Task 1: Database Design and Setup

Goal: Design an SQL database schema that can store patient identifiers, tests, R codes, panels, genes, and historical changes in panel compositions.

Components:  
- Patient table: stores patient identifiers (NHS/hospital number).  
- Tests table: stores test details, linked to patient and panel data.  
- Panels table: stores panel information, including composition history.  
- Genes table: stores gene data and history, linking each gene to a panel.

Task 2: PanelApp API/Pandas Integration

Goal: Use PanelApp API and pandas to populate the panels and genes data within the SQL database.

Components:  
- Fetch panel and gene information using the PanelApp API.  
- Populate the Panels and Genes tables with initial data.  
- Implement a routine to update the database with any API changes periodically.

**Task 3: Build Query Functions for Patient Test Retrieval**

**Goal:** Implement SQL queries to retrieve all tests and associated panels for a given patient identifier.  
  
**Components:**  
- A function that accepts a patient identifier as input and outputs test details.  
- Join queries across Patients, Tests, Panels, and Genes tables to retrieve comprehensive data.

**Task 4: Develop UI for Test and Panel History Visualization**

Goal: Create a user interface where healthcare providers can input patient identifiers and view test and panel history in a clear and understandable format.

Components:  
- Input field for NHS number or hospital number.  
- Display section for test history, including panels and genes.  
- Visual indicators for panel updates and gene composition changes over time.

**User Story 2: Display Gene Panel Composition and Change History**

As a healthcare provider, I want to view a history of gene panels used for each test to track gene inclusion changes over time. This will help me understand whether any genetic variants relevant to the patient’s condition may have been missed due to panel updates.  
  
**Criteria:**

* For each genetic test, I can view the list of genes included in the panel at the time of the test.
* Any historical changes in panel composition are displayed (e.g., if genes were added or removed after the test date).

User Story 1: Retrieve Patient's Genetic Test Summary

As a healthcare provider, I want to be able to enter a patient's identifier (NHS number or hospital number) and receive a summary of all genetic tests conducted on that patient. This will include information on tests performed, panels associated with each test, and relevant R codes.

Criteria:

* I can input a patient's unique identifier.
* I receive a summary list of all tests performed on the patient.
* Each test entry includes - Test name, Date of test, R code associated with the test, Relevant panel(s) used at the time of testing.

As a stakeholder, I want to retrieve and view a detailed history of genetic tests, panels, and gene changes for a specific patient using their unique identifier. This will allow me to understand the tests performed, the panels involved, and any changes to gene inclusion within those panels, thus ensuring that I can accurately interpret the genetic testing history and provide informed care.

Develop a tool that enables healthcare providers to input patient identifiers (e.g., NHS number or hospital number) and retrieve a detailed history of genetic tests, panels, and gene changes associated with the patient.