CS 561 DBMS

Final Exam

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1. Assume that:

-X and Y are entity sets

-R is a relation

-X1, X2, X3, X4, X5, and X6 are all the instances

of X

-Y1, Y2, Y3, and Y4 are all the instances of Y

-Y2 is R’ed by X1, Y3 is R’ed by X2

-no other pairs of instances of X and Y are related

by R

Which of the ER diagrams on the next slide is/are consistent with the above assumptions, and which isn’t/aren’t. Be sure to explain your answers. (No credit without valid explanations.)

Answer

As per the given assumption we can see that Y2 is R’ed by X1 and Y3 is R’ed by X2

R

in other words, 1 1

R

Y3

X2 Assume that:

-X and Y are entity sets

-R is a relation

-X1, X2, X3, X4, X5, and X6 are all the instances

of X

-Y1, Y2, Y3, and Y4 are all the instances of Y

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Y2 Assume that:

-X and Y are entity sets

-R is a relation

-X1, X2, X3, X4, X5, and X6 are all the instances

of X

-Y1, Y2, Y3, and Y4 are all the instances of Y

-Y2 is R’ed by X1, Y3 is R’ed by X2

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X11. Assume that:

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1 1

* As per the given assumption we can say that **some** instances of **X** were **read by Y** but not all
* If **not**, all were then it was **zero** to either **1**
* Which is not clearly defined.
* But we can say that X R’s Y at **most 1**

So based on that Information the right answer would be which is **zero to 1**

Which is observed consistently in the **option 1**

R

1 1

Y

X

Option 1 – will work as it asks for at least 1 [ CONSISTENT ]

Option 2 – will not work as it asks for multiple instances which was not observed in the assumption.

Option 3 – will not work by the reason same as for 2.

Option 4 – was not consistent as n was not observed

Diagram

Description automatically generated

2. Consider the ER diagram on the next slide.

(i) What is the key of entity set A

(ii) What is the key of entity set B

(iii) What is the key of entity set C

Be sure to explain how you got your answers. (No credit without valid explanations.)

Answer

* The Set **A is a weak set**
* which **leads** to **another weak set B**
* which **leads** to a **Strong set C**

**Keys** for weak sets are given **by Partial keys + Primary key**

So

* Key : for set A is – **a1, b2, c1 [WEAK]**
* Key : for set B is – **b2, c1** **[WEAK]**
* Key : for set C is – **c1 [STRONG]**

Q3 Translate the following ER diagram into a minimal storage relational design. Be sure to explain why it’s a minimal storage design. (No credit without a valid explanation.)

A picture containing diagram

Description automatically generated

Both sets are connected by N it is suggested to put a copy of the key in a new table R

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| a1 | a2 | a3 | a4 | b1 |

|  |  |
| --- | --- |
| b1 | a1 |

|  |  |
| --- | --- |
| b1 | b2 |

* The above is the Minimal storage translation as it has N and M relationship which has no upper limit
* So, it is suitable to have new table combines all the key together.
* Rather than creating a new stored relationships in every table

4. Translate the following ER diagram into a minimal storage relational design. Be sure to explain why it’s a minimal storage design. (No credit without a valid explanation.)

Diagram, shape, engineering drawing

Description automatically generated

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| a1 | a2 | a3 | a4 | b1 |

|  |  |  |
| --- | --- | --- |
| b2 | b1 | a1 |

* Set A and B are connected by one-to-one relationship
* It is advised that when having a n to 1 relationship, we should include a copy of key in the other
* There is 1 to 1 participation here
* This translation will be efficient

Q5

Translate the following ER diagram into a minimal storage relational design. Be sure to explain why it’s a minimal storage design. (No credit without a valid explanation.

Diagram

Description automatically generated

* To make it Minimal storage we should be able to connect every entity by relation
* For which using Keys in the relationship will make more sense
* Then including a copy of key in one table “R” will help improve query processing faster.
* So created a new table which contains key to every other table.

|  |  |
| --- | --- |
| a1 | a2 |

|  |  |  |  |
| --- | --- | --- | --- |
| R1 | R2 | R3 | R4 |

|  |  |
| --- | --- |
| b1 | b2 |

|  |  |
| --- | --- |
| d1 | d2 |

|  |  |
| --- | --- |
| c1 | c2 |