1．Assume that

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X and Y are entity sets

-

R is a relation

-

X 1 X 2 X 3 X 4 X 5 and X 6 are all the instances of X

-

Y 1 Y 2 Y 3 and Y 4 are all the instances of Y

-

Y 2 is R’ed by X 1 Y 3 is R’ed by X 2

-

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

1. This ER diagram is consistent with assumption. X R at most 1Y and Y is R’ed at most 1X. e.g.: CS561-WS class in this semester has only one teacher.
2. This ER diagram is consistent with assumption. X R at most NY and Y is R’ed at most 1X. e.g.: CS561-WS class in this semester can have N students..
3. This ER diagram is consistent with assumption. X R at most 1Y and Y is R’ed at most NX. e.g.:N students were taught by 1 teacher in CS561-WS class.
4. This ER diagram is consistent with assumption. X R at most MY and Y is R’ed at most NX. e.g.: M assignments can be completed by N student.

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)

1. a1 is the primary key ,b2,c1 are the foreign key, because a1 is underlined by a dotted line, set A is a weak entity set and set A is R1’ed by set B.
2. b2 is the primary key and c1 is the foreign key, because b2 is underlined by a dotted line, set B is a weak entity set and set B is R2’ed by set C.
3. c1 is the primary key of set C because it’s underlined by a solid line.

3.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.)

Building a new table AB which has two attributes: a1 and b1

A

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

B

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

AB

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

Because the relationship R is a M to N reltionship, which means multiple A R at most NB(at least 1 B), vice versa. Building a new table AB which has two attributes: a1 and b1,is the design which has a minimum storage.

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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.)

A

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

B

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

Because the relationship R is a 1 to1 reltionship, which means a A R at most 1 B, vice versa. In order to save the storage, we can add a1 to table B.

5．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)

ABCD

|  |  |  |  |
| --- | --- | --- | --- |
| a1 | b1 | c1 | d1 |

A

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

B

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

C

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

D

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

Because A,B,C and D are all related by the relationship R,and a1,b1,c1 and d1are their parimary key . In order to save the storage, we should build a new table ABCD which contains a1,b1,c1 and d1.