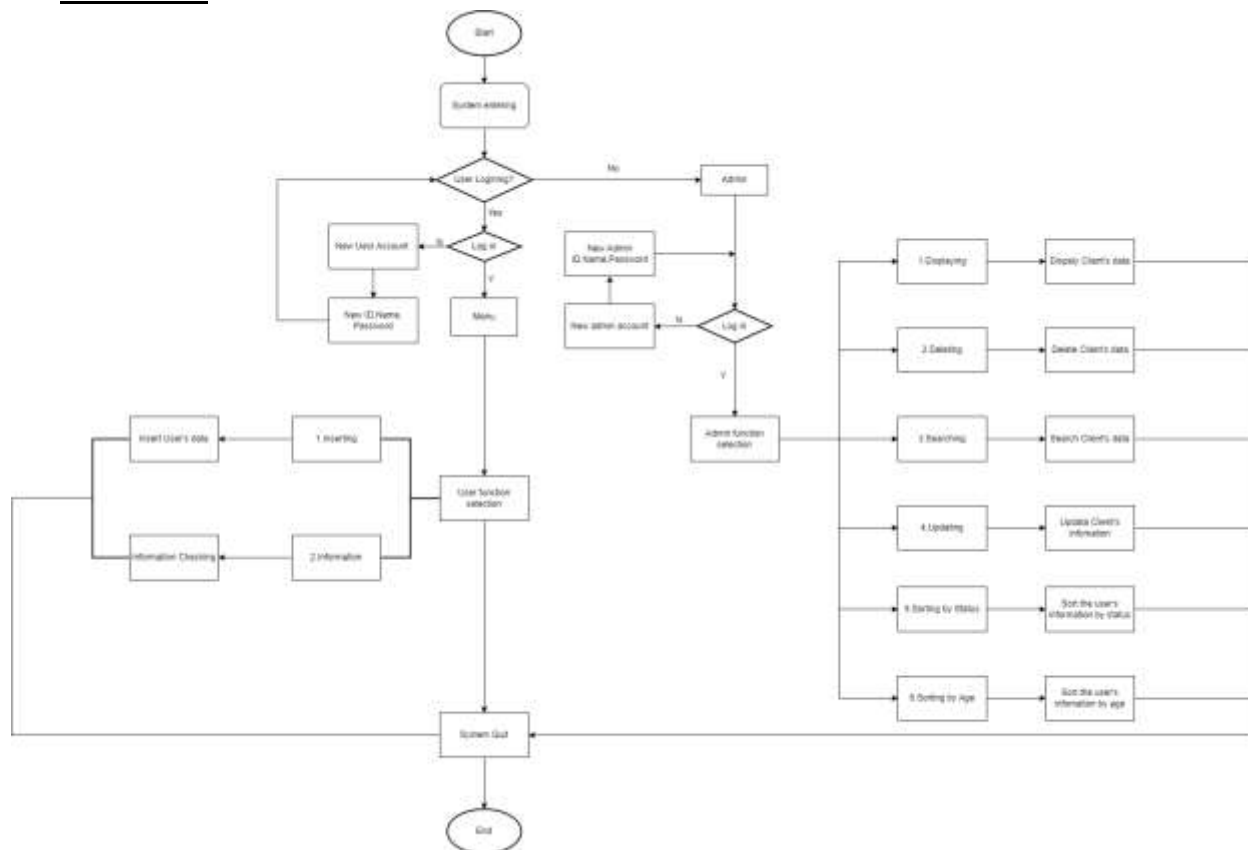


Figure 1 : Flowchart

When we start the program, we first enter the login system, and we also use the login system to enable administrators and users to use different functions.

