* Philosophy 220

Informal Semantics of PL

Truth-conditions

* In SL, if a sentence-letter (C) stood for the proposition that the cat is on the mat, C is true when the cat is on the mat and false otherwise.
* In PL, where ‘the cat is on the mat’ is represented as Mc, the whole sentence ‘Mc’ is true when the cat is on the and and false otherwise.
  * M alone and c alone have no truth-values, because the phrases ‘_______ is on the mat’ and ‘the cat’ have no truth-values.

* Remember, we are simply replacing the sentence letters of SL with more fine-grained representations of sentences, so the truth conditions of connected sentences of PL are the same as the truth conditions of connected sentences of SL.
* So (P & Q) is true when both P and Q are true, and false otherwise. (Pmn & Qab) is true when both Pmn and Qab are true, and false otherwise.

Compound sentences

* A universally quantified sentence is true if every substitution instance of it is true and false if even one substitution instance is false.
* An existentially quantified sentence is true if even one substitution instance is true, and false if every substitution instance is false.

*Quantifiers:

* Examples:

* UD: US presidents
  * Dx: x is dead
  * Wx: x is a woman
  * a: George Washington
  * b: John Kennedy

(Da & Wb)

(∃x)Dx

(∃x)Wx

~(∃y)Wx ⊃ Db

* UD: US presidents
  * Dx: x is dead
  * Wx: x is a woman
  * a: George Washington
  * b: John Kennedy

(Da & Wb) is false because it is false that John Kennedy is a woman.

(∃x)Dx Is true because at least one US President is dead

(∃x)Wx Is false because no US presidents are women

~(∃y)Wy ⊃ ~Db Is false because the antecedent (that it is not the case that there is a woman president) is true while the consequent (that John Kennedy is not dead) is false.

*Examples:

* Construct an interpretation of the following that makes it true, then one that makes it false:
* Ga v Db

* More practice:

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* Construct an interpretation of the following that makes it true, then one that makes it false:
* Ga v Db
  * True:
    * Gx: x is green
    * Dx: x wrote the bible
    * a: Kermit the Frog
    * b: Charles Dickens

More practice:

* Construct an interpretation of the following that makes it true, then one that makes it false:
* Ga v Db
  * False:
    * Gx: x is green
    * Dx: x wrote the bible
    * a: Elton John
    * b: Charles Dickens

* Tautology: Means the same thing as it always has. Any sentence of PL that is necessarily true is a tautology (e.g. Fa v ~Fa)
* Contradiction: Means the same thing as it always has. Any sentence of PL that is necessarily false (e.g. Fa & ~Fa)
* Contingent: Means the same thing as it always has. Any sentence of PL that is neither a contradiction nor a tautology (e.g. Fa)

*Other semantic concepts

* Equivalence: Means the same thing as it always has. Any pair of sentences of PL that always have the same truth value as each other are equivalent.
* Consistency: Means the same thing as it always has. Any set of sentences that can all be true at the same time is a consistent set.

Other semantic concepts

*Other semantic concepts

* Entailment: Means the same thing as it always has. A set of sentences of PL entails a sentence of PL if and only if it is never the case that each member of the set is true while the sentence is false.
* Validity: Means the same thing as it always has. An argument in PL is valid if and only if it is never the case that each premise is true while the conclusion is false.