**- Network Representation**

1- semantic network

2- conceptual graphs

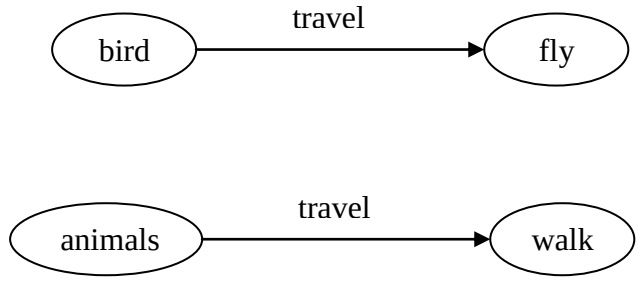
3- frames

**- Semantic Network**

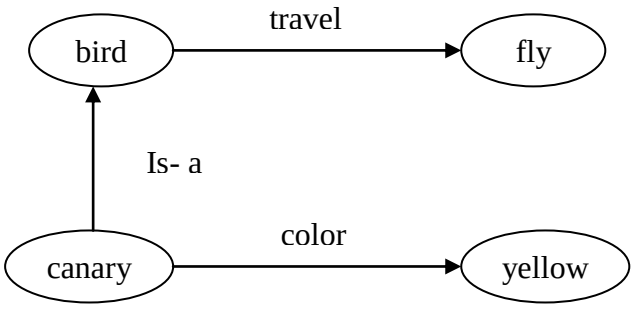
Semantic Network: is directed graph where the nodes represents the objects, entities, values, abstract objects events and the arcs represents the relationship between the entities of the nodes or properties of objects(nodes).

Ex: 1- bird fly

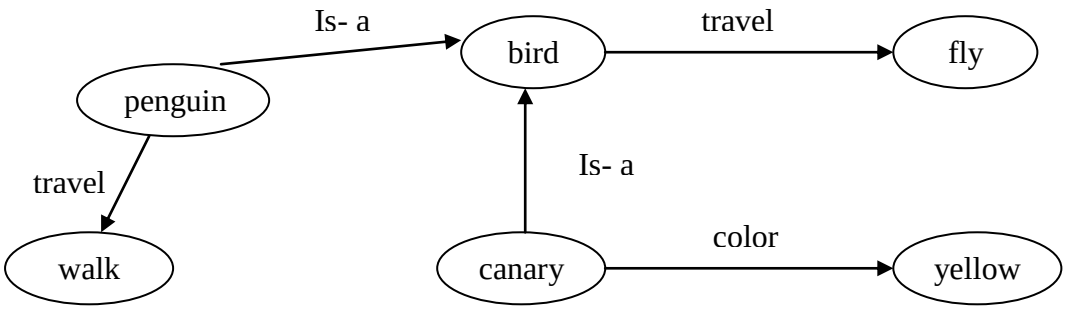
2- Animals walk




Ex: birds fly, canary is a bird, canary has a color of yellow



Ex: penguin is bird, penguin walk




Abstract objects:

To avoid this problem

1- create a node for the abstract object

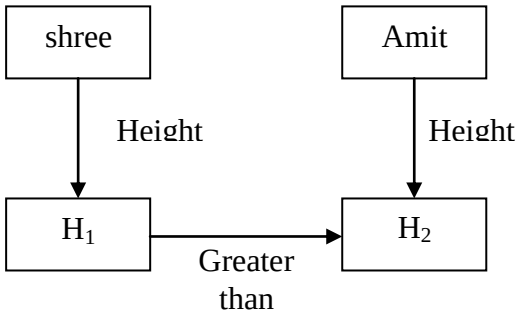
2- create a node for each specific object

3- link the specific nodes to the abstract node using subtype relation

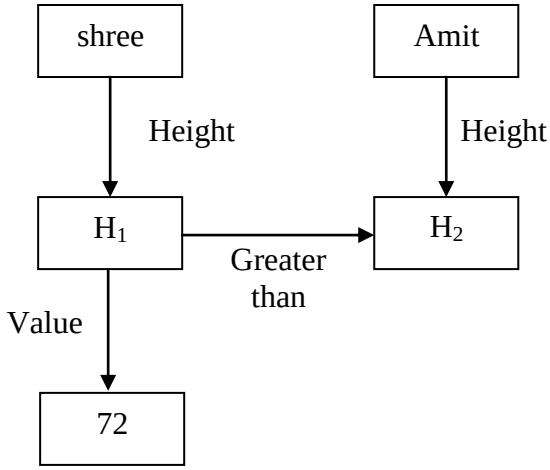
4- link the specific properties to the corresponding specific nodes

- make some important distinction

Suppose we want to represent the fact like" shree is taller than amit"



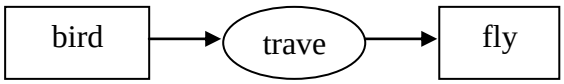

The node $H_1$ and $H_2$ represent Shree's and Amit's height respectively. Some times it is useful to introduce the arc value to make the distinction clear. This is shown in the following figure.

