University of Toronto
CSC343

ER Diagrams: Solutions

1.

|person|	|member|	|club|	Is it possible?
5	0	8	YES **NO**
5	7	8	YES **NO**
5	0	5	YES **NO**
5	10	5	YES **NO**
11	3	4	YES **NO**
11	9	4	**YES** NO

The min constraint of 1 for club's participation in member means that every club must participate in at least one member relationship. Hence, $|club| \leq |member|$. This makes the first three and fifth false.

The max constraint of 1 for person's participation in member means that a person can participate in at most one member relationship. Hence, $|person| \geq |member|$. This makes second and fourth false.

The last is possible. Two people have no member relationships. The nine member relationships each have a unique person and must use all four clubs but some can use the same club. An example (just one of many):

Person: P1, P2, ..., P11
Member (P1, C1), (P2, C2) (P3, C3), (P4, C4), (P5, C4), (P6, C4), (P7, C4), (P8, C4), (P9, C4)
Club: C1, C2, C3, C4

2. Below is an Entity-Relationship diagram about car dealerships. It may or may not represent the domain well. Answer the questions below.

(a) A car sale cannot involve more than one salesperson.

[True] False

Sale is a ternary relationship set. Each relationship (each sale) has exactly three things: one salesperson and one customer and one car. None of these can be null and of course a single sale cannot have multiple salespeople, or multiple cars, or multiple customers.

(b) There can be two cars with the same VIN as long as the model and year are different.

True [False]

VIN is a key indicated by a black (solid) circle. Hence, no two cares can have the same VIN.

(c) A salesperson can work at any number of dealerships.

True [False]

A salesperson must work at exactly one dealership – indicated by (1,1) cardinality constraint.

(d) There can't be more salespeople than dealerships.

True [False]

A dealership may have many salespeople so there can be more salespeople than dealerships (e.g., a single dealership and 100 salespeople who all work at that one dealership).

(e) There can be multiple sales on the same date.

[True] False

Date is not a key (and indeed relationship sets cannot have key attributes).

(f) Two salespeople can have the same sID as long as they work at different dealerships.

True [False]

sID is a key so no. If we wanted to change the model to make this statement true, we would make salesperson a weak entity set that depends on the works at relationship set.

(g) This model contains a weak entity set.

True [False]

A weak entity set is indicated by connecting the key to the edge of a relationship set. There are none in this diagram.

(h) The *works at* relationship is a one-to-many relationship.

[True] False

The max cardinalities are 1 (for salesperson) and N (for dealership) and this defines a one-to-many relationship.