

Assignment # 7

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03/06/2016

1. On the next slide is a sparse multi-dimensional matrix. Create a standard table, called Table 1, and an EAV representation, called Table 2, of this sparse matrix. The slides titled “Sparse Matrices: Exercise” present an example of this kind of task. Create these tables by “hand”. Show the actual tables. You do not need to write code.

a) Table 1 will have as headers: A, B, C, & N.

A	B	C	N
2	1	3	23
1	3	3	29
2	1	1	17

b) Table 2 will have as its headers: R, C, & M. The “C” in Table 2 has a different meaning than the “C” in Table 1

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R	C	M
1	A	2
1	B	1
1	C	3
1	N	23
2	A	1
2	B	3
2	C	3
2	N	29
3	A	2
3	B	1
3	C	1
3	N	17

2. Change the schema of the data in item 1 above by changing the EAV table, called Table 2 in the following way: New values will represent Cost per Area (CPA). You can calculate CPA from the existing information. Modify this table by “hand”. You do not need to write code.

Area [x10 ³ ft ²]	# Bathrooms	X10 ⁵ \$	# of houses	Cost Per Area [\$/ft ²]
A	B	C	N	CPA
2000	1	300000	23	150
1000	3	300000	29	300
2000	1	100000	17	50

R	C	M
1	A	2000
1	B	1
1	C	300000
1	N	23
2	A	1000
2	B	3
2	C	300000
2	N	29
3	A	2000
3	B	1
3	C	100000
3	N	17
1	CPA	150
2	CPA	300
3	CPA	50

3. Use SQL to manipulate Sparse Matrices in the EAV format. Use select statements to transform the relations. Do not use create, update, or insert to modify the database. The SQL code is simple like in the Exercises 1 through 4 of MatrixAlgebra.sql. Given that 2D matrices are directly encoded with the EAV schema do the following:

a) Write SQL for scalar multiplication of a 2D Matrix stored in the EAV schema. See Exercise 5 in MatrixAlgebra.sql

```
SELECT R AS R, C AS C, V*7 AS V  
FROM Table2
```

b) Write SQL for transposition of a 2D Matrix stored in the EAV schema. See Exercise 6 in MatrixAlgebra.sql and the next slide.

```
SELECT C AS R, R AS C, V AS V  
FROM Table2
```

c) Optional: Write SQL for addition of two 2D matrices in the EAV schema. See Exercise 7 in MatrixAlgebra.sql.

```
SELECT A.R AS R, A.C AS C, A.V+B.V AS V  
FROM Table2 AS A  
JOIN Table3 AS B  
ON A.R=B.R AND A.C=B.C
```