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# Knowledge Representation

There are many methods can be used for knowledge representation and they can be described as follows:-

- 1- Semantic net.
  - 2- Conceptual graph.
  - 3- Frames
  - 4- Propositional and Predicates logic.
  - 5- Clause forms
- } Conceptual representation
- } Logical representation

## 1) Semantic Net

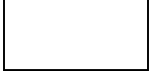
It is consist of a set of nodes and arcs , each node is represented as a rectangle to describe the objects, the concepts and the events. The arcs are used to connect the nodes and they divided to three parts:-

Is a: —————> for objects & types

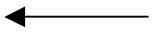
Is —————> To define the object or describe it

Has a [ ]  
can [ ] —————>

لتمثيل الأفعال والأحداث والكائنات

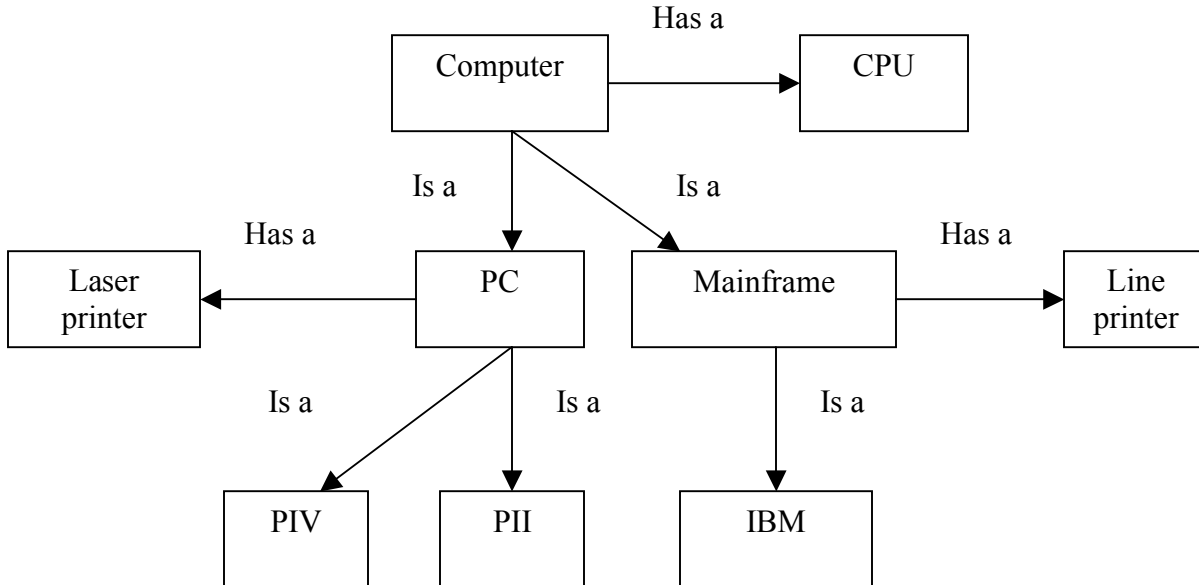


لتمثيل العلاقة بين الكائنات



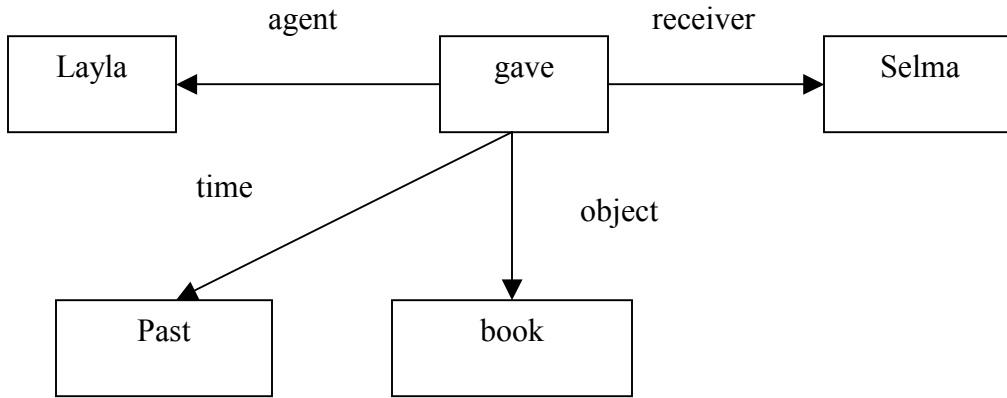
في وصف اللغات الطبيعية فإن arcs تخرج من الفعل لتوضح او لتشير الى الفاعل (agent) والمستقبل (Receiver) والكائن (object) كما تشير الى وقت حدوث الفعل أي في الماضي , الحاضر او المستقبل.

