



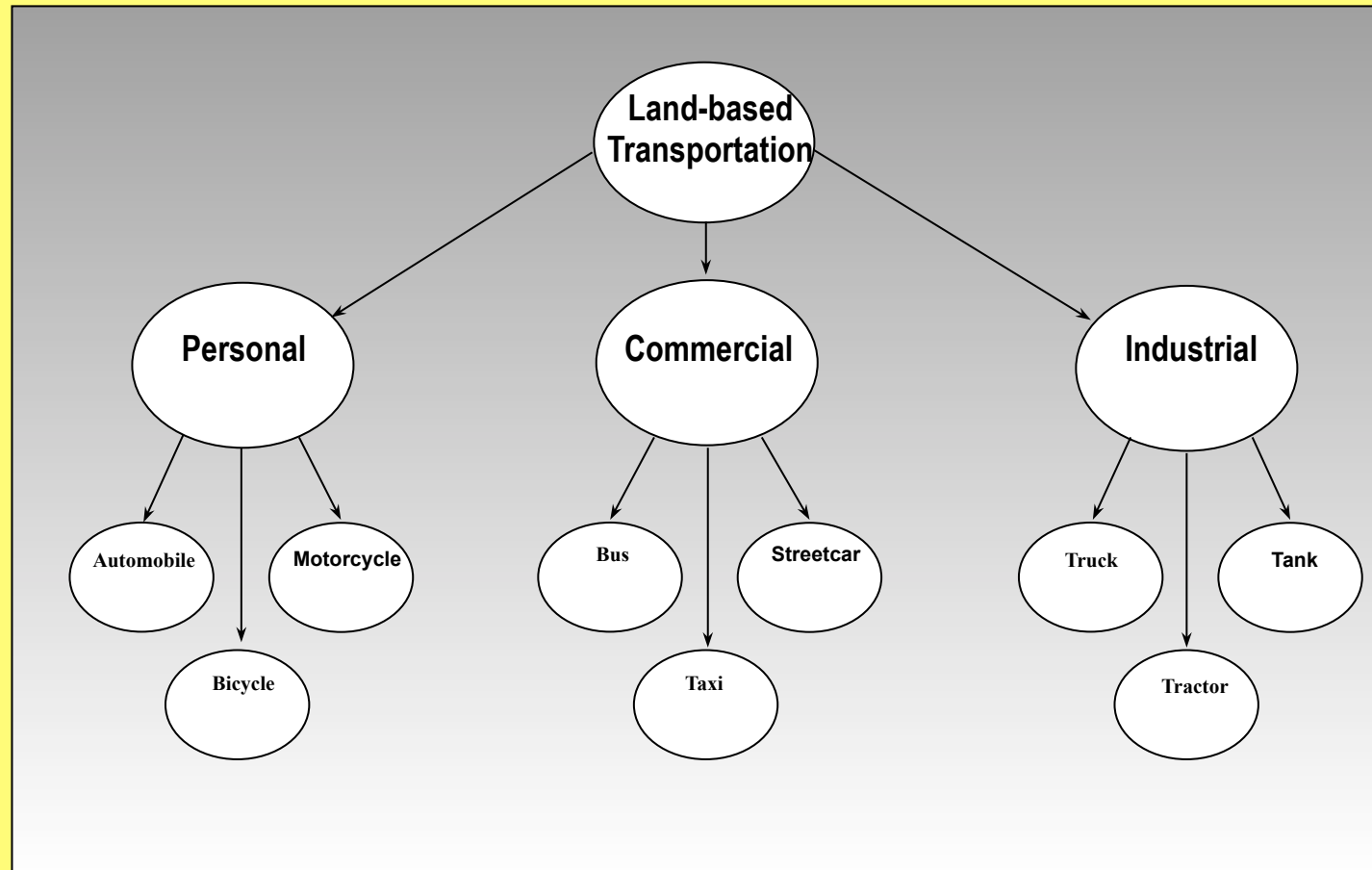
ΕΘΝΙΚΟ ΜΕΤΣΟΒΙΟ ΠΟΛΥΤΕΧΝΕΙΟ

ΣΧΟΛΗ ΑΓΡΟΝΟΜΩΝ ΚΑΙ ΤΟΠΟΓΡΑΦΩΝ ΜΗΧΑΝΙΚΩΝ Διεπιστημονικό
Διατμηματικό Πρόγραμμα Μεταπτυχιακών Σπουδών 'Γεωπληροφορική'

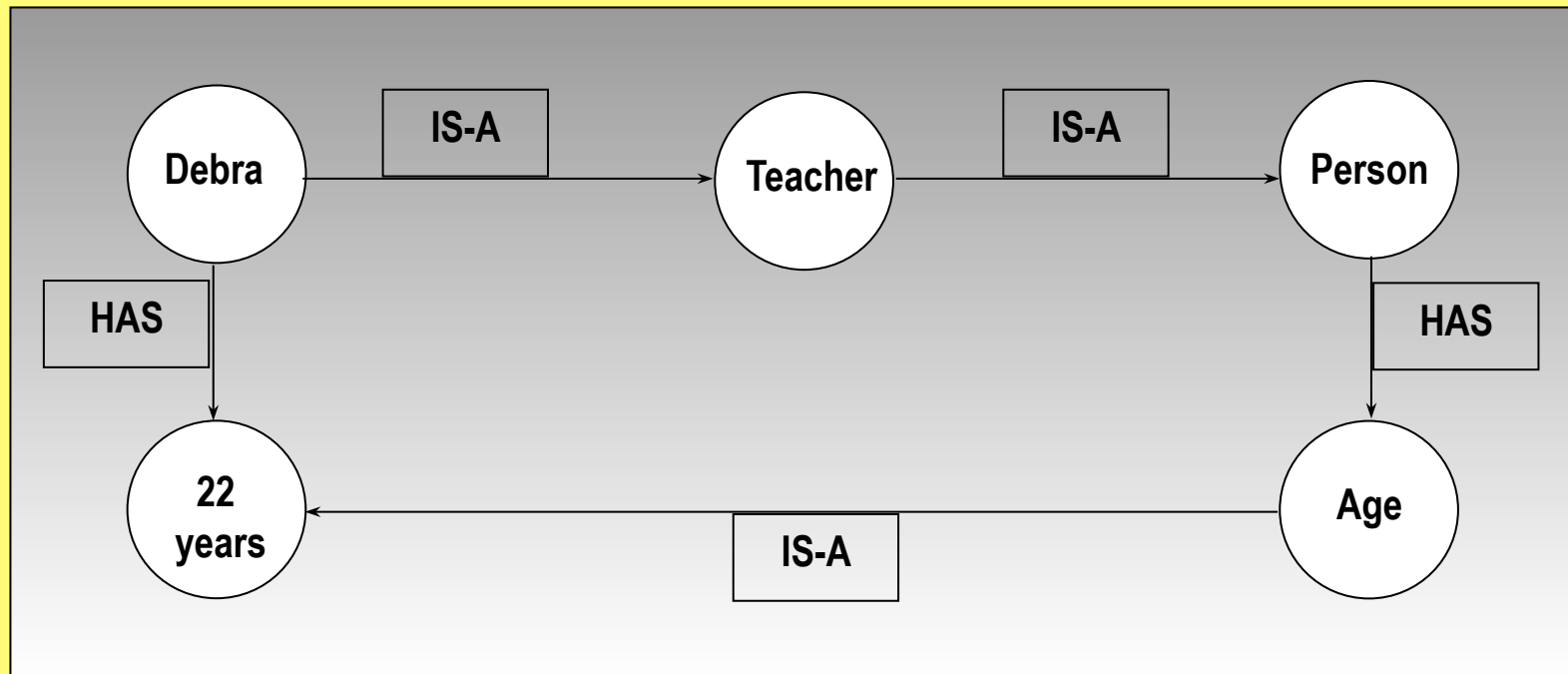
Αντικειμενοστραφής αναπαράσταση και κανόνες γνώσης -- Παραδείγματα

