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Introduction

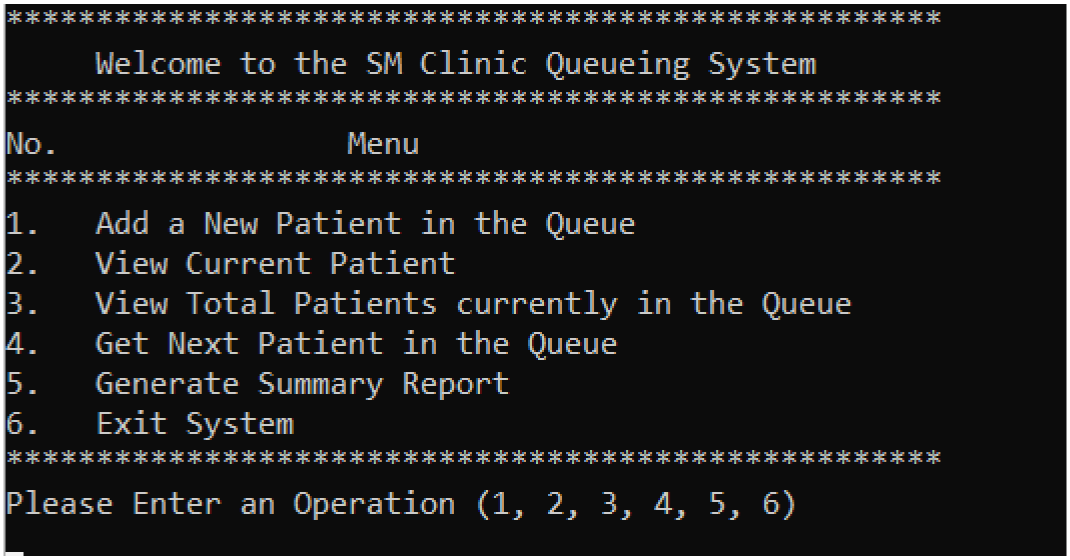
We were tasked with designing and building a system to stimulate a clinic's queuing system. In this system, features such as adding a patient to the queue, view current patient, get next patient, and view the summary report are to be implemented in the system.

Adding a patient to the queue option is selected when a patient wishes to visit the doctor and register at the counter. The system then will prompt user to enter their information such as their ID, name and contact number. After the patient's information has been received, the patient will be added in front of the queue.

Next, view current patient feature will display the current patient who is receiving treatment by the doctor. The get next patient will be selected when a patient left the doctor room. The system will remove the current patient from the queue and display the next patient in line to visit the doctor.

Lastly, view summary report allows users to generate one out of three reports to choose from. The reports consist of List of patients, List of payment and view activity log.

1.0 Output of the system (with screen capture and explanation)



```
****************************************************
     Welcome to the SM Clinic Queueing System
****************************************************
No.                Menu
****************************************************
1.   Add a New Patient in the Queue
2.   View Current Patient
3.   View Total Patients currently in the Queue
4.   Get Next Patient in the Queue
5.   Generate Summary Report
6.   Exit System
****************************************************
Please Enter an Operation (1, 2, 3, 4, 5, 6)
```

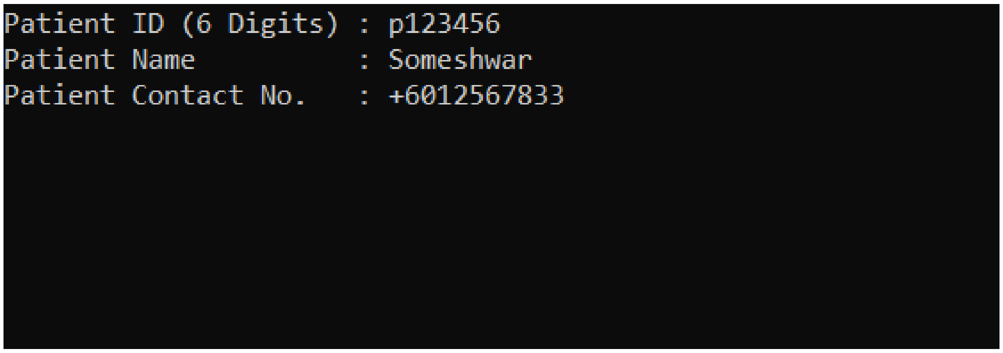
Figure 1.0 : Main Menu

Upon compiling the code, the figure above will appear. A welcome message will be displayed as well as the menu. The menu consists of 6 actions to choose from which are “Add a New Patient in the Queue” , “View Current Patient”, “View Total Patients currently in the Queue”, “Get Next Patient in the Queue”, “Generate Summary Report” and “Exit System”.

