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Information System

3rd Year First Semester

Clinic Management System

Medical Informatics

Benha University

Faculty of Computers & Artificial Intelligence

Teamwork

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1. Introduction

Clinic systems have been growing rapidly in the last few decades to provide better healthcare for patients via reliable computer-based applications. Clinic systems are responsible for the management of a healthcare facility while meeting the high standards of security, functionality and technology that must be associated with patients' medical records. Any computerized healthcare system should adapt to the aforementioned levels in one way or another. Due to the massive growth of modern computer-based methods, it has become much easier to simplify the difficulty of maintaining patients' manual records by computerizing them. This computerization process has many advantages that include efficient patient data retrieval and sharing, secure data protection, confidential accessing, better clinic productivity, and low management costs while reducing human errors. In terms of desktop applications, they have to be installed separately on each computer while also having a usability constraint depending on the physical location where they are installed. Clinic offers a variety of services to any doctor who needs a reliable management system to his/her clinic. The main motivation of this work lies in the following points:

- Doctors need to have an interactive system that allows them to manage and access the records of their patients conveniently regardless of location or any other constraints especially in the case of emergency.
- Clinic Assistants need a user-friendly system that allows them to check the status of their patients, manage appointments, get information about doctors, manage patients' medical records and generate the bills for patients based on services while saving cost, time and effort.
- Maintenance, usability, security, cost and performance are critical factors that must be handled efficiently by any clinic system.

1.1 background

Today's organizations are extremely sophisticated and exceptionally large too. This is mainly attributed to technology, which keeps changing really fast. Technologies are the keys to success and, therefore, play a prudent role in the increasingly competitive world. As a result of this, people's working approach has changed drastically. Time and money are the driving forces in today's setting. In order to remain relevant, it is essential for people to shift from the manual system into an automatic system. This effectively paves way for the computerization concept. Online Clinic Management System is one example of the computerization system. Clinic management system is introduced to optimize clinic's operations. Because of huge changes in management nowadays, this system is significant due to the extensive spread of technology.

1.2 Problem Statement

Based on the studies made on current system flow in the clinic, the following problems have been identified: The excessive paper usage in their daily operation, which is not a good practice to go green, and help preserve our environment, is the main problem. On the other hand, with the increase in the number of patients visiting the clinic daily and due to their paper base system, the clinic is facing problems with the appointment system. It has become very difficult to manage the appointment system manually. Current systems do not provide effective ways to back up data and as a result data can be permanently lost if the data is damaged or misplaced. This may lead to the collapse of the institution. It is extremely clear that the manual system of conducting vital operations within an organization has become an extremely tedious job. In fact, the current system is inconvenient for doctors, clinic assistants, and patients as well, so we had to solve this problem and transfer the system from manual to computerized.

2. Project Objectives

Improved Efficiency: Clinic management system improves the general efficiency of the process of treatment by automating the entire system.

Paperless Record System (Electronic System): The basic advantage of using clinic management system is that it helps you get rid of all the manual paperwork. They are not only difficult to store and maintain but also subject to wear. The software includes the module 'electronic medical records' which maintain all the necessary documents and information about the patient in its system. Clinic management system allows to keep the entire patient record including name, ID, address, gender, age, etc.

Easier and Quicker Access to Patient's Records: It's vital the clinic assistant to be able to track, store, and access patient's medical records with ease. With the help of the system, the clinic assistant can easily record, update and archive crucial patient data within the system for access at future encounters. The system produces the records of all patients in a form of list and clinic assistant can easily search for any patient's medical record by ID. When needed, the doctor can have a glance at the entire history of the patient at the click of a button.

Save time and provide speedy services: Clinic management system saves the time of writing prescriptions, calculating and making bills, filing patient records and also maintaining appointment schedules. As such, doctors can pay more attention to their patients and give them speedy and better service. The system also reduces the waiting time for patients at the clinics. The system tracks and manages the patient appointment before they even walk in the door.

Accuracy: Electronic medical records eliminate the chances of mistakes caused by human hands as all the tasks are automated. For instance, implementing clinic system does away

with the chances of wrong treatment due to the wrong diagnosis. Furthermore, there are printed prescriptions that are easy-to-read. It reduces the chances of getting the wrong medicines due to illegible handwriting of the doctors. Not only that, it's the same case with medical billings. It is one of the important elements of healthcare centers. Clinic management system offers billing modules that reduce the stress of managing the revenue cycle process.

Queue Management: Registration of patients - queue numbers will be assigned

Patient Medical Record Management: Patient's health history and allergy record

Medical Billing and Payment Management: Cash billing or Invoice billing

Appointment Management: Make appointments during consultation, walk in or call in

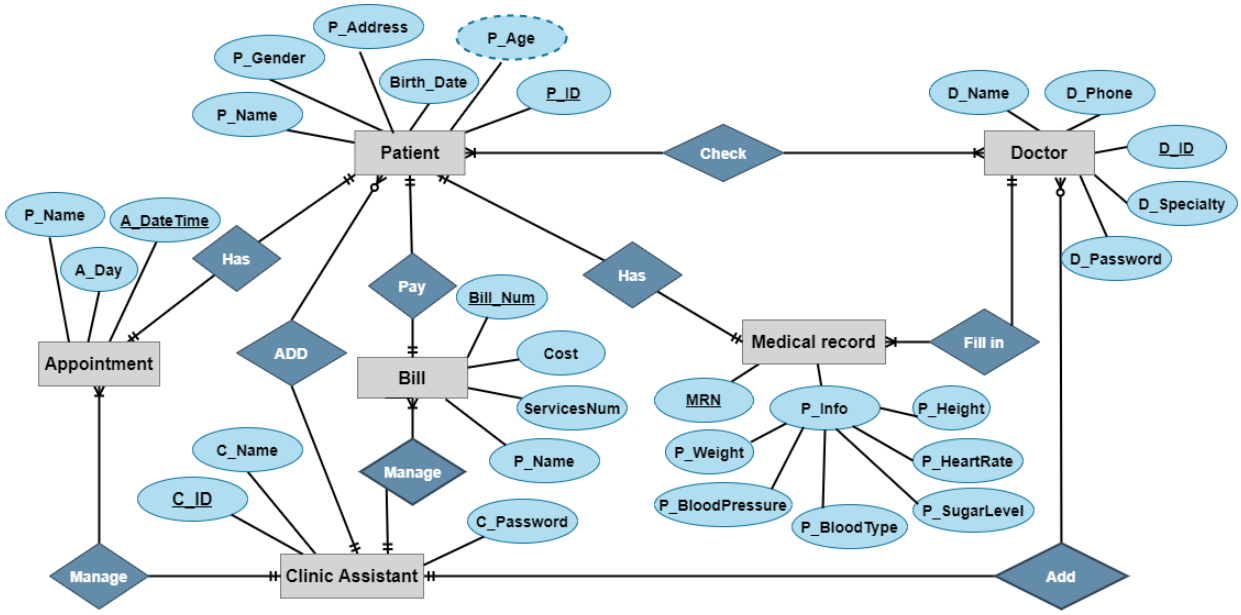
Security Management: Assigned user rights based on their role