When we select the administrator interface, the first thing is to login and register the system, if it is a new administrator then you need to register ID, name, password and the system will successfully save the newly registered administrator ID and password and save it to the background text when it is closed, then successfully log in the administrator interface, then come to the administrator function selection menu, there are 7 functions for the administrator to select:

1. Displaying: The administrator enters the Displaying function by selecting option 1, this function can display all relevant information including name, ID, age, risk status, etc.
2. Deleting: The administrator enters the Deleting function by selecting option 2, this function allows the administrator to delete the user's information by entering the user's ID if the user is not found then the user is not found.
3. This function allows the administrator to search for the user's information by entering the user's ID. If the search is successful, the user's information will be displayed, and

if the user's information is not available, the user will be prompted that the user has not been found. 4. Sorting by status: The administrator enters the Sorting by status function by selecting option 5, this function will sort the user's information by risk status. Sorting by age: The administrator selects option 6 to enter the Sorting by age function, which sorts the user's information by age. When the administrator finishes the above operation, he/she can select option 7 to exit the system.

When the user login interface is selected, the first step is to login and register the system, if the new user, you need to register ID, name, and password, etc. The system will successfully save the newly registered user ID and password and save them to the background text when the system is closed, after successfully logging into the user interface will enter the user function selection menu, there are a total of 3 functions for the user to choose: 1. 1. Inserting: The user enters the Inserting function by selecting option 1, which fills the user's personal information about COVID-19 into their account and saves the information to the background text when the system is closed. 2. information: The user enters the Information function by selecting option 2, which answers some questions about COVID-19 and saves the information to the background text when the system is closed. 3. Exit: The user can exit the user system by selecting option 3.

Block Diagram:

Below shown is the block diagram of the proposed method.

