CS347 Problem Set 2 Solutions

2.4.3

a) $\Pi_{class,country}(\sigma_{bore>=16}(Classes))$
Result: (Iowa, USA), (North Carolina, USA), (Yamato,Japan)

f) $\Pi_{name}(Ships) \cup \Pi_{ship}(Outcomes)$
Result:California, Haruna, Hiei, Iowa, Kirishima, Kongo, Missouri, Musashi, New Jersey, North Carolina, Ramillies, Renown, Repulse, Resolution, Revenge, Royal Oak, Royal Sovereign, Tennessee, Washington, Wisconsin, Yamato, Arizona, Bismarck, Duke of York, Fuso, Hood, King George V, Prince of Wales, Rodney, Scharnhorst, South Dakota, Wet Virginia, Yamashiro

i)
$DamagedShips = \rho_{(ship1,battle1,date1,result1)}((\sigma_{result=damaged}(Outcomes)) \bowtie_{battle=name} (Battles))$
$AllShips = Outcomes \bowtie_{battle=name} Battles$
$\Pi_{ship}(DamagedShips \bowtie_{date1<date \wedge ship1=ship} (AllShips)$
Result: none

2.4.7

a) $R \cup S$
$min = max(m, n)$
$max = n + m$

b) $R \bowtie S$
$min = 0$
$max = n * m$

c) $\sigma_C R \times S$
$min = 0$
$max = n * m$

d) $\Pi_L R - S$
$min = 0$
$max = n$

2.5.1
a) $\sigma_{speed<2\ and\ price>500}(PC) = \emptyset$
Violations: model 1011

e) $\sigma_{lram>ram\ and\ lprice<price}(PC \times \rho_{(lmodel,lspeed,lram)}(Laptop)) = \emptyset$
Violations (laptop model, pc model): (2002, 1002), (2006, 1001)

UML diagram