**Case Study: Clinic Management System**

**Context:**

You are required to develop a console-based Clinic Management System using Core Java. The application will allow clinic administrators to manage patient records, doctor schedules, and appointment bookings. The application will utilize Java Collections for storing patient and doctor information, implement Object-Oriented Programming principles, and include exception handling to manage potential errors.

**Requirements:**

**Features:**

1. **Add and Remove Patients:**
   * Allow clinic administrators to add new patients to the system.
   * Allow clinic administrators to remove patients from the system.
2. **Update Patient Details:**
   * Allow clinic administrators to update details of existing patients, such as name, contact information, and medical history.
3. **Add and Remove Doctors:**
   * Allow clinic administrators to add new doctors to the system.
   * Allow clinic administrators to remove doctors from the system.
4. **Update Doctor Details:**
   * Allow clinic administrators to update details of existing doctors, such as name, specialization, and contact information.
5. **Schedule Appointments:**
   * Allow clinic administrators to schedule appointments for patients with doctors.
   * Ensure that appointments do not conflict with existing appointments or doctor schedules.

**Classes and Objects:**

1. **Patient Class:**
   * Attributes: id, name, contactNumber, medicalHistory.
   * Methods: Constructors, getters and setters, toString method.
2. **Doctor Class:**
   * Attributes: id, name, specialization, contactNumber.
   * Methods: Constructors, getters and setters, toString method.
3. **Appointment Class:**
   * Attributes: id, patientId, doctorId, appointmentDateTime.
   * Methods: Constructors, getters and setters, toString method.
4. **ClinicManagementSystem Class:**
   * Attributes: HashMap<Integer, Patient> patients, HashMap<Integer, Doctor> doctors, ArrayList<Appointment> appointments.
   * Methods:
     + addPatient(Patient patient): Adds a new patient to the system.
     + removePatient(int patientId): Removes a patient from the system.
     + updatePatient(int patientId, Patient updatedPatient): Updates details of an existing patient.
     + addDoctor(Doctor doctor): Adds a new doctor to the system.
     + removeDoctor(int doctorId): Removes a doctor from the system.
     + updateDoctor(int doctorId, Doctor updatedDoctor): Updates details of an existing doctor.
     + scheduleAppointment(int patientId, int doctorId, LocalDateTime appointmentDateTime): Schedules an appointment for a patient with a doctor.
     + Helper methods for input validation and exception handling.

**Deliverables:**

1. Complete source code for the Clinic Management System.
2. Documentation including:
   * How to run the application.
   * Instructions for each feature.
   * Explanation of the exception handling implemented.
3. A brief report on the application design and how Object-Oriented principles were applied.