**Gurnoor Aujla CPSC 471 ASSIGNMENT 2 Tut:01 10102069**

**Question 1**

#### 1.

NoCalgary ← (σ city ≠ 'Calgary' AUTHOR)

R2 ← (NoCalgary ⨝ aEmail = authorId AUTHOR\_PAPER)

ρ myId←paperId ( ( R2 ) )

newReviewer ← (ρ revfName, revlName ←fName,lName ( ( REVIEWER ) ))

R4 ← (R2 ⨝ myId = paperId PAPER\_REVIEW)

R5 ← (R4 ⨝ reviewerId = rEmail newReviewer)

Names ← π revfName, revlName R5

**2.**

R1 ←(paperId Ƒ*AVG\_score* (PAPER\_REVIEW))

R2 ←(paperId Ƒ*AVG submissionDate - invitationDate* (PAPER\_REVIEW))

#### R3 ← σ AVG\_score >= 7 (R1)

#### R4←σ AVG\_submissionDate\_invitationDate\_difference < 30 (R2)

R5 ← (R3 ⨝ R3.paperId = R4.paperId R4)

PAPERS ← π revfName, revlName R5

#### 3.

R1 ← authorId Ƒ*COUNT paperId* (AUTHOR\_PAPER)

R2 ← σ R1.Count\_paperId >3 (R1)

R3 ← σ (CurrentDate – bdate) > 30 (AUTHOR)

R4 ← (R2 ⨝ R2.authorId= R3.aEmail R3)

Names ← π R4.fName, R4.lName R4

**4.**

#### R1 ←( σ score < 6PAPER\_REVIEW))

#### R2 ← π reviewerId( R1)

#### R3 ← ((REVIEWER) – R2))

#### RESULT ← π R3.fName, R3.lName(R3)

**5.**

R1 ← ( paperId Ƒ*COUNT authorId* (AUTHOR\_PAPER))

R2 ←(σ Count\_authorId > 3**)** (R1)

R3 ← (R2 ⨝ AUTHOR\_PAPER.paperId = PAPER.paperId PAPER) ⨝ AUTHOR\_PAPER.paperId = PAPER\_REVIEW.paperId PAPER\_REVIEW

TITLES ← π PAPER.Title R3

AUTHORCOUNT← paperId Ƒ COUNT PAPER\_REVIEW.reviewerIdR3

**6.**

#### R1 ← σ submissionDate >= date('2018-02-30') AND submissionDate <= date('2019-03-30')(PAPER)

#### R2 ←R1 ⨝ R1.paperId = AUTHOR\_PAPER.paperId AUTHOR\_PAPER

#### R3 ← σ isContact = True (R2)

**R4** ←( R3.authorId Ƒ*COUNT R3.PAPER.paperId*  R3)

#### R5 ← σ Count\_R3.PAPER.PaperId >1(R4)

Result ← π fname, lname(R5 ⨝ AUTHOR\_PAPER.authorId = aEmail AUTHOR)

**7.**

#### RESULT ←σ phoneNumber like '403%'REVIEWER

**8.**

#### R1 ←(((AUTHOR ⨝ aEmail = authorId AUTHOR\_PAPER) ⨝AUTHOR\_PAPER.paperId = PAPER\_REVIEW.paperIdPAPER\_REVIEW) ⨝PAPER\_REVIEW.reviewerId = REVEIWER.rEmailREVIEWER)

#### R2 ← π AUTHOR\_PAPER.paperId(σ AUTHOR.city=REVIEWER.city (R1))

#### RESULT ←R2 ⨝ AUTHOR\_PAPER.paperId = PAPER.paperIdPAPER

**Question 2**

**1.**

#### RESULT ←π pName( σ price ≥ 20(PARTS))

**2.**

#### R1 ←σ Sum\_price <= 50 (oNo Ƒ*SUM PARTS.price\*ODETAILS.qty* (PARTS ⨝PARTS.pNo=ODETAILS.pNoODETAILS ))

#### RESULT ← π EMPLOYEES.eName, ZIP\_CODES,city (((R1⨝ODETAILS.oNo=ORDERS.oNoORDERS) ⨝ORDERS.eNo=EMPLOYEES.eNo EMPLOYEES ) ⨝EMPLOYEES.zip=ZIP\_CODES.zip ZIP\_CODES)

**3.**

#### R1 ← CUSTOMERS⨝CUSTOMERS.zip=ZIP\_CODES.zip ZIP\_CODES

#### R2 ← (ρ cNo1←CUSTOMER.cNo, city1←ZIP\_CODE.city, zip1←CUSTOMER.zip (R1)) ⨯ ( ρ cNo2←CUSTOMER.cNo, city2←ZIP\_CODE.city, zip2←CUSTOMER.zip (R1)))

#### RESULT ← π cNo1, cNo2(σ city1 = city2 and zip1=zip2 and cNo1 ≠ cNo2((R2))

**4.**

R1 ← σ city = 'Wichita'(EMPLOYEES⨝EMPLOYEES.zip=ZIP\_CODES.zip  ZIP\_CODES)

