Beckham Carver

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COSC 4820

Dr. Buckner

Homework 2

**PART 1:**

1. [5 points] Give the class names and countries of the classes that carried guns of at least 16-inch bore.

PROJECT(Class, Country){SELECT(Bore >= 16) {Classes}}

|  |  |
| --- | --- |
| **country** | **class** |
| North Carolina | USA |
| Renown | Great Britain |
| Revenge | Great Britain |
| Tennessee | USA |
| Yamato | Japan |

1. [5 points] Find the ships launched prior to 1920.

PROJECT(name){SELECT(launched < 1920){Ships}}

|  |
| --- |
| **name** |
| Haruna |
| Hiei |
| Kirishima |
| Kongo |
| Ramillies |
| Renown |
| Repulse |
| Resolution |
| Revenge |
| Royal Oak |
| Royal Sovereign |

1. [5 points] Find the ships sunk in the battle of the Surigao Strait.

PROJECT(ship){  
 SELECT(battle = “Surigao Strait” AND result = “sunk”){Outcomes}  
}

|  |
| --- |
| **ship** |
| Yamashiro |

1. [5 points] The treaty of Washington in 1921 prohibited capital ships heavier than 35,000 tons. List the ships that violated the treaty of Washington.

PROJECT(name){  
 THETA(launch > 1921){   
 Ships,  
 PROJECT(class){SELECT(displacement > 35000){Classes}  
 }  
}

*Output: Iowa, Missouri, New J., Wisconsin, Washington, Masashi, Yamato.*

1. [5 points] list the name, displacement, and number of guns of the ships engaged in the battle of Denmark Strait.

PROJECT(name, displacement, numGuns) {  
 JOIN{Classes,  
 JOIN{Ships,  
 SELECT(battle = “Denmark Strait”){Outcomes}  
 }  
 }  
}

*Output: should be no output, as ships in Denmark Strait are not listed in Ships relation which contains ‘name’*

1. [5 points] list all the Capital ships mentioned in the database. Remember that all these ships may NOT appear in the Ships relation.

ASSUMING THAT Outcomes.ship CAN/IS RENAMED TO Outcomes.name FIRST- THEN THE FOLLOWING QUERY WORKS, WITH THE RENAME SYNTAX AS GIVEN THIS IS NOT POSSIBLE.

PROJECT(name){  
 THETA(Classes.class = Outcome.name) {Classes, Outcomes}  
 UNION  
 Ships  
}

*Output: all ships in Ships, plus Bismarck from outcomes.*

**The following three problems are directly from the textbook, which its questions expected SQL queries as answers. With the given syntax for this HW some are impossible to solve, so I’ve added SQL-ish statements to complete them when necessary.**

1. [5 points] Find the classes that had only one ship as a member of that class.

PROJECT(class){  
 SELECT(COUNT(Ships.class) = 1){Ships}  
}

1. [5 points] Find those countries that had both battleships and battlecruisers.

PROJECT(country){  
 SELECT(type = “bb” OR type = “bc”){Classes}  
}

1. [5 points] Find those ships that were damaged in one battle, but later fought in another.

PROJECT(ship){  
 SELECT(COUNT(Outcomes.ship) > 1){Outcomes}  
}

**Part 2:**

1. [5 points] R ∪ S.

Maximum is *m* + *n*.

1. [5 points] R (join) S.

Maximum is *m* x *n*, where ‘x’ means cross product.

1. [5 points] σC(R) × S, for some condition C.

Maximum is *m* x *n*, where ‘x’ means cross product.

1. [5 points] πL(R) − S, from some list of attributes L.

Maximum is *m*.