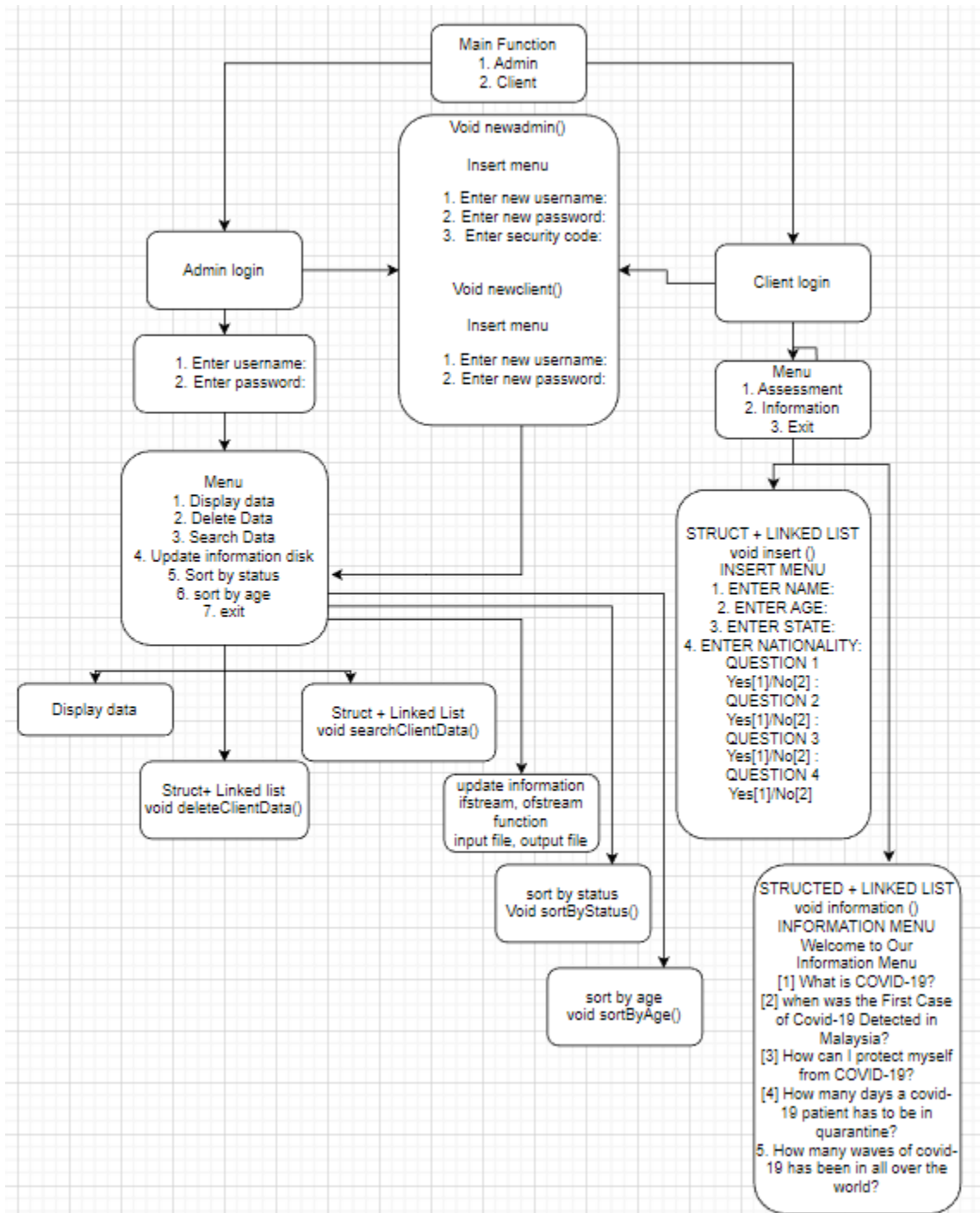


Figure 2: Block Diagram

Result And Discussion

The front page of the program will be shown “STOP THE SPREAD”. Then there will be an option for the user to ask if the user is Admin or Client where 1 for Admin, 2 for Client.

Admin section:

If the user is admin, the function will ask the user to insert admin username , password and security code. There will be a txt file having the admin info already recorded. Inserted username, password and security code will be compared with the recorded data, if the data does not match, the function will ask the user to create a new account with new username, password and security code. The new admin info will be recorded in the existing admin.txt file.

After logging in, the admin will have 7 options to choose:

1. Display All Clients Data
2. Delete Client's Data
3. Search Client Data
4. Update Information Disk
5. Sort Client's Data By Status
6. Sort Client's Data By Age
7. Exit the Page

If the admin chooses option 1; the function will read clients.txt file and show all the client data. If the admin wants to delete a specific client data, he can insert that client name and the program will read the txt file until it finds the name and it'll delete all the info under that client. If the admin wants to search a client's data, he can insert that client name and the code will show that specific client all data by reading the text file and finding the name. There is an information disk for clients where the client can get to know updated news about covid-19. The admin can edit the information disk by choosing “4 Update Information Disk”. The program will allow the admin to insert the question and its related answer for client's convenience. There is another function for the admin to sort the client's data by Status or Age. By sorting the data by status, the admin can get to know whoever is at high risk and by sorting the data by age, the admin can get to know which patient is high risk or low risk according to their age.

Client section:

If the user is a client, the function will ask the client to input his username and password, the input data will be compared with the client.txt file and the function will search for the name and password. If the input data doesn't get matched, the function will ask the user to register with a new username and new password and the new data will be recorded in the existing client.txt file.

After logging in, the client will have 2 options to choose:

1. Assessment
2. Information
3. Exit

If the client chooses the assessment option, the function will ask the client to input personal details so that the function can record the client data under his details. Then the function will ask a few questions to get to the risk status the user is bearing. If the risk status is high, the program will show a number of hospitals for the SOP test. So, the client will choose any of the hospitals of his convenience and our program will book a SOP test appointment session for the user in the selected hospital. Next if the client chooses to get to know any information related to covid-19, the function will show a bunch of questions and the user can choose any of the questions and the function will read covid-19_info.txt file to find the question and it'll print out the answer along with the question. Lastly, the user can exit the page.