#### RESULT ←π cName((R1 ⨝EMPLOYEES.eNo=ORDERS.eNo (ORDERS)) ⨝ORDERS.cNo=CUSTOMERS.cNo (CUSTOMERS))

**5.**

#### R1 ←σ Sum\_price  <= 20 (oNo Ƒ*SUM PARTS.price\*ODETAILS.qty* ((PARTS ⨝PARTS.pNo=ODETAILS.pNo ODETAILS)))

#### RESULT ←π CUSTOMERS.cName ((R1 ⨝ODETAILS.oNo=ORDERS.oNo ORDERS) ⨝ORDERS.cNo=CUSTOMERS.cNo CUSTOMERS)

#### 6.

#### RESULT ← π CUSTOMERS.cName((CUSTOMERS)) - ( π ORDERS.cNo(CUSTOMERS⨝CUSTOMERS.cNo=ORDERS.cNoORDERS)

**7.**

#### R1 ←σ received = false(ORDERS)

#### R2 ← cNo Ƒ*COUNT oNo* R1

#### R3 ← σ COUNT\_oNo=2(R2)

#### RESULT ← π CUSTOMERS.cName (R3 ⨝ORDERS.cNo=CUSTOMERS.cNo CUSTOMERS)

**Question 3**

1.

{s1.stno | (Street(s1) ^ (**∀**cit) ((City(cit) ^ cit.countryName = ‘Canada’ ^ (s1.cityName = cit.cityName)) )🡪 (**∀**cit2) (**∀**s2) (City(cit2) ^ (cit2.countryName = ‘Canada’ )^Street(s2) ˄ (cit2.cityName = s2.cityName) ^ (s2.cityName =cit2.cityName )^ (s2.length > s1.length))}

2.

{h1.ownerName | House(h) ^ (**∀**c) ((City(cit) ^ cit.countryName = ‘Canada’)🡪

((**∃**cit1) (**∃**s) (∃h2) (City(cit1) ^ Street (s) ^ House(h1) ^ (cit1.countryName = ‘Canada’)^ (cit1.cityName = s.cityName) ^ (s.cityName = cit.cityName) ^ (s.stNo = h1.stNo) ^ h1.ownerName = h.ownerName)))}

3.

{h.ownerName | House(h) ^ !((((∃con1) (∃cit1) (∃s1) (∃h1) (Country(con1) ^City(cit1) ^Street(s1) ^ House(h1) ^ con1.name != ‘USA’ ^ cit1.countryName = con1.name ^ cit1.cityName = s1.cityName ^ s1.stNo = h1.stNo )

^ ((∃con2) (∃cit2) (∃s2) (∃h2) (Country(con2) ^City(cit2) ^Street(s2) ^ House(h2) ^ con2.name != ‘USA’ ^ cit1.countryName = con2.name ^ cit2.cityName = s2.cityName ^ s2.stNo = h2.stNo )

^((∃con3) (∃cit3) (∃s3) (∃h3) (Country(con3) ^City(cit3) ^Street(s3) ^ House(h3) ^ con3.name != ‘USA’ ^ cit3.countryName = con3.name ^ cit3.cityName = s3.cityName ^ s3.stNo = h3.stNo )

^((∃con4) (∃cit4) (∃s4) (∃h4) (Country(con4) ^City(cit4) ^Street(s4) ^ House(h4) ^ con4.name != ‘USA’ ^ cit4.countryName = con4.name ^ cit4.cityName = s4.cityName ^ s4.stNo = h4.stNo )

^ (h.ownerName=h1.ownerName =h2.ownerName =h3.ownerName=h4.ownerName)))

^ ((∃con5) (∃cit5) ( ∃s5) (∃h5) (Country(con5) ^ City(cit5) ^ Street(s5) ^ House(h5) ^ con5.name = ‘USA’ ^ cit5.countryName = con5.name ^ cit5.cityName = s5.cityName ^ s5.stNo = h5.stNo ^ h.ownerName = h5.ownerName))}

4.

{count.name | Country(count) ^ ∃b1 (Border(b1) ^ (b.countryName2 = “Germany” ^ count.name = b.countryName1 ) ˅ (count.name = b.countryName2 ^ b.countryName1 = “Germany”)))}

5.

{h.ownerName | House(h) ^ (∀b) ((Border(b) ^ b.countryName2 = “Spain”) 🡪

! ((∃con1) (∃con2) (∃cit1) (∃cit2) (∃s1) (∃s2) (∃h1) (∃h2) (Country(con1) ^ Country(con2) ^ City(cit1) ^ City(cit2) ^Street(s1) ^ Street(s2) ^ House(h1) ^ House(h2)

^ con1.name = b.countryName1 ^ con2.name = b.countryName1 ^ cit1.countryName = con1.name ^ cit2.countryName = con2.name ^ cit1.cityName = s1.cityName ^ cit2.cityName = s2.cityName ^ s1.stNo = h1.stNo ^ s2.stNo = h2.stNo ^

h.ownerName=h1.ownerName=h2.ownerName)))} ^

(∀b2) ((Border(b2) ^ b.countryName1 = “Spain”)) 🡪

! ( (∃cit3) (∃cit4) (∃con3) (∃con4) (∃h3) (∃h4) (∃s3) (∃s4) (City(cit3) ^ City(cit4) ^Country(con3) ^ Country(con4) ^ Street(s3) ^ Street(s4) ^ House(h3) ^ House(h4)

^(con4.name = b2.countryName2) ^ (con3.name = b2.countryName2) ^ (cit3.countryName = con3.name) ^ (cit4.countryName = con4.name) ^ (cit3.cityName = s3.cityName) ^ (cit4.cityName = s4.cityName) ^ (s3.stNo = h3.stNo) ^ (s4.stNo = h4.stNo)

^ (h.ownerName=h3.ownerName=h4.ownerName))}