As we can see, I have added an extra feature which is the “View Total Patients currently in the Queue” feature, where users could know the size of the current Queue just to keep track of the number of patients in the Queue easily.

Then, the system will prompt users to enter which operation they want to perform which allows users to enter an operation from the number 1 to 6 based on their preferred action.

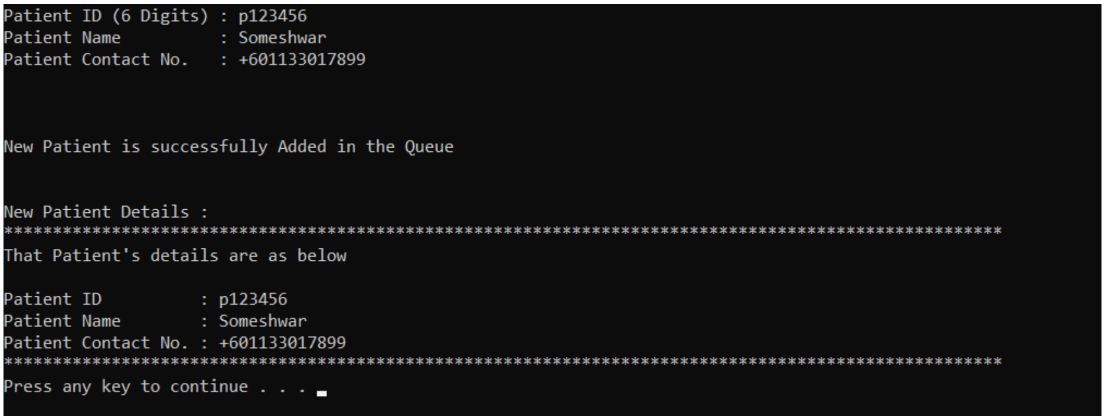
1. Add a New Patient in the Queue - Users will be able to add a new patient to the queue.
2. View Current Patient - System will display the current patient who is receiving treatment by the doctor.
3. View Total Patients currently in the Queue - The number of people in the queue will be displayed
4. Get Next Patient in the Queue – The current patient from queue will be removed and the next patient in line to visit the doctor will be displayed
5. Generate Summary Report - System will prompt users whether to generate a list of patients in the queue, payment list or activity log.
6. Exit System – Users will be able to completely exit the program.



```
Patient ID (6 Digits) : p123456
Patient Name          : Someshwar
Patient Contact No.   : +6012567833
```

Figure 1.1 : Add New Patient To Queue

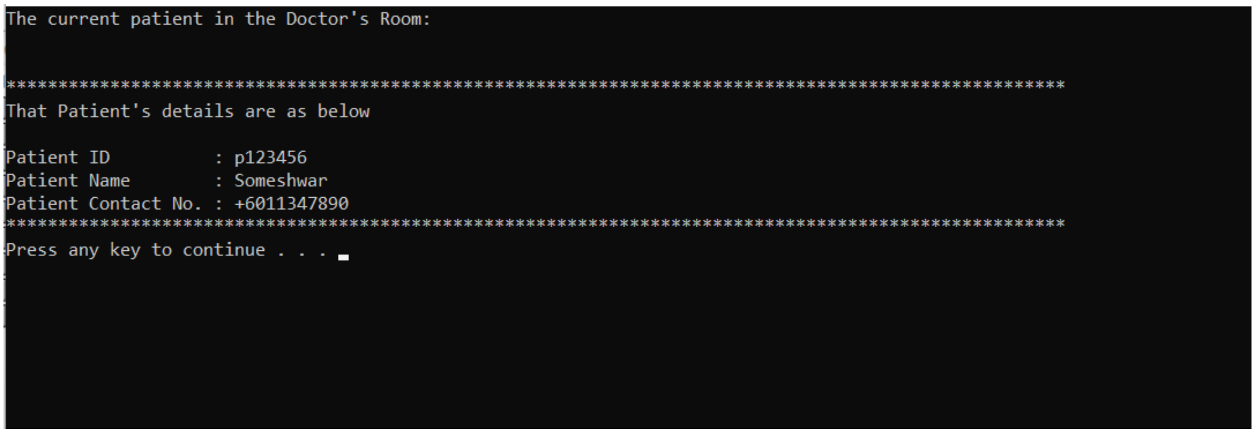
On this page, the system will prompt users to enter the Patient's details such as Patient ID, Patient name and Patient's contact number.



```
Patient ID (6 Digits) : p123456
Patient Name          : Someshwar
Patient Contact No.   : +601133017899



New Patient is successfully Added in the Queue


New Patient Details :
******************************************************************************************************
That Patient's details are as below

Patient ID          : p123456
Patient Name        : Someshwar
Patient Contact No. : +601133017899
******************************************************************************************************
Press any key to continue . . .
```

