Problem Session 5

Midterm Review

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Outline

- Announcements
- SQL
- Transactions
- DTDs
- Q&A
Announcements

- Project 1 due Wed 10/31
- Gradiance – one due Fri 11/2, two due Wed 11/7
- Midterm Wed 10/31 11am-12:15pm Gates B01
  - Up to and including 10/24 lecture on XPath
SQL

SQL
Transactions
DTDs
Consider a table `Exams(student, score)`.

Write a SQL query to find the student with the highest score differential, i.e. the student with the largest spread between his or her highest and lowest scores,

among all students with scores in the table.

Assume there is a unique student with the highest spread and return that student only once.
Sample Solution

```sql
SELECT student
FROM Exams
GROUP BY student
HAVING MAX(score) - MIN(score) >= ALL(
    SELECT MAX(score) - MIN(score)
    FROM Exams
    WHERE score IS NOT NULL
    GROUP BY student
)
```
Transactions

SQL  Transactions  DTDs
Joe_Sells(beer, price). Initially: (Bud, 2.50) and (Miller, 3).

Sally: BEGIN TRANSACTION
S1: SELECT MAX(price) FROM Joe_Sells
S2: SELECT MIN(price) FROM Joe_Sells
COMMIT

Joe: BEGIN TRANSACTION
S3: DELETE FROM Joe_Sells
S4: INSERT INTO Joe_Sells VALUES('Heineken', 3.50);
COMMIT

Suppose S1, S3, S4, Joe commits, S2, Sally commits.
Solution

a) Sally: SERIALIZABLE: MAX = $3.00, MIN = $2.50.
b) Sally: REPEATABLE READ: MAX = $3.00, MIN = $2.50. Sally saw a **phantom** tuple: ('Heineken', $3.50).
c) Sally: READ COMMITTED: MAX = $3.00, MIN = $3.50. Sally saw Joe’s committed deletion.
d) Sally: READ UNCOMMITTED: MAX = $3.00, MIN = $3.50. Sally saw Joe’s uncommitted deletion.

Question: What isolation level do you think Oracle supports as a default?

Answer: REPEATABLE READ. Guarantees no loss of data.
DTDs

SQL
Transactions
DTDs

CS145 Autumn 2007
From 2006 Midterm

DTD1: <!DOCTYPE SP [ 
<!ELEMENT SP (Project*)> 
<!ELEMENT Project (Title, Student+)> 
<!ATTLIST Project ProjNum ID> 
<!ELEMENT Title (#PCDATA)> 
<!ELEMENT Student> 
<!ATTLIST Student StudID ID Name CDATA> ]>

1) For each project, there is
   a) exactly one student; b) at least one student
2) For each student, there is
   a) exactly one project; b) at least one project

Answer: 1b, 2a
From 2006 Midterm

DTD2: <!DOCTYPE SP [  
<!ELEMENT SP (Student*)>  
<!ELEMENT Student (Project)>  
<!ATTLIST Student StudID ID Name CDATA>  
<!ELEMENT Project (Title)>  
<!ATTLIST Project ProjNum ID>  
<!ELEMENT Title (#PCDATA)> ]>

1) For each project, there is  
   a) exactly one student; b) at least one student  
2) For each student, there is  
   a) exactly one project; b) at least one project

Answer: 1a, 2a
From 2006 Midterm

DTD3:  <!DOCTYPE SP [ 
<!ELEMENT SP (Project*, Student*)> 
<!ELEMENT Project (Title)> 
<!ATTLIST Project ProjNum ID stud IDREF> 
<!ELEMENT Title (#PCDATA)> 
<!ELEMENT Student> 
<!ATTLIST Student StudID ID Name CDATA> ]>

1) For each project, there is
   a) exactly one student; b) at least one student

2) For each student, there is
   a) exactly one project; b) at least zero projects

Answer: 1a, 2b
From 2006 Midterm

DTD4: <!DOCTYPE SP [ 
<!ELEMENT SP (Student*, Project*)> 
<!ELEMENT Student> 
<!ATTLIST Student StudID ID Name CDATA proj IDREFS> 
<!ELEMENT Project (Title)> 
<!ATTLIST Project ProjNum ID> 
<!ELEMENT Title (#PCDATA)> ]>

1) For each project, there is
   a) exactly one student; b) at least zero students
2) For each student, there is
   a) exactly one project; b) at least one project

Answer: 1b, 2b
Midterm Topics

* Relational Algebra:
  union/intersect/difference/select/project/product/join/rename
* SQL: select/from/where
* SQL: multirelational queries
* SQL: subqueries
* SQL: outerjoins
* SQL: group by/having
* SQL: insert/delete/update
* SQL: constraints
* SQL: triggers
* SQL: transactions
* SQL: views
* SQL: indexes
* XML: DTDs
* XML: XML Schema
* XML: XPath
Questions?
1. lecture notes
2. Coursework Discussion
3. Office Hours (Mon 1-2 Gates 433, Tue 1-4, 8-11pm Gates B24A)
4. cs145-aut0708-staff@lists.stanford.edu