

CS4123 Autumn 2016
Homework Assignment 3
Rentaplant

This company provides its corporate clients with office plants on a contract basis. The tables below show the type of information that is stored in the Rentaplant database. The monthly rate pays for the care and maintenance of each plant.

Plants

Pnumber	Pname	Variety	Size	Rate
12345	Anthurium	Latino	15	20
12346	Asparagus	Virgatus	20	15
23455	Laurus	Nobilis	25	30
23456	Laurus	Nobilis	20	25
23457	Asparagus	Variegata	25	30
23458	Guzmania	Estrella	33	25
34567	Calathea	Freddie	24	33
34568	Fatsia	Japonica	30	25
34569	Fatsia	Japonica	40	35
45678	Aechmea	Chantinii	30	27
45679	Aglaonema	Lillian	35	30
54321	Ficus	Benjamina	35	35
54322	Cordyline	Stricta	35	40
54323	Yucca	Variegata	40	35

Contracts

Custno	Plant	Until	Qty
A233	12345	24-Oct-18	10
A233	12346	24-Oct-18	40
A345	12345	30-Nov-18	30
A345	12346	30-Nov-18	20
B346	12345	24-Oct-18	25
B346	12346	30-Nov-18	35
D123	34568	31-Dec-17	25
A345	45678	24-Oct-18	35
D123	45679	31-Dec-17	45
D345	45679	31-Dec-17	100
B111	23458	24-Oct-18	65
D123	54321	24-Oct-18	45
D123	54322	24-Oct-18	25
B111	34567	30-Nov-18	25
B111	34568	31-Dec-17	30
D123	45678	31-Dec-17	40
A345	54323	24-Oct-18	50
B111	12345	24-Oct-18	75
A345	54321	24-Oct-18	75

[Names, Numbers, Dates, Money]

Q1 Using the basic sets listed above, write declarations for the sets **Varieties**, **Sizes** and **Rates**

Q2 Using these new sets and the basic sets, write the declaration for the n-ary relation **Plants**.

Q3 Using **Numbers** as the domain, write the declarations for the functions you find in the **Plants** table.

Q4 Customers are identified by a letter in the range A-F followed by a number. Write a suitable definition for **Letters** and then a declaration for the set **CustIDs**.

Q5 Write the declaration for the n-ary relation **Contracts**.

Q6 Using **CustIDs X Numbers** as the domain, write declarations for the two **functions** you can find in the **Contracts** table.

Q7 Write the equivalent SQL for the following set definitions:

- $\{c:\text{CustIDs}, n:\text{Numbers} \mid \text{Qty}(c,n) = 25 \bullet (c, \text{Until}(c,n))\}$
- $\{c:\text{CustIDs}, n:\text{Numbers} \mid \text{Qty}(c,n) = 40 \text{ or } \text{Until}(c,n) = 24\text{-Oct-18} \bullet (c, n)\}$
- $\{c:\text{CustIDs}, n:\text{Numbers} \mid \text{Qty}(c,n) < 50 \text{ and } \text{Until}(c,n) \geq 01\text{-Jan-18} \bullet (c, n)\}$
- $\{n:\text{Numbers} \mid \text{Pname}(n) = \text{Ficus} \text{ and } \text{Size}(n) > 20\}$

Q8 Write set comprehension for the following SQL statements

- Select * from Plants where Variety = 'Japonica' OR Size >= 40;
- Select Pname, Variety, Size from Plants where Rate < 25;
- Select distinct Plant from Contracts where Qty > 30 AND Until < '24-Oct-17';
- Select distinct Size from Plants where Rate > 25;
- Select Size, Rate, Pnumber from Plants where Pname = 'Laurus';
- Select Pnumber, Rate/12 from Plants;