**Example1:** Computer has many part like a CPU and the computer divided into two type, the first one is the mainframe and the second is the personal computer ,Mainframe has line printer with large sheet but the personal computer has laser printer , IBM as example to the mainframe and PIII and PIV as example to the personal computer.

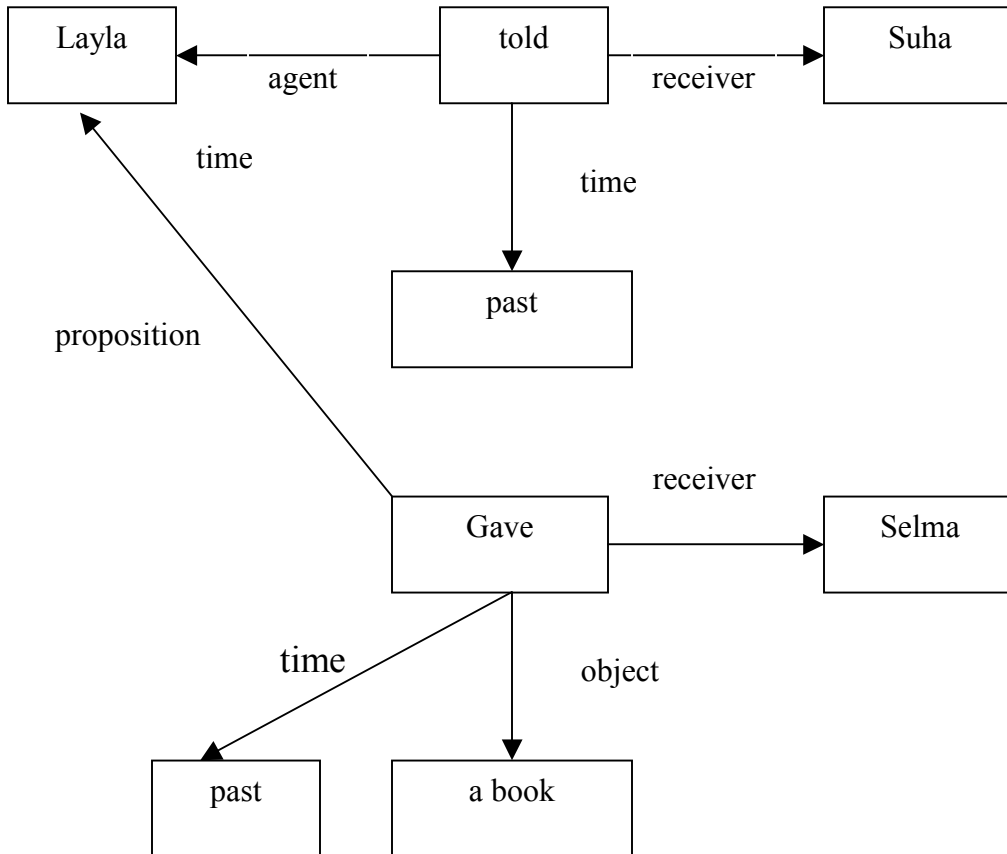