Αργιαλάς Δημήτρης

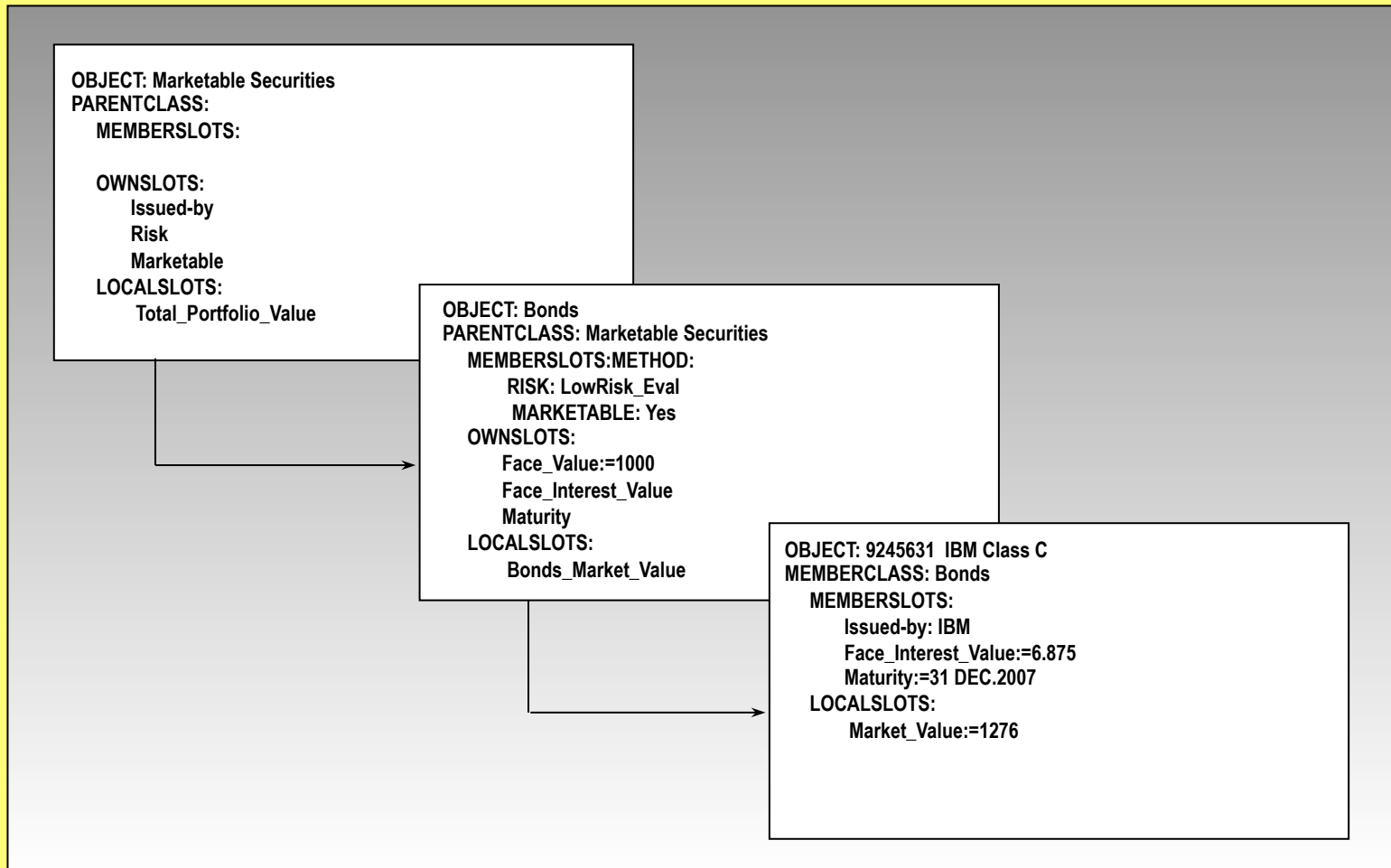
The Concept of Categorization



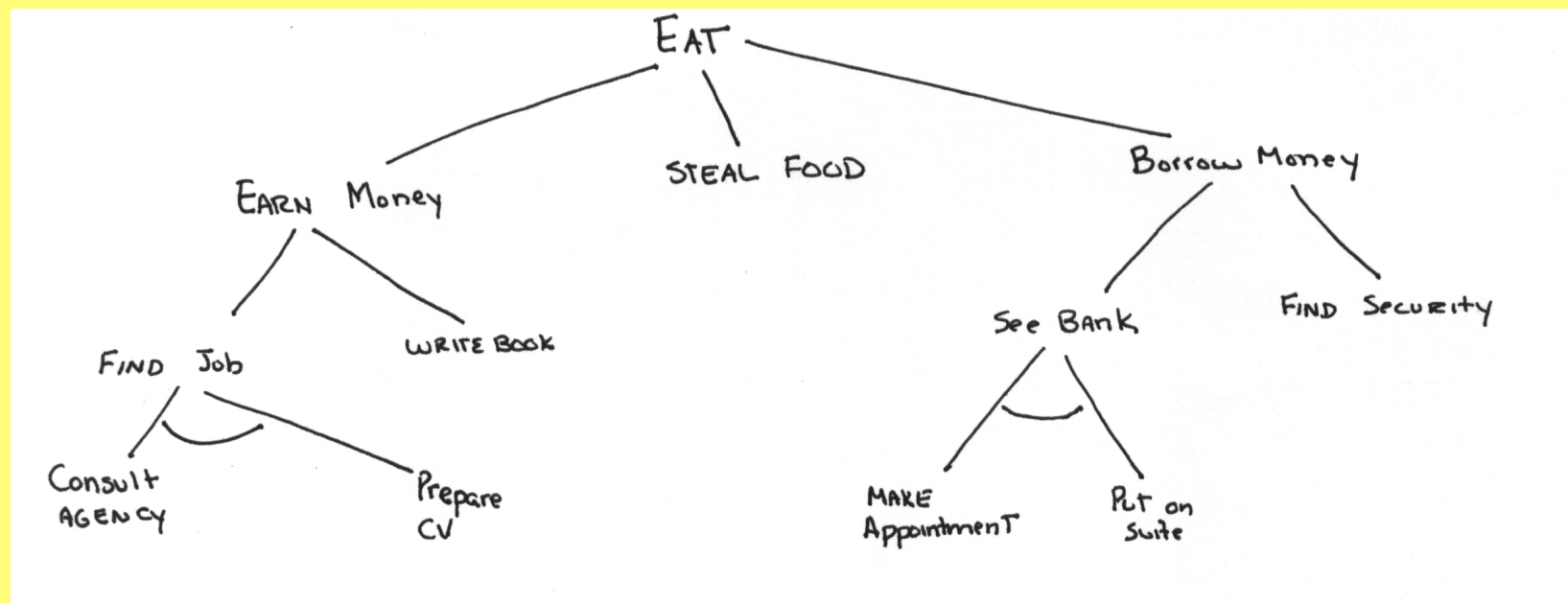
Semantic Network



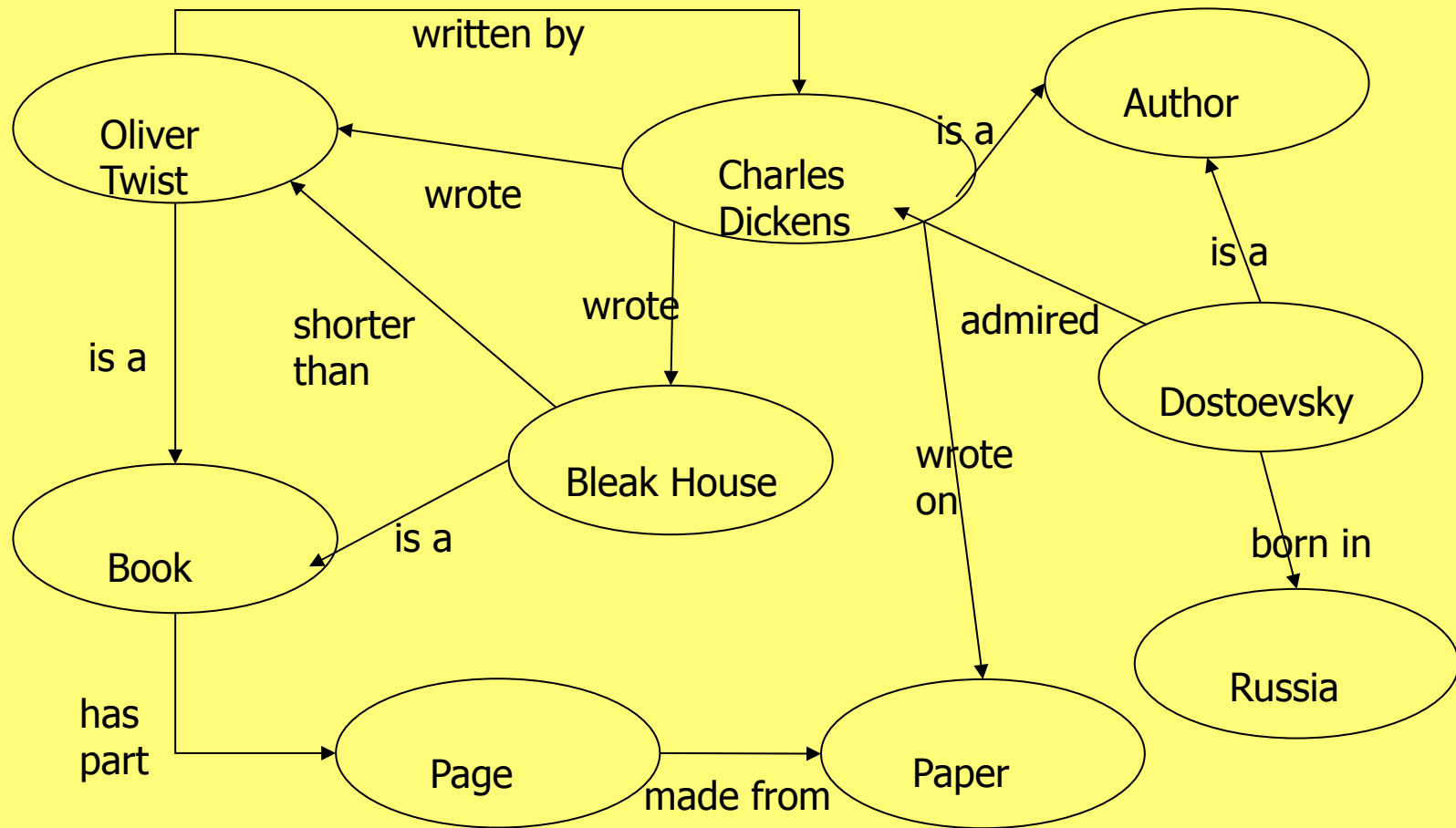
Frame Hierarchy



And/Or Trees and Explanations

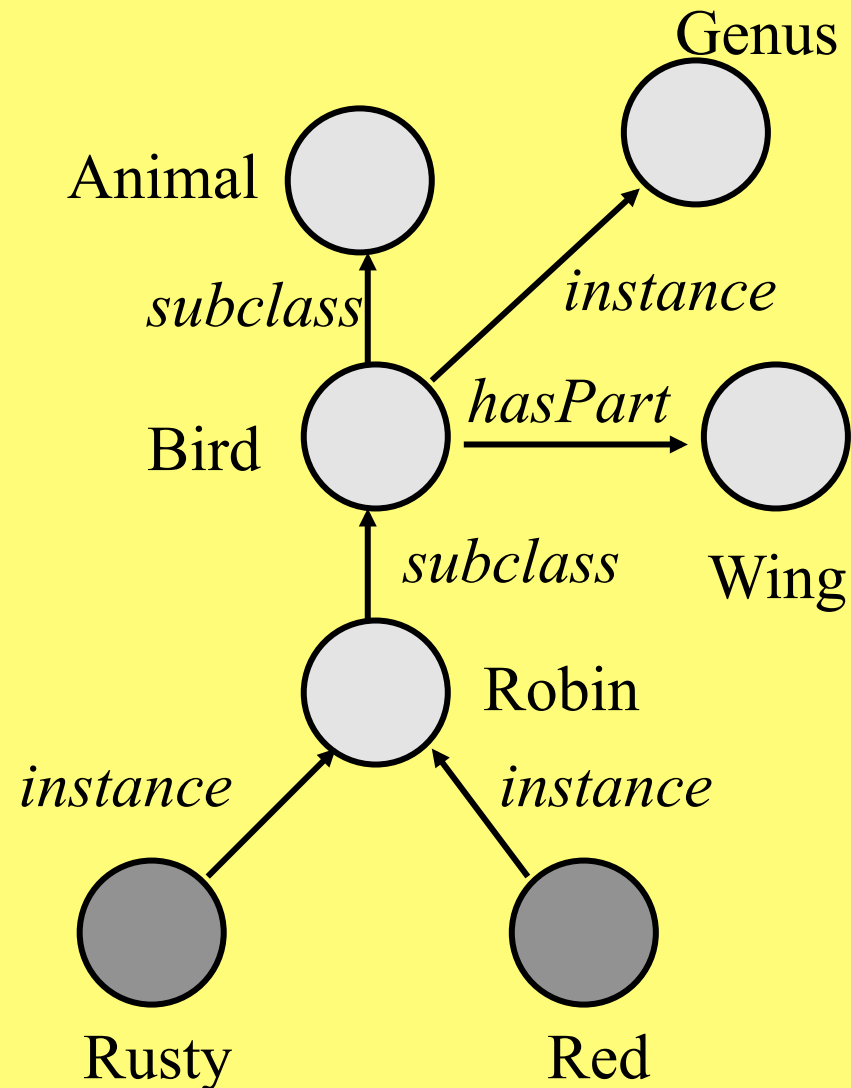


Concept Map - Example

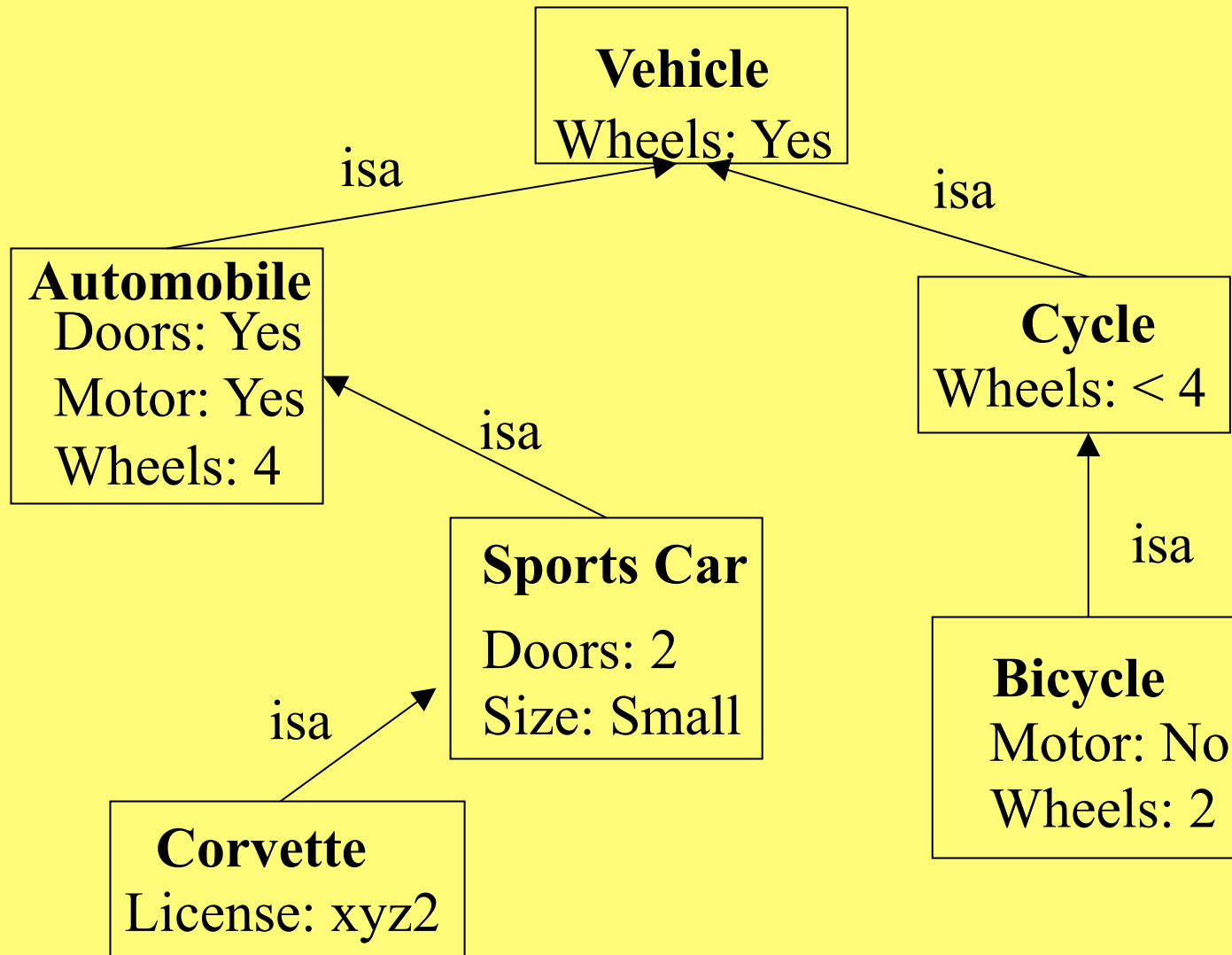


Individuals and Classes

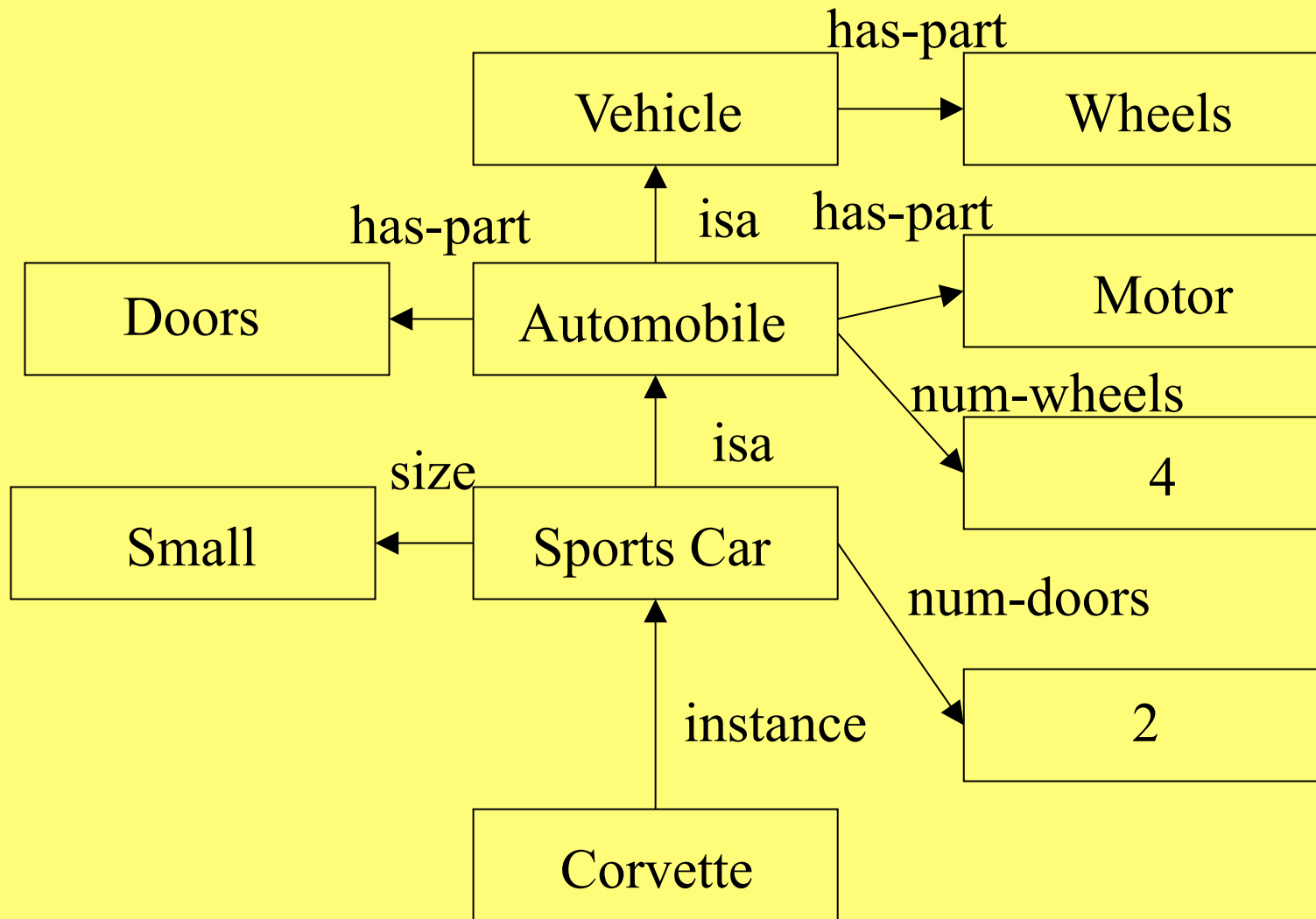
- Many semantic networks distinguish
 - nodes representing individuals and those representing classes
 - the “subclass” relation from the “instance-of” relation



A Frame Example