Figure 1.1.1 : New Patient has been Successfully Added to Queue

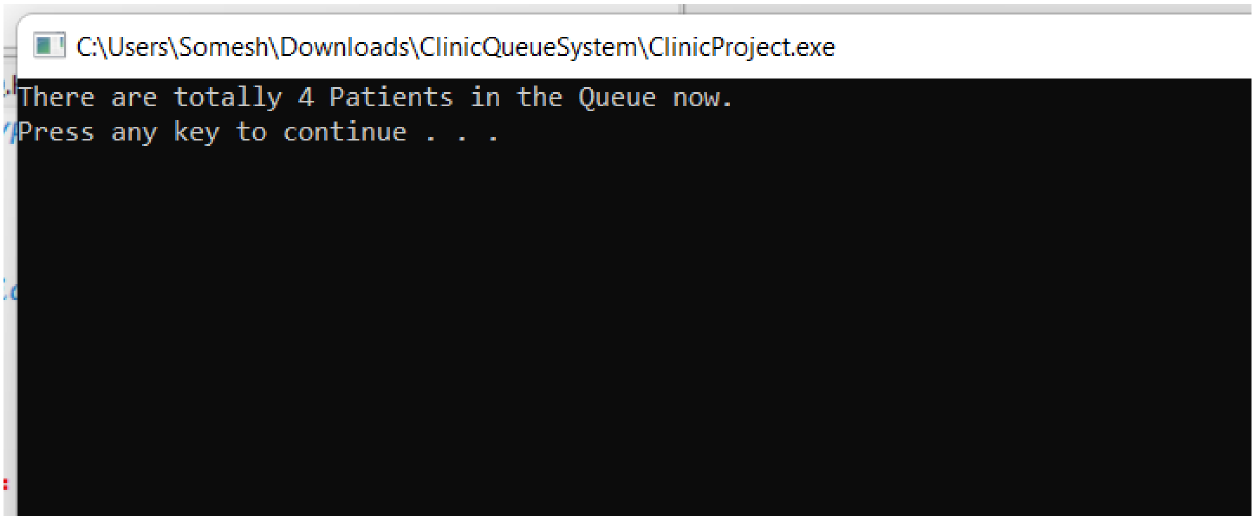
After the user has input all the details acquired, the patient is now successfully added to the queue. A message saying the “New Patient is successfully Added in the Queue” and the new patient’s details can be seen.



```
The current patient in the Doctor's Room:


******************************************************************************************************
That Patient's details are as below

Patient ID          : p123456
Patient Name        : Someshwar
Patient Contact No. : +6011347890
******************************************************************************************************
Press any key to continue . . .
```

Figure 1.2 : Current Patient is Displayed

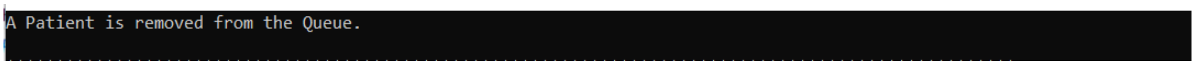
This option allows the current patient which is being treated by the doctor to be displayed. The patient’s details such as their ID, name and their contact number will be displayed.


C:\Users\Somesh\Downloads\ClinicQueueSystem\ClinicProject.exe

```
There are totally 4 Patients in the Queue now.
Press any key to continue . . .
```

Figure 1.3 : Current Total Patients Queue is Displayed

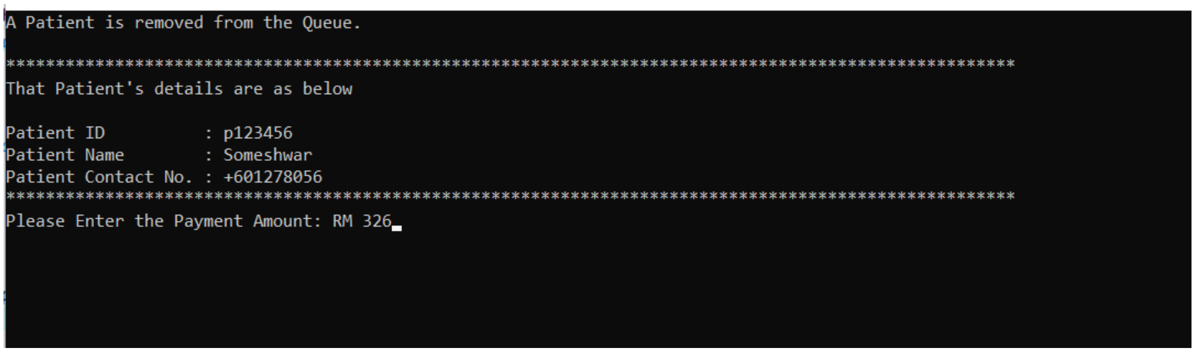
By choosing the "View Total Patients currently in the Queue" option, the system will display the total number of patients currently in the queue waiting to be treated.



```
A Patient is removed from the Queue.
```

