

Notation forms in ER diagrams:

- + Chen-Notation
- + Modified Chen Notation (MC-Notation)
- + Min-Max-Notation
- + Martin-Notation (Crow's foot notation)

Chen-Notation

To represent the cardinalities of binary relation types, the digit 1, in the sense of 0 or 1, and the letters n and m, in the sense of 0 to infinity, are used.

****1:1 ([0 or 1] to [1 or 0])****

Any entity from the first entity set can be related to at most one entity from the second entity set and vice versa.

****1:n ([0 or 1] to any number)****

Any entity from the first entity set can be related to any number of entities from the second entity set. Each entity from the second entity set can be related to at most one entity from the first entity set.

****n:m (any number to any number)****

Any entity from the first entity set can be related to any number of entities from the second entity set and vice versa.

Modifizierte Chen-Notation (MC-Notation)

Modified Chen Notation (MC Notation) is an extension of Chen Notation in which the statement "no or one element" is indicated by the letter c (choice, can), and the statement "one or more element(s)" is indicated by the letter m (must, multiple).

****1:1 (1 to 1) ****

Each entity of the first entity set is related to exactly one entity of the second entity set, and vice versa.

****1:c (1 to [0 or 1]) ****

Each entity of the first entity set can be related to at most one entity of the second entity set. Each entity of the second entity set is related to exactly one entity of the first entity set.

****1:m (1 to [at least 1]) ****

Each entity of the first entity set is related to at least one entity of the second entity set.
Each entity of the second entity set is related to exactly one entity of the first entity set.

****1:mc (1 to [any number]) ****

Each entity of the first entity set can be related to any number of entities of the second entity set. Each entity of the second entity set is related to exactly one entity of the first entity set.

****c:c ([0 or 1] to [0 or 1]) ** Equivalent to 1:1 in Chen notation**

Each entity of the first entity set can be related to at most one entity of the second entity set, and vice versa.

****c:m ([0 or 1] to [at least 1]) ****

Each entity of the first entity set is related to at least one entity of the second entity set.
Each entity of the second entity set can be related to at most one entity of the first entity set.

****c:mc ([0 or 1] to [any number]) ** Equivalent to 1:n in Chen notation**

Each entity of the first entity set can be related to any number of entities of the second entity set. Each entity of the second entity set can be related to at most one entity of the first entity set.

****m:m ([at least 1] to [at least 1]) ****

Each entity of the first entity set is related to at least one entity of the second entity set, and vice versa.

****m:mc ([at least 1] to [any number]) ****

Each entity of the first entity set can be related to any number of entities of the second entity set. Each entity of the second entity set is related to at least one entity of the first entity set.

****mc:mc ([any number] to [any number]) ** Equivalent to m:n in Chen notation**

Any entity of the first entity set can be related to any number of entities of the second entity set, and vice versa.

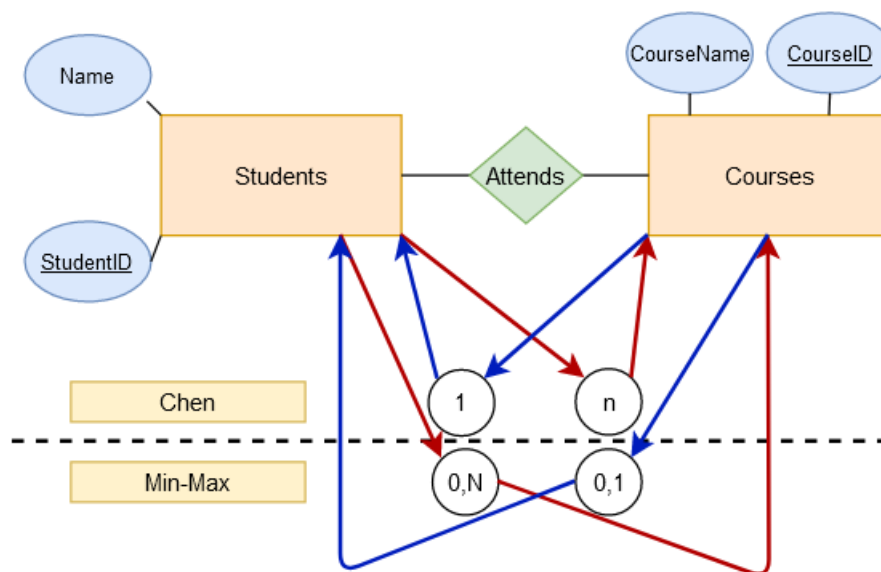
Min-Max-Notation

Min-Max notation is a way of constraining the cardinality of a relationship between entity types in an entity-relationship model. It was introduced because Chen notation allows only restricted statements about a relationship. With the (min,max) notation, both lower and upper bounds can be expressed precisely.











In Min-Max notation, an ordered pair with a minimum and a maximum value is specified for each entity type involved in a relationship. These values indicate the minimum number of relationship expressions in which the entity expressions must participate and the maximum number in which they may participate.

Min-Max [Entity 1]	Chen-Notation	MC- Notation	Min-Max [Entity 2]
(0,1)	1:1	c:c	(0,1)
(0,N)	1:n	c:mc	(0,1)
(0,N)	1:n + total part.	1:mc	(1,1)
(0,N)	n:m	mc:mc	(0,N)
(1,1)	total part. + 1:1	c:1	(0,1)
(1,N)	total part. + 1:n	c:m	(0,1)
(1,1)	total part. + 1:1 + total part.	1:1	(1,1)
(1,N)	total part. + 1:n + total part.	1:m	(1,1)
(1,N)	total part. + n:m	mc:m	(0,N)
(1,N)	total part. + n:m + total part.	m:m	(1,N)

How to read



Martin-Notation (Crow's foot notation)

Martin-Notation	MC-Notation
	c:c
	c:mc
	1:mc
	mc:mc
	1:c
	c:m
	1:1
	1:m
	m:mc
	m:m

Sources:

[Wikiwand - Chen-Notation](#)

[Wikiwand - MC Notation](#)

[Wikiwand - Min Max Notation](#)