Relations & Functions

Representing Relations
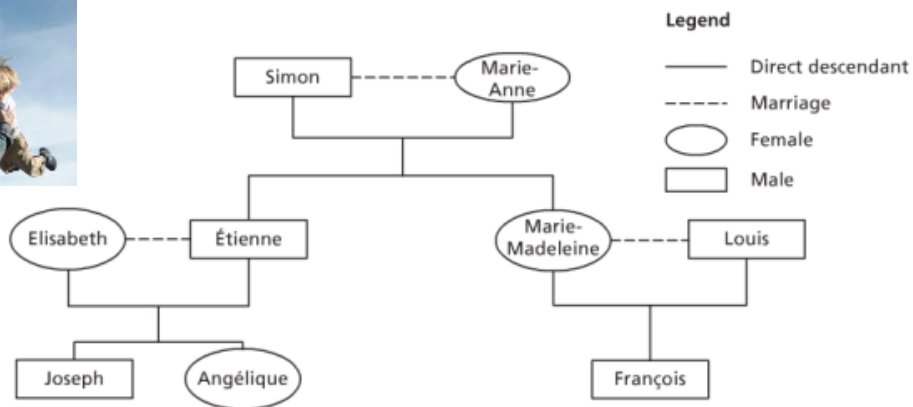
Just like Relationships !!!!

Family Tree

Legend

———	Direct descendant
- - - -	Marriage
(oval)	Female
(rectangle)	Male

Family tree:
- Simon - - - Marie-Anne
  - Elisabeth - - - Étienne
    - Joseph
    - Angélique
  - Marie-Madeleine - - - Louis
    - François

Legend
— Direct descendant
----- Marriage
◯ Female
☐ Male
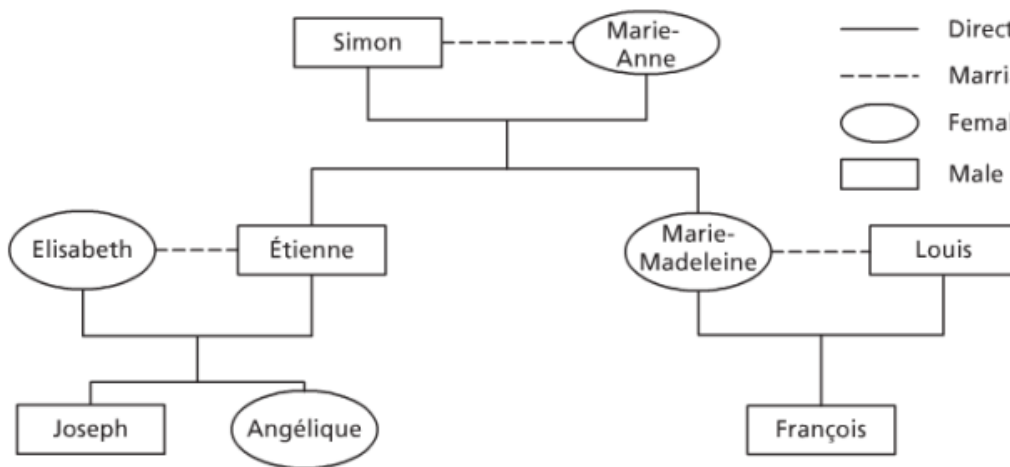
- **How is Joseph related to Simon?**
  Grandson

- **How are Angelique and Francois related?**

  First Cousins

- **How does the family tree show these relations?**

Terminology

A *set* is a collection of distinct objects.

Set of Fruit

Fruit
apple
blueberry
cherry
huckleberry

Set of Colours

Colour
red
green
blue

An *element* of a set is one object in the set.

