

Sentence

Definition: A group of words that express a thought

There are four types of sentences:

Statements: Sentence used to make a claim. They are capable of being true or false

Example: Socrates is a man

Questions: Sentence used to ask a question

Example: Is Socrates a man?

Exclamations: Sentence used to express emotion

Example: Oh, that Socrates were a man

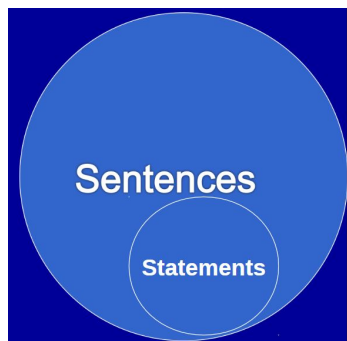
Commands: Sentence used to give orders/command

Example: Be a man, Socrates

Statements

Definition: Statement is a sentence used to make a claim. They are capable of either being true or false. They can also be called assertions or propositions

- Most basic concept of critical thinking
- They are a type of sentence that have the property of being either true or false. There are other types of sentences such as commands, questions and expression of volition (wishes)



Concept: Makes a claim

Property: True or false

Example: Be a man, Socrates - This sentence is neither true or false, hence not a statement.

The two laws of Logic

The property of a statement being either true or false leads to two fundamental laws of logic:

- The law of non-contradiction
- The law of the excluded middle

The law of non-contradiction

Definition: This law states that it is impossible for both a proposition and its negation to be true at the same time.

- Propositions cannot contradict; a combination of statements, ideas, or features of a situation that are opposed to one another.
- In other words, at one and the same time, one cannot truthfully assert or deny that something is the case.
- One cannot assert p and $\sim p$ to be true at the same time (Contradiction)

Example:

Timmy says:

Lassie is a dog (p) - Proposition

Lassie is not a dog ($\sim p$) - Negation of the proposition

Timmy's propositions contradict each other. Lassie cannot **be** a dog and **not be** a dog at the same time, therefore, Timmy is violating the law of non-contradiction

The law of the excluded middle

Definition: This law states that every proposition must either be true or false: nothing in the middle.

- Any middle position between truth and falsity is excluded
- For any given proposition and its negation, one must be true and the other one false. If a proposition is true, its negation must be false. If a proposition is false its negation must be true.

Example:

If according to Timmy "Socrates is a man" is true, then its negation, "Socrates is not a man" must be false

Sets

Definition: A group of proposition

- While propositions are either true or false, sets are either consistent or inconsistent
Concept: Group of propositions
Property: Consistent or inconsistent

Example:

Socrates is mortal (p1)
Socrates is a philosopher (p2)
Socrates has many disciples (p3)

Consistency

Definition: A set of proposition is consistent if and only if it is possible for all the proposition in the set to be true/false at the same time.

- A set of propositions is consistent if they do not contradict one another
- Does not imply that all, or any, of the sentences in a consistent set, are in fact, true.
- To logically evaluate a set of propositions as consistent is only to see that it is possible for them to be true at the same time, not that they are actually true
- Two false statements can be consistent

Example 1: Consistent set (true statements)

Lassie is a dog (p1)
Lassie barks (p2)
Lassie likes walks in the park (p3)

These sets of propositions are consistent because it is possible for their members to be true at the same time

Example 2: Consistent set (false statements)

Socrates is immortal (p1)
Socrates is an Olympian god (p2)

These sets of propositions are consistent because it is possible for their members to false at the same time

Example 3: Inconsistent set (contradictory proposition)

Socrates is mortal (p1)
Socrates is an Olympian god (p2)

Contraction - If socrates is mortal, he cannot be an Olympian god as olympian gods are immortal. In other words it is impossible for the members of the set to be true/false at the same time.

Inference

Definition: Inference is a relationship between two thoughts that occur when one thought supports or justifies or makes it reasonable to believe another thought

- Statements are linked to one another
- Logical relation between propositions
- One thought provides support for another thought or makes it easier to believe that another thought is true
- The second thought follows from the first thought
- Inference indicators: since, thus, implies, consequently, because, it follows that, given that

Example: (Inference)

Socrates is a man (p1)

Socrates is mortal (p2)

Socrates is a man. Therefore Socrates is mortal (Logical relation between p1 and p2. P1 makes p2 true. Actively linked)

Ollie was out all night (p1)

Ollie is tired (p2)

Ollie was out all night. Therefore Ollie is tired (Logical relation between p1 and p2. P1 makes p2 true. Actively linked)

Example: (Set of propositions - that are not linked to one another)

Socrates is a man (p1)

Socrates went for a walk (p2)

No logical relationship can be seen between the two propositions. Therefore no inference can be drawn

Negation means opposite

False means incorrect