3. System Requirements

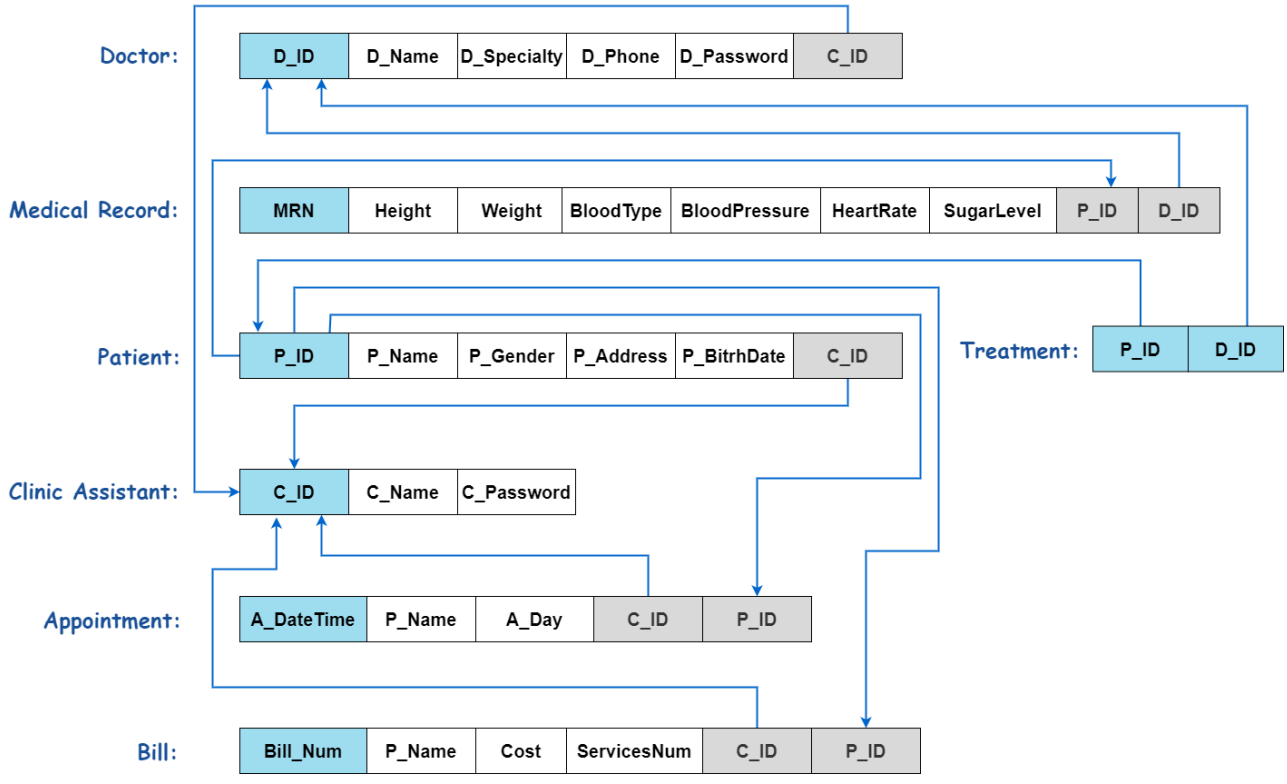
The followings are the hardware and software requirements to run Sterling Clinic Manager:

- Every user should have one pc or laptop to run the software on it.
- Operating system: From Windows XP onwards.
- Recommended Memory: 1 GB is recommended.
- Disk Space: Program and data files will occupy approximately 400 MB.
- Resolution: Minimum display resolution setting: 1024 x 768.
- Internet Connection: Streamxy 1MB or equivalent.

4. Project Entity Relationship Diagram (ERD)



5. Project Mapping



6. Project Schema

Entities Relationship:

One to One:

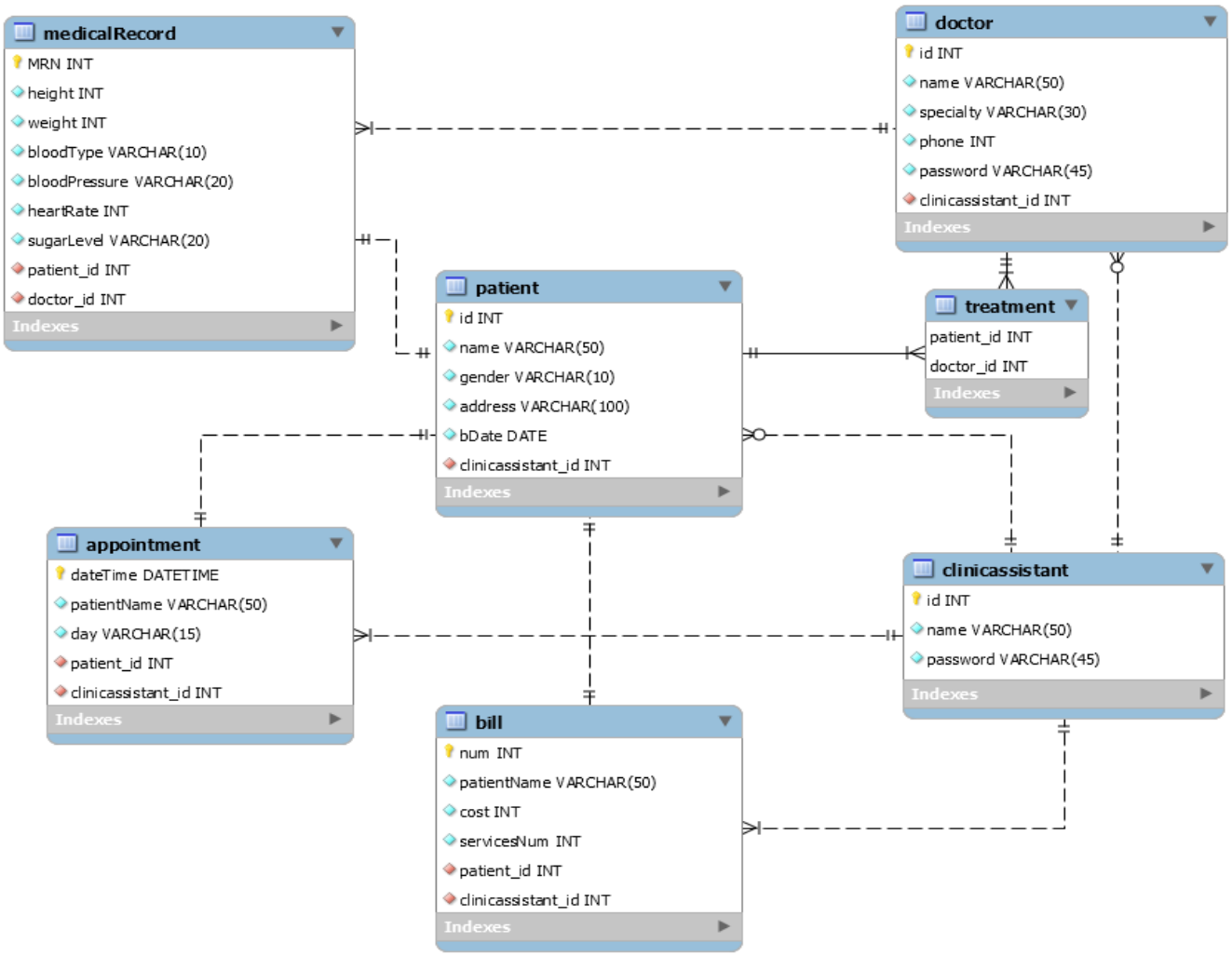
- Patient with Medical record.
- Patient with Appointment.
- Patient with Bill.

One to Many:

- Doctor with Medical record.
- Clinic Assistant with Patient.
- Clinic Assistant with Doctor.
- Clinic Assistant with Appointment.
- Clinic Assistant with Bill.

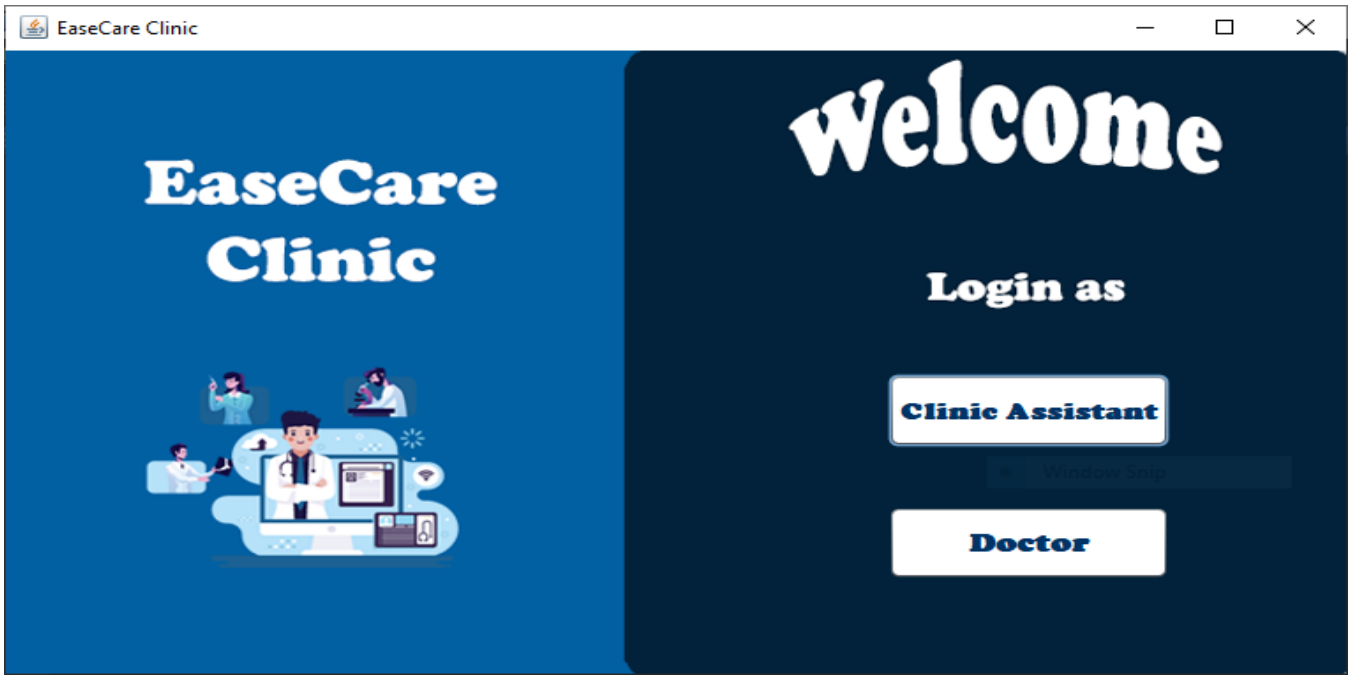
Many to Many:

- Patient with Doctor.