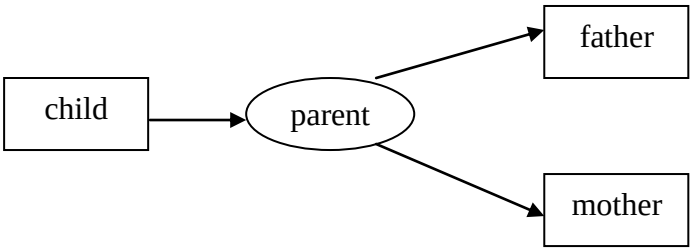


The procedures that operates on nets such as this can be used to exploit the fact that some arcs such as height define new entities where as some arcs like greater than and value merely describe the relationship among existing entities.

## - Conceptual graph

A conceptual graph is a directed bipartite graph concepts ( objects, abstract object, values) are represented by a square or rectangle, relations are also represented by nodes which are called conceptual relation nodes. These nodes are drown as an ellipse . no two nodes of the same type are connected by an arc. A conceptual node can only be linked to a conceptual relation node and vice versa.

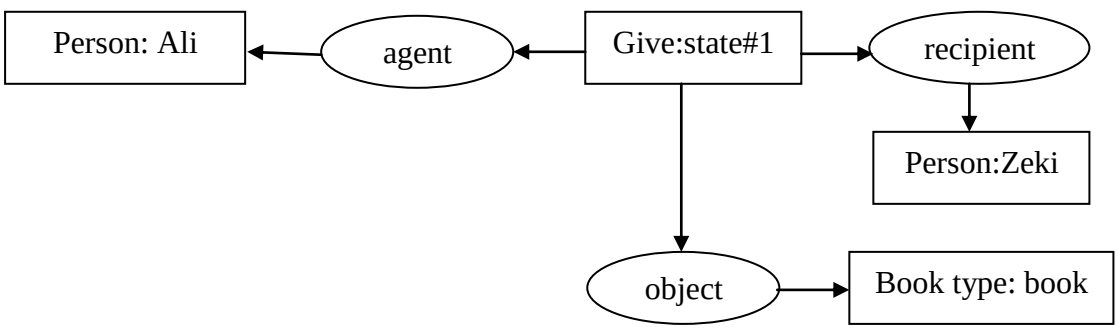



Note: each concept node consists of two fields as follows:

| | | |
|---|---|---|
| Type field | : | specific field |
| Generic field | | individual field |

Ex: Ali gave the book to zeki.

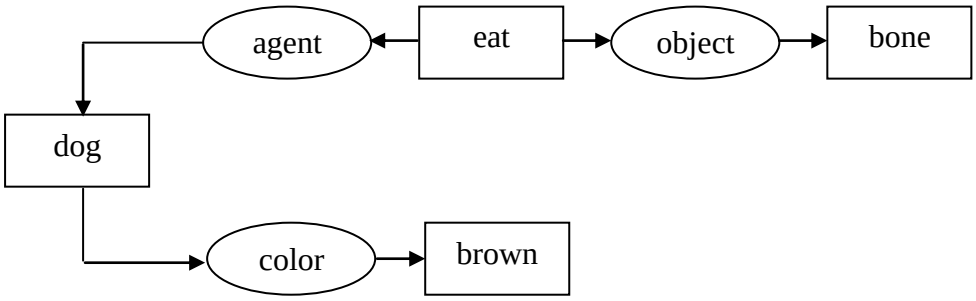


Conceptual graphs allows the use of variable & markers.

