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Small Clinic Management System

1. Object-Oriented Analysis (OOA) Model

1.1 Objects (nouns) include:

- Patient
- ChronicPatient (inherit from Patient)
- Doctor
- Appointment

1.2. Attributes for each Object:

- Patient: id, name, age, medicalHistory
- ChronicPatient: Attributes inherit from Patient, conditionType, lastCheckupDate
- Doctor: id, name, specialty, appointments
- Appointment: date, time, reason, status, patientID, doctorID

1.3. Methods for each Object:

- Patient: scheduleAppointment, updateMedicalHistory, displayInfo, getID
- ChronicPatient: scheduleAppointment (overridden), displayInfo (overridden)
- Doctor: assignAppointment, updateAppointmentStatus, displayInfo, getID
- Appointment: setStatus, displayDetail, getPatientID, getDoctorID

1.4. Inheritance Relationship:

- ChronicPatient inherits from Patient because chronic patient need special treatment

2. Class Design

- Patient: Base class, method scheduleAppointment have polymorphism.
- ChronicPatient: inherit from Patient, add conditionType and lastCheckupDate attributes, overrides scheduleAppointment method to checkup more frequent.
- Doctor: Manage appointment by assign and update status.
- Appointment: Include detail info and link to patient and doctor's ID.

3. Code Walkthrough

Create Objects (Patient, ChronicPatient, Doctor, Appointment) to display general information, schedule and assign appointment, update appointment status, add medical history and show updated information.

The code uses vector for list (medicalHistory, appointment); encapsulation (private attributes, public methods); inheritance and polymorphism for ChronicPatient.

4. Test Result

```
C:\QUANG\CODE\Small Clinic  X + v
Information-----
Patient ID:P123
Patient Name:Mai Dang Quang
Patient Age:24
Medical History: No records
Patient ID:P345
Patient Name:Nguyen Thi D
Patient Age:45
Medical History: No records
Condition: Diabetes
Last Checkup: 08/09/2025
Doctor ID: D011
Name: Huynh Xuan Phung
Specialty: Khoa noi tiet
Appointments: None
Appointment Info-----
Scheduled appointment for patient Mai Dang Quang
Scheduled frequent checkup for patient Nguyen Thi D (Last checkup: 08/09/2025)
Update Appointment Status-----
Appointment assigned to Dr. Huynh Xuan Phung
Appointment assigned to Dr. Huynh Xuan Phung
Appointment status updated to: Completed
Appointment status updated to: Canceled
Update Medical History-----
Medical history updated for patient Mai Dang Quang
Medical history updated for patient Nguyen Thi D
Information Updated-----
Patient ID:P123
Patient Name:Mai Dang Quang
Patient Age:24
Medical History: 09/09/2025; Kham tong quat; Binh thuong;
Patient ID:P345
Patient Name:Nguyen Thi D
Patient Age:45
Medical History: 13/09/2025; Cap them thuoc;
Condition: Diabetes
Last Checkup: 08/09/2025
Doctor ID: D011
Name: Huynh Xuan Phung
Specialty: Khoa noi tiet
Appointments:
  [0] Appointment:
Date: 09/09/2025
Time: 10:00AM
Reason: Kham tong quat
Status: Completed
PatientID: P123
DoctorID: D011
  [1] Appointment:
Date: 13/09/2025
Time: 15:00PM
Reason: Kiem tra dinh ky
Status: Canceled
PatientID: P345
DoctorID: D011

Press any key to continue . . . |
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5. LLM Usage

In this assignment, I use Grok as an LLM to assist in brainstorming and fixing bugs

I prompted: “Suggest methods for an Appointment class in a clinic system including method Patient, ChronicPatient and Doctor”. Grok suggest getStatus, and getPatientID/getDoctorID to link,

I prompted: “I had error “SmallClinicManagement.cpp:16:38: error: 'Appointment' has not been declared” when create .exe by using g++ SmallClinicManagement.cpp -o SmallClinicManagement.exe”. Grok suggest move Class Appointment to the top to fix