Practice Problem Set #2 (Part 2) Solution

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WW Capital Ship Database

World War 2 capital ships database contains the following relations:

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Classes(class, type, country, numGuns, bore, displacement)
Ships(name, class, launched)
Battles(name, date)
Outcomes(ship, battle, result)
```

The relation Classes records the name of the class, the type('bb' for battleship or 'bc' for battlecruiser), the country that build the ship, the number of main guns, the bore (diameter of the gun), and the displacement(weight, in tons). Relation Ships records the name of the ship, the name of its class, and the year in which the ship was launched. Relation Battles gives the name and date of battles involving these ships, and relation Outcomes gives the result (sunk, damaged, or ok) for each ship in each battle.
Sample data of these relations are given in Fig.(1,2,3,4):

SQL Queries

Write SQL statement for the following queries:

1. Find all ships that have more than 100 guns.
2. List the name, displacement, and number of guns of each ships engaged in the battle of Guadalcanal
3. List all class and number of ships each class had
4. Find the ships sunk in the battle of the Denmark Strait.
5. Find the ships launched prior to 1921
6. Find all the pairs of ships which were launched at same year
7. Find those countries which have only battleships but does not have any battlecruiser.
8. Find those countries whose ships were sunk during the battle named "Denmark Strait"
9. Find the classes that had only one ship as a member of that class

Answers

Here JOIN/Cartesian Product is used for the answer. All of these queries can be converted into sub query easily.

1. SELECT Ships.name from Ships, Classes WHERE Ships.classes = Classes.class and Classes.numGuns >= 100
2. SELECT Ship.name, Classes.displacement, Classes.numGuns from Ships, Classes, Outcomes WHERE Ships.class = Classes.class and Ships.name = Outcomes.ship and Outcomes.battle LIKE "Guadalcanal"
3. SELECT class, COUNT(*) AS "Number of Ships" FROM Classes,Ships WHERE Classes.class = Ships.class GROUP BY Classes.class

name	date
Denmark Strait	5/24-27/41
Guadalcanal	11/15/42
North Cape	12/26/43
Surigao Strait	10/25/44

Figure 1: Battles

class	type	country	numGuns	bore	displacement
Bismarck	bb	Germany	8	15	42000
Iowa	bb	USA	9	16	46000
Kongo	bc	Japan	8	14	32000
North Carolina	bb	USA	9	16	37000
Renown	bc	Gt. Britain	6	15	32000
Revenge	bb	Gt. Britain	8	15	29000
Tennessee	bb	USA	12	14	32000
Yamato	bb	Japan	9	18	65000

Figure 2: Classes.

name	class	launched
California	Tennessee	1921
Haruna	Kongo	1915
Hiei	Kongo	1914
Iowa	Iowa	1943
Kirishima	Kongo	1915
Kongo	Kongo	1913
Missouri	Iowa	1944
Musashi	Yamato	1942
New Jersey	Iowa	1943
North Carolina	North Carolina	1941
Ramillies	Revenge	1917
Renown	Renown	1916
Repulse	Renown	1916
Resolution	Revenge	1916
Revenge	Revenge	1916
Royal Oak	Revenge	1916
Royal Sovereign	Revenge	1916
Tennessee	Tennessee	1920
Washington	North Carolina	1941
Wisconsin	Iowa	1944
Yamato	Yamato	1941

Figure 3: Ships

ship	battle	result
Arizona	Pearl Harbor	sunk
Bismarck	Denmark Strait	sunk
California	Surigao Strait	ok
Duke of York	North Cape	ok
Fuso	Surigao Strait	sunk
Hood	Denmark Strait	sunk
King George V	Denmark Strait	ok
Kirishima	Guadalcanal	sunk
Prince of Wales	Denmark Strait	damaged
Rodney	Denmark Strait	ok
Scharnhorst	North Cape	sunk
South Dakota	Guadalcanal	damaged
Tennessee	Surigao Strait	ok
Washington	Guadalcanal	ok
West Virginia	Surigao Strait	ok
Yamashiro	Surigao Strait	sunk

Figure 4: Outcomes

4. SELECT ship FROM Outcomes WHERE battle LIKE "Denmark Strait" and result LIKE "sunk"
5. SELECT name FROM Ships WHERE launched < 1921
6. SELECT a.name as "ship1", b.name as "ship2" FROM Ship a, Ship b WHERE a.launched = b.launched and a.name < b.name
7. (SELECT country FROM Classes WHERE type LIKE "bb" or type LIKE "bc") EXCEPT (SELECT country FROM Classes WHERE type LIKE "bc")
8. SELECT Classes.country FROM CLasses, Ships, Outcomes WHERE Classes.class = Ship.class and Ship.name = Outcomes.ship and Outcomes.result LIKE "sunk" and Outcomes.battle LIKE "Denmark Strait"
9. SELECT class FROM Ships GROUP BY class HAVING COUNT(name)=1

Car Accident Database

Schema

```
person (driverid, name, address)\\
car (license, model, year)\\
accident (reportnumber, year, location)\\
owns (driverid, license)\\
participated (reportnumber, license, driverid, damage\_amount)\\
```

SQL Queries

1. Find names of all drivers who do not own any car
2. Find all drivers who did not make any accident
3. Find the year and the location of accidents where the damage_amount is greater than 5000$
4. Find all the drivers name who caused car accident in “Maryland”
5. Find all the cars model which were damaged by accident during last five years (Current year = 2017)
6. Find the number of accidents in which the cars belonging to “John Smith” were involved
7. Find the total number of people who owned cars that were involved in accidents in 2009

Answers

1. SELECT name FROM Person WHERE driverid NOT IN (SELECT driverid FROM owns)
2. SELECT name FROM Person WHERE driverid NOT IN (SELECT driverid FROM participated)
3. SELECT accident.year, accident.location FROM accident, participated WHERE accident.reportnumber = participated.reportnumber and damage_amount > 5000
4. SELECT name FROM person WHERE driverid IN (SELECT driverid FROM participated WHERE reportnumber IN (SELECT reportnumber FROM accident WHERE location LIKE “Maryland”))
5. SELECT model FROM car WHERE license in (SELECT license FROM participated WHERE reportnumber IN (SELECT reportnumber FROM accident WHERE year > 2012))
6. SELECT COUNT(*) FROM participated, owns, person WHERE person.name LIKE "John Smith" and participated.license = owns.license and person.driverid = owns.driverid
7. SELECT COUNT(DISTINCT driverid) FROM owns where driverid IN (SELECT driverid from participated,accident where accident.reportnumber = participated.reportnumber and accident.year = 2009)