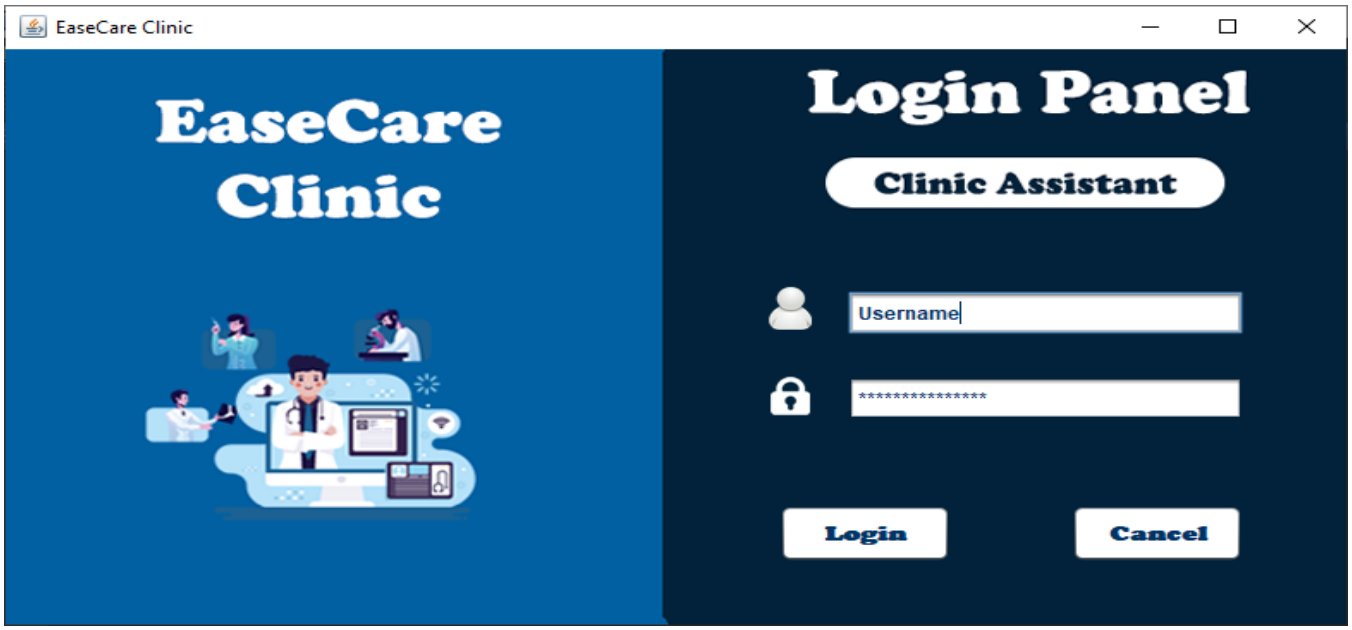


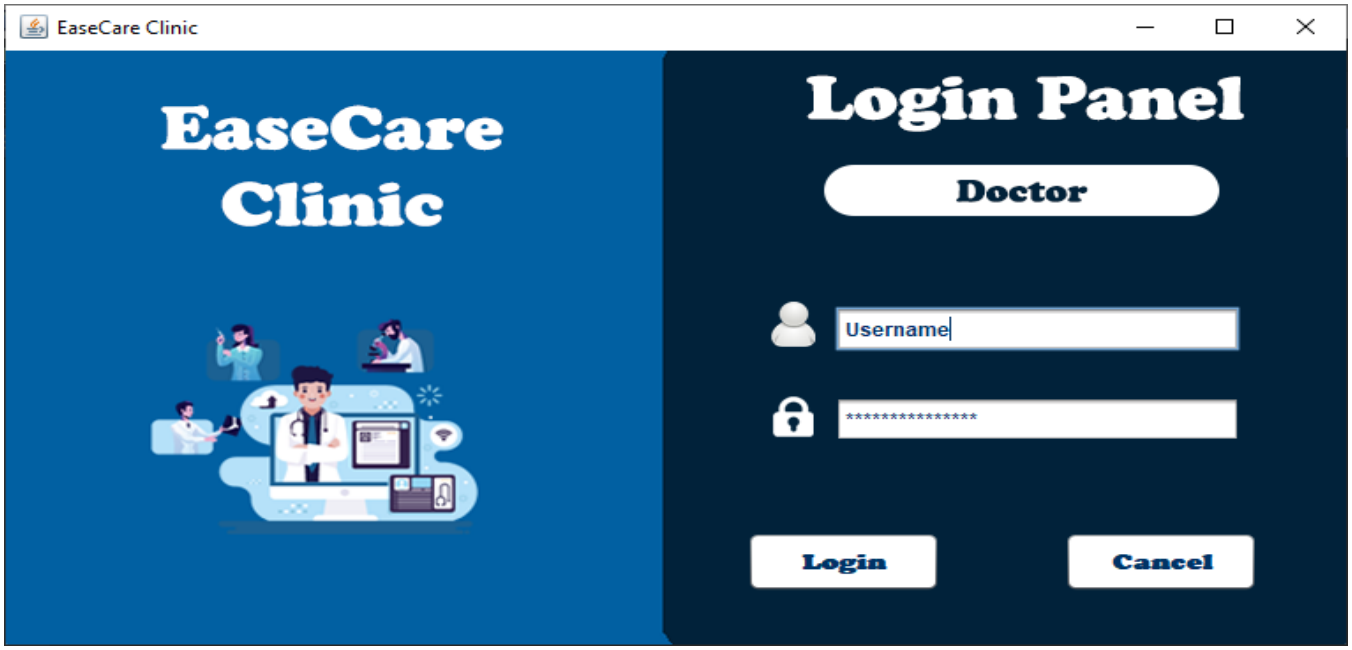
7. Project Graphical User Interface (GUI)

1. **First Page:** Only two categories of people have access to the system, so in the first login screen the user choose to login as "Clinic assistant" or as a "Doctor".

