Exercise 1 - Cardinality

1. State the cardinality that exists between the following entities.

   (a) PRESIDENT and COUNTRY _____

   (b) PUPIL and SCHOOL SUBJECT _____

   (c) ORCHESTRA and MUSICIAN _____

   (d) BOOK and AUTHOR _____

   (e) COUNTRY and CITY _____

2. For each of the following, identity two entities and the cardinality of the relationship between the entities.

   (a) A shop employs many workers. A worker is employed by, at most, one shop.

   Entities: _____

   Cardinality: _____

   (b) A manager manages, at most, one department. A department is managed by, at most, one manager.

   Entities: _____

   Cardinality: _____

   (c) A holiday resort has many hotels. Each hotel is located in exactly one resort.

   Entities: _____

   Cardinality: _____

   (d) A team consists of many players. A player plays for only one team.

   Entities: _____

   Cardinality: _____

   (e) A lecturer teaches, at most, one course. A course is taught by exactly one lecturer.

   Entities: _____

   Cardinality: _____

(f) A flight connects two airports. An airport is used by many flights.

Entities: _____

Cardinality: _____

(g) An order may be for many products. A product may appear on many orders.

Entities: _____

Cardinality: _____

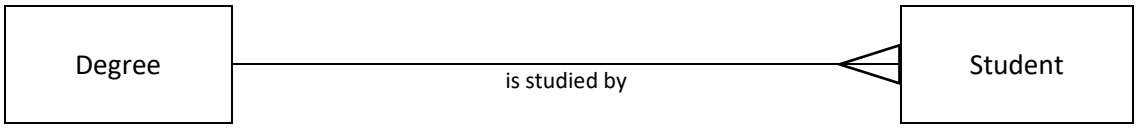
(h) A customer may submit many orders. An order is for exactly one customer.

Entities: _____

Cardinality: _____

3. *(a)* Identify the cardinality between the Degree and Student entities in the entity relationship diagram below.

_____



(b) Describe the 'is studied by' relationship.

_____

_____

4. A hospital has many wards and each ward can be used to look after one or more patients. The hospital stores details of WARDs and PATIENTs in two separate entities.

(a) Write down at least four attributes that would be stored in each of the WARD and PATIENT entities.

_____

_____

(b) State the cardinality of the relationship between the WARD and PATIENT entities.

_____

(c) Create an entity relationship diagram to model these two entities. Your diagram should indicate:

- the name of each entity
- all of the attributes listed in part (a)
- the name of each relationship
- the cardinality of each relationship

5. A music CD can contain many tracks. A track can appear on many different CDs (for example, on a compilation CD, a greatest hits CD etc). Each CD features one or more artists (a band or a solo artist) and successful artists will feature on many CDs.

(a) Write down at least four attributes that would be stored in each of the CD, TRACK and ARTIST entities.

_____

_____

(b) State the cardinality of the relationship between the CD and TRACK entities.

_____

(c) State the cardinality of the relationship between the CD and ARTIST entities.

_____

(d) Create an entity relationship diagram to model these three entities. Your diagram should indicate:

- the name of each entity
- all of the attributes listed in part (a)
- the name of each relationship
- the cardinality of each relationship

6. *(a)* Identify the cardinality of the relationship between each pair of entities in the entity relationship diagram below.

_____

_____

(b) Describe each relationship in this entity relationship diagram.

_____

_____

7. *(a)* Identify the cardinality of the relationship between each pair of entities in the entity relationship diagram below.

_____

_____

(b) Describe each relationship in this entity relationship diagram.

_____

_____