Database Design

Patient Table

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Column Name | Data Type | Constraints | Description | Justification |
| patientID | INT | PRIMARY KEY | Unique patient identifier | Ensures each patient has a unique ID |
| patientName | VARCHAR(100) | NOT NULL | Full name of the patient | Essential for identifying patients |
| phoneNo | VARCHAR(20) | NOT NULL | Patient’s phone number | Needed for contact and appointment communication |
| email | VARCHAR(100) | UNIQUE | Patient’s email address | Used for secure communication and notifications |

Doctors Table

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Column name | Data Type | Constraints | Description | Justification |
| doctorID | INT | PRIMARY KEY | Unique doctor identifier | Ensures each doctor has a unique ID |
| doctorName | VARCHAR(100) | NOT NULL | Full name of the doctor | Necessary for doctor identification |
| specialization | VARCHAR(100) | NOT NULL | Doctors field of expertise | Helps categorize doctors by speciality |
| phoneNo | VARCHAR(20) | NOT NULL | Doctor’s phone number | Needed for communication |
| email | VARCHAR(100) | UNIQUE | Doctor’s email address | Used for secure communication |

DoctorCredentials Table

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Column Name | Data Type | Constraints | Description | Justification |
| username | VARCHAR(255) | PRIMARY KEY, NOT NULL | Unique username | Ensures secure login |
| password | VARCHAR(64) | DEFAULT NULL | Hashed password | Stores encrypted credentials |
| doctorID | INT | FOREIGN KEY | Links credentials to a doctor | Ensures credentials belong to a doctor |

Bookings Table

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Column Name | Data Type | Constraints | Description | Justification |
| bookingNo | INT | PRIMARY KEY | Unique booking identifier | Ensures each appointment is uniquely identified |
| dayOfBooking | INT | NOT NULL | Day of appointment | Needed to specify booking date |
| monthOfBooking | INT | NOT NULL | Month of appointment | Helps in filtering appointments |
| yearOfBooking | YEAR | NOT NULL | Year of appointment | Helps in filtering appointments |
| bookingTime | TIME | DEFAULT NULL | Scheduled time of booking | Specifies the exact time of booking |
| patientID | INT | FOREIGN KEY | Links booking to a patient | Ensures booking is associated to a valid patient |
| doctorID | INT | FOREIGN KEY | Links booking to a doctor | Ensures booking is associated to a valid patient |

Prescriptions Table

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Column Name | Data Type | Constraints | Description | Justification |
| prescriptionID | INT | PRIMARY KEY | Unique prescription identifier | Ensures each prescription is uniquely identified |
| bookingNo | INT | FOREIGN KEY | Links prescription to a booking | Identifies prescriptions are linked to a visit |
| medicationName | VARCHAR(100) | NOT NULL | Name of prescribed medication | Identifies the prescribed medication |
| dosage | VARCHAR(50) | NOT NULL | Dosage of the medication | Specifies dosage for patient safety |
| duration | VARCHAR(50) | NOT NULL | Duration of medication use | Defines prescription length |
| instructions | TEXT |  | Additional info | Provides special usage instructions |

Visits Table

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Column Name | Data Type | Constraints | Description | Justification |
| visitID | INT | PRIMARY KEY | Unique visit identifier | Ensures each visit is uniquely identified |
| bookingNo | INT | FOREIGN KEY | Links visit to a booking | Ensures visit records are linked to an appointment |
| notes | TEXT |  | Doctor’s notes on the visit | Allows doctors to record visit details |
| prescriptionID | INT | FOREIGN KEY | Links visit to a prescription (optional) | Enables tracking of prescriptions |

AccessLogs Table

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Column Name | Data Type | Constraints | Description | Justification |
| logID | INT | PRIMARY KEY | Unique log entry identifier | Ensures each log entry is uniquely identified |
| username | VARCHAR(255) | NOT NULL | Username of the accessing user | Identifies who accessed the system |
| accessTime | TIMESTAMP | DEFAULT | Time of access | Tracks when system access occurred |
| action | TEXT | NOT NULL | Description of the action performed | Details on what was accessed |

Justification of Design Choices

**Normalization:** The schema follows third normal form (3NF) to eliminate redundancy and improve data integrity.

**Foreign Keys**: Ensure data consistency by maintaining referential integrity between tables.

**Indexes:** Primary keys ensure efficient indexing for fast lookups.

**Security:** Doctor credentials are stored separately to limit unauthorized access risks.

**Flexibility:** The Visit and Prescription tables allow for detailed medical record tracking.

**Logging Mechanism:** The AccessLogs table keeps track of all access attempts for security and auditing purposes.