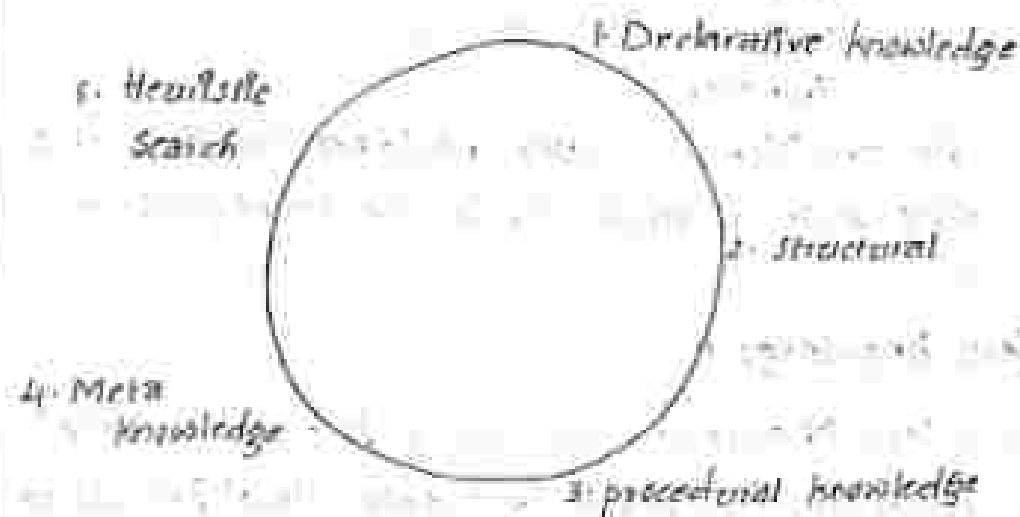


Knowledge Representation:

It represents the information from the real world for a computer to understand & then utilize knowledge to solve complex problem like communicating human being in natural language.

Knowledge Representation means presenting knowledge that AI should acquire knowledge in different forms.

Types of Knowledge Representation



Types:

1. Declarative knowledge
2. Structural
3. procedural knowledge
4. Meta knowledge
5. Heuristic Search

1. Declarative knowledge:

This includes concepts, objects and facts expressed in declarative sentence.

Ex: As per curriculum & academics, A, Respect CSE - B is the Best.

2. Structural knowledge:

Basic problem solving knowledge that describes the relation between concepts and objects.

Ex: legs & hands & eyes \rightarrow human

3. procedural knowledge:

It includes rules, strategies, procedures, etc

Ex: In the water jug problem, we have strategies

fill

empty

transfer

The condition is water should not overflow and by using these strategies & rules the agent perform process

4. Meta knowledge:

The Meta knowledge consists of knowledge other than declarative, structural and procedural knowledge

Ex: Attendance, fee, Admissions are meta knowledge of a teacher

5. Heuristic knowledge:

It represents initial and final states.

Semantic Network

It is a graphical notation for representing knowledge in patterns of interconnected nodes. There are two types of Semantic Networks.

1. Simple semantic N/W
2. Partition semantic N/W

1. Simple semantic N/W

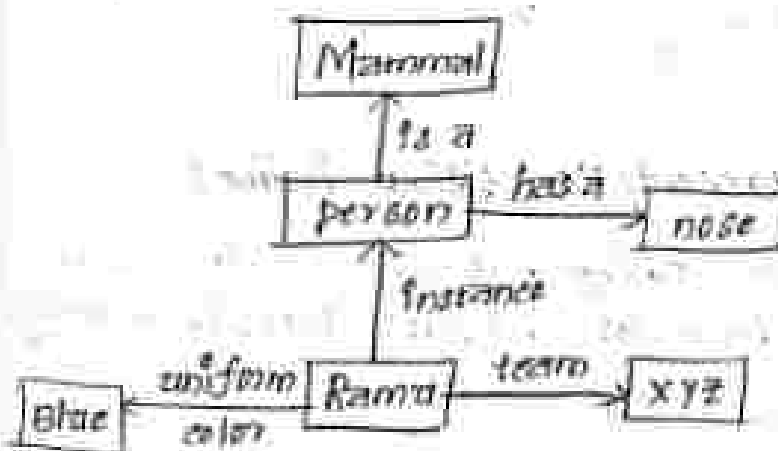
It consists of the following things

has a →

is a →

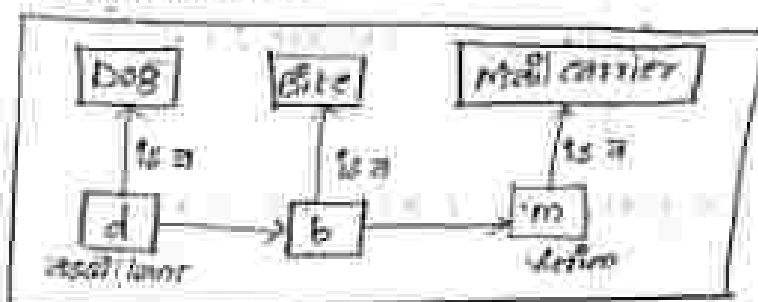
Instance →

Ex: Create a Simple semantic N/W for a class Mammal
 person class inherits properties of class Mammal
 person class has instance named Ramu who is
 in the team XYZ having blue color uniform and
 person class has a characteristic nose