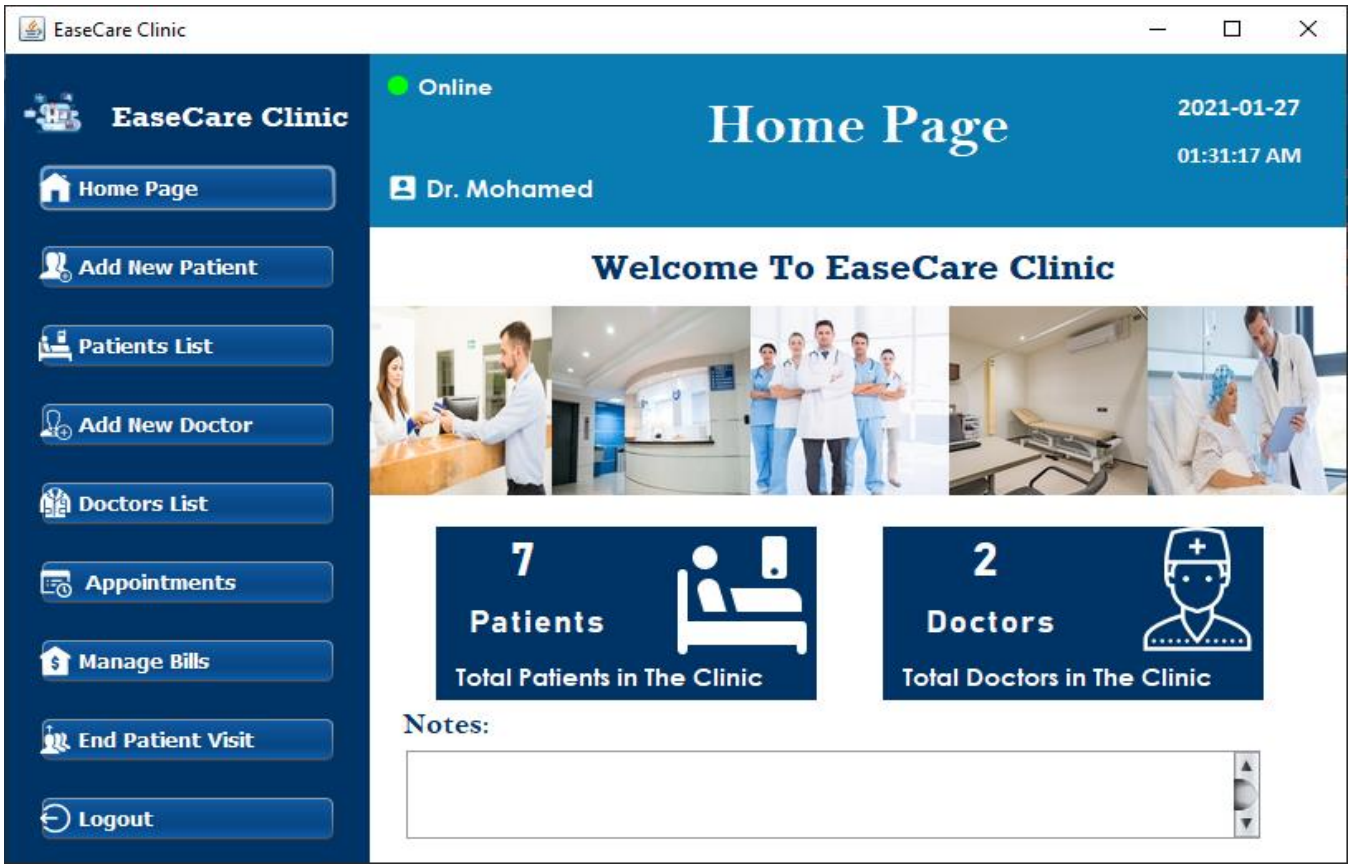


2. **Login Page:** Based on user's choice, he/she has to enter correct username and password to login to the system.

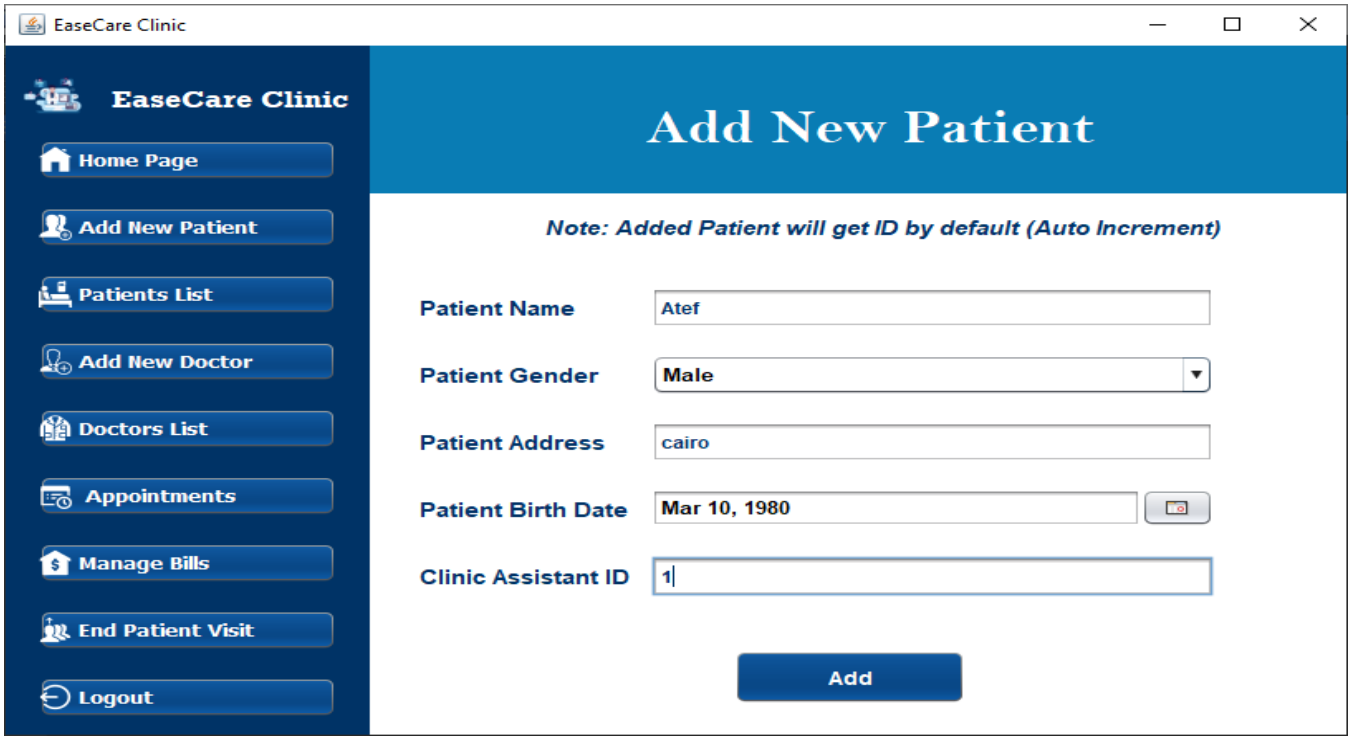




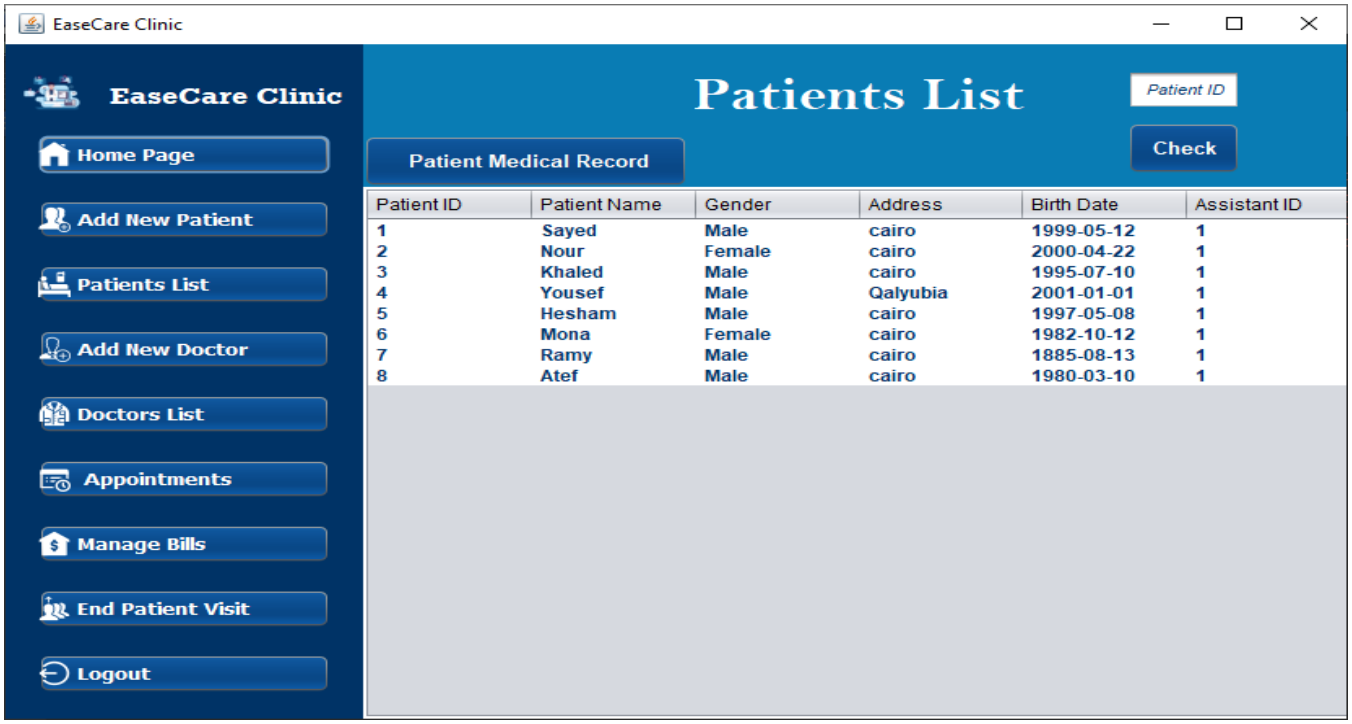
3. **Home page:** is the first screen when login to the system, it shows the number of patients registered in the clinic and the number of doctors in clinic. Also, on the right of the screen, there is today's date and current time, to help the clinic assistant and doctor know the time and date easily. A nave bar is found in every screen to facilitate interacting with the system. Nave bar show all activities can be done in the system. Clinic assistant can add notes also.



