Databases 2014 Answers

* 1. R ÷ S

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| **X** |
| Alice |
| Carol |

* + 1. It will return all the rows in R (with columns found exclusively in R) that have rows in R which contain all the attributes from S.
  1. Given:  
     AB → C   
     C → D ***violates!***  
     D → A ***violates!***

Derived:  
AB → ABCD   
C → ACD ***violates!***  
AC → ACD ***violates!***  
BC → ABCD   
ABC → ABCD  
D → AD ***violates!***  
BD → ABCD  
ABD → ABCD  
CD → ACD ***violates!***  
BCD → ABCD  
Candidate Keys: {A, B} {B, D} {B, C}

* 1. ?
  2. Can’t we get rid of the A in AB -> C?

R(A, B, C, D)

R1(A, C)

R2(B, C, D)

C → A

R2A(C, D)

R2B(B, C)

C → D

R(A, B, C, D)

R1(A, B, C)

R3(A, D)

R2(C, D)

* + 1. SELECT n1, n2, n3 FROM data  
       GROUP BY n1, n2, n3 HAVING *SUM*(n4) = 0;
    2. (SELECT n1,n2,n3 FROM data WHERE n4 = 0)

EXCEPT

(SELECT n1,n2,n3 FROM data WHERE n4 <> 0);

* + 1. SELECT DISTINCT d1.n1, d1.n2, d1.n3 FROM data AS d1  
       LEFT JOIN data AS d2  
        ON d2.n1 = d1.n1  
        AND d2.n2 = d1.n2  
        AND d2.n3 = d1.n3  
        AND d2.n4 <> 0  
       WHERE d2.n4 IS NULL;  
       -- GROUP BY d1.n1, d1.n2, d1.n3;
  1. A dirty read occurs when two processes are running at once and one of the processes reads the value set by another process before it has been committed (i.e. before the transaction is over). This can only happen at the lowest isolation level, read uncommitted.

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| **Transaction 1** | **Transaction 2** |
| select bal from accounts where name=‘Alice’  select bal from accounts where name=‘Alice’ | update accounts set bal=99 where name=‘Alice’  rollback |

1. In this example, if the isolation level is set to *Read Uncommitted*, the first time Alice’s balance is read, it will return her original balance. However, when it is read a second time, 99 will be the result. In all other isolation levels, her balance will be the same both times, despite the second transaction.