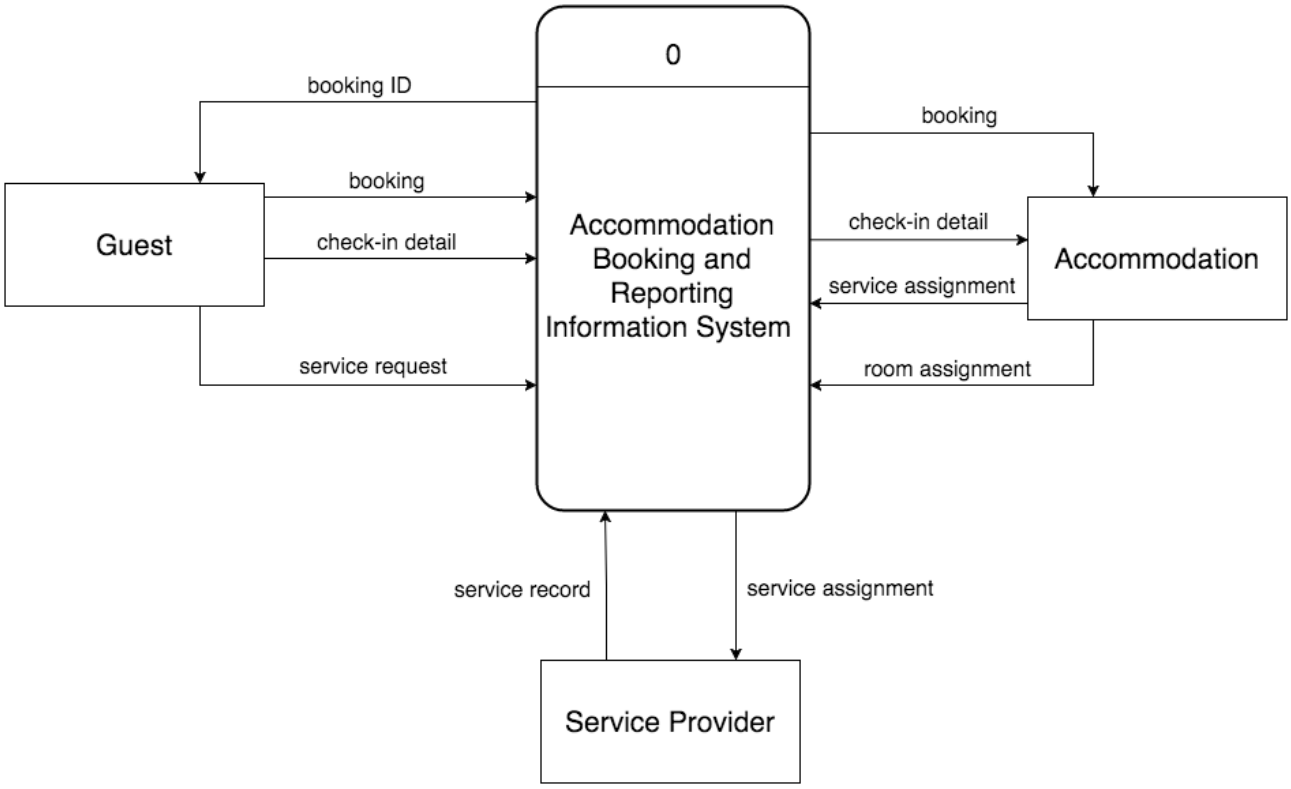
Assignment 1 Design Report

1. DFD

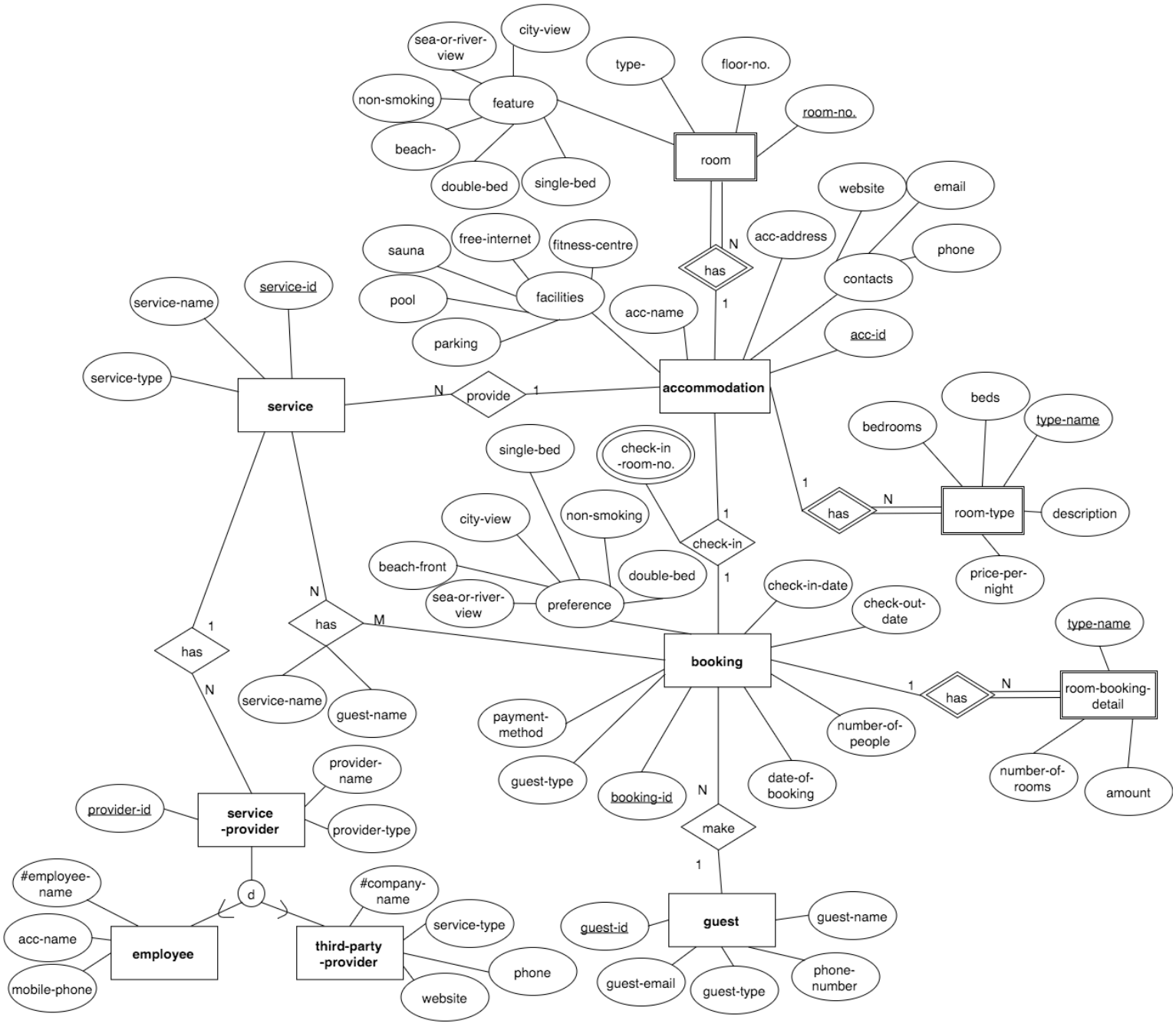


“Guest” is one of the main terminators. Data that guests need to provide are booking information when making bookings, check-in detail when the actual stays happen and service requests when guests need specific service. And each guest will receive a booking ID after the payment was made.

“Accommodation” is another main terminator. Accommodations need to get the information of bookings when guests make bookings as well as check-in detail when guests arrive at their spots. Besides, they need to assign the room(s) for each booking, so these detail should be provided to the system.

Once the accommodation receive the service request from a guest, actual provider should be assigned to execute the service. And finally the service records are recorded in the system.

2. ER Diagram



An accommodation has many rooms, which are identified by a unique room number.

In two different accommodations, there could be 2 same room number, so "room" is a weak entity that rely on the entity "accommodation".

Different accommodations have different unique name of the type of room, even if they look very similarly. So "room-type" is also a weak entity that rely on the entity "accommodation".

Guests are identified by their unique guest ID(for individuals it is the passport of the guest, and for groups a specific ID will be assigned).

Guests make booking, and every booking is identified by the unique booking ID. A guest can make several bookings, and a booking belongs to a specific guest, so it is binary 1:N relation.

Assuming that for each booking, the guest must arrive at the spot and stay at the accommodation, so a booking means that the guest will make an actual stay at an accommodation. And normally we can only make a booking for a single accommodation, which is also an assumption of this case. As a result, there is a binary 1:1 relation between "booking" and "accommodation". Meanwhile, it means a guest may have several stays in an accommodation. When the "check in" happen, a room number will be assigned, so it should be the attribute of the "check-in" action. There could be different types of rooms and different number of rooms in a booking, so the room numbers that are assigned should be multivalued. For the same reason, I design a weak entity named “room-booking-detail” to represent different room types and room numbers.