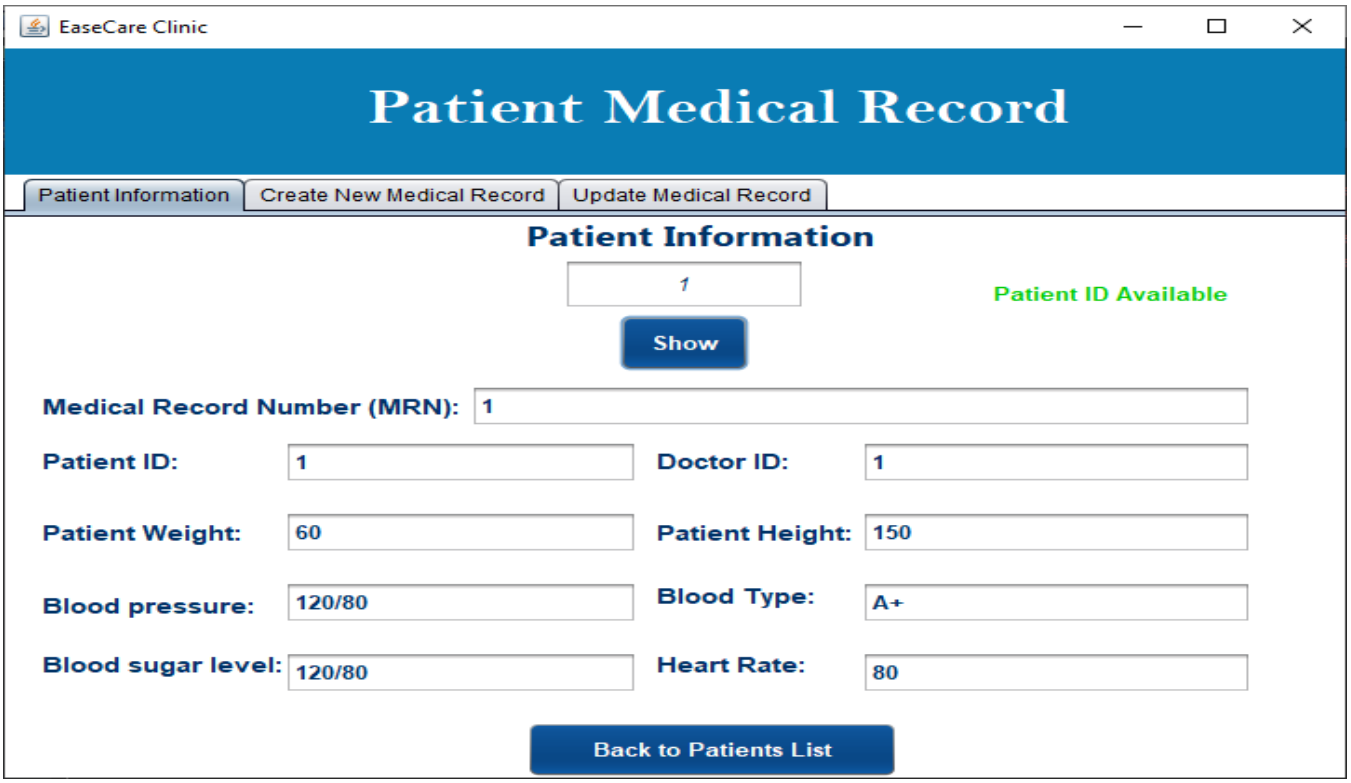
4. **Add New Patient:** is for clinic assistant only. The system gives patient a Unique ID by default (auto increment) and Clinic assistant writes down initial information of the patient like: name, gender, address, birth Date. the Clinic assistant writes id as an identification.

