Evan T Gardner, Albert Burd, Corie Beale, Daniel P McLean, Renee Reyes

Database Management CSIT-213-02

Professor Jonathan D. Weiss

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Relational Algebra Group Project: Airbnb

Relational Algebra Expression I:

Show the places within Jersey City, New Jersey that require the visitor to stay at least 30 nights?

∏ [Listing].Listing\_ID, Listing\_Name, Room\_Types, Minimum\_Nights\_Required, Price\_Per\_Night, Country, Location, Area

σ Location = ‘New Jersey’ ∩ Area = ‘Jersey City’ ∩ Minimum\_Nights\_Required ≥ 30

[Listing] ⋈ Listing.Listing\_ID = Country.Listing\_ID [Country]

⋈ Country.Listing\_ID = Location.Listing\_ID [Location]

⋈ Location.Listing\_ID = Area.Listing\_ID [Area]

Relational Algebra Expression II:

What places within Austin, Texas have an availability of 100 days for the year?

∏ [Listing].Listing\_ID, Listing\_Name, Room\_Types, Availability\_Per\_Year, Price\_Per\_Night, Country, Location, Area

σ Location = ‘Texas’ ∩ Area = ‘Austin’ ∩ Availability\_Per\_Year = 100

[Listing] ⋈ Listing.Listing\_ID = Country.Listing\_ID [Country]

⋈ Country.Listing\_ID = Location.Listing\_ID [Location]

⋈ Location.Listing\_ID = Area.Listing\_ID [Area]

Relational Algebra Expression III:

What Airbnb stays do not have a Listing Licence Number?

∏ [Listing].Listing\_ID, Listing\_Name, Room\_Types, Price\_Per\_Night, Listing\_Licence\_Number, Country, Location, Area

σ Listing\_Licence\_Number = NULL

[Listing] ⋈ Listing.Listing\_ID = Country.Listing\_ID [Country]

⋈ Country.Listing\_ID = Location.Listing\_ID [Location]

⋈ Location.Listing\_ID = Area.Listing\_ID [Area]

Relational Algebra Expression IV:

What is the ratio of Airbnb stays within Greece that have a Listing Licence Number?

∏ [Listing].Listing\_ID, Listing\_Name, Room\_Types, Price\_Per\_Night, Listing\_Licence\_Number, Country

σ Listing\_Licence\_Number = NOT NULL ∩ Country = ‘Greece’

[Listing] ⋈ Listing.Listing\_ID = Country.Listing\_ID [Country]

Relational Algebra Expression V:

What Airbnb stays have over 500 reviews or a minimum of 5 reviews per month?

∏ [Listing].Listing\_ID, Listing\_Name, Room\_Types, Number\_Of\_Reviews, Number\_Of\_Reviews\_Per\_Month, Country

σ Number\_Of\_Reviews = 500 ∪ Number\_Of\_Reviews\_Per\_Month > 5

[Listing] ⋈ Listing.Listing\_ID = Country.Listing\_ID [Country]

⋈ Country.Listing\_ID = Reviews.Listing\_ID [Reviews]

Relational Algebra Expression VI:

How many hosts have over 5 listings within Airbnb stays in New York City?

∏ COUNT(Host\_ID), Host\_Name, Number\_Of\_Listings\_Per\_Host, Area

σ Area = ‘New York City ∩ Number\_Of\_Listings\_Per\_Host > 5

[Host] ⋈ Host.Listing\_ID = Country.Listing\_ID [Country]

⋈ Country.Listing\_ID = Location.Listing\_ID [Location]

⋈ Location.Listing\_ID = Area.Listing\_ID [Area]

Relational Algebra Expression VII:

What is the ratio of Airbnb stays within Germany that have a Listing Licence Number?

∏ [Listing].Listing\_ID, Listing\_Name, Room\_Types, Price\_Per\_Night, Listing\_Licence\_Number, Country

σ Listing\_Licence\_Number = NOT NULL ∩ Country = ‘Germany’

[Listing] ⋈ Listing.Listing\_ID = Country.Listing\_ID [Country]

Relational Algebra Expression VIII:

How many Airbnb stays are within the Neighborhood of Hietzing in Vienna, Austria?

