Normalisation Proofs

* Property Relation
* FD Set

PropertyID ->{Property Title,AvgRating,Description,CategoryID,Price Per Night, Availability\_Status,

RoomCount,BedsCount,BathroomCount,AccomodationLimit,CheckInTime,

CheckOutTime,Pets\_Allowed,SmokingAllowed,Cancellation\_Policy,Hosted\_By,

City,State,Zipcode,Latitude,Longitude,Country}

Zipcode -> {City,State,Country}

* Min FD

PropertyID -> Property Title

PropertyID -> AvgRating

PropertyID -> Description

PropertyID -> CategoryID

PropertyID -> Price Per Night

PropertyID -> Availability\_Status

PropertyID -> RoomCount

PropertyID -> BedsCount

PropertyID -> BathroomCount

PropertyID -> AccomodationLimit

PropertyID -> CheckInTime

PropertyID -> CheckOutTime

PropertyID -> Pets\_Allowed

PropertyID -> SmokingAllowed

PropertyID -> Cancellation\_Policy

PropertyID -> Hosted\_By

PropertyID -> Zipcode

PropertyID -> Latitude

PropertyID -> Longitude

Zipcode -> City

Zipcode -> State

Zipcode -> Country

* Closure of PropertID+ : {PropertyID,PropertyTitle,AvgRating,Description,CategoryID,Price Per Night,Availability\_Status,RoomCount,BedsCount,BathroomCount,AccomodationLimit,CheckInTime,CheckOutTime,Pets\_Allowed,SmokingAllowed,Cancellation\_Policy,Hosted\_By,City,State,Zipcode,Latitude,Longitude,Country}
* Here key is PropertyID.
* Last three FDs does not have PropertyID on leftside. Therefore this relation is not in BCNF, it is in 2 NF. We can make it in BCNF by decompose as two relation :

R1( PropertyID,PropertyTitle,AvgRating,Description,CategoryID,Price Per Night,

Availability\_Status,RoomCount,BedsCount,BathroomCount,AccomodationLimit,CheckInTime,

CheckOutTime,Pets\_Allowed,SmokingAllowed,Cancellation\_Policy,Hosted\_By,Zipcode,Latitude,

Longitude)

R2(Zipcode,City,Country,State)

We didn’t do this because to make database more practical and queries faster.

* Contract\_Details Relation
* FD set

ContractID->{PropertyID,Commision\_Percent\_Per\_Booking,Fixed\_Monthly\_Rent,

Commision\_Amount,StartDate,EndDate}

* Min FD

ContractID->PropertyID

ContractID-> Commision\_Percent\_Per\_Booking

ContractID-> Fixed\_Monthly\_Rent

ContractID-> Commision\_Amount

ContractID-> StartDate

ContractID-> EndDate

* Closure of ContractID+ : { ContractIDPropertyID,Commision\_Percent\_Per\_Booking,

Fixed\_Monthly\_Rent, Commision\_Amount,StartDate,EndDate}

* Here key is ContractID.
* ‘Contract\_Details’ relation is in BCNF because in minimal FD set all FDs have key on their left-hand side.
* BookingCancellation Relation
* FD set

CancellationID -> {BookingID,REfundAmount,CancellationDate,CancellationReason,RefundStatus}

* Min FD

CancellationID -> BookingID

CancellationID -> REfundAmount

CancellationID -> CancellationDate

CancellationID -> CancellationReason

CancellationID -> RefundStatus

* Closure of CancellationID+ : { CancellationID,BookingID,REfundAmount,CancellationDate,

CancellationReason,RefundStatus}

* Here key is CancellationID.
* ‘BookingCancellation’ relation is in BCNF because in minimal FD set all FDs have key on their left-hand side.
* BookingInvoice Relation
* FD set