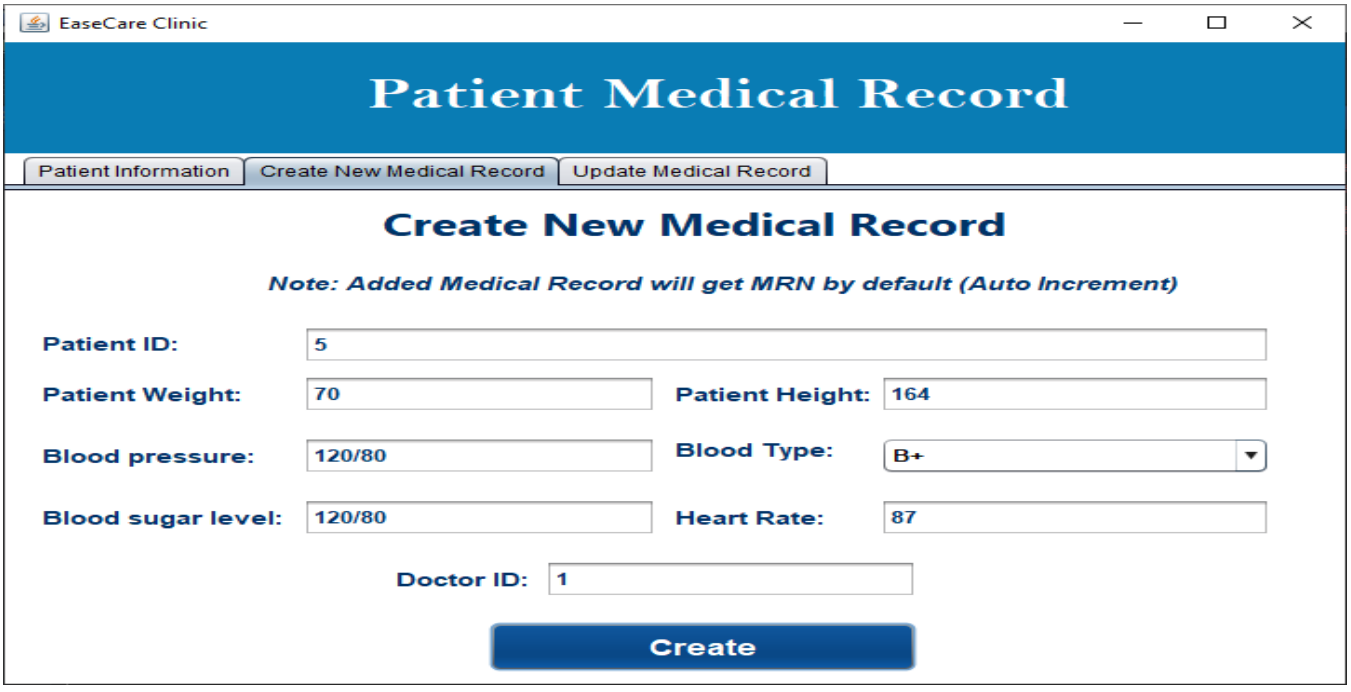


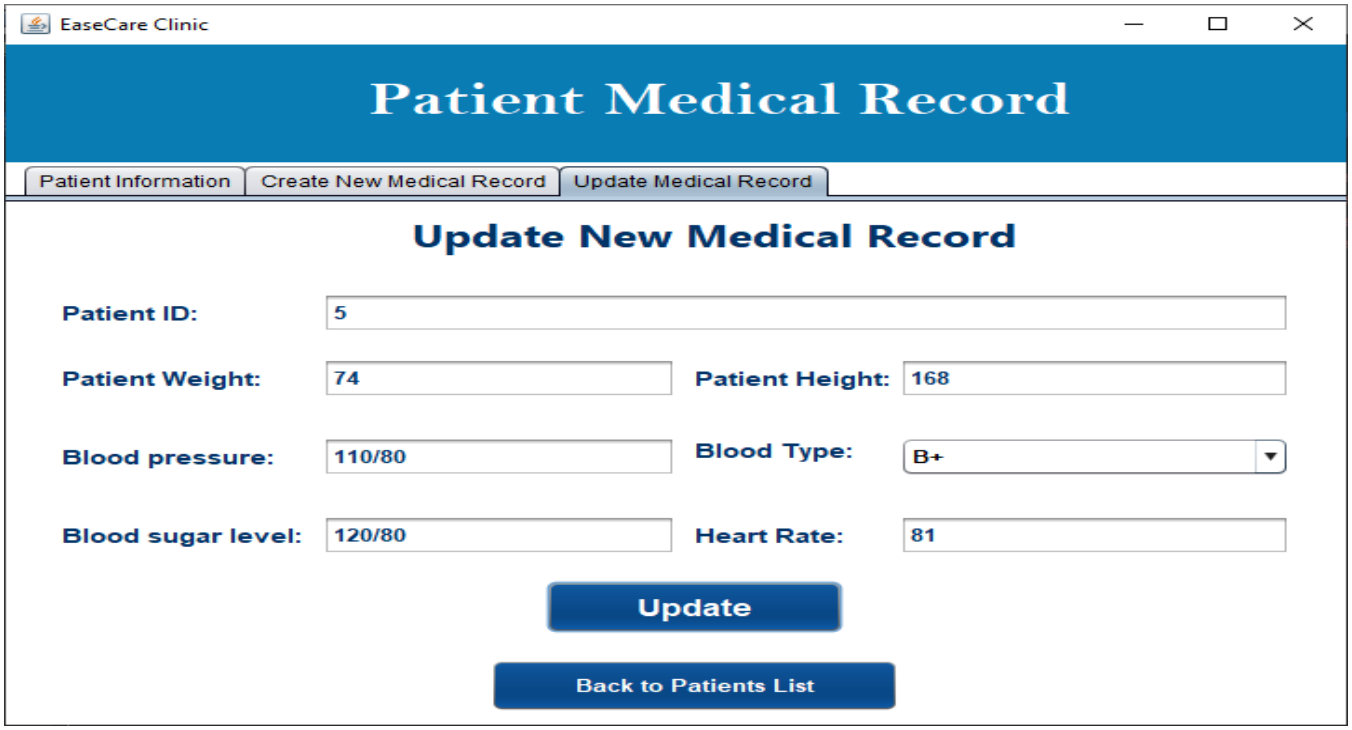
5. **Patients List**: Next screen shows the list of patients added to the clinic system and also can search by using Patient ID. By clicking on "Check Medical Record" move you to the Medical Record.



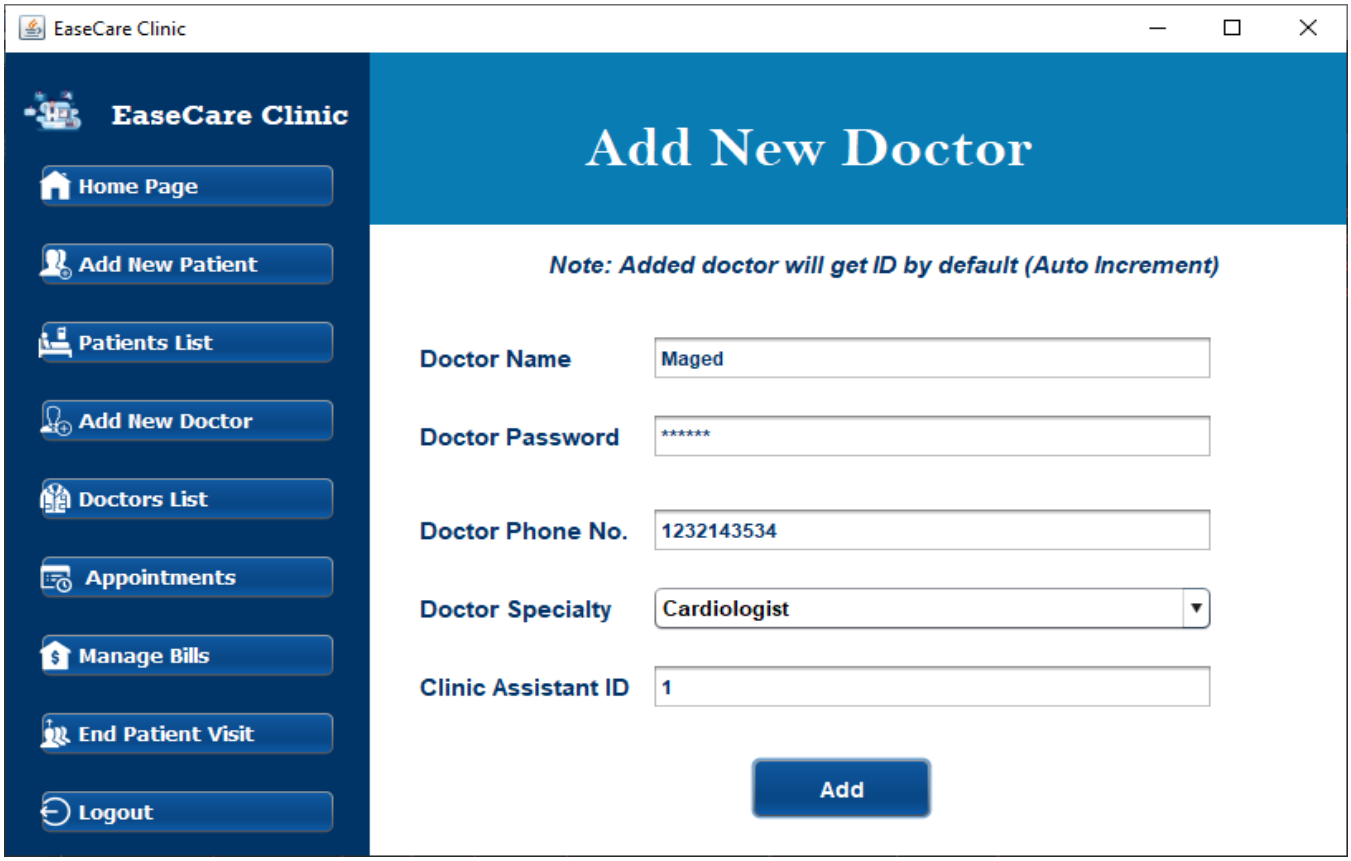
6. **Patient Medical Record:** there are three tabs, first tab: for show patient medical record, the doctor enters the patient id to show the information second tab: if the patient doesn't have medical record, doctor creates new MR by enter patient id and some medical info as: weight, height, blood type…etc. And doctor id who created the medical record. (The system gives patient a Unique MRN by default (auto increment)). Third tab: for update the medical record for specific patient using his/her id.