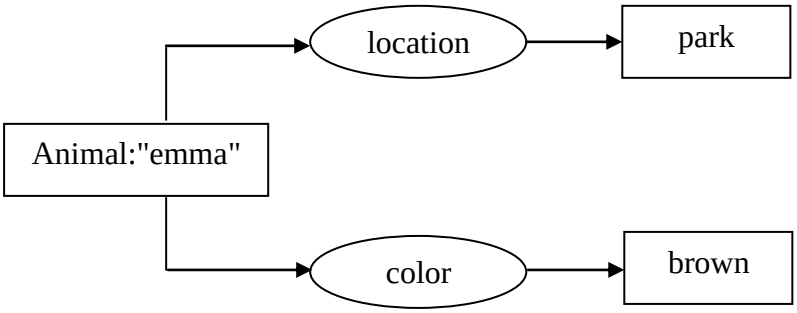
- operations on conceptual graphs:

Ex: let

$g_1$:



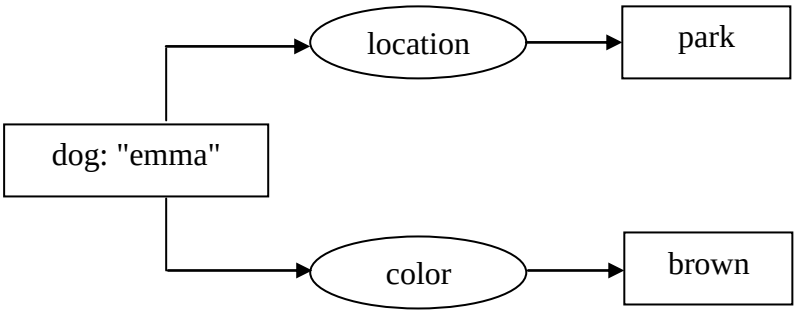

$g_2$:




1- specializing: $g_2 \longrightarrow g_{31}$

If a concept is labeled with a generic marker replace it by an individual marker

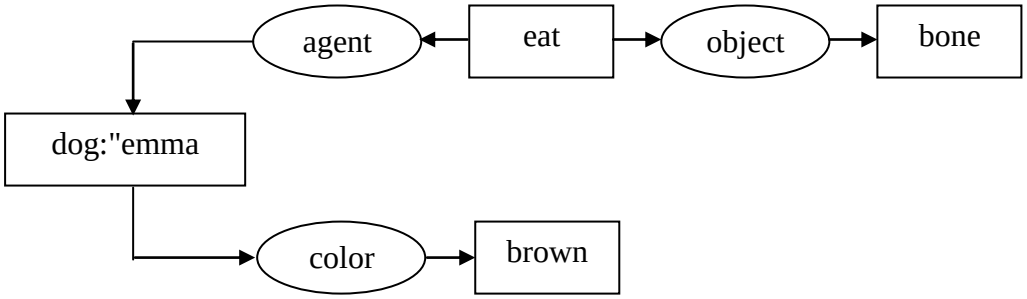
$g_{31}$:




2- restriction : $g_1 \longrightarrow g_{32}$

A type label on concept may be replaced by one of its subtypes as long as this is consistent with the referent of the concept

$g_{32}$:

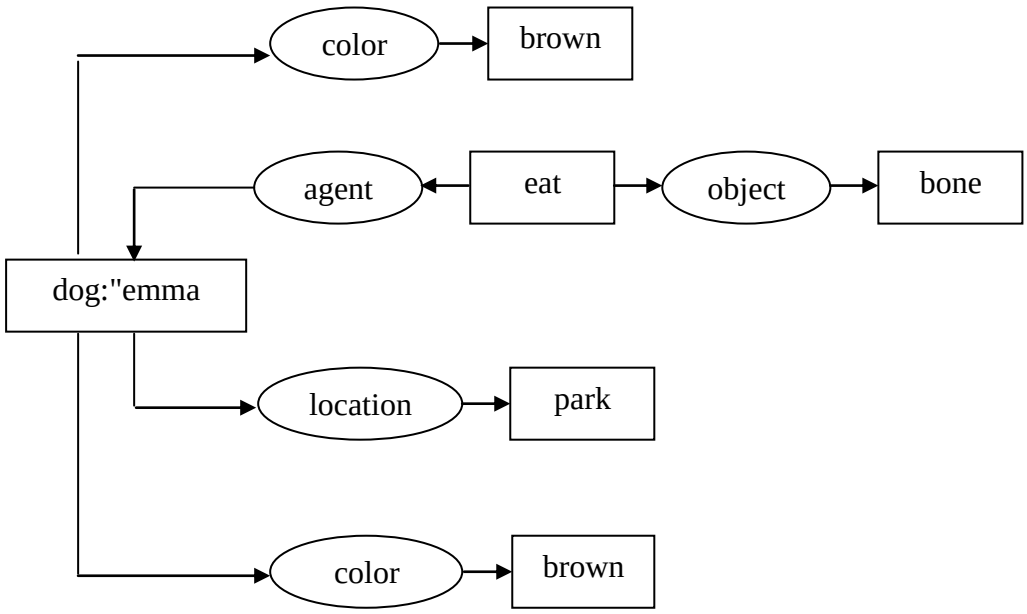



$g_{32}$ is obtained from $g_1$ by a restriction operation.

