Homework 2:

6.10:

a. Π_{name} (Student $\bowtie$ takes $\bowtie$ ($\sigma_{dept\_name='Com. Sci.'}$ (Course)))

b. $\Pi_{ID, name}$ (Student) $-\ \Pi_{ID, name}$ ($\sigma_{year < 2009}$ (Student $\bowtie$ takes))

c. dept-name $G_{max(salary)}$ (instructor)

d. Assume the above query as max-salary

∴ $G_{min(max(salary))}$ (max-salary)

6.12:

a. .. Π_{sec_id} ($\sigma_{countu(ID)>1}$ (course-id, sec-id, semester, year $G_{countu(ID)}$ (teaches)))

b. Π_{sec_id} ($\sigma_{t2.ID \neq teaches.ID \wedge t2.course-id = teaches.course-id}$ (teaches $\times \rho_{t2}$ (teaches)))

$\wedge$ t2. sec-id = teaches. sec-id $\wedge$ t2. semester = teaches. semester

$\wedge$ t2. year = teaches. year

6.13:

a. Assume   company-name $G_{countu(person-name)}$ (works) is g_1

    also $G_{max(countu(person-name))}$ (g_1) is g_2

∴ $\Pi_{company-name}$ $(g_1 \bowtie g_2)$

b. Assume   company-name $G_{sum(salary)}$ (works) is g_1

    also $G_{min(sum(salary))}$ (g_1) is g_2

∴ $\Pi_{company-name}$ $(g_1 \bowtie g_2)$

c. Assume $G_{average(salary)}$ ($\sigma_{company-name = 'First Bank Corporation'}$ (works)) is g_1

    also   company-name $G_{average(salary)}$ (works) is g_2

∴ $\Pi_{company-name}$ ($\sigma_{g_2. average(salary) > g_1. average(salary)}$ (g_2))

6.14:

a. $\Pi_{name}(\sigma_{publisher = 'McGraw-Hill'}(\text{borrowed} \bowtie \text{member} \bowtie \text{book}))$

b. $\Pi_{name, isbn}(\text{borrowed} \bowtie \text{member}) \div \Pi_{isbn}(\sigma_{publisher = 'McGraw-Hill'}(\text{books}))$

c. Assume $name \, G_{countu(isbn)}(\sigma_{publisher = 'McGraw-Hill'}(\text{borrowed} \bowtie \text{member} \bowtie \text{book})$ is g_1

   $\therefore \Pi_{memb\_no, \, name}(\sigma_{countu(isbn) > 5}(g_1))$

d. Assume $publisher, memb\_no \, G_{countu(isbn)}(\text{borrowed} \bowtie \text{member} \bowtie \text{book}))$ is g_1

   $\therefore \Pi_{name, \, memb\_no}(\sigma_{countu(isbn) > 5}(g_1))$