

## Brief Notes: Semantics Course.

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Monday, September 13th

- the study of meanings: semantics, pragmatics.
- Semantics : no context - Pragmatics: context
- different interpretations of words in English
- Units in Language.
- Generic or Specific expressions.

Wednesday, September 15th 2021

Semantics: Branch of Linguistics concerned with how meaning is conveyed by a system of units.  
Such as Phonetics, Morphology.

Units: words, sentences.

Language: Sounds, Form, Meaning.

For example: Car < Meaning : Mobile, Object, Wheels, Mechanic.

A package of different features in a specific word.

A mental image of specific words < its sense.

A word < denotes: signals, a Reference.

Speakers decide what the reference is.

Words:

Denotation: Literal meaning.

Connotation: beyond the literal meaning, meaning values determined by culture. < Associative Meaning.

Compositionality: The meaning of a sentence is a function of the meaning of the component words and how they are organised. Literal meanings.

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Semantics looks into the conventional meaning of words and sentences.

- The Linguistic meaning.
- Conventional: meaning agreed upon, regardless of context.

Types of meaning:

- Conceptual meaning < Sense.
- Associative meaning < Positive, Negative. How people feel about the word.

For Example: i could eat a horse < not a straightforward meaning < not literal.

I < Agent.

State of affairs < an event that is happening in the world.

Why do we study Semantics when speakers already know the meaning of all words and sentences?

- We want to set up a theory of meaning < to give facts about meaning.

Different theories in Semantics:

- Formal Semantics: Anything written in symbols and numbers, so it is using tools from Philosophy and Logic to analyse the relationship between language and reality.
- Lexical Semantics: the meaning of words and sentences and idioms.
- Denotational Semantics: Meaning < sense, reference, denotation, connotation.

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-Denotation: the entire class of objects to which an expression refers.

- Reference: how a speaker uses language to help hearers identify an object in the world. It changes by changing the time and the place.

-The relationship between Semantics and other fields in Linguistics?

> Semantics and Phonology: Depending on the stress in different words in language.

For Example: Project < Verb, Project < Noun.

-Morphology: The form of a word, like adding suffixes and prefixes.

- Syntax: Structures and their possible meanings in sentences.

- Philosophy and Logic:

For Example: If you study, you will pass.

1 < T, 2 < T

1 < F, 2 < T, F

-Psychology: How do children acquire meaning? < Nouns.

-Semiotics: the study of signs. < the meaning of the sign is Iconic so it is easier to understand. Or it could be Arbitrary.

-Pragmatics: 2 ways of looking at meaning.

- Sentence meaning: For Example: Good Morning < it is a greeting. No hidden intention.

- Speaker meaning: if a student comes late to a class, the teacher says " Good Morning" it is meant for Sarcasm, it depends on the situation and the context.

A direct meaning is a **Statement**. < Sentence meaning.

If it was to use the language to make a **Request** then it is < Speaker meaning.

-Sentence meaning: is meaning away from language use in contexts < meaning within the sentence level.

-Speaker meaning in Pragmatics: meaning above the sentence level < meaning in **particular** contexts.

### Wednesday, September, 29, 2021

-Propositions: The basic semantic content, what the sentence says about the world.

- That part of a declarative sentence that describes a state of affairs < A statement.

- Inference: For example < Sandy is a woman: Sandy is a female.  $P=Q$  < Entailment: a relationship between two propositions such that the truth of the first guarantees the truth of the second.

-Testing for Entailment:

-Q.

-Negative Q.

-P and Negative Q.

- if the result is impossible then P Entails Q.

- if the result is possible then P does not entail Q.

- Entailment does not survive negation.

### Monday, October 4th, 2021

-The Falsity of **Q** means the Falsity of **P**.

For Example:  $P \supset$  Mary Loves John.

$Q \supset$  John Loves Mary.

Truth Table:

- $P$  is T >  $Q$  > T or F

-  $F \supset$  T or F

- T or F > T
- T or F > F

- Presupposition: -Background- what a speaker assumes to be the case prior to making an utterance.
- To presuppose means to assume in the **shared background**.

For Example:

-Kevin regrets leaving Maya alone.

- Kevin left Maya alone.

P is T, Q > T

P is F, Q > T

- Presupposition survives negation.

-It is about given information which is shared and new information too.

- **Entailment** is generated based on the sense of relationships.

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Presupposition Triggers:

- Definitive Description: John saw the man with two heads.  
Presupposition> There is a man with two heads.
- Change of state verbs: John started smoking> he did not use to smoke.
- Iterative: John ate Shawarma again > he ate Shawarma before.
- Temporal clauses ( Adverbial): While he was singing, his mother called.
- Cleft sentences: it was John who ate the apples> somebody ate the apples.
- Comparatives: John is a better linguist than Dave> they are both linguists.  
It was John who killed Amanda> somebody killed Amanda.
- Factive Verbs: John realized that he was poor.

John regrets leaving Maya alone.

- What did you buy yesterday?>> Somebody bought something.

- How fast were you going when you passed the red light?>> She passed the red light.

-What were you doing when Alice was killed?>> Alice was killed.

-When did you fail your Semantics exam?>> You failed your Semantics exam.

3rd Type of Inference> **Implicature.**

-A: Has your gym been closed recently?

Implicature: you are not in shape.

- A:How did you do in your semantics test?

B: The weather is nice today.

-A: Requesting a letter of recommendation.