A Semantic Net Example



The Landform-Pattern Elements superclass with its seven subclasses and their characteristic properties.

```
(@CLASS= HLA01_Lf_PE
  (@SUBCLASSES=
    LF_Valley_Fill_PE
    LF_Pediment_PE
    LF_Continental_Alluvium_PE
    LF_Alluvial_Fan_PE
    LF_Playa_PE
    LF_Eroded_Valley_Fill_PE
    LF_Bahada_PE
  )
  (@PROPERTIES=
    boundary_type
    boundary_type_downslope
    boundary_type_upslope
    drainage_pattern
    drainage_texture
    gullies_frequency
    gullies_shape
    landuse_landcover_overall
    microscale_indicators
    microtopography
    phototone
    phototone_texture
    phototone_uniformity
    planimetric_2d_shape
    ridge_lines
    size_absolute_area
    size_length
    size_radial_extent
    size_relative_area
    size_surface_height
    size_thickness
    size_width
    slope_average_gradient
    slope_gradient_range
```

Κανόνας για τον προσδιορισμό ενός αλλουβιακού ριπιδίου με χωρικές σχέσεις

If-site-occurs-at

a piedmont plain,

If-site-occurs-higher-than

a broad basin floor,

If-site-occurs-lower-than

an upland valley,

If-site –occurs-downslope-of

a valley mouth,

If-site-occurs-adjacent-to

playa,

If-site-occurs-upslope of

a playa.