Code[6]

```
=====
=====
                        STOP THE SPREAD
=====
=====
>>>>>>>Welcome to COVID-19 Health Assessment Page<<<<<<<

Are you a client or admin?
1. Admin
2. Client
Please Enter Your Role:1
-----
Enter Your Username:Tasnim
Enter Your Password:tasnim123
Enter Your Security Code:209488

                        Welcone, Admin!
-----
```

Figure 3: admin log in

```

Are you a client or admin?
1. Admin
2. Client
Please Enter Your Role:1
-----
Enter Your Username:Ain
Enter Your Password:ain123
Enter Your Security Code:204585

Admin doesn't exist! Create a new account.
Enter new username:Ain
Enter new password:ain123
Enter new security code:204585

**Admin account created successfully.**

Welcome, Admin!
-----

```

Figure 4: Admin registration if new user

```

Welcome, Admin!
-----
Please choose an option from the menu below:
1. Display All Clients Data
2. Delete Client's Data
3. Search Client Data
4. Update Information Disk
5. Sort Client's Data By Status
6. Sort Client's Data By Age
7. Exit the Page

Enter your choice: 1
=====
Displaying all client data:
-----
Client ID: 167481041241
Name: Tasnim
Age: 12
State: kl
Nationality: my
Risk Status: High Risk
----
Client ID: 167481376341
Name: Fiza
Age: 22
State: Serdang
Nationality: Indian
Risk Status: Low Risk
----
Client ID: 167481381741
Name: Alex
Age: 20
State: KL
Nationality: Chinese
Risk Status: High Risk
----
Client ID: 167481392241
Name: John
Age: 24
State: Pahang
Nationality: American
Risk Status: High Risk
----

```

Figure 5: Admin access options and displaying client data idf choose 1

```

Please choose an option from the menu below:
1. Display All Clients Data
2. Delete Client's Data
3. Search Client Data
4. Update Information Disk
5. Sort Client's Data By Status
6. Sort Client's Data By Age
7. Exit the Page

Enter your choice: 2
=====
Enter client's name: John
***Data for John has been deleted.***
Please choose an option from the menu below:
1. Display All Clients Data
2. Delete Client's Data
3. Search Client Data
4. Update Information Disk
5. Sort Client's Data By Status
6. Sort Client's Data By Age
7. Exit the Page

Enter your choice: 3
=====
Enter client's name: John
No data found for John

```

Figure 6: Delete client data

```

Please choose an option from the menu below:
1. Display All Clients Data
2. Delete Client's Data
3. Search Client Data
4. Update Information Disk
5. Sort Client's Data By Status
6. Sort Client's Data By Age
7. Exit the Page

Enter your choice: 3
=====
Enter client's name: Tasnim
***Data for Tasnim***
Name: Tasnim
Age: 12
State: kl
Nationality: my
Risk Status: High Risk

```

Figure 7: Search Client Data

```

Please choose an option from the menu below:
1. Display All Clients Data
2. Delete Client's Data
3. Search Client Data
4. Update Information Disk
5. Sort Client's Data By Status
6. Sort Client's Data By Age
7. Exit the Page

Enter your choice: 4
=====
Enter the new question about COVID-19: How many waves of covid-19 has been in all over the world?
Enter the answer for the question: Recently the world is facing third wave which has been started from 2022

Information has been updated. Updated information is::
=====

```

```
Information has been updated. Updated information is::

1. What is COVID-19 :: Covid-19 is an infectious disease caused by a newly discovered strain of coronavirus, a type of virus known to cause respiratory infections in humans. This new strain was unknown before DECEMBER 2019, when the outbreak of a pneumonia of unidentified cause emerged in Wuhan, China.

2. When was the First Case of Covid-19 Detected in Malaysia? :: The first case of Covid-19 in Malaysia was detected on 24 JANUARY 2020

3. What Covid-19 Risk Index For Each Activity::

[A] Low Risk
- Opening the mail
- Getting restaurant takeout
- Pumping gasoline
- Playing tennis
- Going shopping

[B] Moderate-Low Risk
- Grocery shopping
- Going for a walk, run, or bike ride with others
- Playing golf
- Staying at the hotel for two nights
- Sitting in the doctor's waiting room
- Going to the library or museum
- Eating in a restaurant(outside)
- Walking in a busy downtown
- Spending an hour at a playground

[C] Moderate risk
- Having dinner at someone else's house
- Attending a backyard barbecue
- Going to a beach
- Shopping at a mall
- Sending kids to school, camp, or day-care
- Working a week in an office building
- Swimming in a public pool
- Visiting an elderly relative or friend in their home

[D] Moderate-high risk
- Going to hair salons and barbershop
- Eating at restaurant(inside)
- Attending a wedding or funeral
- Traveling by plane
- Playing basketball
- Playing football
- Hugging or shaking hands when greeting a friend

[E] High Risk
- Eating at a buffet
- Working out at the gym
- Going to an amusement park
How many days a covid-19 patient has to be in quarantine?
Minimum 7 days
How many waves of covid-19 has been in all over the world?
Recently the world is facing third wave which has been started from 2022
```

