

CS 344

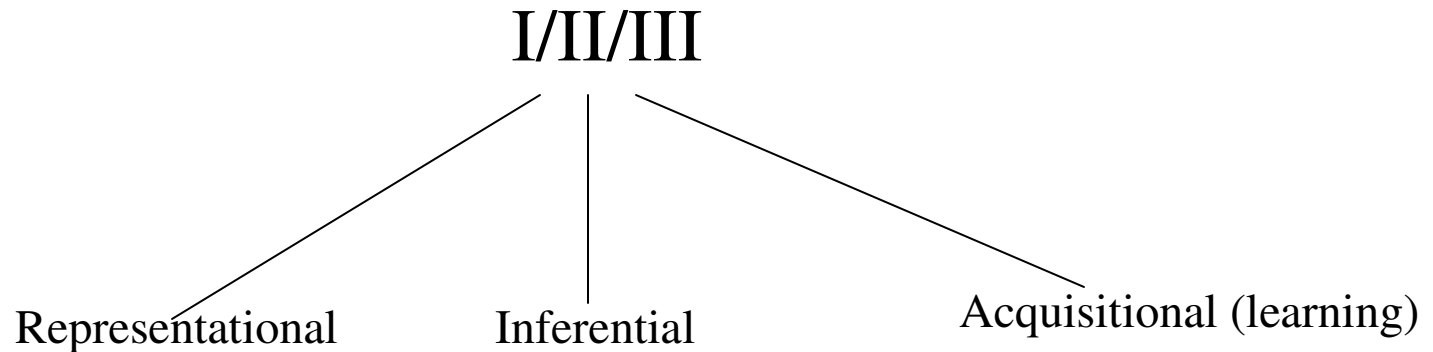
Artificial Intelligence

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Knowledge representation

- Requirements:
 - Adequacy (I) (also called completeness)
 - Correctness (II)
 - Efficiency (III)



Representation

- Should be able to represent everything in scope (expressive power)
- Correct
- Efficient

Knowledge

- Structured (Eg: tables)
- Semi-structured (Eg: Xml database)
- Unstructured (Eg: Plain text)

- Examine tables as a knowledge representation scheme
- How do tables fair in terms of
 - Adequacy
 - Inference
 - Acquisition ?

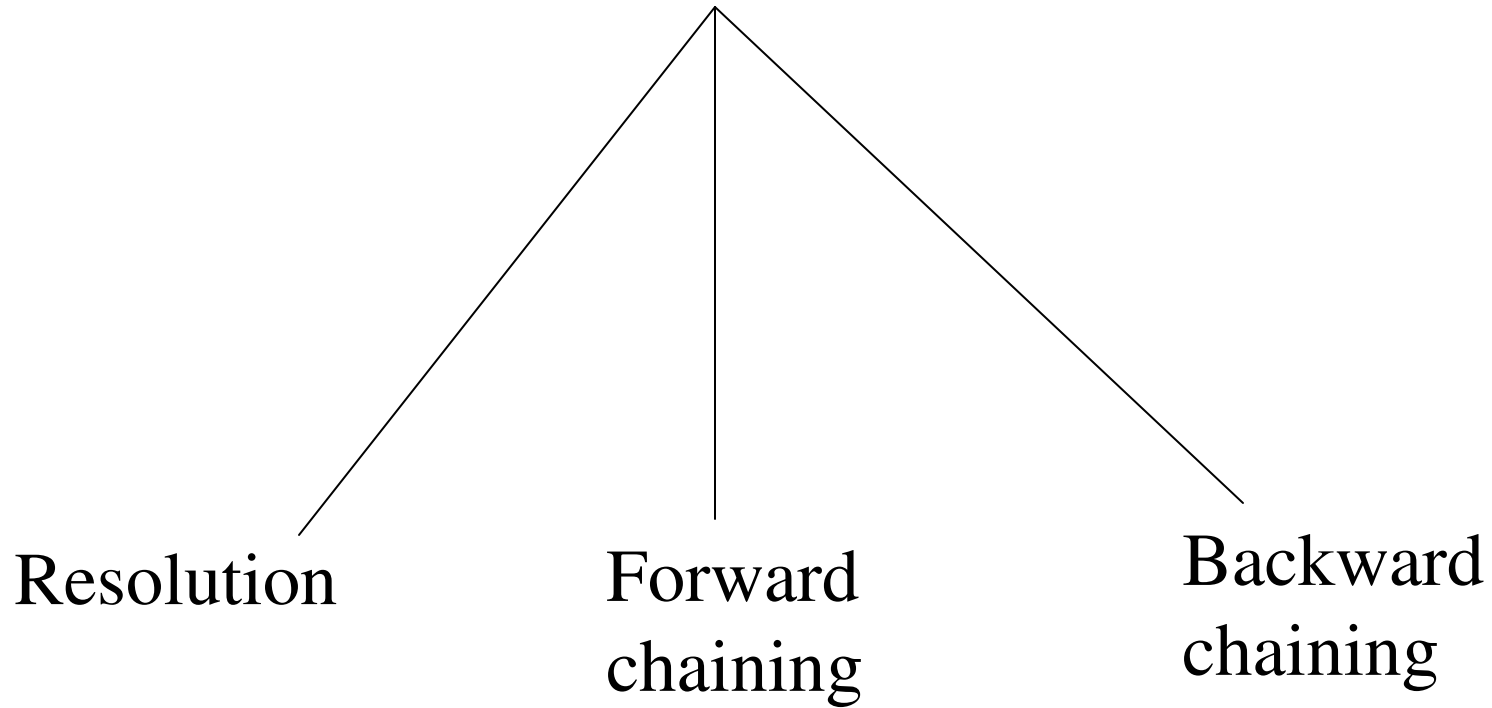
Student name	Height	Weight	BMI
Ram	5.6	76	xyz
Shyam	6.2	63	pqr
John	5.1	56	abc