Table 10.

Basin and Range-Maturity_Erosion_Stage Indicators and their values
(partial)

relative_relief_of_region	"low"
relative_size_of_mountains	"small"
slope_change_at_piedmont_angle	"not abrupt"
shape_of_basins	"rather plain than concave"
overall_hypsometric_distribution_within_the_section	"more than 1/2 of the surface is below 2000 ft"
proportion_of_Mountain_Ranges_versus_Piedmont_Plains_versus_Basins	"20% : 40% : 40%"
amount_of_observed_tectonic_evidences_in_mountain_ranges	"low (the minority has a fault origin)"
degree_of_basin_integration	"high"
stage_of_erosion_cycle	"maturity (advanced,late)"
frequency_of_bolsons	"low (less prelevant)"
frequency_of_semi_bolsons	"high (more prelevant)"
degree_of_integration_of_drainage_pattern	"high"
outlet_of_the_drainage_network	"usually to another drainage basin"

Basin-and Range partial rule 1

IF

frequency_of_mountain_ranges	is "high"
presence_of_desert_basins	is "high"
shape_of_a_mountain_range	is "assymetric"
relative_spatial_position_of_mountain_ranges	is "rather straight"
overall_direction_of_mountain_ranges	is "roughly parallel"
overall_description	is "basin ranges intervening desert planes"

Then HYPOTHESIS Basin_and_Range is true with certainty=medium

Basin-and Range partial rule 2

IF

frequency_of_mountain_ranges is	"high"
presence_of_desert_basins is	"high"
overall_description is	"basin ranges intervening desert planes"

Then HYPOTHESIS Basin_and_Range is true with certainty=low


Πίνακας 2: Οι επιπλέον ιδιότητες των υπό – κατηγοριών του οδικού δικτύου και οι τύποι τους.

Sub - class	property	type	Sub - class	property	type
National_road	Slope	float	Street	Slope	float
	Length	Integer		Length	Integer
	Category_of_road_network	String		Category_of_road_network	String
	Condition_of_road_network	String		Condition_of_road_network	String
	Road_accessibility	String		Road_accessibility	String
	Geometrical_characteristics	String		Geometrical_characteristics	String
	Velocity	integer		Velocity	integer
	Traffic_volume	integer		Traffic_volume	integer
	Number_of_road_lanes	integer		Traffic_capacity	integer
	Cross_section_type	string		-	-
Width_of_bridge	integer				
Provincial_road	Slope	float	Rural_and_forest_road	Slope	float
	Length	Integer		Length	Integer
	Category_of_road_network	String		Category_of_road_network	String
	Condition_of_road_network	String		Condition_of_road_network	String
	Road_accessibility	String		Road_accessibility	String
	Geometrical_characteristics	String			
	Velocity	integer			

2.3.2. Τεκμηρίωση τιμών ιδιοτήτων Alluvial Fans – F1

☒

Description

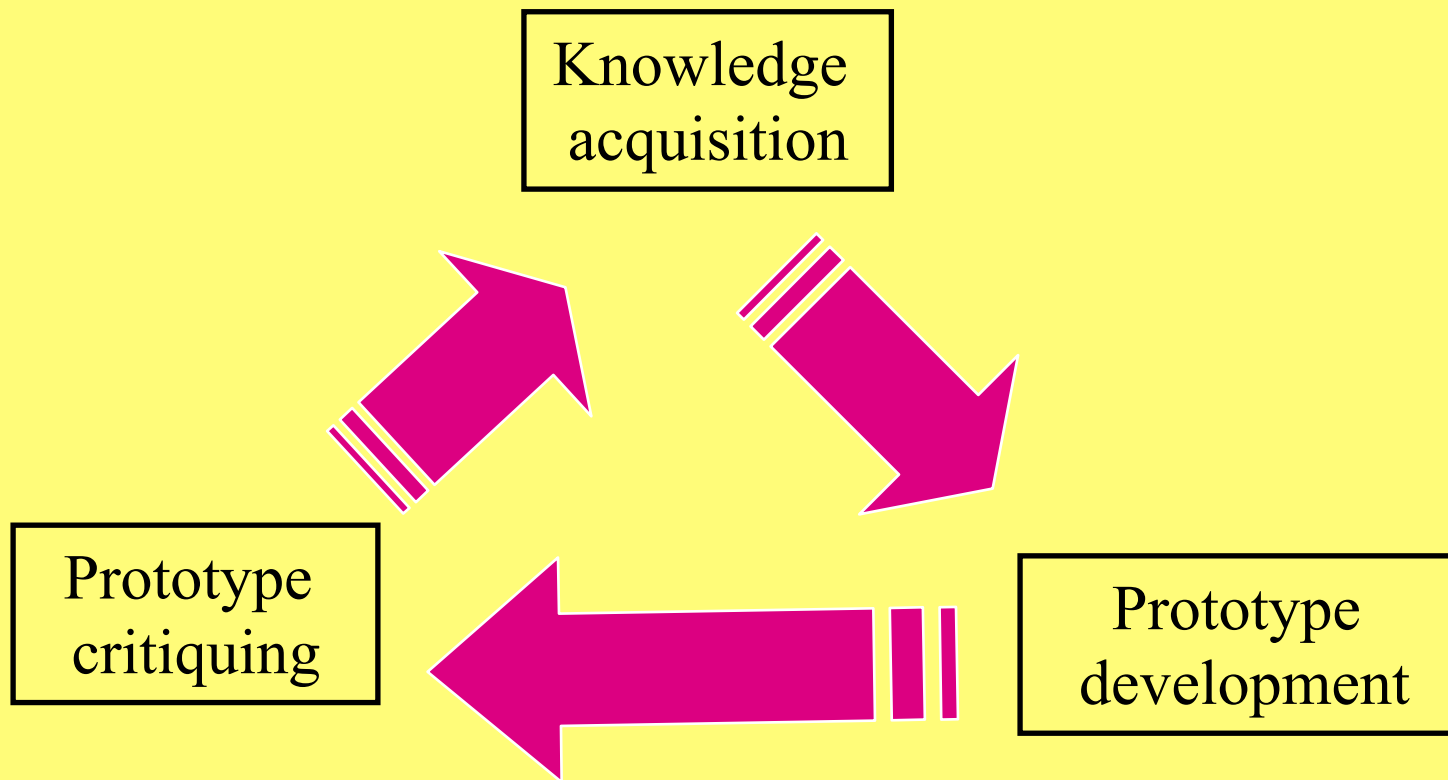


These, the oldest fan surfaces, are isolated (23) remnants of thick gravel, sand, and boulder deposits (8) laid down a million or more years ago (1). Of the four types, they are the coarsest in texture (29), have the greatest thickness (11), and contain the largest percentage of debris flow constituents(9). According to Bull (1991), these deposits typically have a thickness from 5 to over 50 m (10), have less than 1% of their surfaces preserved as pavement (12), and are cemented with calcium carbonate (caliche) (7). Their soil cover consists only of an "A" horizon of vesicular silt 4-12 cm thick, with no "B" horizon overlying the caliche zone (3). They are isolated because they have been severed from sources of depositional material in the mountain front as a result of tectonic movement, entrenchment of main channels, or other events. F1 fans are