∏ COUNT([Listing].Listing\_ID), Listing\_Name, Room\_Types, Price\_Per\_Night, Country, Location, Area, Neighborhood

σ Neighborhood = ‘Hietzing’ ∩ Country = ‘Austria’ ∩ Area = ‘Vienna’

[Listing] ⋈ Listing.Listing\_ID = Country.Listing\_ID [Country]

⋈ Country.Listing\_ID = Location.Listing\_ID [Location]

⋈ Location.Listing\_ID = Area.Listing\_ID [Area]

⋈ Area.Listing\_ID = [Listing\_Neighborhood].Listing\_ID [Listing\_Neighborhood]

Relational Algebra Expression IX:

What are the longitude and latitude of Airbnb stays within Singapore within the neighborhood Changi Bay?

∏[Listing].Listing\_ID, Listing\_Name, Country, Neighborhood, Longitude, Latitude

σ Country = ‘Singapore’ ∩ Neighborhood = ‘Changi Bay’

[Listing] ⋈ Listing.Listing\_ID = Country.Listing\_ID [Country]

⋈ Country.Listing\_ID = Location.Listing\_ID [Location]

⋈ Location.Listing\_ID = Area.Listing\_ID [Area]

⋈ Area.Listing\_ID = [Listing\_Neighborhood].Listing\_ID [Listing\_Neighborhood]

Relational Algebra Expression X:

How many Airbnb stays have their last review on the date 5/5/21?

∏ [Listing].Listing\_ID, Listing\_Name, COUNT(Last\_Review), Country, Location, Area

σ Last\_Review = ‘5/5/21’

[Listing] ⋈ Listing.Listing\_ID = Reviews.Listing\_ID [Reviews]

⋈ Reviews.Listing\_ID = Country.Listing\_ID [Country]

⋈ Country.Listing\_ID = Location.Listing\_ID [Location]

⋈ Location.Listing\_ID = Area.Listing\_ID [Area]

Relational Algebra Expression XI:

What is the Host Name for all of the of the Airbnb stays within the United States

∏ Host\_ID, Host\_Name, Listing\_ID, Listing\_Name, Counrty

σ Country = ‘United States

[Listing] ⋈ Listing.Listing\_ID = Host.Listing\_ID [Host]

⋈ Host.Listing\_ID = Country.Listing\_ID [Country]

Relational Algebra Expression XII:

Which area has the highest number of reviews for all of their Airbnb stays?

∏[Listing].Listing\_ID, Listing\_Name, Country, Location, Area, SUM(Number\_Of\_Reviews)

[Listing] ⋈ Listing.Listing\_ID = Reviews.Listing\_ID [Reviews]

⋈ Reviews.Listing\_ID = Country.Listing\_ID [Country]

⋈ Country.Listing\_ID = Location.Listing\_ID [Location]

⋈ Location.Listing\_ID = Area.Listing\_ID [Area]

Relational Algebra Expression XIII:

Show the places within Washington D.C, District Of Columbia that require the visitor to stay at least 30 nights?

∏ [Listing].Listing\_ID, Listing\_Name, Room\_Types, Minimum\_Nights\_Required, Price\_Per\_Night, Country, Location, Area

σ Location = ‘District Of Columbia’ ∩ Area = ‘Washington D.C’ ∩ Minimum\_Nights\_Required ≥ 30

[Listing] ⋈ Listing.Listing\_ID = Country.Listing\_ID [Country]

⋈ Country.Listing\_ID = Location.Listing\_ID [Location]

⋈ Location.Listing\_ID = Area.Listing\_ID [Area]

Relational Algebra Expression XIV:

What is the average number of reviews for San Diego, California in the United States?