InvoiceID -> {BookingID,TransactionID,PaymentStatus,PaymentDate,Amount}

* Min FD

InvoiceID -> BookingID

InvoiceID -> TransactionID

InvoiceID -> PaymentStatus

InvoiceID -> PaymentDate

InvoiceID -> Amount

* Closure of InvoiceID+ : {InvoiceID,BookingID,TransactionID,PaymentStatus,PaymentDate,Amount}
* Here key is InvoiceID
* ‘BookingInvoice’ relation is in BCNF because in minimal FD set all FDs have key on their left-hand side.
* Bookings Relation
* FD set

BookingID -> {UserID,PropertyID,BookingDate,CheckInDate,CheckOutDate,IsConfirmed}

* Min FD

BookingID -> UserID

BookingID -> PropertyID

BookingID -> BookingDate

BookingID -> CheckInDate

BookingID -> CheckOutDate

BookingID -> IsConfirmed

* Closure of BookingID+ : {BookingIDUserID,PropertyID,BookingDate,CheckInDate,

CheckOutDate,IsConfirmed}

* Here key is BookingID.
* ‘Bookings’ relation is in BCNF because in minimal FD set all FDs have key on their left-hand side.
* Users Relation
* FD set

User\_ID -> {PhoneNumber,FullName,Email,Password,Address,GovernmentID}

* Min FD

User\_ID -> PhoneNumber

User\_ID -> FullName

User\_ID -> Email

User\_ID -> Password

User\_ID -> Address

User\_ID -> GovernmentID

* Closure of User\_ID+ : {User\_ID,PhoneNumber,FullName,Email,Password,Address,GovernmentID}
* Here key is User\_ID.
* ‘Users’ relation is in BCNF because in minimal FD set all FDs have key on their left-hand side.
* Preferences Relation
* FD set

Pref\_ID -> {UserID,Pref\_Amenity,Pref\_Property\_Type,PrefferedLocation}

* Min FD

Pref\_ID -> UserID

Pref\_ID -> Pref\_Amenity

Pref\_ID -> Pref\_Property\_Type

Pref\_ID -> PrefferedLocation

* Closure of Pref\_ID+ : { Pref\_ID ,UserID,Pref\_Amenity,Pref\_Property\_Type,PrefferedLocation}
* Here key is Pref\_ID.
* ‘Preferences’ relation is in BCNF because in minimal FD set all FDs have key on their left-hand side.
* Ratings Relation
* FD set

{User\_ID,PropertyID} -> {Rating,Reviews}

* Min FD

{User\_ID,PropertyID} -> Rating

{User\_ID,PropertyID} -> Reviews

* Closure of {User\_ID,PropertyID} + : {User\_ID,PropertyID,Rating,Reviews}
* Here key is {User\_ID,PropertyID}
* ‘Ratings’ relation is in BCNF because in minimal FD set all FDs have key on their left-hand side.
* Hosts Relation
* FD set

Host\_ID -> {Name,PhoneNumber,Email,Average\_Ratong,AverageResponseTime,SuperHostStatus}

* Min FD

Host\_ID -> Name

Host\_ID -> PhoneNumber

Host\_ID -> Email

Host\_ID -> Average\_Ratong

Host\_ID -> AverageResponseTime

Host\_ID -> SuperHostStatus

Closure of Host\_ID+ : {Host\_ID,Name,PhoneNumber,Email,Average\_Ratong,

AverageResponseTime,SuperHostStatus}

* Here key is Host\_ID
* ‘Hosts’ relation is in BCNF because in minimal FD set all FDs have key on their left-hand side.
* Wishlist Relation
* Here key is {UserID,PropertyID}
* This relation is in BCNF because two attributes relation always in BCNF.
* PropertyAmenities Relation
* Here key is {PropertyID,Amenity\_Name}
* This relation is in BCNF because two attributes relation always in BCNF.
* Property Category Relation
* FD set

CategoryID -> CategoryName

* Min FD

CategoryID -> CategoryName

Closure of CategoryID+ : {CategoryID, CategoryName}

* Here key is CategoryID.
* This relation is in BCNF because in minimal FD set FD have key on its left-hand side.
* Host Languages Relation
* Here key is {Host\_ID , LanguagesSpeken}
* This relation is in BCNF because two attributes relation always in BCNF.