

Specification for Tutorial 1

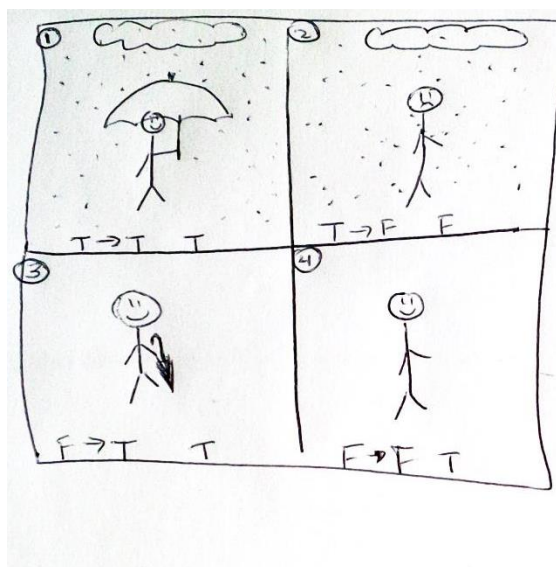
Tutorial 1, Part 2

Propositional Logic

In your own words, define the following:

1. **Proposition:** Declarative statement that has a value of True (T) or False (F), but not both
2. **Atomic proposition:** Propositions that cannot be divided into smaller propositions, i.e. the smallest unit of information
3. **Compound proposition:** Proposition that contains one or more logical connectives
4. **Negation:** The negation of p is a new proposition with the opposite truth value of p (i.e. $\neg p$, "not p ")
5. **Conjunction:** Both p and q , $p \wedge q$, is a new proposition which is true only when both p and q are true
6. **Disjunction:** Inclusive or, p or q , $p \vee q$, is a new proposition whose, true if p is true, q is true, or both p and q are true
7. **Exclusive Or:** p xor q , $p \oplus q$, is a new proposition that is true if exactly one of p or q is true; otherwise false (even if both are true)
8. **Conditional Statement:** If a then b , $a \rightarrow b$, if a happens then you expect b to happen as well but b can happen without a ... it is a new proposition which is only false when a is true and b is false
9. **Biconditional:** $a \leftrightarrow b$, a and b must co-occur to be true
10. **Solving Expressions:** To solve the complex expressions, the sub-expressions must be evaluated and the results are then substituted back into the expression by **reduction**
11. **Truth Tables:** exhibit the relationship between the truth values of a compound proposition and the truth values of its component propositions; all possible solutions

Quick illustration on implications



r = It is raining
 u = I bring my umbrella

If it is raining, then I will bring my umbrella.

	r	u	$r \rightarrow u$
①	T	T	T
②	T	F	F
③	F	T	T
④	F	F	T