# CS 317 Quiz 1

Friday, Aug 10<sup>th</sup>

### Note: ANY COPYING WILL RESULT IN A FAIL GRADE



1. The E/R diagram shown above is for the following scenario: A publishing company produces academic books on various subjects. Authors who specialise in one or more particular subject write books. The company employs a number of editors who do not have particular specializations but who take sole responsibility for editing one or more publications. A publication covers a single subject area but may be written by one or more author - the contribution of each author is recorded as a percentage for the purposes of calculating royalties. In NOT MORE THAN 2 SENTNCES, reason about *which relation has the incorrect cardinality* in the E/R diagram.

# <u>ANSWER:</u> From the specification, "...[Editors] take sole responsibility for editing one or more publications...". Thus an editor can edit more than one publication (one to many), but each publication has only a single editor. Thus the relationship for "edits" should be one to many, not many to many.

2. A timetable database is required for a University Department. Each taught event is part of a module, each event will have exactly one member of staff associated and several individual students. Each event takes place in a single weekly time slot. Each time slot has a day of the week and a time of day associated. Each of the weekly time slots is exactly one hour long, however we wish to represent the fact that some events take more than one hour. Which of the following does **not** represent a possible solution AND why?

- A. A many-to-many relation between Events and Time-Slots is established
- B. A one-to-many relation between Events and Time-Slots is established
- C. Each event has an attribute "start" which refers to Time-Slots and "duration" which gives the length of the event in minutes
- D. Each event has an attribute "start" which refers to Time-Slots and "duration" which gives the number of slots spanned
- E. Each event has two attributes "first" and "last" each of which refer to Time-Slots

ANSWER: B, Currently the relation only consists of a start time, and it is believed to last 1 hour. The addition of a 1:N relationship means that a single event can have multiple time-slots, and thus we can now imply how long the event takes and thus satisfy the new criteria. It however stops more than one event happening at the same time, which would severely weaken the timetable.

3. Is it possible for a relationship to be declared *Many-one* and be *symmetric*? A symmetric relation is one that is it's own inverse. Under what conditions would this be true?

#### <u>ANSWER:</u> A relationship that is declared M-O can be symmetric only if - it runs from an entity set to itself and - it is actually one-one



- 4. Consider the ER diagram shown above where A, B and C are entity sets.
  - a. Specify the condition(s) that is(are) necessary in order to represent all three sets with a single table.
  - b. Now Specify the condition(s) that is(are) necessary in order to represent all three sets with two tables, one for B and one for C.

<u>Answers</u>: a. The ISA relationship must be disjoint. B and C must have the same attributes. B. The ISA relationship must be total.

- 5. Suppose we define a database about the customers of a bank and the loans they have received from the bank. For each customer we need to record information about their name, address, phone number and the company they work for. For each loan we need to record the amount, the interest rate, date the loan was issued, and the date the loan should be paid off.
  - a) Is it a good idea to represent the company for which a customer works as an attribute of the customer or as a relationship? Briefly justify your answer.
  - b) Which is the best way to represent the relationship between the customer and their loans: - by defining the loan as an attribute of the customer, or - by making the loan a separate entity set and defining a relationship set between it and the customer?

## Answer:

- A. The Company should be an attribute of the customer, assuming each customer works for a single company. We don't need to keep any information for each company.
- **B.** The loan should be a separate entity set associated with a customer through a relationship for the following reasons:
  - A. A customer may have more than one loans.
  - B. A loan has additional information on its own.