2.3.1. Πίνακας Ιδιοτήτων Alluvial Fans – F1

1	LF_GM_Landform_Absolute_Age	"Over 1000000 years"
2	LF_GM_Landform_Geomorphological_Process	"Fluvial Deposition"
3	LF_GM_Landform_Has_Multiple_Soil_Layers	"No"
4	LF_GM_Landform_Is_Fully_Developed	"Yes"
5	LF_GM_Landform_Relative_Age	"Oldest of all fans"
6	LF_GM_Landform_Silt_Layer_Present	"No"
7	LF_GM_Landform_Soil_Caliche_Is_Present	"Yes"
8	LF_GM_Landform_Soil_Composition	"Thick gravel, sand, and boulder deposits"
9	LF_GM_Landform_Soil_Debris_Containment_Ratio	"Very large", "Largest of all fans"
10	LF_GM_Landform_Soil_Thickness_Absolute	"5 to over 50 m"
11	LF_GM_Landform_Soil_Thickness_Relative	"Greatest of all fans"
12	LF_GM_Landform_Surface_Preserved_As_Pavement_Ratio	"Less than 1%"
13	LF_ML_Landform_Can_Be_Used_For_Ambush	"Yes in the lower parts of the drainage net"
14	LF_ML_Landform_Can_Be_Used_For_Concealment	"Yes in the lower parts of the drainage net and horizontal only in the

Cyclical development





PSEUDO CODE RULES

1. **IF** **The customer's income is less than 25,000.**
 THEN **The customer's line of credit is denied.**

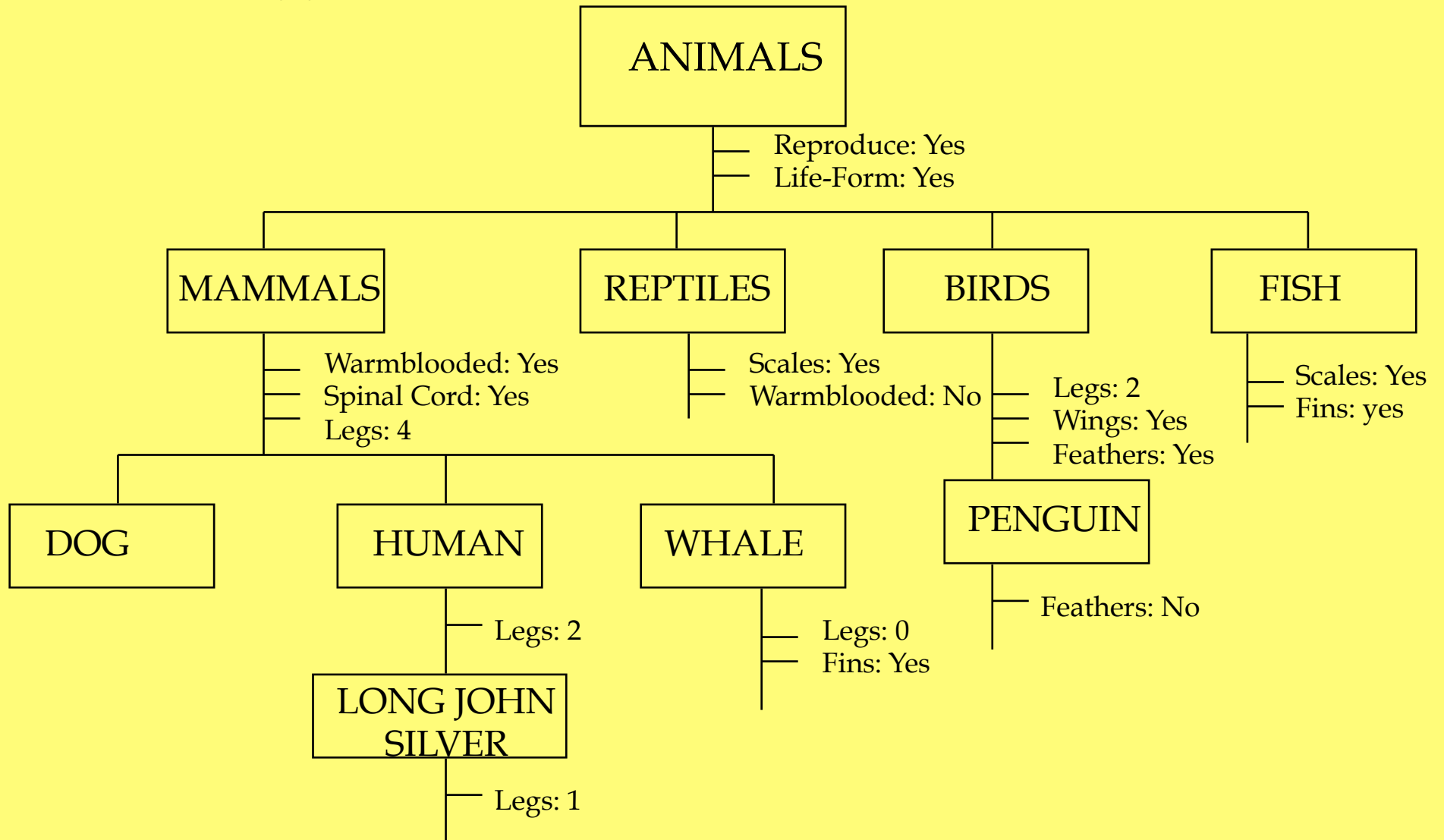
2. **IF** **The customer's income is at least 25,000.**
 and **The customer's credit rating is excellent.**
 THEN **The customer's line of credit is approved.**

3. **IF** **The customer's income is at least 25,000.**
 and **The customer's credit rating is good.**
 and **The customer has been in their present job less than 2.5 years.**
 THEN **The customer's line of credit is denied.**

