1. **ER-to-Relational Mapping (50 pts)**: Apply ER-to-relational mapping to the ER diagram to the below ER-diagram. Show application of each step of the mapping algorithm and the final database schema.

![ER Diagram](image)

Figure 1: ER Diagram

2. **SQL Queries** (50 pts): Consider the following database schema that keeps track of Sailors, Boats and the boats reserved by sailors.

   Sailors(*sid, sname, rating, age)
   Boats(*bid, bname, color)
   Reserves(*sid, *bid, *date)

Sample tuple for each relation is given below

   Sailors(22, Dustin, 7, 45)
   Boats(101, Interlake, blue)
   Reserves(22, 101, 1998-10-10)
Keys are denoted by *. Specify the following queries in SQL using above database schema.

(a) find sailors who have reserved at least one boat
(b) find sid’s of sailors who have reserved a red and a green boat
(c) find names of sailors who have reserved boat #103
(d) find sid’s of sailors who have not reserved boats
(e) find names of sailors who made at least 3 reservations
(f) find the name of sailors with the highest rating
(g) find the name and age of oldest sailors
(h) find the age of youngest sailor for each rating level
(i) find the names of sailors who reserved more red boats than green
(j) find sailors who have reserved all the boats