Figure 1.4.1 : Patient has been Successfully Removed from Queue

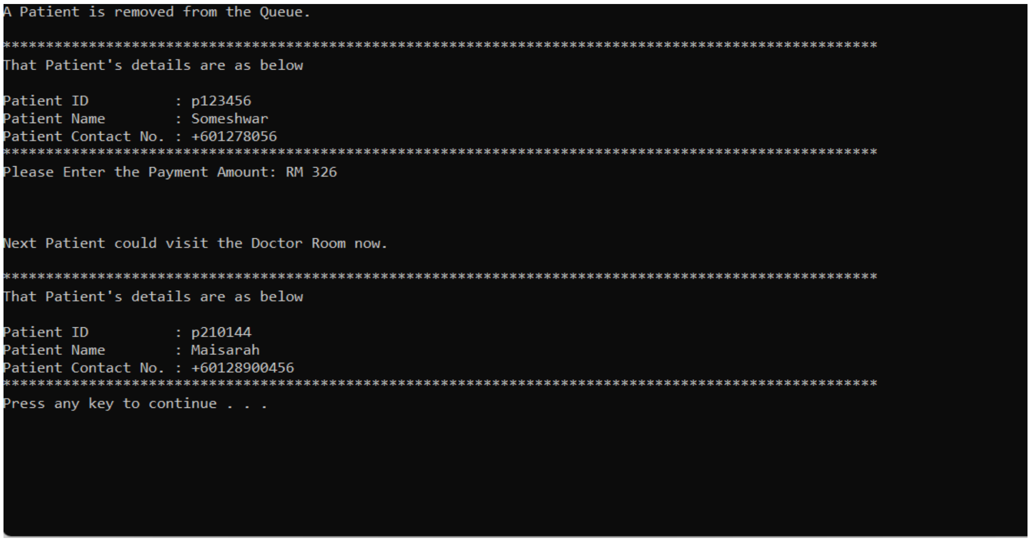
The above figure will appear when the fourth option is chosen which is the "Get Next Patient in the Queue" option. The patient that has received their treatment will be removed.



```
A Patient is removed from the Queue.

******************************************************************************************************
That Patient's details are as below

Patient ID          : p123456
Patient Name        : Someshwar
Patient Contact No. : +601278056
******************************************************************************************************
Please Enter the Payment Amount: RM 326_
```

Figure 1.4.2 : Patient Details are Displayed & Prompt Payment Amount

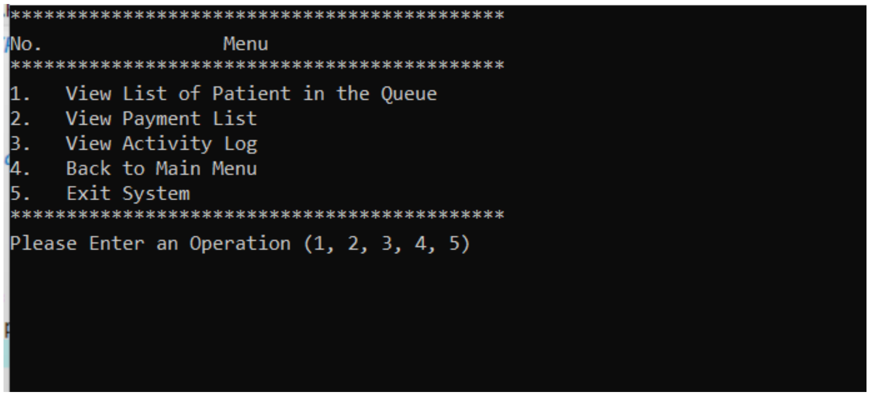
After the current patient has been removed as they have already been treated by the doctor, the details of the patient will be printed out. Then, the system will prompt the user to enter the payment amount.



```
A Patient is removed from the Queue.

******************************************************************************************************
That Patient's details are as below

Patient ID          : p123456
Patient Name        : Someshwar
Patient Contact No. : +601278056
******************************************************************************************************
Please Enter the Payment Amount: RM 326



Next Patient could visit the Doctor Room now.

******************************************************************************************************
That Patient's details are as below

Patient ID          : p210144
Patient Name        : Maisarah
Patient Contact No. : +60128900456
******************************************************************************************************
Press any key to continue . . .
```

Figure 1.4.2 : Next Patient in Queue is Displayed

As payment has been made by the previous patient as shown in the figure above. The details of the next patient in line to receive treatment by the doctor will be shown.

