# CMPT-354 D1 Fall 2008
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## Solution Assignment 1

Total marks: 50 (5 % of the assignments)
Due date: September 19, 2008

Consider the following schema of a *product database*:

Parts(pid: integer, pname: string, color: string)
Suppliers(sid: integer, sname: string, address: string)
Catalog(sid: integer, pid:integer, price: real)

The *Catalog* records that some *Supplier* sid supplies *Part* pid at a given price.

Formulate each of the following queries in relationalalgebra.

a) Find the sname and address of the Suppliers that supply (one of) the Parts with pname = 'MountainBikeXXX' for at most $300.

$$\pi_{sname,address}((\sigma_{price \leq 300} Catalog) \bowtie (\sigma_{pname='MountainBikeXXX'} Parts) \bowtie Suppliers)$$

Note that $\bowtie$ denotes the (natural) join.

b) Find the sids of Suppliers who supply a red part and a green part.

$$\rho_{R1}(\pi_{sid}(Catalog \bowtie (\sigma_{color=red} Parts)))$$
$$\rho_{R2}(\pi_{sid}(Catalog \bowtie (\sigma_{color=green} Parts)))$$
$$R1 \cap R2$$

c) Find the sids of Suppliers who supply every red part or every green part.

$$\rho_{R1}(\pi_{sid,pid} Catalog) / (\pi_{pid}(\sigma_{color=red} Parts)))$$
$$\rho_{R2}(\pi_{sid,pid} Catalog) / (\pi_{pid}(\sigma_{color=green} Parts)))$$
$$R1 \cup R2$$

d) Find the pids of the most expensive parts supplied by Supplier with sid = 5.

$$\rho_{R1}(\sigma_{sid=5} Catalog)$$
$$\rho_{R2(1\to sid1, 2\to pid1, 3\to price1, 4\to sid2, 5\to pid2, 6\to price2)}(R1 \times R1)$$
$$\rho_{R3}(\sigma_{price2 > price1} R2)$$
$$\pi_{pid} R1 - \pi_{pid1} R3$$