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Prof. Wilson Wong

CS3431/A Term 2017

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Assignment 3

Assignment 3: Relational Algebra

Part 1: Tours

1. R1 🡨 σ vehicleType = ‘boat’ AND licenseType ­= ‘land’ (RT ⋈ T ⋈ G)

R2 🡨 σ vehicleType = ‘car’ AND licenseType = ‘sea’ (RT ⋈ T ⋈ G)

R3 🡨 σ vehicleType = ‘bus’ AND licenseType = ‘sea’ (RT ⋈ T ⋈ G)

Result 🡨 γ title, count(guideID) (R1 ∪ R2 ∪ R3)

1. γ lastName, firstName, sum(price) (C ⋈ σ vehicleType = ‘car’ OR vehicleType = ‘bus’ (RT ⋈ T))
2. R1 🡨γ max(numLoc) (γ lastName, firstName, count(locationID) as numLoc(RT ⋈ C ⋈ T ⋈ L))

γ lastName, firstName, count(locationID) = R1 as Visits (RT ⋈ C ⋈ T ⋈ L)

Part 2: Science Fiction Books

1a. Foreign Key SF.ISBN References AB.ISBN

Foreign Key SF.ISBN References S.ISBN

Foreign Key SF.publisherName References P.publisherName

Foreign Key AB.fullName References A.fullName

Foreign Key AB.address References A.fullName

Foreign Key S.city References W.city

Foreign Key W.code References S.warehouseCode

1b. alter table SF add constraint SF\_ISBN\_FK References AB(ISBN)

alter table SF add constraint SF\_ISBN\_FK References S(ISBN)

alter table SF add constraint SF\_publisherName\_FK References P(publisherName)

alter table AB add constraint AB\_fullName\_FK References A(fullName)

alter table AB add constraint AB\_address\_FK References A(address)

alter table S add constraint S\_city\_FK References W(city)

alter table W add constraint W\_code\_FK References S(warehouseCode)

2a. γ fullName, address, avg(price) (AB ⋈ σ year<2000 (SF))

2b. select fullName, address, avg(price)

From AB natural join (select \* from SF where year<2000)

Group by fullName, address

Order by fullName;

3a. π warehouseCode, city ((σ numberOfBooks < 10 (S)) ⋈ (σ publisherName = ‘Wiley’ (SF)))

3b. select warehouseCode, city

From (select \* from S where numberOfBooks <10)

Natural join

(select \* from SF where publisherName = ‘Wiley’);

Part 3: Relational Algebra

1.

|  |  |  |  |
| --- | --- | --- | --- |
| **A** | **B** | **Q** | **T** |
| 6 | 4 | David | 6 |
| 3 | 1 | Tom | 3 |
| 3 | 2 | Susan | 3 |

2.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **M.B** | **Y** | **M.Z** | **N.B** | **Q** | **N.Z** |
| 3 | Lisa | 12 | 3 | Susan | 12 |

3.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Z** | **G** | **H** | **A** | **B** | **Q** |
| α | 2 | 1 | 2 | 3 | 4 |
| α | 2 | 1 | 2 | 5 | 10 |
| β | 3 | 3 | 8 | 2 | 3 |