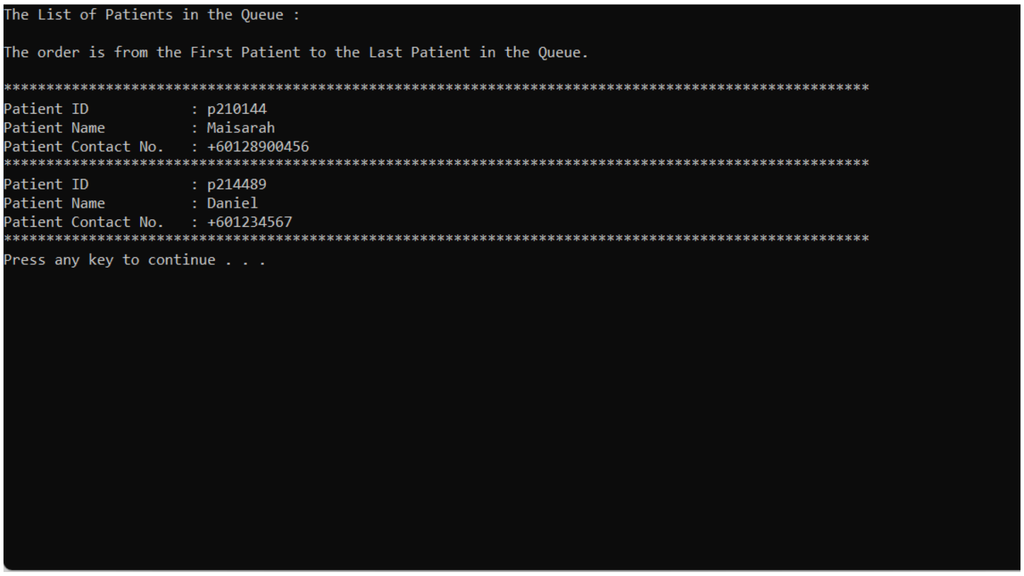


```
********************************************
No.                Menu
********************************************
1.   View List of Patient in the Queue
2.   View Payment List
3.   View Activity Log
4.   Back to Main Menu
5.   Exit System
********************************************
Please Enter an Operation (1, 2, 3, 4, 5)
```

Figure 1.5 : Generate Summary Report (Menu)

In the instance where the user chooses to generate a summary report, users will come across the above menu which consists of 5 options to choose from. The options given are as follows.

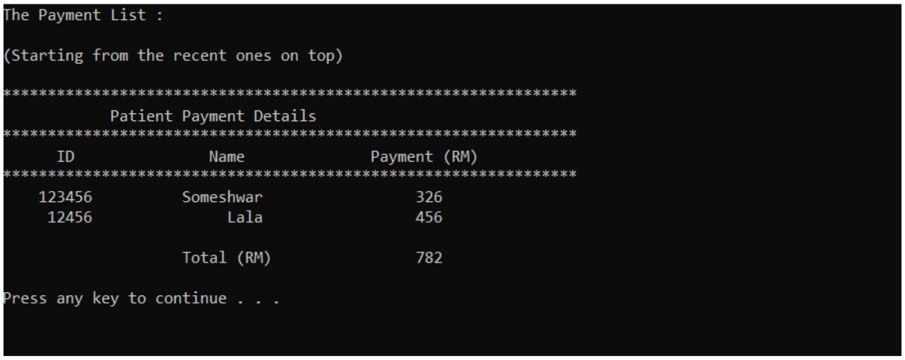
1. View List of Patient in the Queue - Users will be able view all the patients in the queue.
2. View Payment List - System will display the list of payments that has been made by patients
3. View Activity Log - Users will be able to view the activity log
4. Back to Main Menu – User will be redirected back to the Main Menu
5. Exit System - Users will be able to completely exit the program.



```
The List of Patients in the Queue :

The order is from the First Patient to the Last Patient in the Queue.

******************************************************************************************************
Patient ID            : p210144
Patient Name          : Maisarah
Patient Contact No.   : +60128900456
******************************************************************************************************
Patient ID            : p214489
Patient Name          : Daniel
Patient Contact No.   : +601234567
******************************************************************************************************
Press any key to continue . . .
```