An accommodation should provide diversified services, so the relation between "accommodation" and "service" is binary 1:N.

One booking can request several services, and one service can be provide to several users from several bookings, so the relationship between them is binary M:N.

One used service can have several providers, so it is binary 1:N relationship between “service” and “service-provider”. And service providers contains employees(for in-house services) and third party service providers(for outsourced services). Service providers are identified by a unique provider ID, and employees have their names, while third party service providers have company names.

3. Mapping

STEP 1: ENTITY MAPPING

accommodation [acc-id, acc-address, website, email, phone, pool, sauna, parking, free-internet, fitness-centre]
guest [guest-id, guest-email, guest-name, guest-type, phone-number]
booking [booking-id, date-of-booking, guest-type, number-of-people, check-in-date, check-out-date, payment-method, sea-or-river-view, beach-front, city-view, non-smoking, double-bed, single-bed]
service [service-id, service-name, service-type]

STEP 2: WEAK ENTITY MAPPING

room-type [acc-id, type-name, description, price-per-night, beds, bedrooms]
room [room-no., acc-id, type-name, floor-no., sea-or-river-view, beach-front, city-view, non-smoking, double-bed, single-bed]
room-booking-detail [booking-id, type-name, number-of-rooms, amount]

room-booking-detail (booking-id) reference booking (booking-id)
room-type (acc-id) reference accommodation (acc-id)
room (acc-id) reference accommodation (acc-id)

STEP 3: BINARY 1:1 RELATIONSHIP MAPPING

booking [booking-id, date-of-booking, ***acc-id***, guest-type, number-of-people, check-in-date, check-out-date, payment-method, sea-or-river-view, beach-front, city-view, non-smoking, double-bed, single-bed]

booking (acc-id) reference accommodation (acc-id)

STEP 4: BINARY 1:N RELATIONSHIP MAPPING

booking [booking-id, date-of-booking, ***acc-id***, ***guest-id***, guest-type, number-of-people, check-in-date, check-out-date, payment-method, sea-or-river-view, beach-front, city-view, non-smoking, double-bed, single-bed]
service [service-id, service-name, service-type, ***acc-id***]
service-provider [provider-id, ***service-id***, provider-type, provider-name]

booking (acc-id) reference accommodation (acc-id)
booking (guest-id) reference guest (guest-id)
service (acc-id) reference accommodation (acc-id)
service-provider (service-id) reference service (service-id)

STEP 5: BINARY M:N RELATIONSHIP MAPPING

booking [***booking-id***, date-of-booking, acc-id, guest-id, guest-type, number-of-people, check-in-date, check-out-date, payment-method, sea-or-river-view, beach-front, city-view, non-smoking, double-bed, single-bed]
service [***service-id***, service-name, service-type, acc-id]
use[***booking-id, service-id***, guest-name, service-name]

use (booking-id) reference booking (booking-id)
use (service-id) reference service (service-id)

STEP 6: MULTIVALUED ATTRIBUTE

check-in-room-detail [booking-id, check-in-room-no.]

check-in-room-detail (booking-id) reference booking (booking-id)

STEP 7: SUPER & SUB-CLASSES

employee [provider-id, #employee-name, acc-name, mobile-phone]
third-party-provider [provider-id, #company-name, service-type, phone, website]

employee (provider-id) reference service-provider (provider-id)

third-party-provider (provider-id) reference service-provider (provider-id)

FINAL SCHEMA

accommodation [acc-id, acc-address, website, email, phone, pool, sauna, parking, free-internet, fitness-centre]

room [room-no., acc-id, type-name, floor-no., sea-or-river-view, beach-front, city-view, non-smoking, double-bed, single-bed]

room-type [acc-id, type-name, description, price-per-night, beds, bedrooms]

room-booking-detail [booking-id, type-name, number-of-rooms, amount]

booking [booking-id, date-of-booking, acc-name, guest-id, guest-type, number-of-people, check-in-date, check-out-date, payment-method, sea-or-river-view, beach-front, city-view, non-smoking, double-bed, single-bed]

guest [guest-id, guest-email, guest-name, guest-type, phone-number]

service [service-id, service-name, service-type, acc-id]

service-provider [provider-id, service-id, provider-type, provider-name]

use[booking-id, service-id, guest-name, service-name]

check-in-room-detail [booking-id, check-in-room-no.]

employee [provider-id, #employee-name, acc-name, mobile-phone]

third-party-provider [provider-id, #company-name, service-type, phone, website]