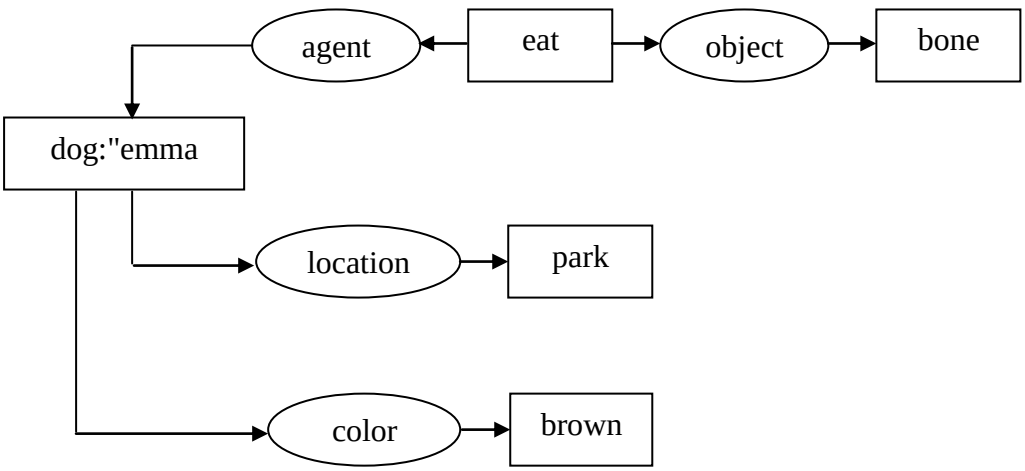
3- join operation

The join operation rule let us combine two graphs into single graph if there is a concept node c1 in ($g_1$) that is identical to node c2 in ($g_2$), then can delete c2 & link all operations incident on c2 to c1

$g_4$:

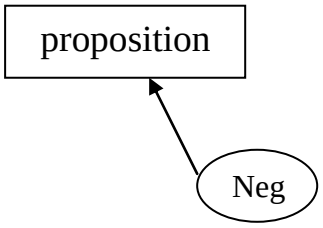



4- simplicity

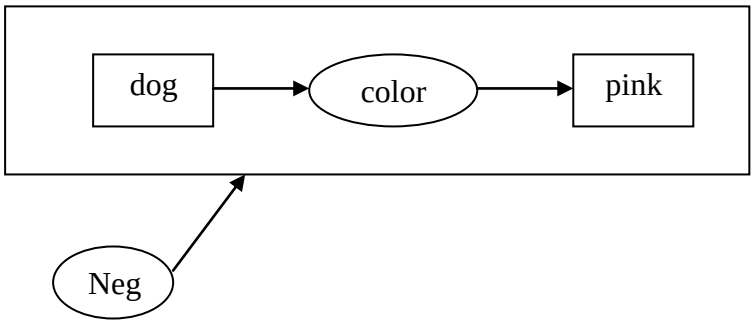


**- Negation of conceptual graph:**

Negation is represented as a conceptual node of type proposition and then Neg operator is linked to the node.