Figure 1.5.1 : List of Patient in Queue

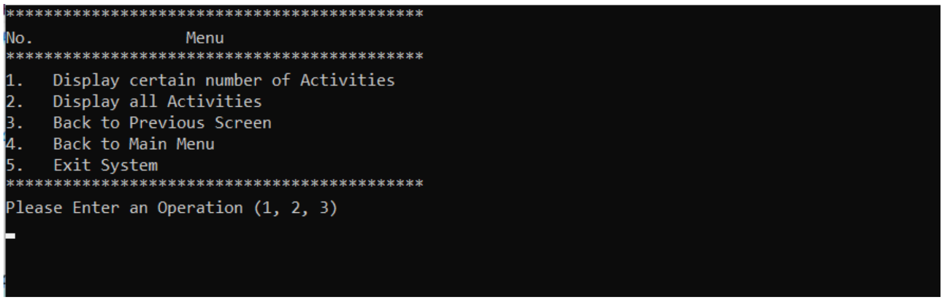
This option allows the user to view the list of all the patients currently in the queue. All the details regarding the patients will be printed out as well. The recent patients who entered the queue will be placed at the bottom.



```
The Payment List :

(Starting from the recent ones on top)

*****************************************************************
            Patient Payment Details
*****************************************************************
      ID                Name                Payment (RM)
*****************************************************************
    123456          Someshwar                    326
     12456               Lala                    456

                    Total (RM)                   782

Press any key to continue . . .
```

Figure 1.5.2 : List of Payment

The payment list will print out all the transactions that have already been made by the patient as well as the patient’s ID and their name. The arrangement of the list is arranged from top to bottom, the patients that has made payment recently are situated on top.

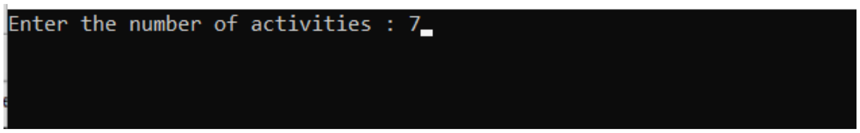


```
********************************************
No.                Menu
********************************************
1.   Display certain number of Activities
2.   Display all Activities
3.   Back to Previous Screen
4.   Back to Main Menu
5.   Exit System
********************************************
Please Enter an Operation (1, 2, 3)
```

Figure 1.5.3 : Activity Log (Menu)

In this page, users will be able to choose from these 5 options, the options consist as below.

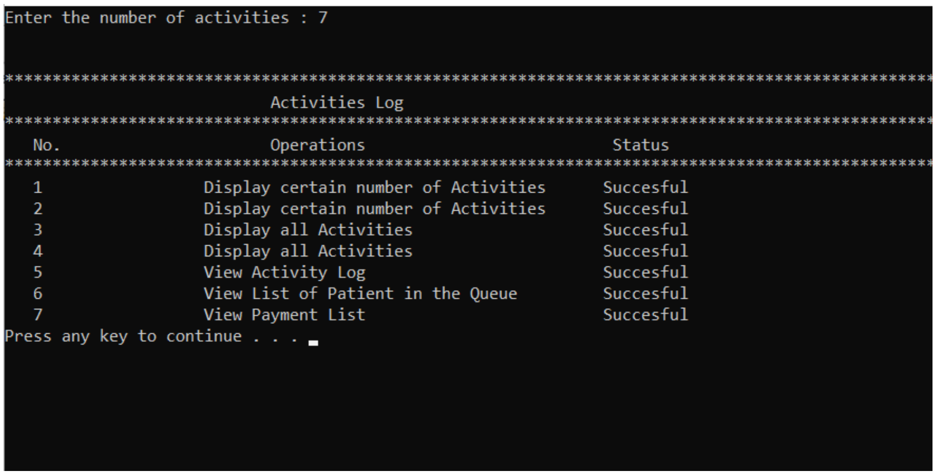
1. Display certain number of Activities - Certain number of activity log will be displayed
2. Display all Activities - All the activity log will be displayed
3. Back to Previous Screen - User will be redirected back to the Summary Report Menu
4. Back to Main Menu – Users will be redirected back to the Main Menu
5. Exit System - Users will be able to completely exit the program.



```
Enter the number of activities : 7
```

