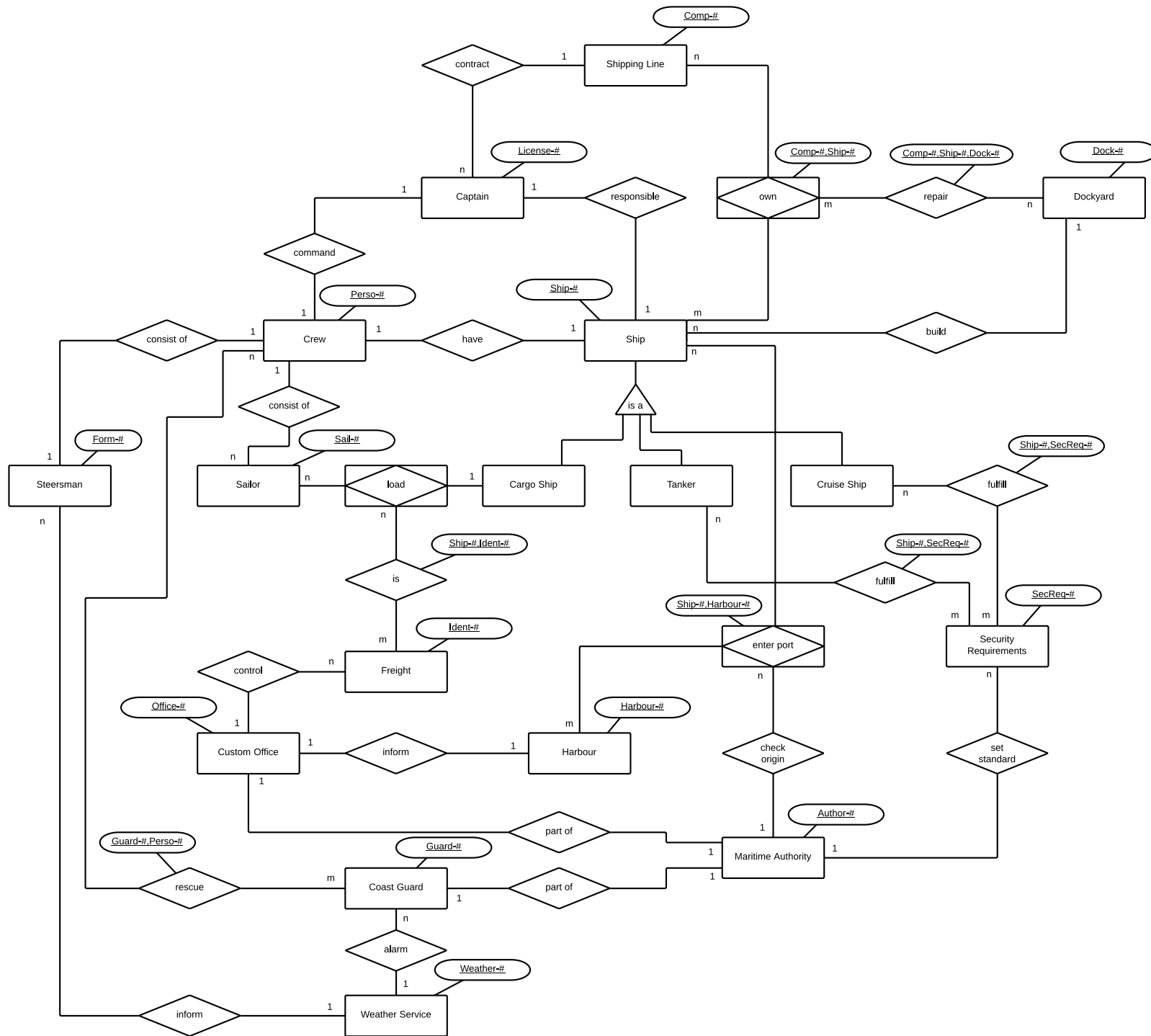


Instructions Very Hard Exercise5: Cargo Ship

- a) One Ship (Ship-#) has one Crew (Perso-#). A Crew is uniquely assigned to one Ship. One Captain (License-#) is responsible for one Ship. One Ship can only be commanded by one Captain.
- b) A Crew has many Sailors (Sailor-#) but only one Steerman (Form-#). A Captain uniquely commands one Crew as one Crew can only have one Captain. Sailors and the respective Steerman work uniquely for one Crew.
- c) A Captain can only have one contract with one Shipping Line (Comp-#). However a Shipping Line can employ more than one Captain. A Shipping Line owns many Ships. Ships are also owned by Joint Ventures of Shipping Lines.
- d) Ownership means that Ships need to be repaired by Dockyards (Dock-#). It is not necessarily important that Ships are repaired by a specific Dockyard. However Ships are built in one Dockyard only.
- e) Ships can be classified as a Cargo Ship, a Tanker or a Cruise Ship. One Cargo Ship is loaded by one or more Sailors. Tankers and Cruise Ships have to fulfil various Security Requirements (SecReq-#).
- f) The loadings of Cargo Ships are classified as Freight (Ident-#). Freight is controlled by the only Custom Office. The Custom Office informs its specific Harbour (Harbour-#). Each Harbour has its own Custom Office.
- g) Ships enter Harbours. The specific Maritime Authority (Author-#) checks the origin of Ships, while they enter the Harbour.
- h) The Maritime Authority sets standards about various Security Requirements, which need to be fulfilled. To each Maritime Authority belongs one Custom Office and one Coast Guard (Guard-#).
- i) The Weather Service (Weather-#) alarms Coast Guards and informs Steersmen.
- j) Coast Guard rescue one or more Crew, which have come into trouble.



Shipping Line

<u>Comp-#</u>

Captain

<u>License-#</u>	<u>Comp-#</u>	...

own

<u>Comp-#</u>	<u>Ship-#</u>	...

Dock

<u>Dock-#</u>	...

Ship

<u>Ship-#</u>	<u>Dock-#</u>	...

Steersman

<u>Form-#</u>	...

Harbour

<u>Harbour-#</u>	...

Custom Office

<u>Office-#</u>	...

repair

<u>Comp-#</u>	<u>Ship-#</u>	<u>Dock-#</u>	...

fulfill (Cruise Ship)

<u>Ship-#</u>	<u>SecReq-#</u>	...

is

<u>Ship-#</u>	<u>Ident-#</u>	...

fulfill (Tanker)

<u>Ship-#</u>	<u>SecReq-#</u>	...

enter port

<u>Ship-#</u>	<u>Harbour-#</u>	<u>Author-#</u>	...

Coast Guard

<u>Guard-#</u>	<u>Weather-#</u>

Maritime Authority

<u>Author-#</u>	...

Freight

<u>Ident-#</u>	<u>Office-#</u>	...

Custom Office

<u>Office-#</u>	...

rescue

<u>Guard-#</u>	<u>Perso-#</u>	...

Sailor

<u>Sail-#</u>	<u>Perso-#</u>	<u>Ship-#</u>	...