Entity 'Patient'

A patient's basic information to be recorded. There will be one row for each patient's information. The entity 'Patient' holds static data about a patient: the attributes that record basic information of patients.

Attribute	Description
patient_id	A numeric ID. This is the primary key of entity 'Patient', which identifies each patient. It is issued when the patient first time register in the clinic's system. And patients can use this ID number and their date of birth to sign in.
name	Holds the name of patients.
gender	The gender of a patient. Holds one of the values: 'female' or 'male', indicating whether the patient is female or male.
home_address	The home address of a patient.
phone_number	The contact phone number of a patient.
email	Holds the email address of a patient.
date_of_birth	The date of birth of each patient. Patients can use this attribute and their 'patient_id' to sign in the system.
medicare_number	The Medicare number of a patient, which should be 20-digit long.
smoker	Holds either a 'yes' or 'no', indicating whether the patient smokes.

Entity 'WaitingTime'

This entity is built for showing the data of patients' queue. E.g. how long patients wait until they are called for consultation with the doctor. Each row in this entity stands for each time a patient enters the clinic and signs in for a consultation. It can have many rows for one patient who come in for many consultations.

Attribute	Description
arrive_time	The time that a patient signs in to the system and automatically joins the waiting queue of consultation. The system will call the patient that has the earliest arriving-time (longest waiting-time) when the doctor becomes free. This attribute 'arrive_time' and 'patient_id' together are the primary key of the entity.
patient_id	This foreign key from entity 'Patient' identifies each patient, which is assigned to patients the first time they register in the system. A patient can use this ID number and date-of-birth to sign in the system and start a consultation. This attribute 'patient_id' and 'arrive_time' together are the primary key of the entity.
leave_time	When a patient gets called by system to go to the doctor's office for consultation, if the patient shows up, this holds the time that a patient gets called. If the patient does not show up, then this will hold nothing, indicating that the patient signs in to the system, but leaves before the consultation.

Entity 'PatientRecord'

This entity records diseases the patient has. Each row represents a specific disease record of a patient for one time.

Attribute	Description
patient_id	This foreign key from entity 'Patient' is a numeric ID number assigned to patients the first time they register in the clinic system. It identifies each patient. And a patient can sign in to the system by using this assigned ID and date-of-birth. Combination of 'patient_id', 'add_time' and 'disease_id' together are the primary key of the entity.
add_time	The time and the day when a specific disease of a patient is added on the patient's record. One disease of one patient can only be added once, when it has not been removed from the record yet. Combination of 'patient_id', 'add_time' and 'disease_id' together are the primary key of the entity.
remove_time	The time and the day when a specific disease of a patient is removed from the patient's record. Only diseases that have been added can be removed. After the disease is removed, if the patient has the same disease, it will be added again in a new row.
disease_id	This is the ID number of the disease that the patient has. In total, there are about 300 hundred standard diseases, thus there are about 300 IDs in total. Combination of 'patient_id', 'add_time' and 'disease_id' together are the primary key of the entity.

Entity 'Disease'

This entity records all the diseases that patients may have. Each row stands for each specific disease. There are about 300 rows for the list of 300 standard disease names.

Attribute	Description
disease_id	The ID number of the disease which is assigned manually. Each of this identifies a specific disease name. This is the primary key of this entity. It should hold about 300 values in total for 300 standard disease names.
disease_name	The name of disease. There should be 300 standard disease names in total.

Entity 'Doctor'

This entity records the basic information of doctors. In total, there will be about 100 rows for 100 doctors in this clinic.

Attribute	Description
doctor_id	The primary key of this entity. It is an ID number that identifies a doctor.
name	The name of each doctor.

Entity: 'Attendence'

This entity records when a doctor arrives at and leaves work every day, on which we calculate how many numbers of hours they work by comparing the arriving-time and the leaving-time on that day.

Attribute	Description
arrive_time	The time that a doctor arrives the clinic. It is the time the doctor starts work. The format is "YYYY-MM-DD-HH-MM-SS". The combination of this attribute 'arrive_time' and 'doctor_id' is the primary key of this entity.
leave_time	The time that a doctor leaves the clinic. The format is "YYYY-MM-DD-HH-MM-SS". It is the time the doctor leaves work.
doctor_id	This is a foreign key from entity 'Doctor'. It is an ID number that identifies a doctor. The combination of this attribute 'doctor_id' and 'arrive_time' is the primary key of this entity.

Entity: 'Medicine'

The medicine in the clinic which is used by patients. This entity holds 'static' data about a medicine with those attributes.

Attribute	Description
medicine_id	For each kind of medicine, it should have a unique number. There are about 3000 kinds in total. It is also the primary key. E.g. '1' for aspirin, '2' for vitamin c, etc.
medicine_name	The name of the medicine itself, which is named according to the international standard. E.g. 'ASPIRIN' or 'VITAMIN C'.

Entity: 'Prescription_has_Medication'

Because the relationship between prescription and medication is many-to-many, this table shows the relationship of different prescriptions and different medicine. It records for each prescription, and each medicine it requires.