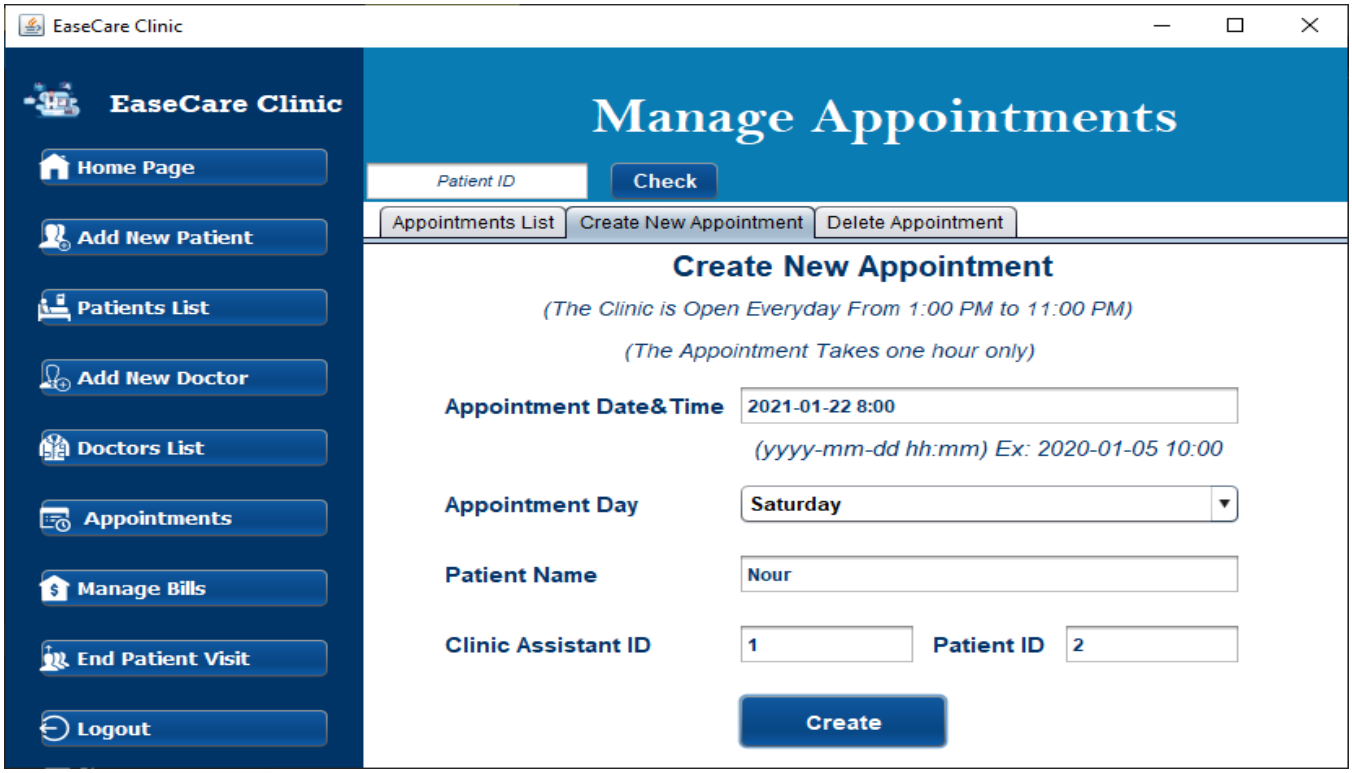


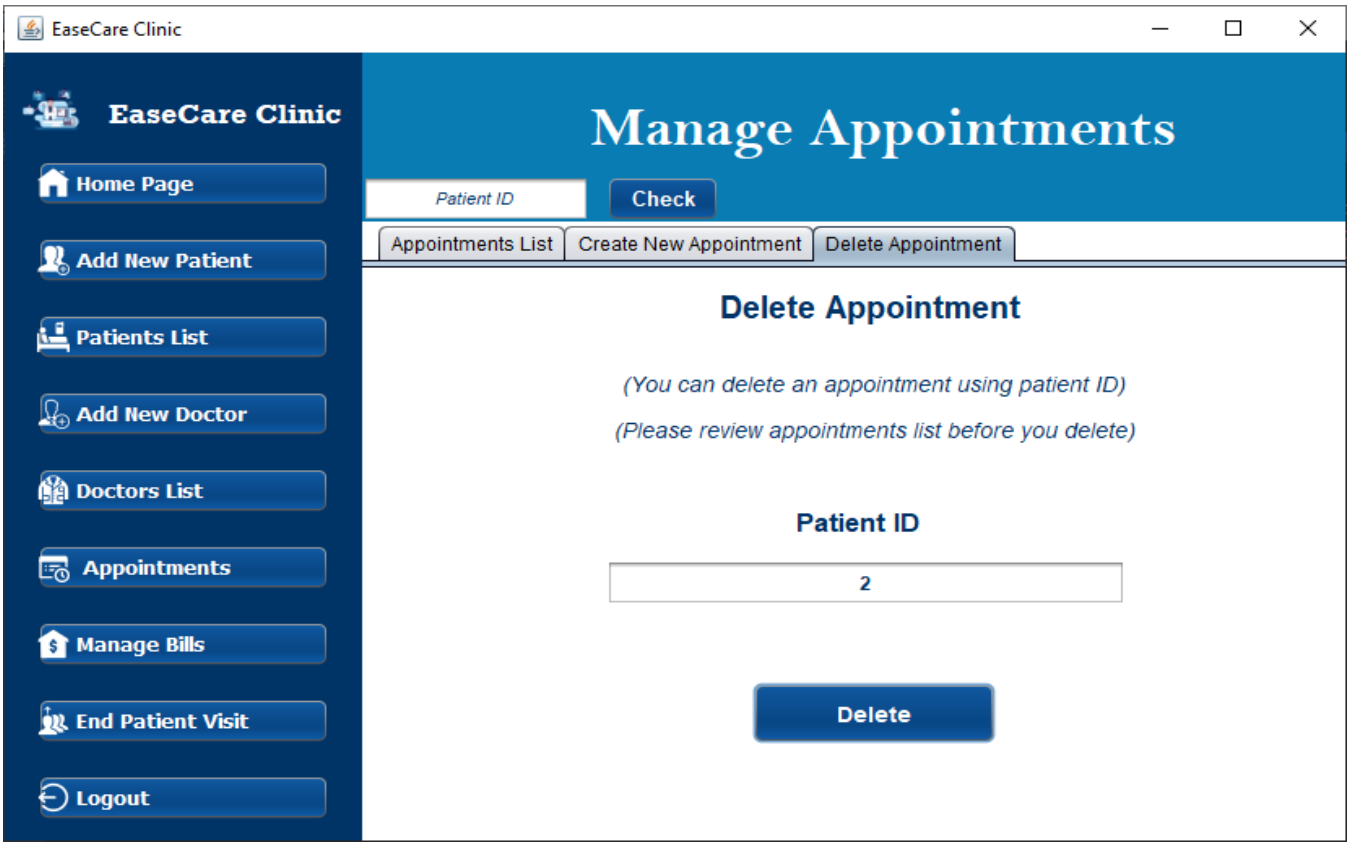
7. **Add New Doctor:** is for clinic assistant only, the system gives patient a Unique ID by default (auto increment) and Clinic assistant writes down doctor's information and give each doctor a username and a password to enable him to login to the system.



8. **Doctors List:** Next activity is to view list of doctors found added to the clinic system and also can search by using doctor ID.

9. **Manage Appointments:** it has three tabs, the first tab to view appointments list to decide the available dates and also can search using patient id to know if patient has booked appointment before or no. Second tab is to create new appointments, it includes dateTime, day, and patient's name & ID and clinic assistant ID who created the appointment. Third tab: for delete appointment using patient ID. The clinic assistant deletes the appointment if the appointment is missed or its time expires.