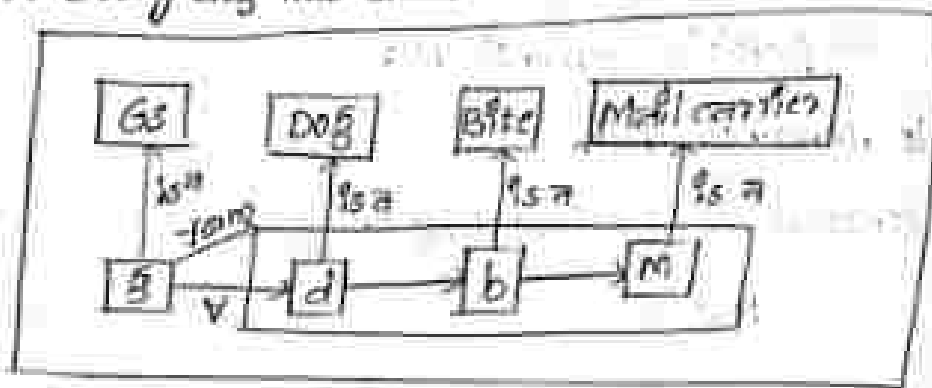


2. Partition Semantic N/W

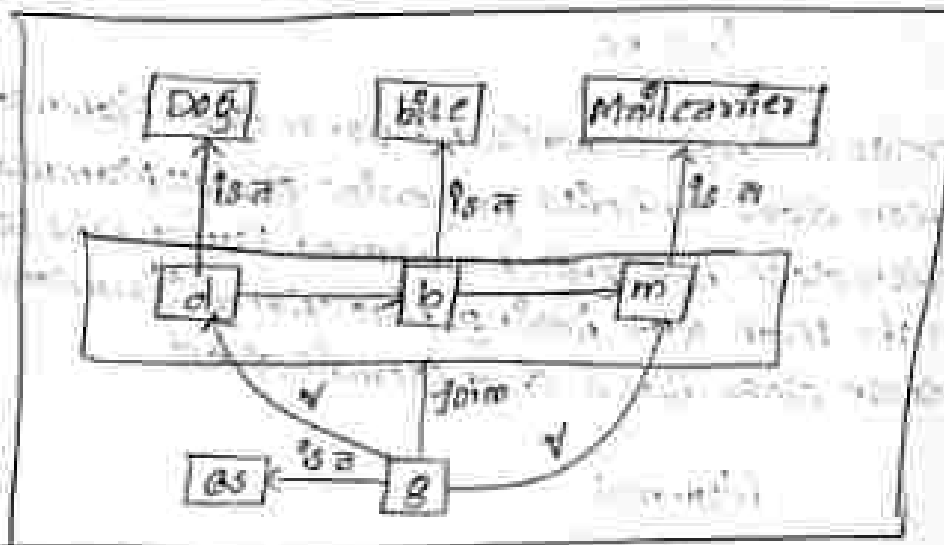
Ex: Draw a partition semantic N/W for the dog bites the mail carrier.



Ex: Every dog has bitten a mail carrier.



ii) Every dog in town^{1st} bitten every mail carrier.



Knowledge Representation Using Frames

Here frames are nothing but like records in our data base that have slots and slot values for an entity.

Ex: 1. Employee details

Rama (

(profession (value, manager))

(EmpId (value, 100))

(Address (value, Delhi))

)

In database we have the table shown below

Name	position	EmpId	Address
Ramu	manager	1010	Delhi

Q, convert the given statement in terms of frames swiggy

Is a yellow bird having wings to fly

swiggy

```
(
  (species (value, bird))
  (color (value, yellow))
  (activity (value, fly))
  (instrument (value, wings))
)
```

Techniques of logical representation

1. Logical representation

In logical representation we have two types:

1. proposition logic
2. predicate logic

Using logical representation we write the simplified form of given statement.

1. proposition logic

Here we use the symbols \neg , \wedge , \rightarrow , \leftrightarrow , \vee .