Attribute	Description
prescription_id	The foreign key and one of the composite primary key of this table. It records which prescription it is.
medicine_id	The foreign key and one of the composite primary key of this table. It records which medicine is used in the prescription. For each prescription, it can have several medication.
dose	The quantity of the medicine in the specific prescription. E.g. '10ml'.

frequency	The times that the patient take the medicine during a period of time. E.g. 'twice a day'.
permission_record	It records the requirement and response of the restricted medicine prescription. And this record can be empty because some prescriptions don't have restricted medicine.
validation	It records whether this prescription is valid if the prescription contains restricted medicine, and enumerates the validation by "yes" or "no".

Entity: 'Prescription'

A record for one consultation that contains one or more medications. It will record every prescription and it is created by the corresponding consultation. And it also shows whether it is a prescription that created by nurse or not.

Attribute	Description
prescription_id	For every prescription it should have a unique number, which is also the primary key that generated by DBMS. When there is a new prescription, DBMS generates a number for it and saves its information in other columns.
consultation_id	The foreign key of this table. In this column, we can find that the prescription is from the corresponding consultation.
old_prescription_id	In the situation that patient calls the clinic, if a nurse creates a prescription for the patient, it holds the original prescription's unique number, which is the 'prescription_id'. This column can be null when the prescription is not extended from the old prescription.
nurse_id	The foreign key of this table. We record which nurse creates the new prescription for the patient.

Entity: 'Nurse'

The employee in the clinic that can create new prescriptions when patients phone the clinic. In the clinic there may be lots of nurses and everyone has a unique number as an identification. In this case, it only records who creates the new prescription for the patient. However, for advanced database establishment, this table can add other attributes like "phone number" or "attendance".

Attribute	Description
nurse_id	The primary key of this table and it is unique for every nurse.
nurse_name	The name of the nurse. E.g. 'Alice'.

Entity: 'Consultation'

This table records the consultation information every time. And it has several attributes that record the consultation details.

Attribute	Description
consultaton_id	The primary key of this table. And the unique number is generated by DBMS. When a consultation is created, it means a doctor is diagnosing a patient. For different consultations, the doctor, patient or time may different.
start_time	The start time of the consultation, and the format is "YYYY-MM-DD-HH-MM-SS". When a patient enters in the room to meet with the doctor, then the time starts.
end_time	The end time of the consultation, and the format is "YYYY-MM-DD-HH-MM-SS". When a patient gets out the room, then the time ends.
notes	For each consultation, the doctor will write about 200 words notes for the patient, and it can be saved in this column.
doctor_id	The foreign key of this table which records the doctor of this consultation.
patient_id	The foreign key of this table which records the patient of this consultation.

Entity: 'Test'

There is a list of about 100 standard tests that doctors can choose from.

Attribute	Description
test_id	This primary key is a unique integer.
test_name	The name of test itself. It is unique and not null. E.g. chest x-ray.

Entity: 'Image'

Some tests result in one or more medical images needing to be stored.

Attribute	Description
image_id	This primary key is a unique integer.
analysis	Each image has a short analysis of around 100 words.
image_file.	Images can be up to 20 Mb in size. It is to store the picture. The datatype is BLOB.
consultation_id	To distinguish which consultation it belongs to. This is the foreign key.
test_id	To distinguish which test it belongs to. This is the foreign key.

Entity 'Sample'

A test may require that one or more biological samples be sent to a pathology lab for testing.

Attribute	Description
sample_id	This primary key is a unique integer to distinguish which sample it is.

note	The doctor will take samples from the patient and give each sample a descriptive note (about 150 words). It is not null.
send_date	The doctor will send samples to one of 10 pathology labs. When the samples are sent should be recorded. The format is "YYYY-MM-DD-HH-MM-SS".
place_sent	The doctor will send samples to one of 10 pathology labs used by the clinic. Where the samples are sent should be recorded.
result	The results of each sample will be received from the lab, every sample will have a result. It is not null.
receive_time	When results are received should be recorded. The format is "YYYY-MM-DD-HH-MM-SS".
lab_id	Samples should be sent to labs. This is the foreign key to distinguish which lab it is.
consulation_id	To distinguish which consultation it belongs to. This is the foreign key.
test_id	To distinguish which test it belongs to. This is the foreign key.

Entity 'Lab'

Samples are sent to Pathology labs for testing.

Attribute	Description
lab_id	A test may require that one or more biological samples be sent to a pathology lab for testing. There are 10 labs. This primary key is a unique integer.
lab_name	Each lab has its own name.

Entity 'Message'

Message will be sent to doctors and patients that the test results are available.

Attribute	Description
message_id	The system automatically sends messages to the doctor and patient, telling them that test results are available. This primary key is a unique integer to distinguish which message it is.
context	To record what is in the message.
sample_id	To distinguish which sample it belongs to. This is the foreign key.

Entity 'Consultation_has_test'

During a consultation, the patient may need one or more tests to be performed. The primary key in this entity is the combination of two foreign keys.

Attribute	Description
consultation_id	To distinguish which consultation it belongs to. This is the foreign key.
test_id	To distinguish which tests may be performed. This is the foreign key.