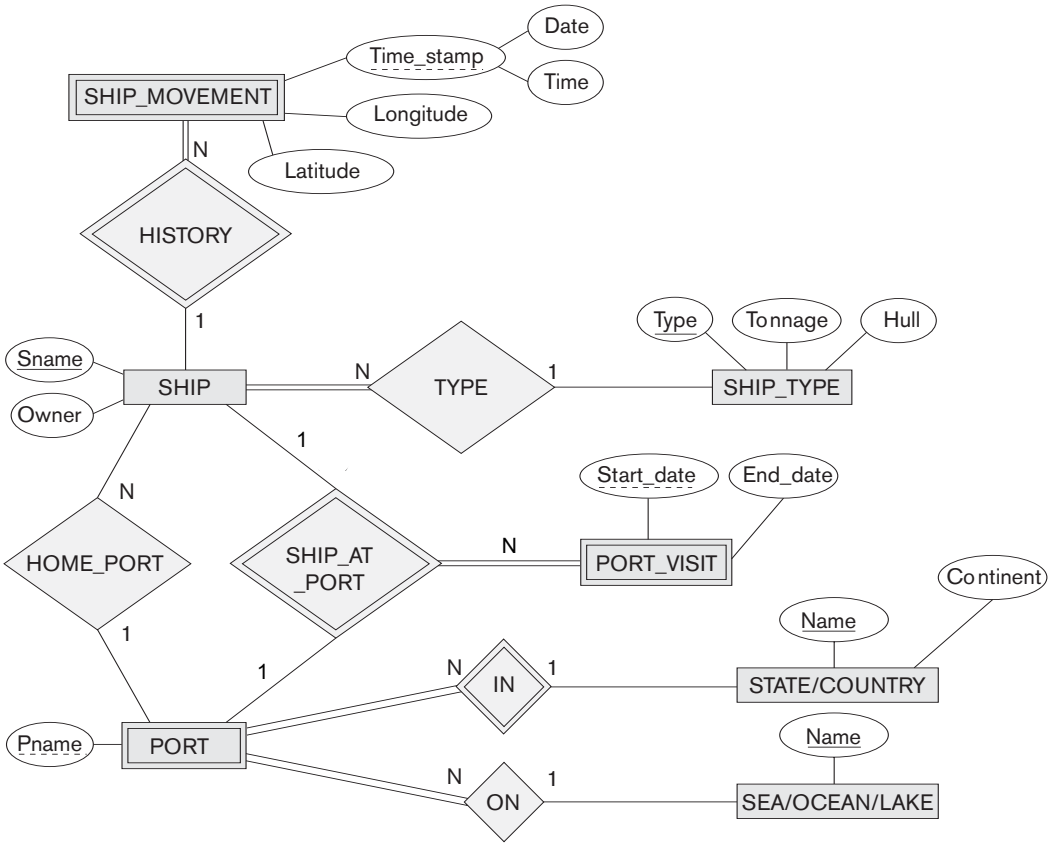
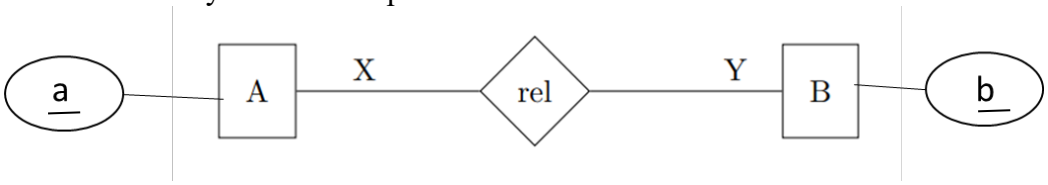
CS3402 Tutorial 2:

1. Consider the following ER diagram for a database that keeps track of transport ship movements.
   a. List all weak entities and, for each weak entity, state the respective owner entities.
   b. According to the ER diagram, is it possible that a ship visits the same port more than once?
   c. Is it possible that multiple ships are associated with a specific Port $p1$ and Port_visit $pv1$ in the SHIPT_AT_PORT relationship?
   d. Translate the ER diagram below to relational tables by following the steps of the mapping algorithm discussed in the lecture:
      1) Map *strong entity* types
      2) Map *weak entity* type (if any)
         (Hint: If a weak entity W has an owner entity O, you need to map O before you can map W; note that O itself may be a weak entity.)
      3) Map binary *1:1 relationship* types (if any)
      4) Map binary *1:N Relationship* types (if any)
      5) Map binary *M:N relationship* types (if any)
      6) Map *N-ary* relationship type (if any)
      7) Map *multi-valued* attributes (if any)



2. Consider the following ER model with entities A and B (with attributes a and b) connected by a relationship.



a. Complete the table below by converting the ER model to relational schema, for all cardinality options. Write down the relations and underline their primary keys.

Cardinality in E/R Model	Relational Schema
M:N	
1:N	
N:1	
1:1	

b. Suppose we want to add the following tuples to the relations:
(a1, b1), (a1, b2), (a2, b1), (a2, b2)

- Which of these tuples can be inserted into the relational schemas you created for the **M:N** relationship?
- How about the **1:N** case?
- How about the **1:1** case?