Ex: Given statement: If raining you get wet

This statement is return by using proposition logic as

$\neg \text{raining} \rightarrow \text{wet}$

2. Predicate logic

It is an extension to propositional logic other than \neg , \wedge , \rightarrow , \leftrightarrow , \vee we have quantifiers here i.e. \forall , \exists .

Ex: Given: All students like football

This statement is return by using proposition logic as

$$\forall (\text{Student}(x) \rightarrow \text{Likes}(x, \text{Football}))$$

2. Semantic Net Representation

It is a graphical notation for representing knowledge in patterns of interconnected rules/nodes. There are two types of Semantic N/W

1. Simple semantic N/W
2. Partition semantic N/W

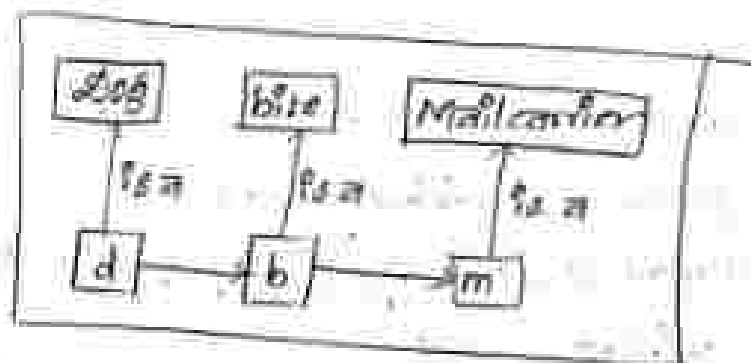
1. Simple Semantic N/W

It consists of the following things



2. Partition Semantic N/W

Ex: Draw a partition semantic N/W for the dog likes the mail carrier.



3. Frame Representation

Here frames are nothing but records in our DB that have slots and slot values for an entity.

Ex: Employee details Rama (

(profession (value, manager))

(Empid (value, 1010))

(Address (value, Delhi)))

In database we have the table as

Name	profession	Empid	Address
Rama	manager	1010	Delhi

4. Production Rule

production rule system consists of conditions and action pairs "If condition then action"

Ex: If (Bus stop \wedge Bus arrives) THEN ^{action} (get into the bus)

If (In the bus \wedge find a empty seat) THEN action (sit down)

If (In bus \wedge unpaid) THEN action (pay charges)

If (bus arrives at destination) THEN action (get down)

Case Grammar

Case Grammars was proposed by J. Fillmore in 1968.
He proposed 6 cases.

1. Agentive (Agent)
2. Objective (Object)
3. Instrumental (Instrument)
4. Dative (Indirect Object)
5. Factive (result of the action)
6. Locative (Location of action)

Tabular way to represent cases

case	Question
Action	What was the event occur?
Agent	Who did the event?
Objective	What was involved in the event?
beneficial	Who got benefited with the event?

Case	Question
Time	which time event was occurred
Location	where it was happened

Ex: John gave an Apple to poojitha in the kitchen

Case	Question
Action	gave
Agent	John
Objective	Apple
Beneficial	poojitha
Time	past
Location	kitchen

Here case grammar states that whether the two units are semantically or syntactically same

Ex: Given statements are

The door was broken by John with hammer

Using hammer John broken the door

Note: If both the sentences convey the same meaning but may be of different forms, then they are called as semantically equal.

Ex: Mother baked for one hour
cake baked for one hour

Note: In the above statements initial objects of the both statements are different and rest is same, then they are called syntactically equal.

Script

Event: Student attending Exam

The components provided by the script are

1. Rules: These are the persons included in the event
i.e. student
2. Props: Objects which are involved in the Exam
i.e. id card, pen, paper...
3. Entry condition: These are the conditions needed to be satisfy before an event occur.
Ex: id card, hall ticket
4. Results: Conditions that will be true after event occur.
Ex: After receiving question paper, he will handover the answer sheet to invigilator
5. Tracks: Tracks are nothing but variations of the event.
Ex: B.Tech, M.Tech, MBA, Earnnet, AIEEE, Gate...
6. Scene: These are the sequence of actions occurred in event.
Ex: Scenes:

Examhall entry



get allocated seat



get question paper



writing answers



Submitting answer sheet

Semantic Web

The semantic web is an extension of traditional web. It provides communication to the user and server allowing data to share. To design web page we use hypertext Markup language. But the disadvantage is there is no

user defined tasks we use only predefined tasks. so, that we use extensible Markup language. It is an extension to HTML.

Eg: Circular

```
<to> faculty </to>
<from> head </from>
<headline> faculty meeting </headline>
<body> there is meeting for faculty in room no 15
on 12/12/19 </body>
```

```
</circular>
```

XML schema

```
<Book>
```

```
<Title> . . . . . </Title>
```

```
<author> . . . . . </author>
```

```
<abstract> . . . . . </abstract>
```

```
</Book>
```