

Student Name:

**CS3431: Database Systems I  
C-Term 2013, Quiz 3**

**ShipClass**(name, type, country, numGuns, designYear, weight) --- Call it **S**

**WarShips**(shipName, className, builtYear) ---- Call it **W**

**Missions**(missionName, date) ----- Call it **M**

**Results**(shipName, missionName, status) ---- Call it **R**

Write the **algebraic expression** and the **SQL Select statement** for the following queries

**Q1: Report the WarShips information (name, class, builtyear) from USA.**

$\pi_{shipName, className, builtYear} (\sigma_{country='USA'} (S \bowtie_{name=className} W))$

**Select** W.\*  
**From** W, S  
**Where** W.className = S.name  
**And** country = 'USA';

**Q2: Report ship name for ships that were 'ok' in one mission, but later 'damaged' in another.**  
*Hint: assume damaged ones do not participate again in missions.*

$\pi_{shipName}(\sigma_{status='ok'}(R)) \cap \pi_{shipName}(\sigma_{status='damaged'}(R))$

**Select** shipName  
**From** R  
**Where** status = 'ok'  
**Intersect**  
**Select** shipName  
**From** R  
**Where** status = 'damaged';

**ShipClass**(name, type, country, numGuns, designYear, weight) --- Call it S

**WarShips**(shipName, className, builtYear) ---- Call it W

**Missions**(missionName, date) ----- Call it M

**Results**(shipName, missionName, status) ---- Call it R

**Q3: Report the Warships names that ‘sunk’ within 2 years from its first mission**

*Hint: Assume the date field is of type “Date” where you can apply Max() and Min() functions. The most recent date is always the maximum. Also assume Years(date1, date2) should return the number of years between the two dates.*

$R1 \leftarrow \gamma_{shipName, firstDate < -min(date)}(M \bowtie R)$ $R2 \leftarrow \pi_{shipName, sunkDate < -date}(\sigma_{status='sunk'}(M \bowtie R))$ $Result \leftarrow (\sigma_{Years(sunkDate, firstDate) \leq 2}(R1 \bowtie R2))$
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**Select** Q1.ShipName

**From**

(**Select** shipName, min(date) as firstDate

**From** R, M

**Where** R.missionName = M.missionName

**Group By** shipName) Q1,

(**Select** shipName, date as sunkDate

**From** R, M

**Where** R.missionName = M.missionName

**And** status = ‘sunk’) Q2

**Where** Q1.shipName = Q2.shipName

**And** Years(sunkDate, firstDate) <= 2;

**Q4: Report the warships names that participated in more than 3 missions. Report the name and count sorted by the name.**

$\tau_{shipName}(\sigma_{cnt > 3}(\gamma_{shipName, cnt < -count(*)}(R)))$
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**Select** shipName, count(\*)

**From** R

**Group By** shipName

**Having** count(\*) > 3

**Sorted by** shipName;