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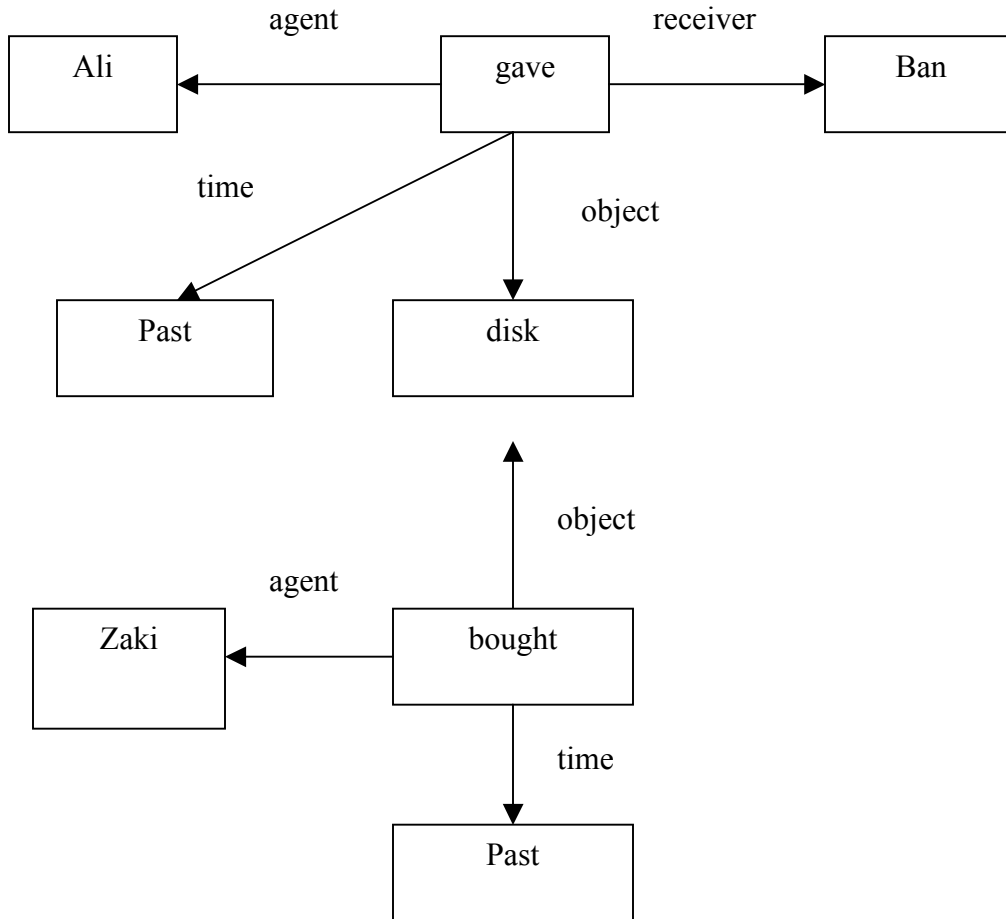
**Example 2:** Layla gave Selma a book



**Example 3:** Layla told Suha that she gave Selma a book



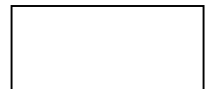
#### Example 4: Ali gave Ban a disk which is Zaki bought



## 2) The Conceptual Graph

وهي طريقة لتمثيل المعرفة مشابهة لطريقة Semantic Net وتتكون من جزئيين:

يستخدم لتمثيل الأسماء والصفات والأفعال والثوابت

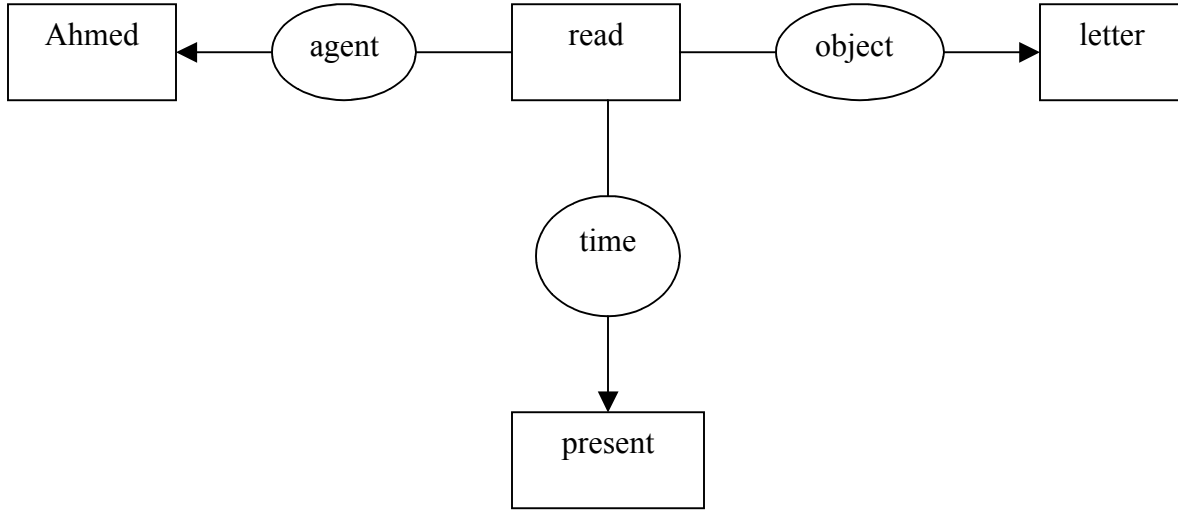


يستخدم لتمثيل أدوات التعريف والعلاقات

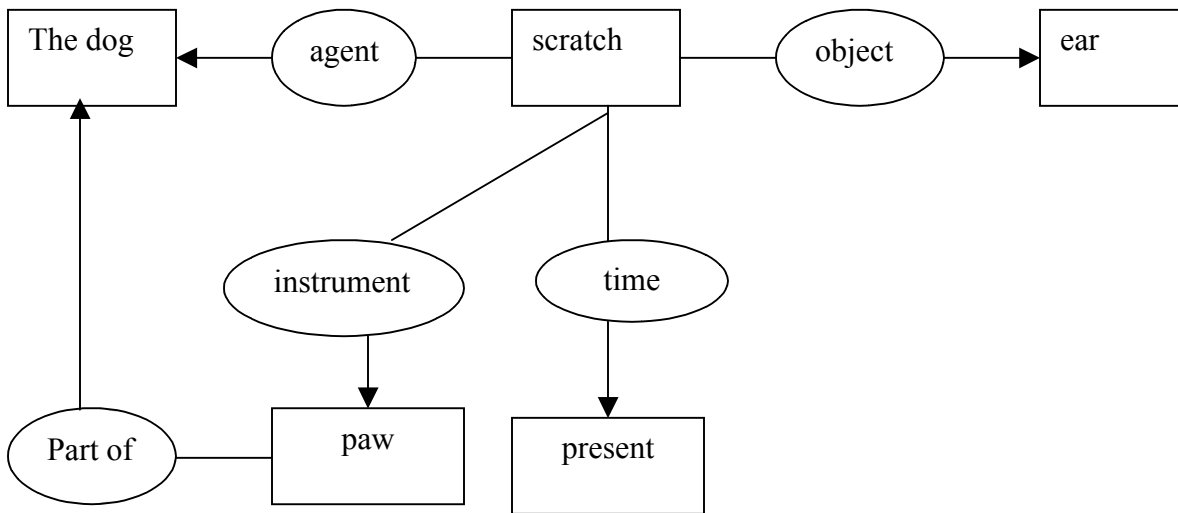


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**Example 1:** Ahmed read a letter Yesterday