Set of Fruit
Fruit
apple
blueberry
cherry
huckleberry

Apple is an **element** of the set of Fruit

A _relation_ associates the elements of one set with the elements of another set

Arrow Diagram

may have the colour

apple

blueberry

cherry

huckleberry

blue

green

red
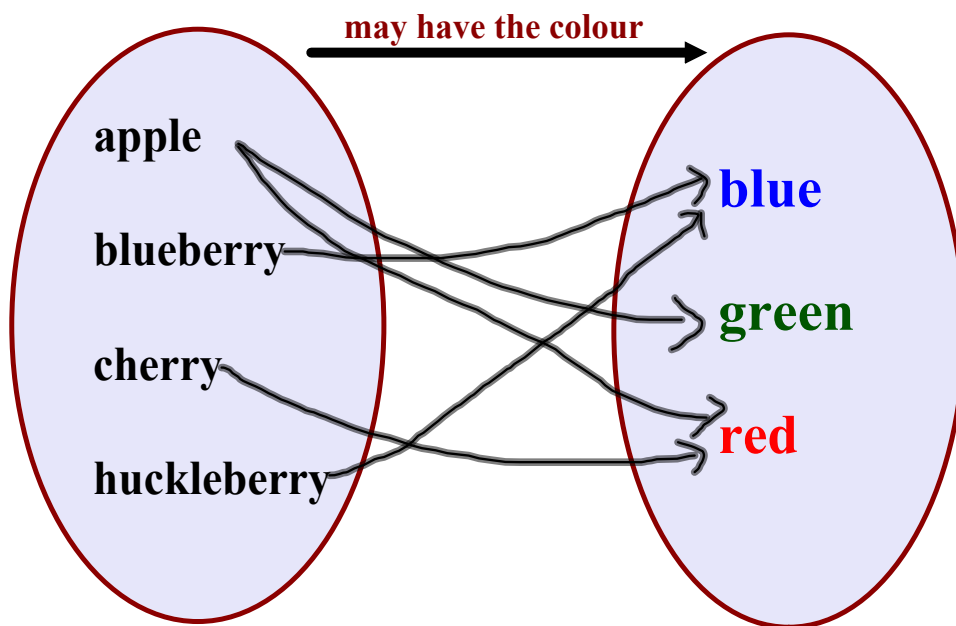
Some other ways to display the relation :

Use a table

Fruit	Colour
apple	red
apple	green
blueberry	blue
cherry	red
huckleberry	blue

Use a set of *ordered pairs* to display a relation.

$\Big\{$ **(apple,red) , (apple, green) , (blueberry, blue) ,
(cherry, red) , (huckleberry, blue)** $\Big\}$

Northern communities can be associated
with the *territories* they are in.

| Community	Territory
Hay River	NWT
Iqaluit	Nunavut
Nanisivik	Nunavut
Old Crow	Yukon
Whitehorse	Yukon
Yellowknife	NWT

a) Describe this relation in words.
b) Represent this relation:
   **i)   as a set of ordered pairs**
   **ii) as an arrow diagram**

i)

The communities are the first ordered pairs.
The territories are the second ordered pairs.

$$\left\{ \begin{array}{l} \text{(Hay River, NWT) , (Iqaluit, Nunavut) , (Nanisivik, Nunavut) ,} \\ \text{(Old Crow, Yukon), (Whitehorse, Yukon) , (Yellowknife , NWT)} \end{array} \right\}$$
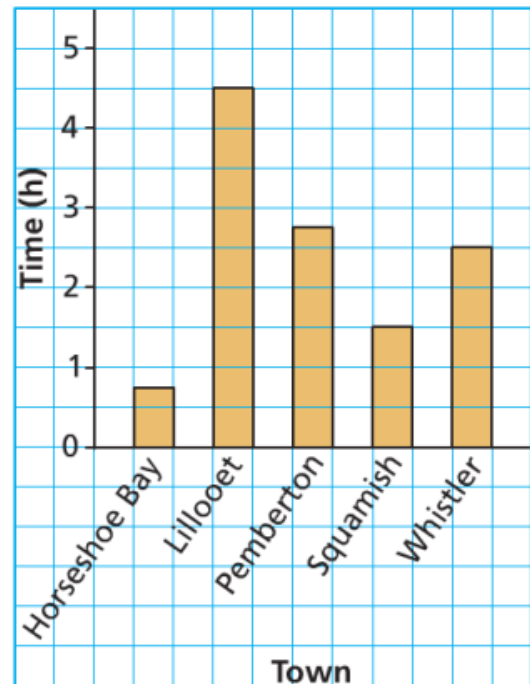
ii)