EaseCare Clinic
EaseCare Clinic
Home Page
Add New Patient
Patients List
Add New Doctor
Doctors List
Appointments
Manage Bills
End Patient Visit
Logout
Manage Appointments
Patient ID
Check
Appointments List
Create New Appointment
Delete Appointment
Create New Appointment
(The Clinic is Open Everyday From 1:00 PM to 11:00 PM)
(The Appointment Takes one hour only)
Appointment Date&Time
2021-01-22 8:00
(yyyy-mm-dd hh:mm) Ex: 2020-01-05 10:00
Appointment Day
Saturday
Patient Name
Nour
Clinic Assistant ID
1
Patient ID
2
Create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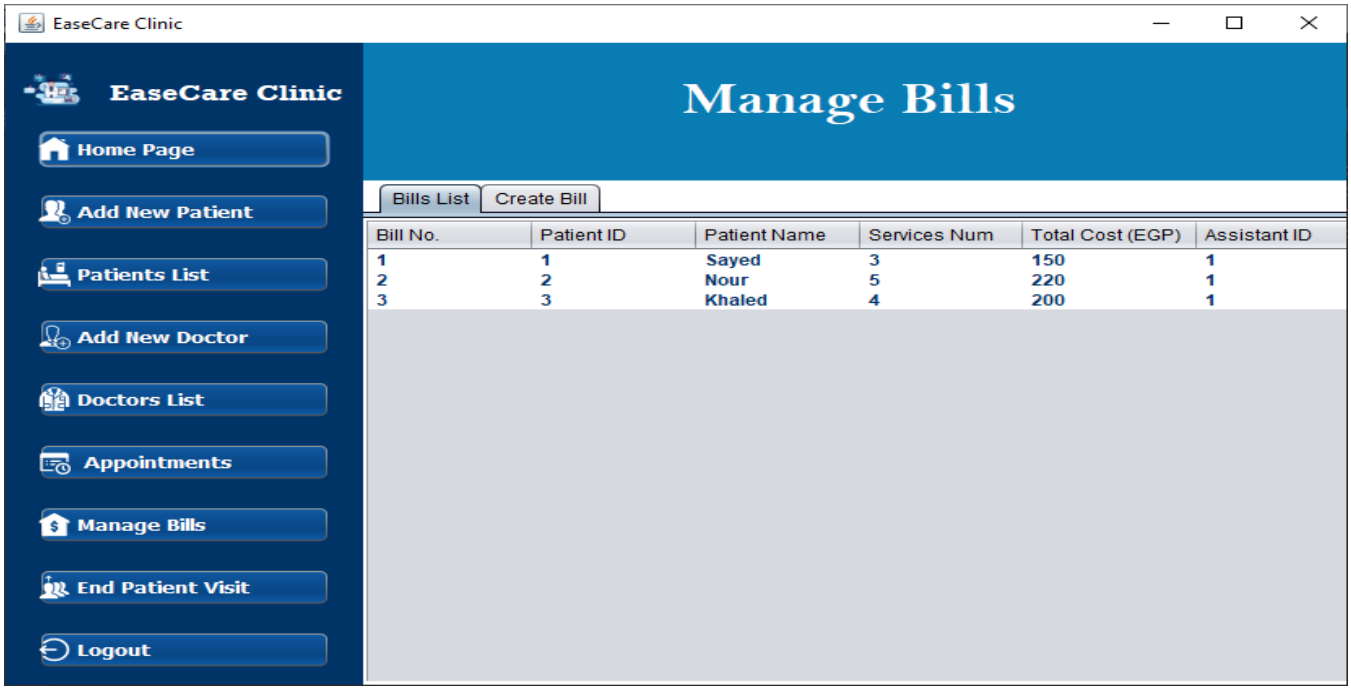
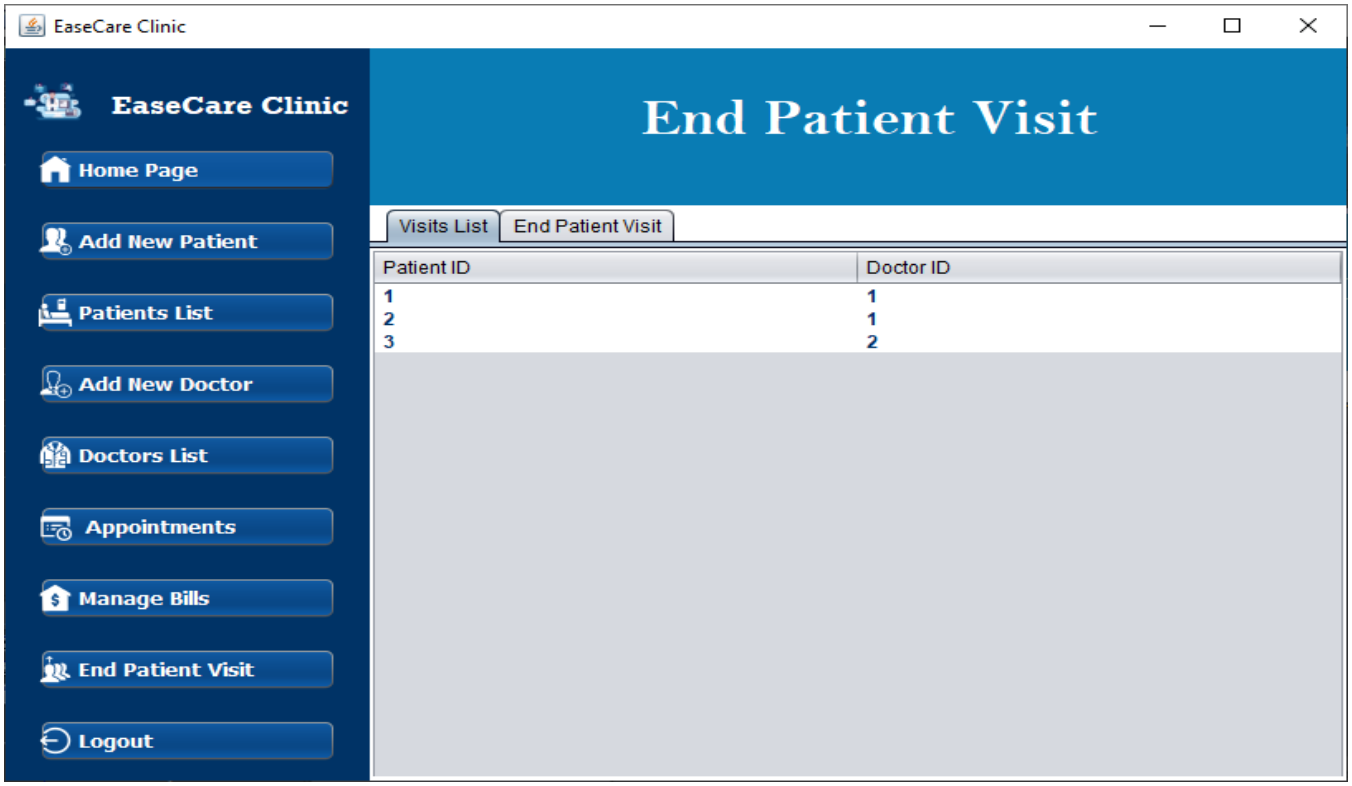
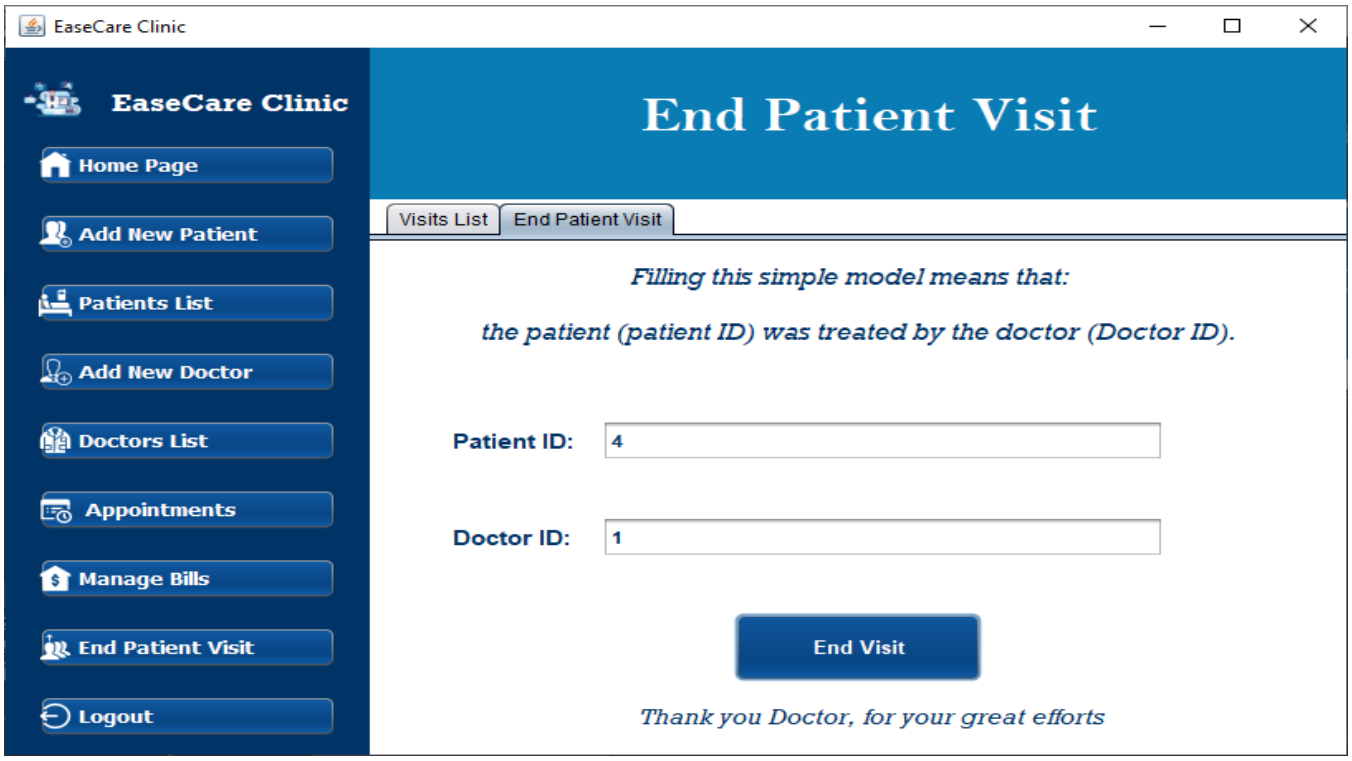
End Patient Visit
Logout
Manage Appointments
Patient ID
Check
Appointments List
Create New Appointment
Delete Appointment
Delete Appointment
(You can delete an appointment using patient ID)
(Please review appointments list before you delete)
Patient ID
2
Delete

10. **Manage Bills:** it has two tabs, the first tab to view the bills list that contains bill number, patient id, patient name, the number of services, total cost of services, and clinic assistant id who created the bill. Second bill for create new bill for patient, the system gives a unique bill number by default (auto increment) and clinic assistant writes down bill information as the number of services, cost of the services, patient id, patient name, and clinic assistant id who created the bill.



11. **End Patient Visit:** it has two tabs, first tab for show the list of the patient id (who has been treated) and the doctor id (who has treated the patient). Second tab, it is for doctor, after doctor end the treatment, he should fill the form that means that doctor has treated the patient (patient id) and that he checked out the patient.