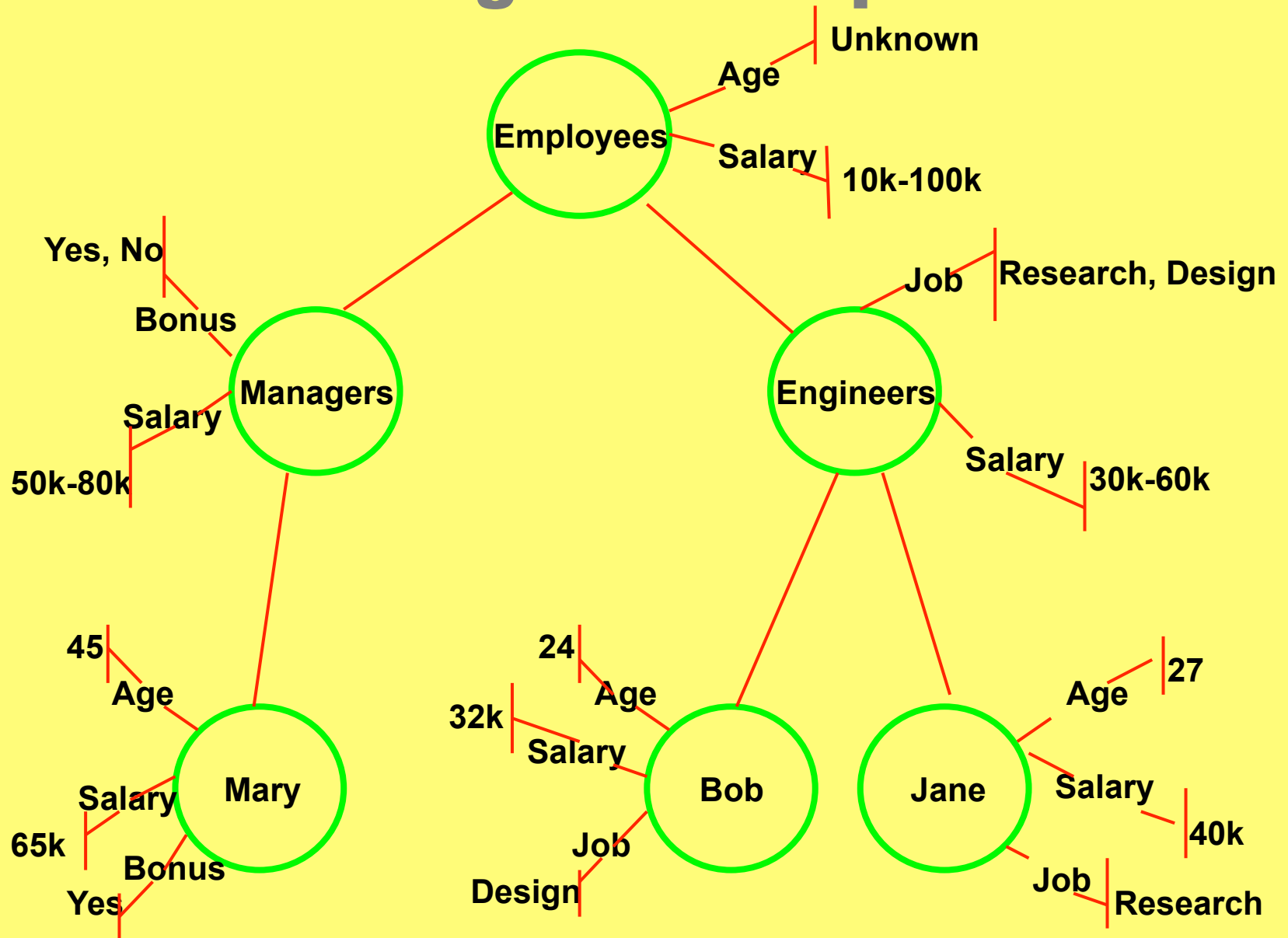
4. **IF** **The customer's income is at least 25,000.**
 and **The customer's credit rating is good.**
 and **The customer has been in their present job at least 2.5 years.**
 THEN **The customer's line of credit is approved.**

5. **IF** **The customer's income is at least 25,000.**
 and **The customer's credit rating is poor.**
 THEN **The customer's line of credit is denied.**