∏ [Listing].Listing\_ID, Listing\_Name, Country, Location, Area, AVG(Number\_Of\_Reviews)

σ Country = ‘United States’ ∩ Location = ‘California ∩ Area = ‘San Diego’

[Listing] ⋈ Listing.Listing\_ID = Reviews.Listing\_ID [Reviews]

⋈ Reviews.Listing\_ID = Country.Listing\_ID [Country]

⋈ Country.Listing\_ID = Location.Listing\_ID [Location]

⋈ Location.Listing\_ID = Area.Listing\_ID [Area]

Relational Algebra Expression XV:

What is the average amount of listings that each person has within the United States?

∏ Host\_ID, Host\_Name, AVG(Number\_Of\_Listings\_Per\_Host), Country, Location, Area

σ Country = ‘United States’

[Host] ⋈ Host.Listing\_ID = Country.Listing\_ID [Country]

⋈ Country.Listing\_ID = Location.Listing\_ID [Location]

⋈ Location.Listing\_ID = Area.Listing\_ID [Area]

Relational Algebra Expression XVI:

How many Airbnb stays within the United States are Entire Homes?

∏ COUNT([Listing].Listing\_ID), Listing\_Name, Room\_Types, Price\_Per\_Night, Country, Location, Area

σ Country = ‘United States’ ∩ Room\_Types = ‘Entire Home/apt’

[Listing] ⋈ Listing.Listing\_ID = Country.Listing\_ID [Country]

⋈ Country.Listing\_ID = Location.Listing\_ID [Location]

⋈ Location.Listing\_ID = Area.Listing\_ID [Area]

Relational Algebra Expression XVII:

What Airbnb stays in Italy have price per night that is less than 150 or Availability Per Year is more than 50?

∏[Listing].Listing\_ID, Listing\_Name, Room\_Types, Availability\_Per\_Year, Price\_Per\_Night, Country, Location, Area

σ Country = ‘Italy’ ∩ Price\_Per\_Night < 150 ∪ Availability\_Per\_Year > 50

[Listing] ⋈ Listing.Listing\_ID = Country.Listing\_ID [Country]

⋈ Country.Listing\_ID = Location.Listing\_ID [Location]

⋈ Location.Listing\_ID = Area.Listing\_ID [Area]

Relational Algebra Expression XVIII:

How many Airbnb stays within the United States are Private Rooms?

∏ COUNT([Listing].Listing\_ID), Listing\_Name, Room\_Types, Price\_Per\_Night, Country, Location, Area

σ Country = ‘United States’ ∩ Room\_Types = ‘Private Rooms’

[Listing] ⋈ Listing.Listing\_ID = Country.Listing\_ID [Country]

⋈ Country.Listing\_ID = Location.Listing\_ID [Location]

⋈ Location.Listing\_ID = Area.Listing\_ID [Area]

Relational Algebra Expression XIX:

What is the average number of reviews for Los Angeles, California in the United States?

∏ [Listing].Listing\_ID, Listing\_Name, Country, Location, Area, AVG(Number\_Of\_Reviews)

σ Country = ‘United States’ ∩ Location = ‘California ∩ Area = ‘San Los Angeles’

[Listing] ⋈ Listing.Listing\_ID = Reviews.Listing\_ID [Reviews]

⋈ Reviews.Listing\_ID = Country.Listing\_ID [Country]

⋈ Country.Listing\_ID = Location.Listing\_ID [Location]

⋈ Location.Listing\_ID = Area.Listing\_ID [Area]

Relational Algebra Expression XX:

What Country has the highest number of reviews within the last twelve months?

∏ [Listing].Listing\_ID, Listing\_Name, Country, Location, Area, Number\_Of\_Reviews\_Last\_Twelve\_Months

[Listing] ⋈ Listing.Listing\_ID = Reviews.Listing\_ID [Reviews]

⋈ Reviews.Listing\_ID = Country.Listing\_ID [Country]

⋈ Country.Listing\_ID = Location.Listing\_ID [Location]

⋈ Location.Listing\_ID = Area.Listing\_ID [Area]