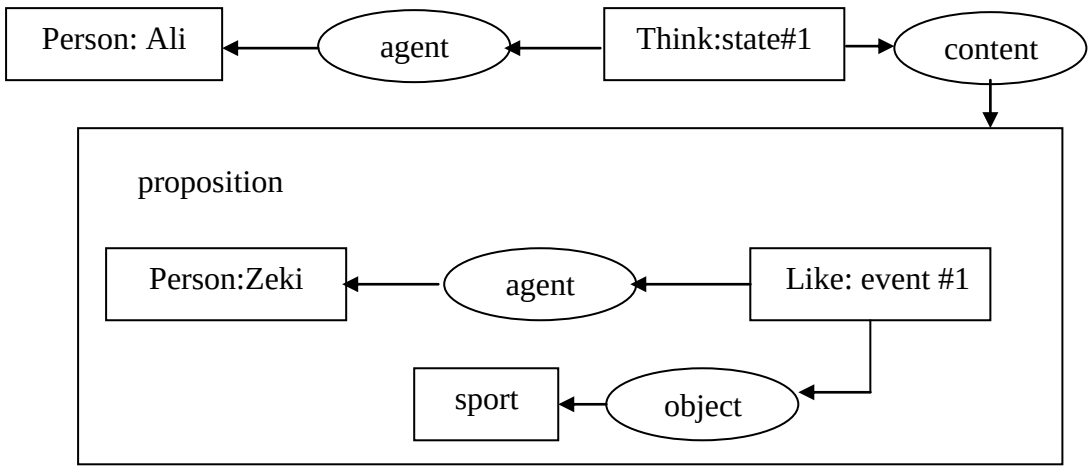

Ex: there are no pink dogs




Representing propositions by conceptual graph:

A proposition is represented by a concept node of type "proposition" where the individual field is the proposition represented as a conceptual graph.

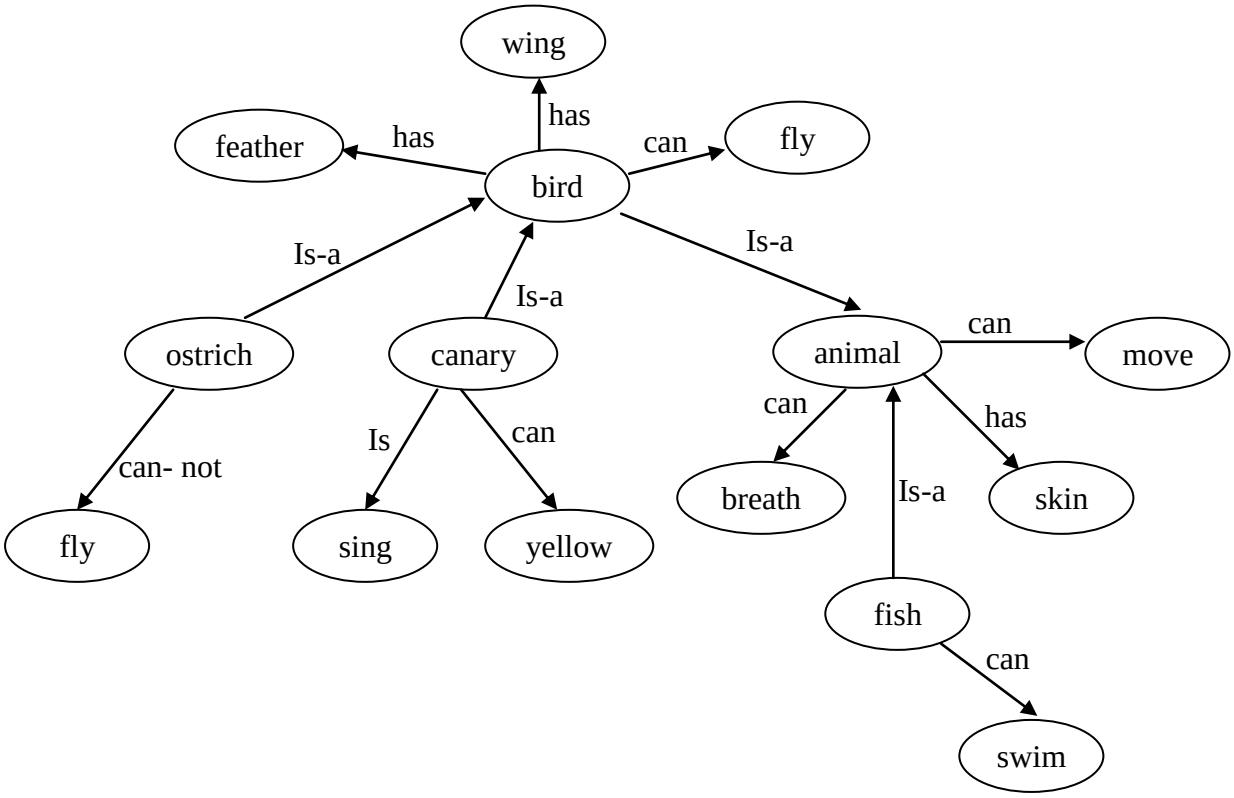
Ex: Ali thinks that zeki likes sport.

