Relational Model for Co-working Space management system

Building(<u>BuildingID</u>, BuildingName, Address(BuildingNo, StreetName, City, ZipCode), Location, Status)

Here, BuildingID is Primary key and Not Null

Floor(<u>BuildingID, FloorNo</u>)

Here, BuildingID & FloorNo, together make Primary key and are Not Null

Space(<u>SpaceID</u>, SpaceType, Max_capacity, Space_description, SpaceName, Per_seat_cost, availability)

According to our diagram, we have assumed every space to have a unique spaceid. Hence, SpaceID is Primary key and Not Null

Participation(<u>BuildingID</u>, <u>FloorNo</u>, <u>SpaceID</u>)

Participation shows aggregation between BuildingID, FloorNo and SpaceID. Since SpaceID is unique, therefore, SpaceID id Primary key and Not Null. Also, since every space must be mapped to a Building and Floor , therefore FloorNo (Foreign Key) and BuildingID (Foreign Key) are Not NULL

User(<u>UserID</u>, FirstName, LastName, ContactNo)

Here UserID is Primary key and Not Null

Freelancer(<u>F_UserID</u>, Email, Identification_number, Identification_type, address(HouseNo, StreetName, City, Zipcode))

Since Freelancer is a subclass of User, therefore, it inherits User's ID (UserID) as F_UserID and is Primary key here, so Not Null

CorporatePoc (<u>C_UserID</u>, Corporate_email, SSN)

Since CorporatePoc is a subclass of User, therefore, it inherits User's ID (UserID) as C_UserID and is Primary key here, so Not Null

SpaceBooking(<u>BookingID</u>, Num_seats_booked, BookingTimeStamp, Start_Timestamp, End_Timestamp, <u>SpaceID</u>, <u>UserID</u>)

Spacebooking has Primary key as BookingID and SpaceID and UserID as Foreign Keys and are Not NULL

Services (<u>ServiceID</u>, ServiceType, Cost_per_serivce)

Here, ServiceID is Primary Key and Not Null

ServiceBooking(<u>BookingID</u>, <u>ServiceID</u>, quantity_requested, service_requested_timestamp)

This has BookingID and ServiceID as Primary key and are Not Null

Invoice(<u>InvoiceNumber</u>, <u>BookingID</u>, BillingDate, SpaceCost, ServiceCost, TotalBillingCost)

Here, InvoiceNumber is Primary key and and is Not Null and BookingID as Foreign key and Not Null

Corporate(<u>CorporateID</u>, CorporateName, Vat_number , Address(UnitNum, BuildingName, StreetName, City, ZipCode), website, <u>C_UserID</u>)

Here, CorporateID is Primary Key and Not Null and C_UserID is foreign key and Not Null

Employees(<u>CorporateID</u>, <u>EmployeeID</u>, FirstName, LastName, CorporateEmail)

Here, CorporateID and EmployeeID together make Primary Key and are Not Null

Since Address Attribute type in entity types – Building, Freelancer and Corporate is Composite, Hence the above relation is not in 1 NF

1st Normal Form

Building(<u>BuildingID</u>, BuildingName, BuildingNo, StreetName, City, ZipCode, Location, Status)

Floor(<u>BuildingID, FloorNo</u>)

Space(<u>SpaceID</u>, SpaceType, Max_capacity, Space_description, SpaceName, Per_seat_cost, availability)

Participation(<u>BuildingID, FloorNo, SpaceID</u>)

User(<u>UserID</u>, FirstName, LastName, ContactNo)

Freelancer(<u>F_UserID</u>, Email, Identification_number, Identification_type, HouseNo, StreetName, City, Zipcode)

CorporatePoc (<u>C_UserID</u>, Corporate_email, SSN)

SpaceBooking(<u>BookingID</u>, Num_seats_booked, BookingTimeStamp, Start_Timestamp, End_Timestamp, <u>SpaceID</u>, <u>UserID</u>)

Services (<u>ServiceID</u>, ServiceType, Cost_per_serivce)

ServiceBooking(<u>BookingID</u>, <u>ServiceID</u>, quantity_requested, service_requested_timestamp)

Invoice(<u>InvoiceNumber</u>, <u>BookingID</u>, BillingDate, SpaceCost, ServiceCost, TotalBillingCost)

Corporate(<u>CorporateID</u>, CorporateName, Vat_number , UnitNum, BuildingName, StreetName, City, ZipCode, website, <u>C_UserID</u>)

Employees(<u>CorporateID</u>, <u>EmployeeID</u>, FirstName, LastName, CorporateEmail)

Since {CorporateID, EmployeeID) → { FirstName, LastName, CorprateEmail)

But FirstName, LastName, and CorprateEmail are Partially dependent on EmployeeID only, therefore above relational model is not in 2nd Normal Form

Building(BuildingID, BuildingName, BuildingNo, StreetName, City, ZipCode, Location, Status)

Floor(BuildingID, FloorNo)

Space(SpaceID, SpaceType, Max_capacity, Space_description, SpaceName, Per_seat_cost, availability)

Participation(BuildingID, FloorNo, SpaceID)

User(UserID, FirstName, LastName, ContactNo)

Freelancer(F_UserID, Email, Identification_number, Identification_type, HouseNo, StreetName, City, Zipcode)

CorporatePoc (C_UserID, Corporate_email, SSN)

SpaceBooking(BookingID, Num_seats_booked, BookingTimeStamp, Start_Timestamp, End_Timestamp, SpaceID, UserID)

Services (ServiceID, ServiceType, Cost_per_serivce)

ServiceBooking(BookingID, ServiceID, quantity_requested, service_requested_timestamp)

Invoice(InvoiceNumber, BookingID, BillingDate, SpaceCost, ServiceCost, TotalBillingCost)

Corporate(CorporateID, CorporateName, Vat_number , UnitNum, BuildingName, StreetName, City, ZipCode, website, C_UserID)

Employees(EmployeeID, FirstName, LastName, CorporateEmail)

Corporate_Employees(CorprateID, EmployeeID)

In order to remove Partial Dependency a new relation Corporate_Employees is created. Here CorporateID and EmployeeID together make Primary Key and are Not Null

Hence the above relational model is in 2nd Normal Form

Also, the above relational model is also Normalized till 4th Normal Form as for every one of its non-trivial multivalued dependencies X →→ Y, X is a superkey.