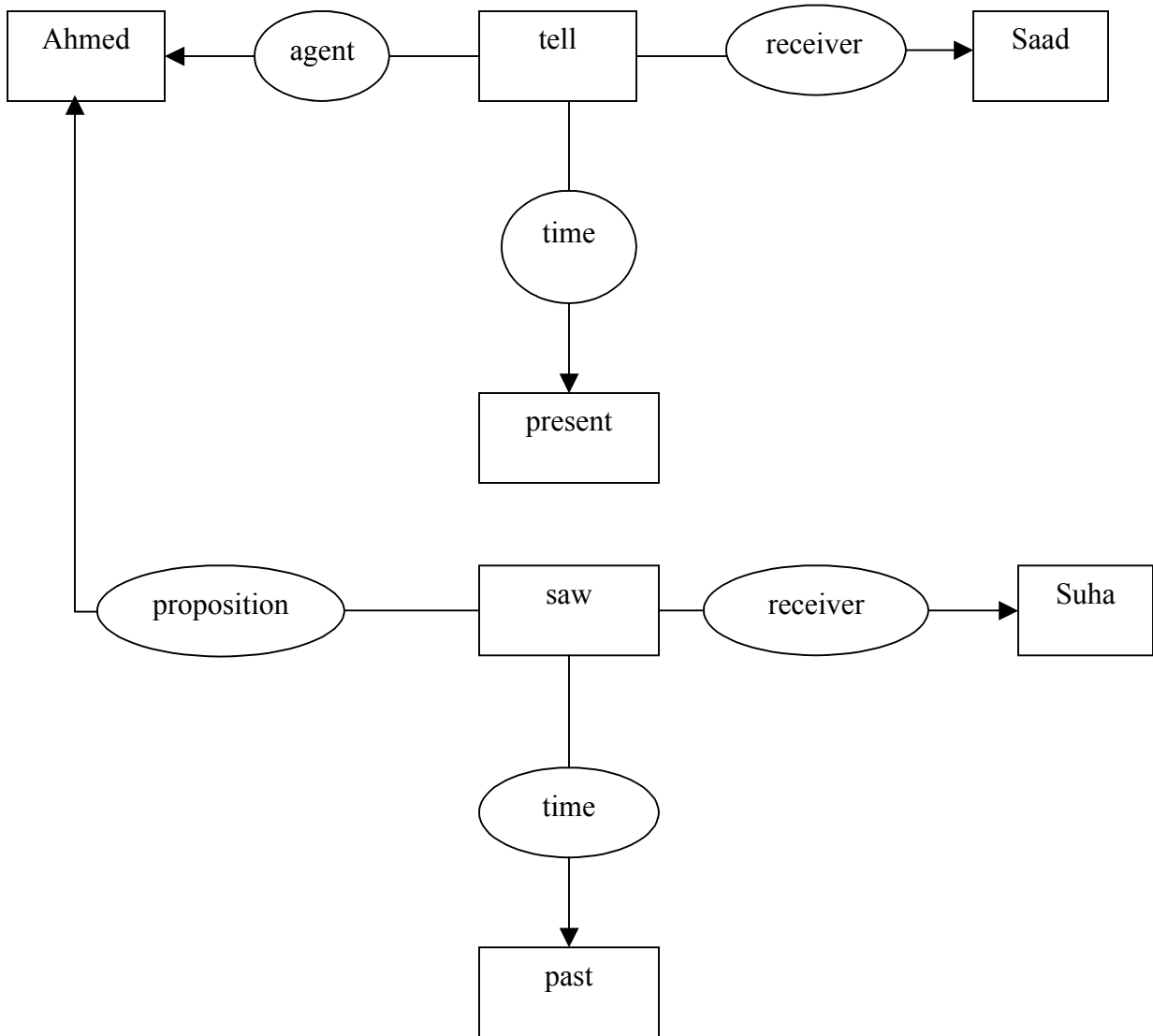


**Example 2:-** The dog Scratch it ear with is paw



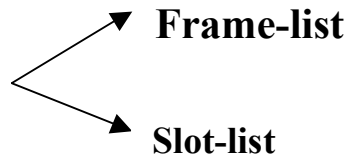
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**Example 3:** Ahmed tell Saad that he saw Suha