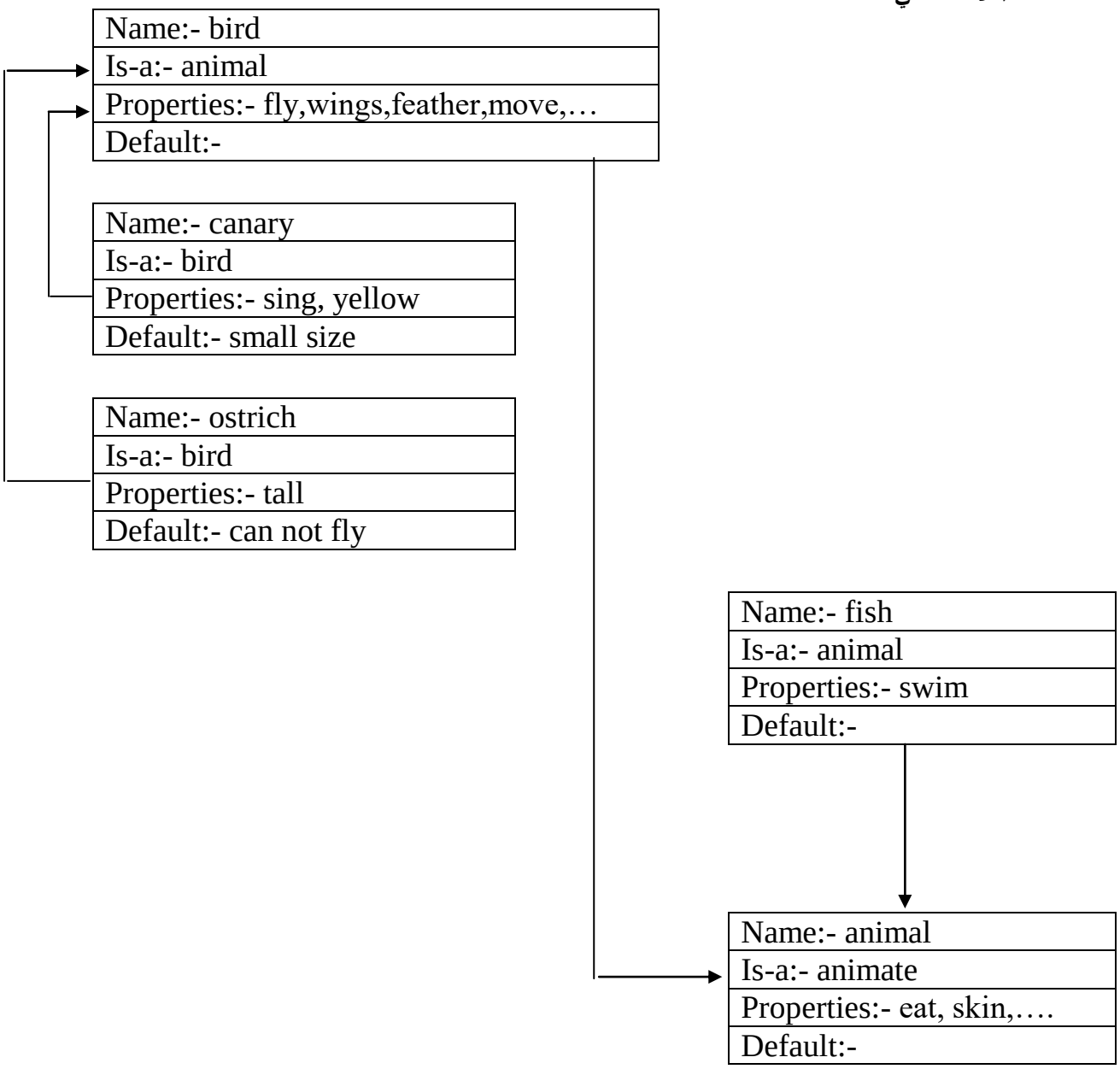


## - Frames

Frames is a collection of attribute usually called slots and associated value that describe some of entity in the world.

Ex: covert the semantic network to frames




Name:- bird
Is-a:- animal
Properties:- fly,wings,feather,move,…
Default:-
Name:- canary
Is-a:- bird
Properties:- sing, yellow
Default:- small size
Name:- ostrich
Is-a:- bird
Properties:- tall
Default:- can not fly
Name:- fish
Is-a:- animal
Properties:- swim
Default:-
Name:- animal
Is-a:- animate
Properties:- eat, skin,….
Default:-