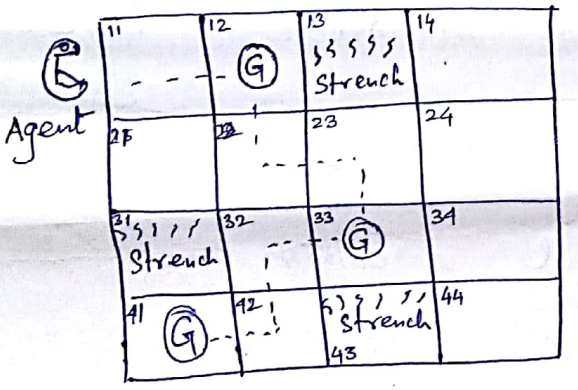
Logic: A logic must be defined by the semantics or meaning of a fact (or sentence/expression). The semantics defines the truth of each sentence with respect to each possible world.

e.g., "$x + y = 4$" is true if and $\begin{cases} x=1 \\ y=3 \end{cases}$ $\begin{cases} x=2 \\ y=2 \end{cases}$ $\begin{cases} x=3 \\ y=1 \end{cases}$

false if and $\begin{cases} x=1 \\ y=2 \end{cases}$ $\begin{cases} x=1 \\ y=1 \end{cases}$

In standard logic every logic must be either true or false. There is no in between.

$\alpha \models \beta$ iff $M(\alpha) \subseteq M(\beta)$ — β follows logically from ~~another~~ α ~~sentence~~.



KB: There are ~~some~~ "Gold Coins" and ~~some~~ "Stench"es in some of the ~~grids~~ squares.

G_1: There are "gold Coin" in ~~squ~~ squares [1,2], [3,3] and [4,1]

G^F: There are gold coin in squares [1,1], [1,3], and [1,4]

S: There are Stench in squares [1,3], [3,1] and [4,3]

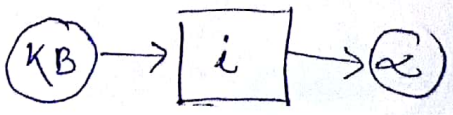
S^F: There are Stench in squares [1,1], [1,3] and [1,4]

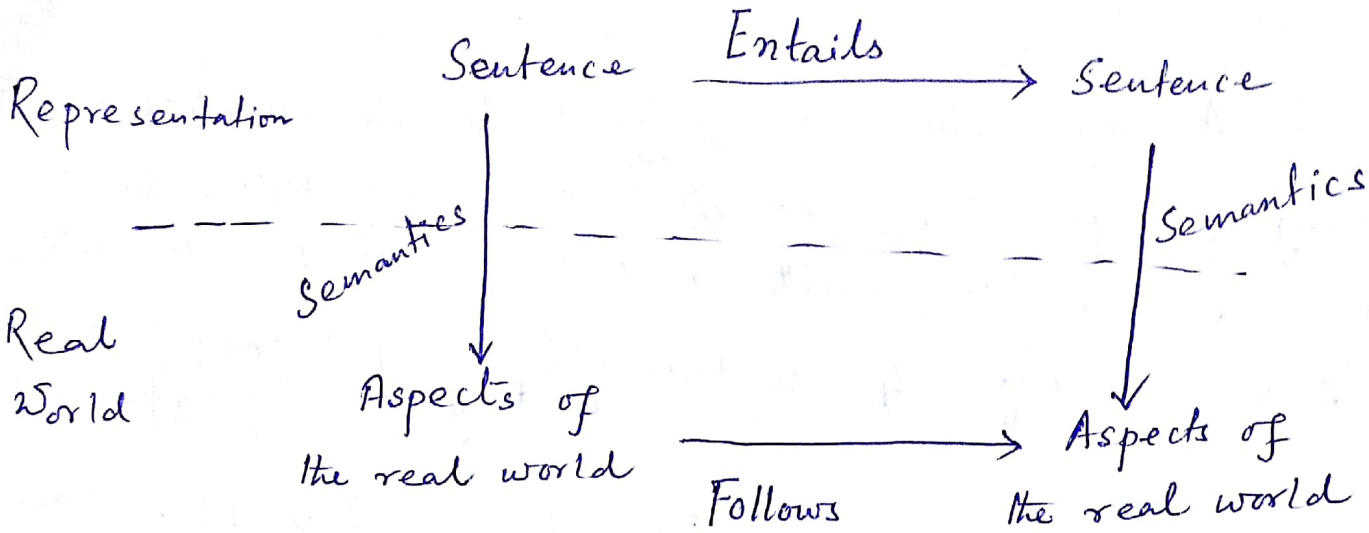
{ Hunt the Wumpus.
Pokemon

$KB \models G$ } $KB \not\models G^F$
$KB \not\models S$ } $KB \not\models S^F$

Logical inference: Let α an inference algorithm i can derived from KB by i. This is known as logical inference.