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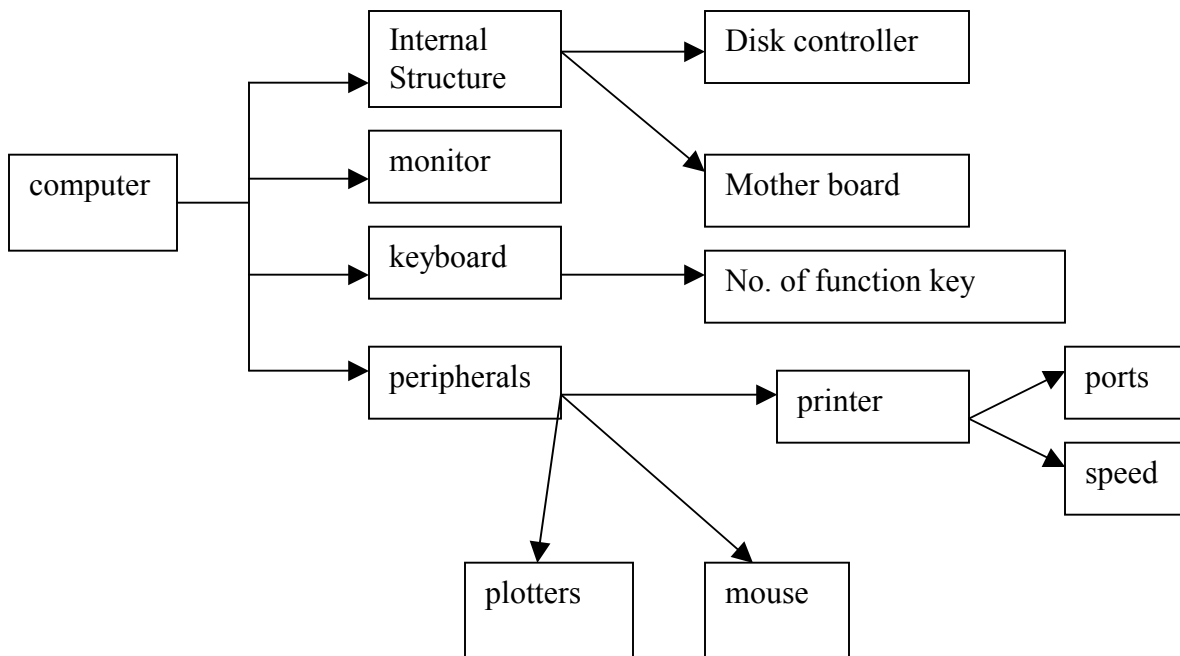
### 3) Frame:



**Frame-list( node-name, parent, [child]).**

**Slot-list(node-name, parent).**

### Example:



Frame –list( computer,\_, [Internal structure, monitor, keyboard , peripherals]).

Frame-list(Internal structure, computer, [disk controller, mother board]).

Frame- list(printer, peripheral, [speed, ports]).

Slot-list(motherboard, Internal structure).

Slot-list(mouse, peripheral).

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### **Homework 1: solve with Semantic net**

Ships are divided in two types , the first is “ Ocean lines” and the second is “Oil tank” , the ships has an engine , the oil tank are specified to transfer oil therefore it has “ fire tools” , the ocean lines are specified to transfer the traveler therefore it has “ swimming pool” , Ibnkaldon as an example to oil tank and ship b and ship n as an example to ocean line.

### **Homework 2: Using Semantic Net and Conceptual graph to solve the following statement:**

- 1) Suha send a book to Tom.
- 2) Tom believe that Mustafa like cheese.
- 3) Monkey ema grasp the banana with hand.