**Assignment 2: Relational Algebra**

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Consider the following relational database schema

RESIDES (PERSON\_NAME, STREET, CITY, STATE, ZIP)

WORKS (PERSON\_NAME, COMPANY\_NAME, SALARY)

ADDRESS (COMPANY\_NAME, CITY, STATE, ZIP)

MANAGES (PERSON\_NAME, MANAGER\_NAME)

Instead of using Greek symbols in a MS Word document, you can use the following notation

Selection Operator – **Sigma**: **S [NAME = ‘John’ AND CITY = ‘Santa Clara’] (STUDENT)**

Projection Operator – **PI**: **P[NAME, PHONE] (…..)**

Rename Operator – **Rho**:  **R[‘Phone No.’] (PHONE) or R[S](STUDENT)**

Provide a Relational Algebra Expression for each of the queries below:

1. Find name and city of all employees who work for ‘Best Deals’ (5 pts)

Relational algebraic expression:

**P[**R1**.**PERSON\_NAME, R1.CITY**]** **(S**[R1.PERSON\_NAME = W.PERSON\_NAME AND W.COMPANY\_NAME = ‘Best Deals’] **(R[R1](RESIDES)** **X** **R[W](WORKS)))**

1. Find names of employees who work in ‘Santa Clara’ (5 pts)

Relational algebraic expression:

**P**[PERSON\_NAME] **(S[**WORKS.COMPANY\_NAME=ADDRESS.COMPANY\_NAME AND ADDRESS.CITY = ‘Santa Clara’**](WORKS** **X** **ADDRESS))**

1. Find name and city of employees who live in the same Zip code as the company they work for (5 pts)

Relational algebraic expression:

**P[**RESIDES**.**PERSON\_NAME,RESIDES.CITY**]**

**(S[**RESIDES.PERSON\_NAME = WORKS.PERSON\_NAME AND WORKS.COMPANY\_NAME = ADDRESS.COMPANY\_NAME AND RESIDES.ZIP = ADDRESS.ZIP**]**(**RESIDES X WORKS X ADDRESS**)**)**

1. Find name and city of employees who live in the same city and street as their manager

Relational algebraic expression:

**P[**R1.PERSON\_NAME, R1.CITY**]**

**(S**[R1.PERSON\_NAME = M.PERSON\_NAME AND

R2**.**PERSON\_NAME = M.MANAGER\_NAME AND

R1**.**CITY = R2.CITY AND

R1.STREET = R2.STREET] **(R[R1](RESIDES) X R[R2](RESIDES) X R[M](MANAGES) ) )**

1. Find name of managers who live in ‘Palo Alto’ and who manage employees who live in ‘San Jose’.

Relational algebraic expression:

**P [**R1.PERSON\_NAME**]**

**(S[**R1.PERSON\_NAME = M.MANAGER\_NAME AND

R1.CITY = ‘Palo Alto’ AND

R2**.**PERSON\_NAME = M.PERSON\_NAME AND

R2.CITY = ‘San Jose’**] (R[R1](RESIDES) X R[R2](RESIDES) X R[M](MANAGES) ) )**

1. Find name, city, and state of all persons who do not work for any company.

Relational algebraic expression:

P[R1.PERSON\_NAME, R1.CITY, R1.STATE](**S**[R1.PERSON\_NAME = R2.PERSON\_NAME] (**R[R1]**(**RESIDES**) **X** **R[R2]**(**P**[PERSON\_NAME](**RESIDES**) – **P**[PERSON\_NAME](**WORKS**) ) ) )