$KB \vdash_i \alpha$





How do we know that KB is true ?

KB is created as per some referancial truth. I.e., KB is considered true as per the knowledge of the real world.

Syntax : The syntax defines the allowable sentence.

Complex sentence and Logical connections.

¬ (not) : Negation. A literal is either an atomic sentence (a positive literals) or a negated atomic sentence (a negative literals)

∧ (and) : Conjunction

∨ (or) : disjunction

⇒ : implies (implication)

⇔ : biconditional (if and only if)

Property of Proposional logic : i) declarative language

- Semantics is based on truth relation between sentence and possible worlds

ii) Expressive

- Use partial information of disjunction and negation

iii) Compositionality

- The meaning of a sentence (facts) is the function of the meaning of its parts.

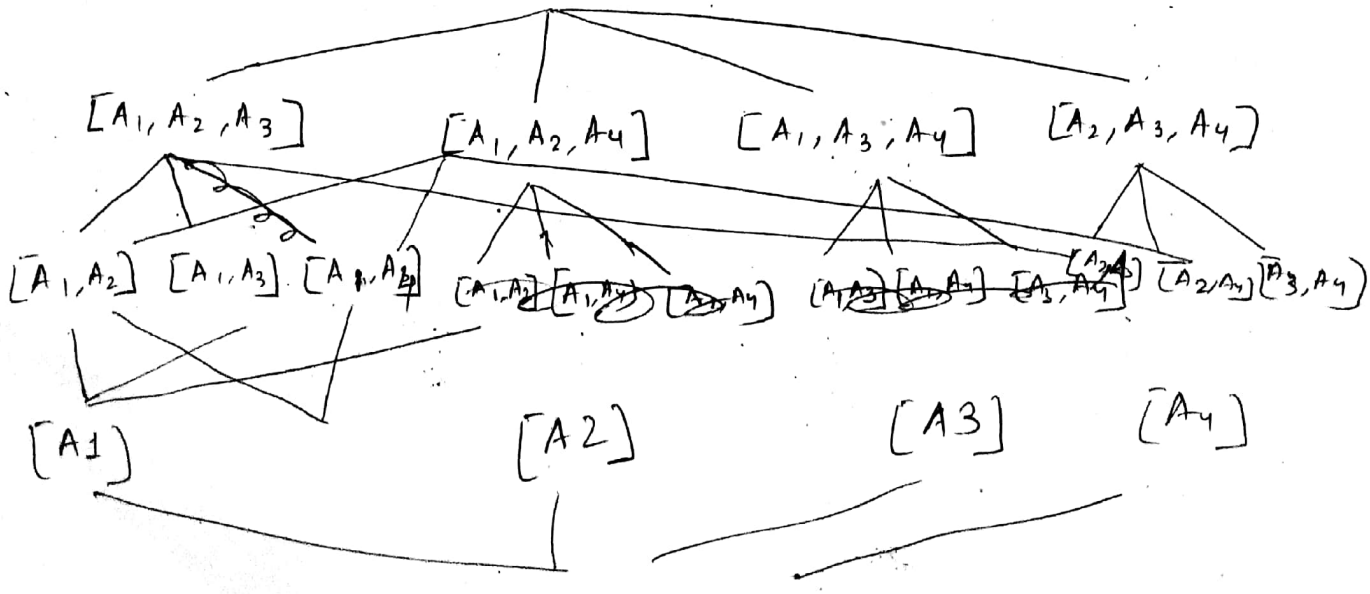
e.g., meaning of $F = F_1 \wedge F_2$

$\Rightarrow$ meaning of F_1 and F_2

Disadvantage : In multi-objects environment each rule need to be writen(design) seperately.

Contextual Logic : Logical Resioning based on the contexts of the real world.

$A_1 \wedge A_2 \wedge \cdots \wedge A_3 \rightarrow C$



No.

Propositional Logic

Tom is a cat

① cat (Tom) ← Logical representation of an english sentence.

Let we represent the following fact.

"All cat has a tail"

② $\forall x$: cat (x) → has_tail (x).

Now using deduction mechanism

using propositions ① & ② we can conclude

↳ has_tail (Tom).

↳ English Representation "Tom has a tail"