Figure 8: Update Information Disk


```

Please choose an option from the menu below:
1. Display All Clients Data
2. Delete Client's Data
3. Search Client Data
4. Update Information Disk
5. Sort Client's Data By Status
6. Sort Client's Data By Age
7. Exit the Page

Enter your choice: 5
=====
***Sorted data by status***

Name: AIDA NABILA
Age: 24
State: Kajang
Nationality: Malaysian
Status: high risk

Name: HAIFA JULIA
Age: 23
State: Serdang
Nationality: Indonesian
Status: high risk

Name: MAIESHA ANJUM
Age: 20
State: Johor
Nationality: Malaysian
Status: high risk

Name: WUXIN
Age: 21
State: Cheras
Nationality: Chinese
Status: high risk

Name: NUSRAT JAHAN
Age: 19
State: Serdang
Nationality: Indonesian
Status: low risk

Name: ZUO CHANG
Age: 20
State: Cheras
Nationality: Chinese
Status: low risk

```

Figure 9: Sort by Status (High to low risk)

```

Please choose an option from the menu below:
1. Display All Clients Data
2. Delete Client's Data
3. Search Client Data
4. Update Information Disk
5. Sort Client's Data By Status
6. Sort Client's Data By Age
7. Exit the Page

Enter your choice: 6
=====
***Sorted data by age***

Name: NUSRAT JAHAN
Age: 19
State: Serdang
Nationality: Indonesian
Status: low risk

Name: MAIESHA ANJUM
Age: 20
State: Johor
Nationality: Malaysian
Status: high risk

Name: ZUO CHANG
Age: 20
State: Cheras
Nationality: Chinese
Status: low risk

Name: WUXIN
Age: 21
State: Cheras
Nationality: Chinese
Status: high risk

Name: HAIFA JULIA
Age: 23
State: Serdang
Nationality: Indonesian
Status: high risk

Name: AIDA NABILA
Age: 24
State: Kajang
Nationality: Malaysian
Status: high risk

```

Figure 10: Sort by Age

```

Please choose an option from the menu below:
1. Display All Clients Data
2. Delete Client's Data
3. Search Client Data
4. Update Information Disk
5. Sort Client's Data By Status
6. Sort Client's Data By Age
7. Exit the Page

Enter your choice: 7
=====

*****Thank you for using the COVID-19 Health Assessment.*****

Process returned 0 (0x0)   execution time : 345.514 s
Press any key to continue.

```

Figure 11: Exit the page (Admin)

```

>>>>>>>Welcome to COVID-19 Health Assessment Page<<<<<<<

Are you a client or admin?
1. Admin
2. Client
Please Enter Your Role:2
-----
Enter Your Username:Alex
Enter Your Password:alex123

Welcome, Client!

```

Figure 12: Client login

```

>>>>>>>Welcome to COVID-19 Health Assessment Page<<<<<<<

Are you a client or admin?
1. Admin
2. Client
Please Enter Your Role:2
-----
Enter Your Username:Selena
Enter Your Password:selena123

Client doesn't exist! Create a new account.
Enter new username:Selena
Enter new password:selena123

**client account created successfully.**

Welcome, Client!