is located in

Hay River → Nunavut
Iqaluit → NWT
Nanisivik → Nunavut
Old Crow → Yukon
Whitehorse → NWT
Yellowknife → Yukon
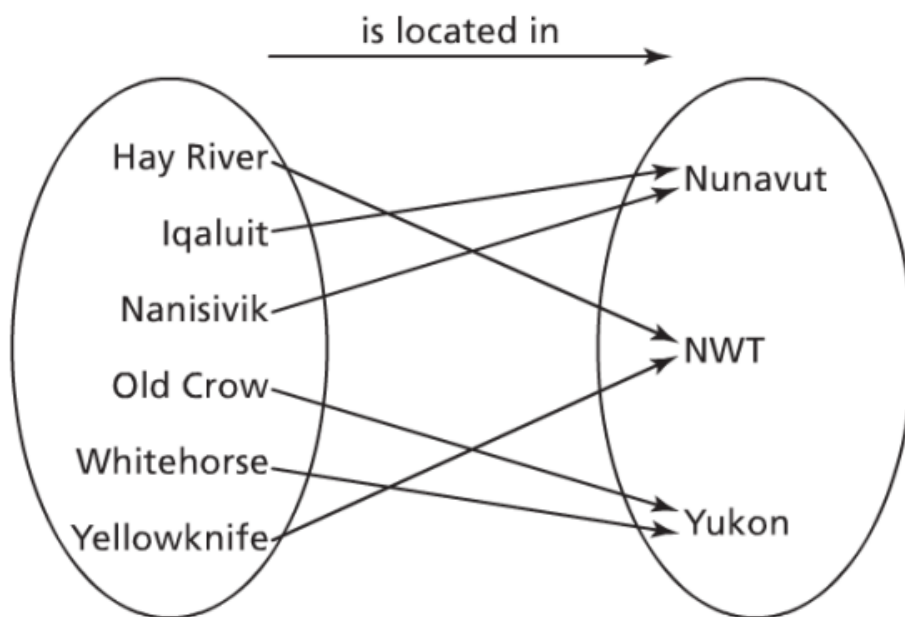
Representing a Relation Given as a bar graph
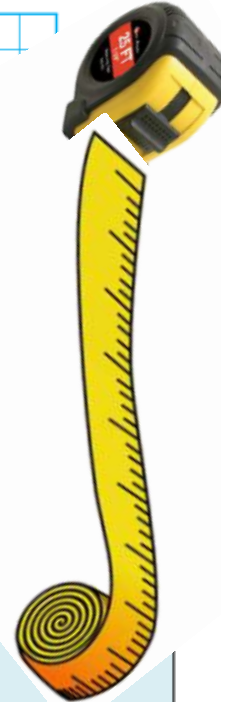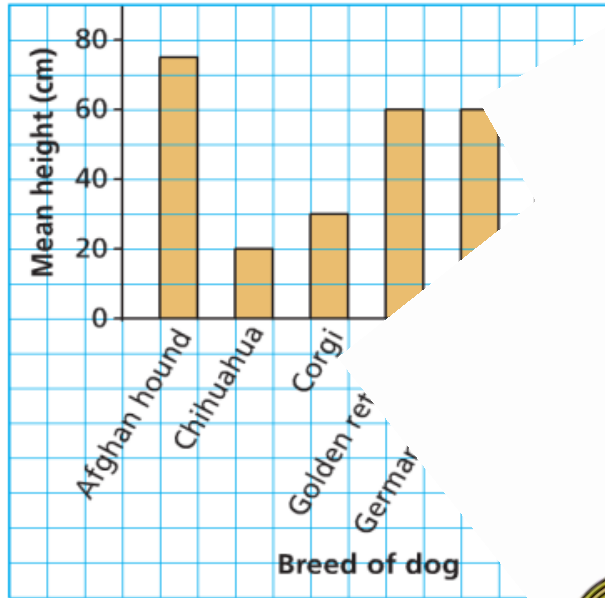
Breed of Dog	Mean Height

Different towns in British Columbia can be associated with the average time, in hours, that it takes to drive to Vancouver.

Represent the relation as a *table*.

solution:

Town	Average Time (h)
Horseshoe Bay	0.75
Lillooet	4.5
Pemberton	2.75
Squamish	1.5
Whistler	2.5