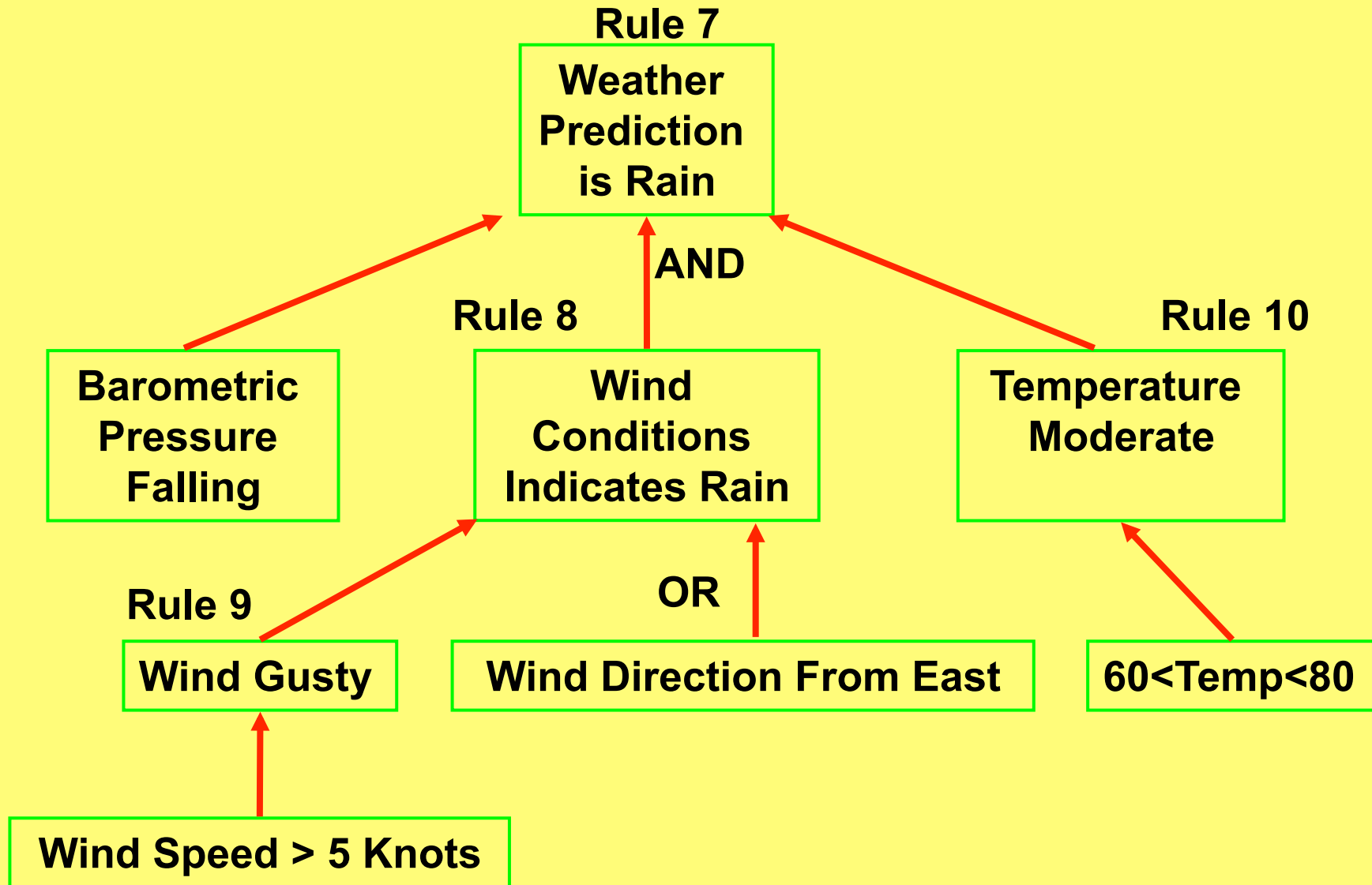
KR With Frames



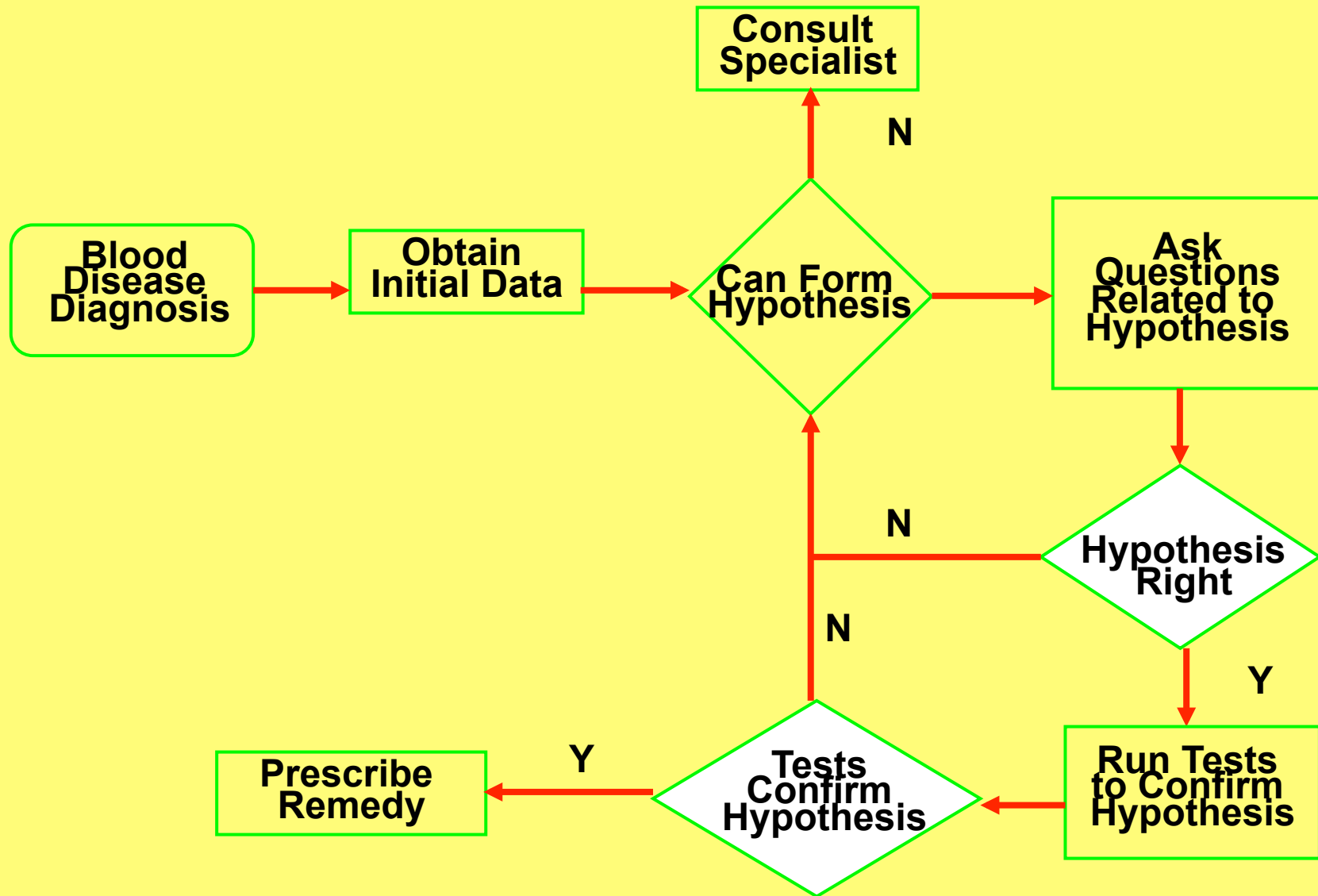
Cognitive Maps



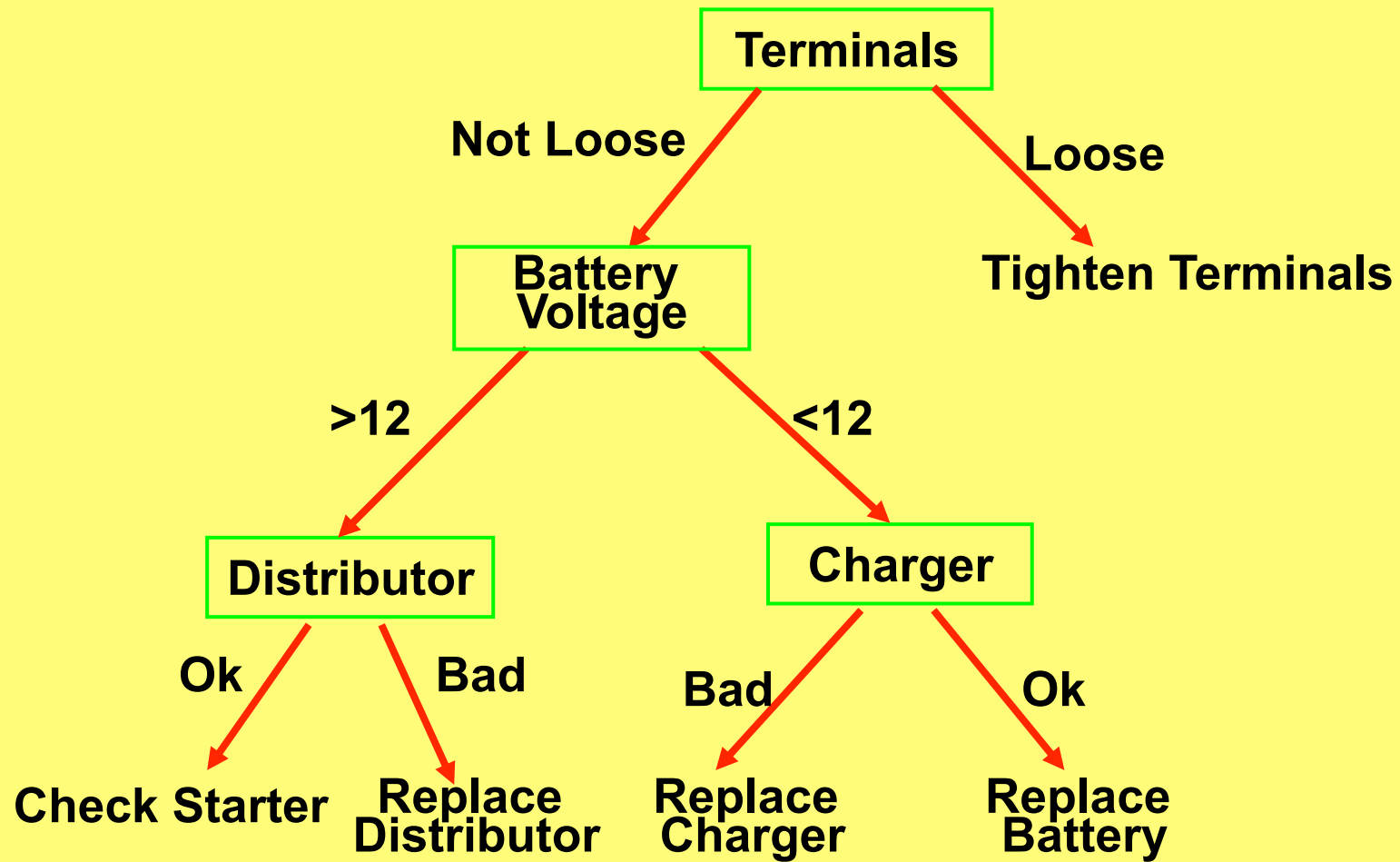
Inference Network



Flowcharts



Decision Tree



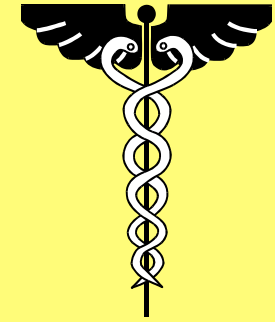
A diagnostic rule



IF there are spots on leaves, and
the color of spots is pale
yellow, gray, or purple, and
the shape of spots is bounded
making acute angle with
veins, and the season is
spring

Then the disease is downy mildew -
probability = 0.9

A treatment rule



IF the disease is downy mildew

THEN the treatment method is chemical
spraying, and the material
used is redomil+copper

Soil Frame

Slots

Facets

Ph

value type: real
single/multiple: single
possible value: > 0.0 & 14.0

EC

value type: real
single/multiple: single
possible value: > 0.0

Texture

value type: nominal
single/multiple: single
possible value: sand, loam, clay, heavy clay,
gravely, coarse sand, silty clay, silty clay
loam, salt loam, fine sand, sand clay loam,
silt loam, sandy loam, loamy fine sand

...

...

Disorder hierarchy