- Consider the question “Which student is the tallest?”
- Without a procedure to calculate max, the question cannot be answered. (Needs Inferencing)

Other knowledge representation schemes

1. Propositional calculus
 2. Predicate calculus
 3. Semantic net
 4. Frames
- Predicate calculus is considered as the epitome of KR in terms of adequacy and inferencing

Inferencing in PC

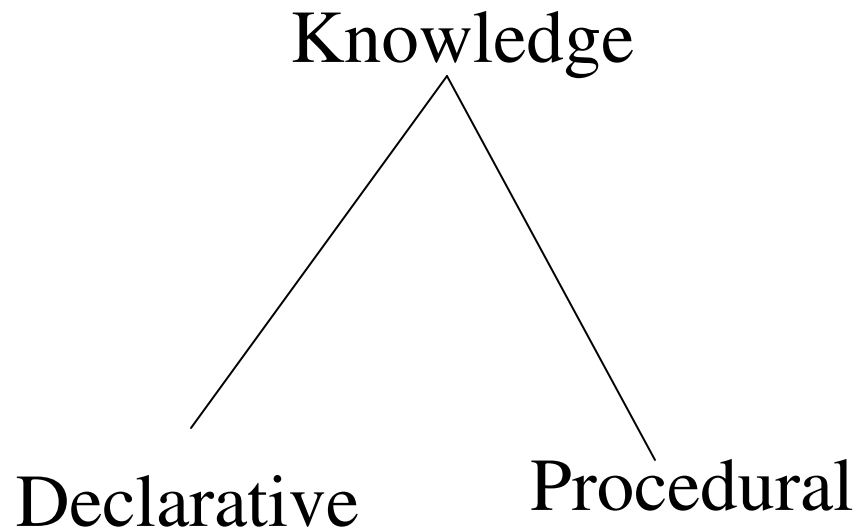


How to represent “Many”?

Consider Q2 in Quiz

Not many cities have a policeman who has been beaten by every thief in the city; Ramnagar is such a city

- All men are mortal - $\forall x[man(x) \rightarrow mortal(x)]$
- Some men are learned - $\exists x[man(x) \wedge learned(x)]$
- Many men are rich - $\exists L \forall x[man(x) \wedge rich(x) \wedge$
 $belongs(x, L) \wedge$
 $? \nearrow greater(length(L), threshold)]$



- Declarative knowledge deals with factoid questions (what is the capital of India? Who won the Wimbledon in 2005? Etc.)
- Procedural knowledge deals with “How”
- Procedural knowledge can be embedded in declarative knowledge

Example: Employee knowledge base

Employee record

Emp id : 1124

Age : 27

Salary : 10L / annum

Tax : Procedure to calculate tax from basic salary,
Loans, medical factors, and # of children