

## CS 386: Quiz 2, 18 April 2006

Name: \_\_\_\_\_ KEY \_\_\_\_\_

No books or notes. Work individually.

All three questions involve a database about student organizations, with two tables: `officers(club role pname)` and `location(club room)`. (There is an example instance below.)

Question 1 (4 points): Consider the following relational algebra query over this database:

$$\pi_{\text{officers.pname, location.room}}(\sigma_{\text{officers.club=location.club AND role='Treasurer'}}(\text{officers} \times \text{location}))$$

Write an equivalent (always gives the same answer) relational algebra query using join ( $\bowtie$ ).

*One solution is:*

$$\pi_{\text{officers.pname, location.room}}(\sigma_{\text{role='Treasurer'}}(\text{officers} \bowtie_{\text{officers.club=location.club}} \text{location}))$$

*It's also possible to move the other selection condition into the join:*

$$\pi_{\text{officers.pname, location.room}}(\text{officers} \bowtie_{\text{officers.club=location.club AND role='Treasurer'}} \text{location})$$

Question 2 (3 points): Write an SQL query that is equivalent to the relational algebra query in Question 1.

```
SELECT O.pname, L.room
FROM officers O, Location L
WHERE O.club = L.club and O.role = 'Treasurer'
```

Question 3 (3 points): Give the result of the relational algebra query in Question 1 when applied to the following database instance.

<u>club</u>	<u>role</u>	<u>pname</u>	<u>club</u>	<u>room</u>
outdoor	President	Ross	outdoor	SH118
outdoor	VP	Li	biking	NH312
<b>outdoor</b>	<b>Treasurer</b>	<b>Mendez</b>		
biking	President	Mori		
biking	VP	Jeffers		
<b>biking</b>	<b>Treasurer</b>	<b>Bartoli</b>		
sailing	President	Akers		
sailing	VP	Agrawal		
<b>sailing</b>	<b>Treasurer</b>	<b>Pirahesh</b>		

*The tuples in boldface above are the ones where role = 'Treasurer'. However, only the first two join with something in the location table. So the result is*

```
result(pname room)
Mendez SH118
Bartoli NH312
```