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route = (routeID)
cruise = (cruiseID, routeID [fk1], cost)
fk1: routeID → route(routeID)
location = (locID, surrID)
port = (portID, port_name, city, state, country, locID [fk2])
fk2: locID → location(surrID)
leg = (legID, distance, arrives [fk3], departs [fk4])
fk3: arrives → port(portID)
fk4: departs → port(portID)
contains = (routeID [fk5], legID [fk6], sequence)
fk5: routeID → route(routeID)
fk6: legID → leg(legID)
cruiseline = (cruiselineID)
ship = (cruiselineID [fk7], ship_name, max_cap, speed, locID
                                             [fk8])

fk7: cruiselineID → cruiseline(cruiselineID)
fk8: locID → location(surrID)
river = (cruiselineID, ship_name [fk9], uses_paddles)
fk9: (cruiselineID, ship_name) → ship(cruiselineID, ship_name)
oceanliner = (cruiselineID, ship_name [fk10], lifeboats)
fk10: (cruiselineID, ship_name) → ship(cruiselineID, ship_name)
person = (personID, first_name, last_name)
passenger = (personID [fk11], miles, funds)
fk11: personID → person(personID)
booked = (cruiseID [fk12], personID [fk13])
fk12: cruiseID → cruise(cruiseID)
fk13: personID → person(personID)
crew = (personID [fk14], taxID, cruiseID, experience)
fk14: personID → person(personID)
crew_license = (taxID [fk15], license)
fk15: taxID → crew(taxID)
occupies = (personID [fk16], locID, [fk17])
fk16: personID → person(personID)
fk17: locID → location(locID)
supports = (cruiseID [fk18], cruiselineID, ship_name, progress,
                                             ship_status, next_time)
fk18: cruiseID → cruise(cruiseID)

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As our group implemented our relational schema into SQL, we came across a couple of constraints that are not supported by the components in the physical schema. A list of constraints is as follows

- Ensure that each leg has separate departure and arrival ports.
- Ensure that if next_time has a time, that the time is in the future.
- Ensure that if the final port has been reached that the next_time attribute is null.
- Ensure that the booking numbers must be less than or equal to the ship's max capacity.
- Ensure that all passengers' and crews' locations are back on the ship before departing a port.
- Ensure funds are enough to cover the cost of a cruise before booking.
- Ensure that at the final port, the crews' and passengers' locations must be at the port.
- Ensure that each cruise has at least one crew member assigned to it.
- Ensure that each route has at least one leg.
- Ensure that each person has a location specified.
- Ensure that each cruise line owns at least one ship.
- Ensure that each cruise follows one route.
- Ensure for any given route, for consecutive legs, the arrival of the former leg must match with the departure of the latter leg.