Figure 1.5.3.1 : Prompt User on Number of Activities to Display

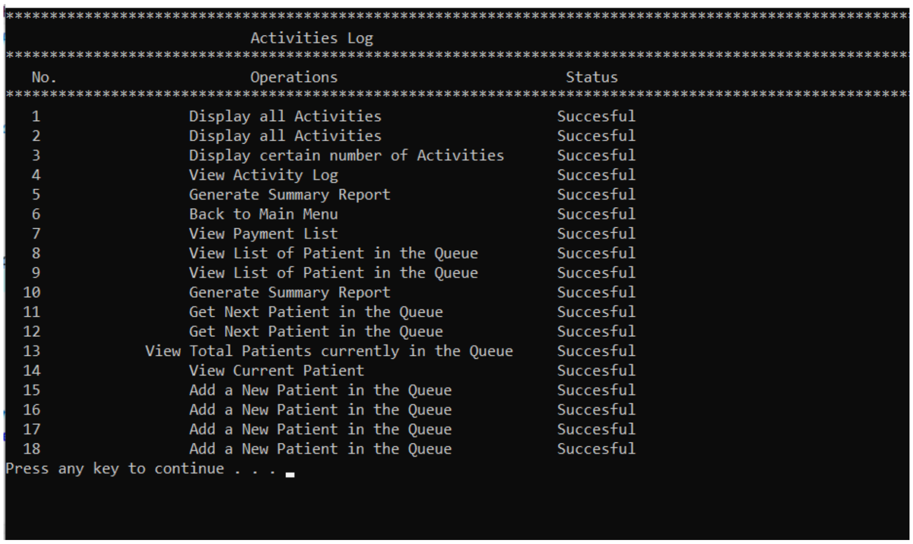
By clicking the 1st option in the Activity Log Menu (Figure 1.5.3), the user should insert the number of recent activities they want to view at and upon filling the number in, the figure below will be displayed.



```
Enter the number of activities : 7


*************************************************************************************************
                            Activities Log
*************************************************************************************************
   No.                      Operations                           Status
*************************************************************************************************
   1                 Display certain number of Activities      Succesful
   2                 Display certain number of Activities      Succesful
   3                 Display all Activities                    Succesful
   4                 Display all Activities                    Succesful
   5                 View Activity Log                         Succesful
   6                 View List of Patient in the Queue         Succesful
   7                 View Payment List                         Succesful
Press any key to continue . . .
```

Figure 1.5.3.2 : Display of Activity Log based on User’s Input

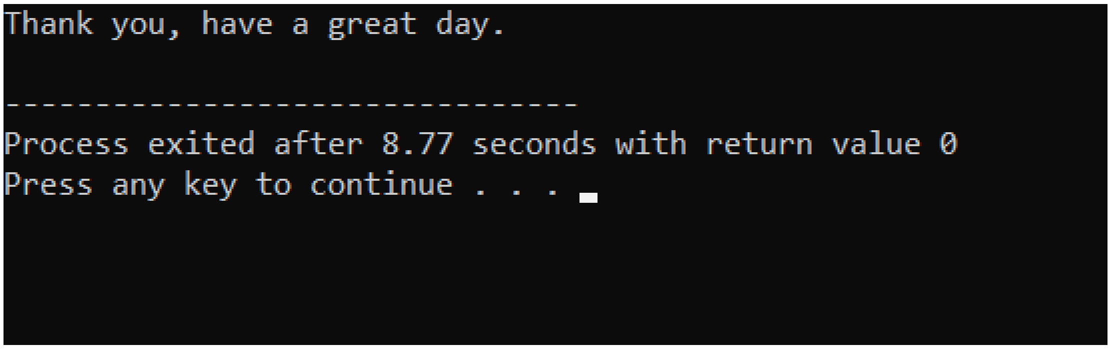
Based on this figure, the user has entered number 7, hence the recent 7 activities that have been carried out by the user will be displayed in descending order. The details of the operations as well as their status is printed out as well.



```
*******************************************************************************************************
                            Activities Log
*******************************************************************************************************
   No.                      Operations                          Status
*******************************************************************************************************
   1                 Display all Activities                    Succesful
   2                 Display all Activities                    Succesful
   3                 Display certain number of Activities      Succesful
   4                 View Activity Log                         Succesful
   5                 Generate Summary Report                   Succesful
   6                 Back to Main Menu                         Succesful
   7                 View Payment List                         Succesful
   8                 View List of Patient in the Queue         Succesful
   9                 View List of Patient in the Queue         Succesful
  10                 Generate Summary Report                   Succesful
  11                 Get Next Patient in the Queue             Succesful
  12                 Get Next Patient in the Queue             Succesful
  13            View Total Patients currently in the Queue     Succesful
  14                 View Current Patient                      Succesful
  15                 Add a New Patient in the Queue            Succesful
  16                 Add a New Patient in the Queue            Succesful
  17                 Add a New Patient in the Queue            Succesful
  18                 Add a New Patient in the Queue            Succesful
Press any key to continue . . .
```

Figure 1.5.3.3 : Display of All Activities in the Activity Log

By clicking the 2nd option in the Activity Log Menu (Figure 1.5.3), the user could see a screen displayed with all the activities that have been carried out. This is displayed in a stack, hence the recent activities will be displayed on the top and vice versa. The details of the operations as well as their status is printed out in this screen as well.



```
Thank you, have a great day.

--------------------------------
Process exited after 8.77 seconds with return value 0
Press any key to continue . . .
```

Figure 1.6 : Exit and leave the System

By clicking on the 6th option in the Main Menu (Figure 1.0), the system will bring us to a new page with a thank you message saying “Thank you, have a great day.”, the program ends and closes.