```

Figure 13: Client registration if new user

```

Please choose an option from the menu below:
1. Assessment
2. Information
3. Exit

Enter your choice: 1
=====
*Insert Your Personal Details First*
Your Fullname:Selena
Your Age:30
Your State:KL
Your Nationality:American
1. Do you have a fever? (Y/N): Y
2. Do you have following symptoms?
   -cough
   -shortnessOfBreath
   -fatigue
   -bodyAches
   -headache
   -lossOfTasteOrSmell
   -soreThroat
   -congestionOrRunnyNose
   -nauseaOrVomiting
   -diarrhea
   (Y/N):Y
3. Have you been in close contact with someone who has COVID-19? (Y/N):Y
4. Have you traveled recently? (Y/N): Y
-----
Your risk level is high. Please take appropriate precautions.

```

Figure 14: Assessment for client

```

-----
Your risk level is high. Please take appropriate precautions.
Here are a list of hospitals that offer swab testing:
[1]Sunway Medical Centre
[2]MSU Medical Centre
[3]Poliklinik South City
[4]Klinik Hanita
[5]Subang Jaya Medical Centre(SJMC)
[6]Klinik Mediviron Puchong Avenue
[7]Sungai Long Medical Centre
-----
Please select a hospital by entering its number: 5

>>> You have selected [5]Subang Jaya Medical Centre(SJMC).
>>> We have contacted the hospital for your swab session. Please follow government's SOP.
-----

```

Figure 15: List of hospitals if high risk

```

Please choose an option from the menu below:
1. Assessment
2. Information
3. Exit

Enter your choice: 1
=====
*Insert Your Personal Details First*
Your Fullname:Selena
Your Age:38
Your State:cHERAS
Your Nationality:Canadian
1. Do you have a fever? (Y/N): N
2. Do you have following symptoms?
   -cough
   -shortnessOfBreath
   -fatigue
   -bodyAches
   -headache
   -lossOfTasteOrSmell
   -soreThroat
   -congestionOrRunnyNose
   -nauseaOrVomiting
   -diarrhea
   (Y/N):N
3. Have you been in close contact with someone who has COVID-19? (Y/N):N
4. Have you traveled recently? (Y/N): N

Your risk level is low, but it is still important to follow guidelines from public health officials to prevent the spread of COVID-19.
=====

```

Figure 16: If client is in low risk

```

Please choose an option from the menu below:
1. Assessment
2. Information
3. Exit

Enter your choice: 2
=====
Please select a question from the list below:
1. What is COVID-19?
2. when was the First Case of Covid-19 Detected in Malaysia?
3. How can I protect myself from COVID-19?

Enter your choice: 2
2. when was the First Case of Covid-19 Detected in Malaysia? :: The first case of Covid-19 in Malaysia was detected on 24 JANUARY 2020

```

Figure 17: Information disk

```

Please choose an option from the menu below:
1. Assessment
2. Information
3. Exit

Enter your choice: 3
=====
*****Thank you for using the COVID-19 Health Assessment.*****
=====
Process returned 0 (0x0)   execution time : 233.629 s
Press any key to continue.

```

Figure 18: Exit the page (client)

Conclusion

By ensuring that the necessary techniques were correctly performed, the goals we set were achieved. In response to the current epidemic, the idea of online health risk assessment has been adopted worldwide. increase. The scope of this project is much smaller than that of already deployed applications like MySejahtera.

Since this project was an algorithm-based effort, some ideas are used here. One of the ideas we used is to toggle on the primary function. Additionally, an iterative search strategy was used in the Search by Name section. Also, we used "cin.getline" instead of just "cin" so that it can conclude the white space. However, the program can not search the data by client ID where there are already unique IDs for each client. Moreover, the program will not show the list of the hospitals according to the client's location; the list will be random.

Nevertheless, our project can be modified further and can improve the functionality by offering more facilities to the user and stop covid-19 spread.

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Member's Roles

Name	Roles
TASNIM MAHDIYA	Leader, Coding, Presentation Slides Report: *Abstract *Literature Review *Methodology - Block Diagram *Result and Discussion *Conclusion *Reference *Report Format
Wuxin	Presentation Slides Report: *Problem Statement *Methodology - flowchart
Zuo Chang	Presentation Slides Report: *Introduction