Relationships that exist between the classes:

Inheritance:

We have the parent class person and both staff and patient inherit from this parent class. Patient and staff are considered the child classes which inherit the attributes of the parent class and have some (unique) attributes of their own.

Composition:

The appointment class has a composited relationship with the patient class. The appointment class is the container, and the patient class is the contained class. These two classes are dependent on one another. When we destroy the patient class the appointment will be destroyed with it. You cannot have an appointment without a patient therefore we can see complete dependency which means it's a composite relationship.

⇒ Composition is a "have a" relationship. So, it can be said that a patient can have at least 1 appointment in the dental clinic and at most many appointments in the dental clinic. They need at least one appointment because that is how they get register into the system for the dental clinic. Additionally, one to many appointments can be for one patient. An appointment must have one patient only. If there are multiple patients, they each need their own appointment.

The appointment class has a composited relationship with the staff class. The appointment class is the container, and the staff class is the contained class. These two classes are dependent on one another. When we destroy the staff class the appointment will be destroyed with it. You cannot have an appointment without a staff like a dentist or hygienist therefore we can see complete dependency which means it's a composite relationship.

⇒ Composition is a "have a" relationship. So, it can be said that a staff can have at least 0 appointment in the dental clinic and at most many appointments in the dental clinic. This is because if it is a slow day in the dental clinic, the staff will have no appointments to attend for however on a busy day they will have many appointments. Additionally, an appointment can be conducted by at least one staff and at most many staff, this will depend on the patient's condition.

The appointment class has a composited relationship with the service class. The appointment class is the container, and the service class is the contained class. These two classes are dependent on one another. When we destroy the service class the appointment will be destroyed with it. You cannot have an appointment without a service to be done in the appointment therefore we can see complete dependency which means it's a composite relationship.

⇒ Composition is a "have a" relationship. So, it can be said that a appointment can have at least 1 service to be done in an appointment and at most many services done in the appointment. This will depend on the patient's condition and the amount of time the staff have to complete the services. Additionally, the same service can be done in none or in many appointments

The bill class has a composite relationship with the appointment class. The bill class is the container, and the appointment class is the contained class. These two classes will also be dependent on each other. When the appointment class is destroyed then so will the bill class. This is because there is no need for

the bill if they appointment does not exist. Therefore, we can see complete dependency which means it's a composite relationship.

- ⇒ Composition is a "have a" relationship. The bill must summarize the details of one appointment and an appointment can only be summarized in one bill. If a patient has had multiple appointments in this dental clinic, then they would have several bills to account for these appointments. This means that the bill must have on appointment only and vice versa meaning the appointment can have one bill only.

The bill class has a composite relationship with the branch class. The bill class is the container, and the branch class is the contained class. These two classes will also be dependent on each other. When the branch class is destroyed then so will the bill class. This is because there is no bill if they branch that provides this bill does not exist. Therefore, we can see complete dependency which means it's a composite relationship.

- ⇒ Composition is a "have a" relationship. The branch (one branch) can have 0 to many bills depending on whether this dental branch is operational and functional. Additionally, the bills all have to be part of the 1 branch, and they cannot be from another branch.

Aggregation:

There is an aggregation between the class and staff and branch. In which we say that the branch "has a" staff. Whereby the branch can have on or more staff members. Additionally, it is aggregation because we can say that these two classes can exist independently. A staff can exist if the class branch is destroyed because the different employees can find a job some place else. And although it may not be efficient the branch can still exist without a staff.

- ⇒ For the branch to be operational we say that 1 branch has many staff members so that its operation is guaranteed, and services can be conducted, and appointments can be made. Many staff members can be working at the same branch

There is an aggregation relationship between the class dental company and branch. These two classes can exist independently because even if the class dental company is destroyed a branch can still exist. This is because in the real-world if a dental company shuts down or goes bankrupt for example, the individual branches can be sold off to other companies meaning they can still be maintained. It can be said that a dental company "has a branch."

- ⇒ A dental company can have at least 1 branch and at most has many branches. And 1 or many dental branches can be part of the same dental company.