2.0 Weakness and improvement areas of your system

There is 1 major weakness and 1 area that needs improvement specifically in our system that we created. The weakness is the patientID inserted by the users will not be unique, there could be duplicates of the same ID numbers in the system. This is due to the insufficient knowledge we have on the implementation of this function.

The function of the system that needs to be improved is the user input section in Figure 1.2, where the user should input the patient details, such as their patient ID, name and contact number. This is where users should be careful when they are typing their details in as they could easily make mistakes such as typing a number at the "Patient Name :" line, or vice versa, typing an alphabet at the "Patient Contact No. :" line. This is because we did not implement an extra few lines of "if else" statement which could easily restrict the users from entering the wrong input.

We were not able to figure out a way to implement this despite many trial and error, we still could not implement the right way without having to deal with the excess bugs, hence we decided to not implement these features just so that we could move on with coding the other functions in the system.

Although we tried really hard reviewing and researching the resources on the Internet, in places such as StackOverflow.com, GeeksforGeeks.com, cplusplus.com, etc, we still could not find a proper implementation way to include it in our system.

Hence, the system will likely be having the same patient ID if the user accidentally inputs the wrong ID number.

3.0 Delegation of Task

Task	Completed by
PatientInfo Class (.h and .cpp file)	Maisarah
PatientQ Class (.h and .cpp file)	Maisarah
PaymentList Class (.h and .cpp file)	Somesh
Log Class (.h and .cpp file)	Somesh
Driver File	Somesh and Maisarah
Project Report	Somesh and Maisarah

4.0 Reflection – key learning and challenge faced

Somesh

Before even Miss Koo distributed this project, I had already set a goal in my mind which is to prepare sufficiently and work hard enough to understand all the Data Structures concepts that have been taught in class so that I would be able to complete this project by implementing all the functions mentioned in the project requirement.

Although I have worked hard and put in a lot of effort for this subject compared to other subjects just so that I could do well in this project and eventually score an A grade, we were still short in implementing all the functions in the project requirement, as mentioned above, we could not implement the function to remove duplicate patient IDs'. This not only shows that we have much more to learn and practice in this never-ending field, it also shows that I have worked hard enough to implement all the functionalities except for one.

In the earlier Data Structures Assignment, I was unable to produce a fully functionable and completed version of Cake Ordering System due to my lack of understanding in the implementation of Linked Lists and Pointers. As for now, I and Maisarah take pride in what we have coded out together as it shows that hard work will pay off as long as we are willing to put in the work.

I am so grateful to be part of this project, as well as being in the same group as Maisarah, because not only we have pushed each other very hard for this subject together just so we could score well, we also have improved our understanding with most of the Data Structures topic learnt in class.

Although this was a hard project to complete, thanks to this project I have improved my coding skills as a whole and I am sure the skills and knowledge I have learnt along the way while completing this project will surely be beneficial in my coming semesters as well as in my career as a Software Engineer.

Maisarah

While working on this project, not only have I improved my coding skills in C++ and improved my understanding in the Data Structures concepts, I have also learned a few lessons along the way. As Somesh mentioned above, in the last assignment where we had also been part of the same group, we were struggling badly to even understand the basics of Linked Lists, not to mention how bad we had to struggle just to code out an imperfect Cake Ordering System. Although our code was functionable it was incomplete and a mess as a whole.

As for this project, I can clearly see a significant improvement in my skills while working on it. From a person who does not completely understand the concept of Linked Lists to a person who implemented Linked Lists in multiple places in this project, not to mention I also completed the implementation of PatientQ class by implementing the Queue concepts, this not only taught me that hard work will eventually pay off but also taught me how important it is to be consistently working on our skills if we want to improve ourselves.

Although there were the functions where I and Somesh both could not implement successfully after trying plenty of times, just like Somesh, I take pride in what I have contributed in this project and wish to put in the same effort for my Final Exams and also just to improve my skills as an aspiring Web Developer. I have also learned the importance of time management and the consequences that I will be facing if I don't manage my time well while working on this project. I will take this as a lesson and improve myself into a more responsible student as well as a groupmate.

Conclusion

This has been a beneficial experience for the both of us and we are grateful to be working together in this project as we both believe this will be very useful for us to improve our skills as well as our Data Structures knowledge, so that not only we could do well in the coming final exams but also make us skillful computer science student. We both have learned our fair share of lessons while working on this project and we both will push each other to keep up the consistent good work that we are already doing and improve on our flaws that we have discovered, just so we set out to be a better individual, a great student, and a skillful as well as a successful Software Engineer and Web Developer in the near future.