Database Design
CS 6360.003(Spring 2020)
Assignment 3
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QUESTION:

2.Consider the ER diagram shown in Question 1 above for part of a BANK database.

a. List the names of all relationship types, and specify the **(min, max)** constraint on each participation of an entity type in a relationship type. Justify your choices.

b. Suppose that every customer must have at least one account but is restricted to at most two loans at a time, and that a bank branch cannot have more than 1,000 loans. How could you convert this **Cardinality-Participation** notation into **(min,max)** notation to represent these constraints?

ANSWERS:

a. The different relationship types in the ER diagram are:
* BRANCHES

For this relationship type, BANK is the owner entity type which identifies weak entity BANK_BRANCH. Since BANK:BANK_BRANCH has a 1:N cardinality and both have total participation constraints, we can say that the (min,max) would be (1,N) and (1,1) respectively as shown below.

* ACCTS

For this relationship type, BANK_BRANCH is a weak entity and has a partial participation constraint. Whereas ACCOUNT is a strong entity type with full participation constraint in the relationship. Hence, for BANK_BRANCH:ACCOUNT, with a 1:N cardinality we can say that the (min,max) would be (0,N) and (1,1) respectively as shown below.

* LOANS

For this relationship type, BANK_BRANCH is a weak entity and has a partial participation constraint. Whereas LOANS is a strong entity type with full participation constraint in the relationship. Hence, for BANK_BRANCH:LOANS, with a 1:N cardinality we can say that the (min,max) would be (0,N) and (1,1) respectively as shown below.
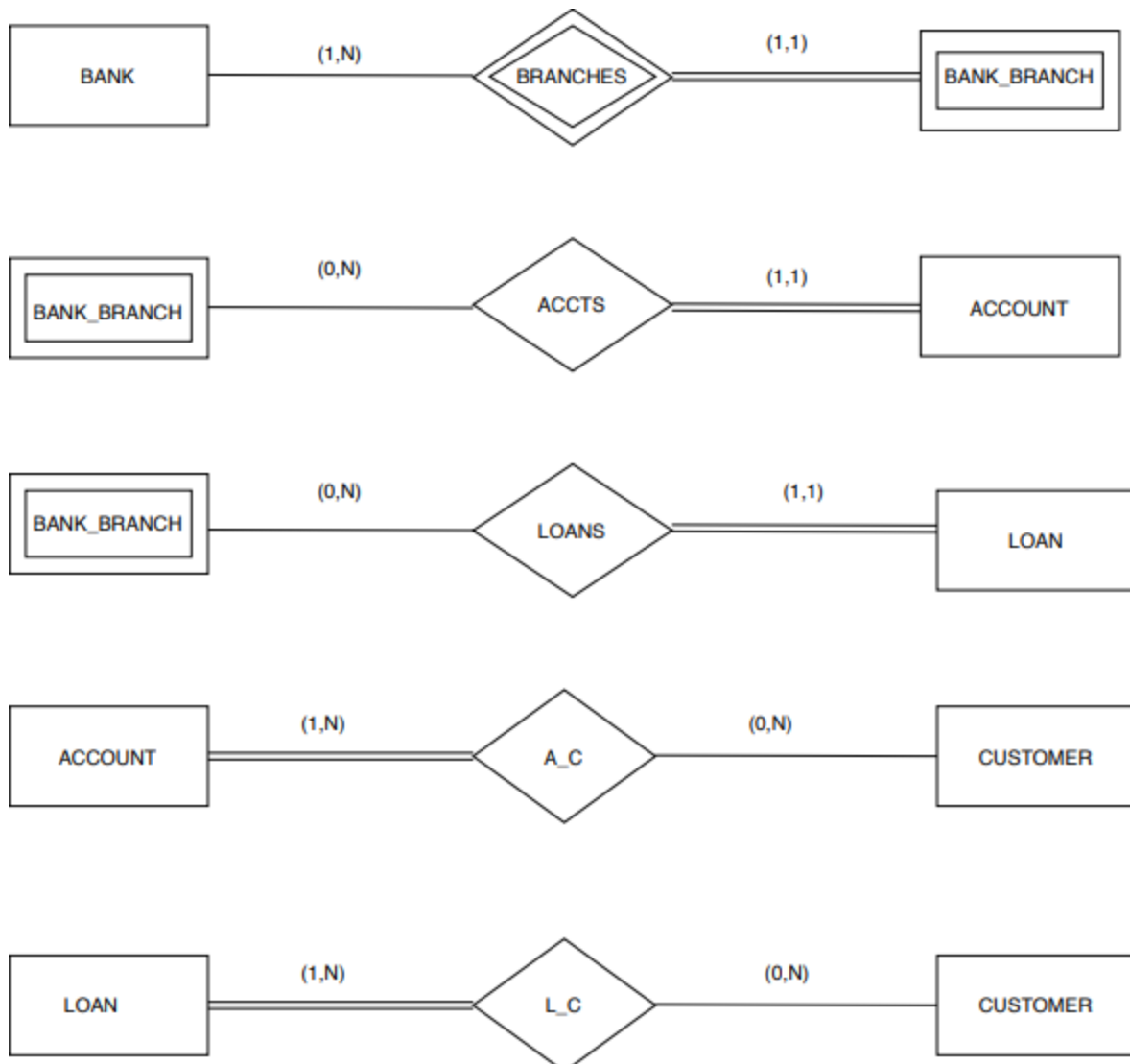
* A_C

For this relationship type, ACCOUNT is a strong entity and has a full participation constraint. CUSTOMER is also a strong entity type but with partial participation constraint in the relationship. Hence, for ACCOUNT:CUSTOMER, with a N:M cardinality we can say that the (min,max) would be (1,N) and (0,N) respectively as shown below.

- L_C

For this relationship type, LOAN is a strong entity and has a full participation constraint. CUSTOMER is also a strong entity type but with partial participation constraint in the relationship. Hence, for LOAN:CUSTOMER, with a N:M cardinality we can say that the (min,max) would be (1,N) and (0,N) respectively as shown below.

(min,max) constraint on each participation of an entity type in the above relationship types are as follows:

BANK	(1,N)	BRANCHES	(1,1)	BANK_BRANCH

BANK_BRANCH	(0,N)	ACCTS	(1,1)	ACCOUNT

BANK_BRANCH	(0,N)	LOANS	(1,1)	LOAN

ACCOUNT	(1,N)	A_C	(0,N)	CUSTOMER

LOAN	(1,N)	L_C	(0,N)	CUSTOMER

b. The **Cardinality-Participation** notation into **(min,max)** notation to represent the given constraints can be depicted as highlighted below:

| BANK_BRANCH | (0,1000) | LOANS | (1,1) | LOAN |

| ACCOUNT | (1,N) | A_C | (1,N) | CUSTOMER |

| LOAN | (1,N) | L_C | (0,2) | CUSTOMER |

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