B: (A) has a nice handwriting.

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Speech acts theory: using words and sentences to perform actions.

>using language to do things or carry out actions.

-“How to do things with words” J.Austin.

Pragmatics deals with utterances> Language in Context.

- Constative >Descriptive: I play Football. **Past tense and Future.**

- Performative:**I Pronounce** you husband and wife.

Using the **first person**> making things happen as an action. **Present tense.** Using the word Hereby.

Types of Sentences:

-Declarative(Statement): The Function is Assertion. For Example: it is cold in this room.

-Interrogative: The Function is Asking>Information seeking. For Example:Can you walk?

- Imperative: The Function is Order. For Example: Walk.

### Wednesday, October 13th, 2021

I name this ship Titanic> Performative.

I believe in the revolution of robots> Constative.

I warn you not to come any closer> Performative.

I admit that I took money from your pocket> Performative.

I think I was wrong> Constative.

I give you food everyday> Constative.

I'm trying to get this door open> Constative.

### The speaker and the hearer are involved in 3 speech acts:

- The locutionary act: basic linguistic content.

-The illocutionary act: the intention of the speaker, the meaning of an utterance within a system of social interaction.

-The perlocutionary act: the effect of what is said on the listener<(Emotions, Reactions).

### Examples:

-While Climbing:

Ehab: my shoe is stuck on the fence> request for help

Perlocution> Sympathy.

-A mother to a child:

“Look at the mess under your table”> illocution: clean your mess.

Perlocution> Compliance.

-”I’m Hungry”

Context 1: Beggar> I’m hungry

Locution> Statement

Illocution> request money

Perlocution>Sympathy.

Context 2: Child to a mother at 9:00  
There's school tomorrow> they ate dinner.  
Child: " I'm hungry"  
Locution>Statement.  
Illocution> Rejecting sleep.  
Perlocution>Being angry.

Context 3: Office: Man likes a woman.  
Man: " I'm Hungry"  
Locution> Statement.  
Illocution> Request.  
Perlocution> Emotions, Reactions.

Context 1: " What time is it?"  
In a park: Man and woman on a bench.  
Locution> a question.  
Illocution> Starting a convo.  
Perlocution> Rejection, Approval.

### Wednesday, October 20th, 2021

A: That comes to 200 dollars.  
Illocution: Request, Informing.

A: There's a spider near your bed.  
Illocution: Warning.

A: I'm afraid we're closing down sir.  
Illocution: Informing, Apology, Request to leave.

A: We're closing in 15 minutes.  
Illocution: Informing, Requesting.

A: Can I remind everybody that we will meet again tomorrow.  
Illocution: Informing, Reminding.

A: Your car is in the way. Indirect.> Request.( Declarative)

A: Can you move your car? Indirect. Request.( Interrogative)

A: Move your car. Direct. Order. ( Imperative)

A: I can't move my car. Indirect. Request.

"Politeness Theory"

We Don't have any milk.

1- Declarative

2- Declarative: illocution> Request> Indirect.

Optative> Wishing for something indirectly.

Offering, Inviting. ( More illocution).

Implicature

A: How was your semantics exam?

B: It was from another world.

> The exam was hard.

A: Has your gym closed down recently?

B: is overweight.

Cooperative principle: 4 Maxims or Conditions.( Paul Grice)

1- Maxim of quality.

2- Maxim of quantity.

3- Maxim of relevance.

4- Maxim of manner.

A: Where does Shayma live?

B: Somewhere in Palestine.

Implicature: B Doesn't want to share Shayma's Location.

A: Would you like some chocolate?

B: I'm Diabetic.

Implicature: B doesn't want chocolate.

Context: Semantics Classroom.

Guest: Can I attend this class?

Ehab: I have 35 students.

Implicature: The guest can't attend.

### Monday, October 25th, 2021

The kid slept and had a nightmare > a strict order, sequence.

-The Cooperative Principle( CP): a set of rules that speakers follow and expect others to follow in order to establish agreed meaning.

- Conversation is and should be governed by the CP, which is a condition on the way rational conversation is conducted.

- it's the principle that the participants in a conversation work together in order to manage their speech exchange in the most efficient way possible.

- The Maxim of Quality: make your contribution true:

A: Do not say what you believe to be false.

B: Do not say that for which you lack adequate evidence.

- The Maxim of Quantity: messages should be as economical as possible.

A: make your contribution as informative as is required for the current purpose of the exchange.

B: Do not make your contribution more informative than is required.

For Example:

Lubna: How are you?

Mo: My medical checkup came out negative and my wife got fired and my dog disappeared.

Implicature > Mo is not Ok.

-The Maxim of Relevance: make your contribution relevant.

-The Maxim of Manner:

A: Be brief.

B: Don't be obscure.

C: Avoid Ambiguity.

D: Be orderly.

## Flouting > Violating.

-Four ways in which a speaker can behave with respect to the 4 maxims:

1- Observe all the maxims: to say the right amount, to say enough > to be relevant, and to be clear.

Mother: Where are my cars?

Son: They're on the table in the kitchen.

2- Opt out: to refuse to take part in a conversation.

3- Violate a maxim: to fail to observe it with the assumption that the hearer will not notice > Lie.

4- Flout a maxim: to violate a maxim intentionally that the hearer is expected to be aware of the violation in order to work out an implicature = allows speakers to implicate what they don't prefer to say explicitly.

John: David failed his writing course 3 times.

Mary: He is so smart.

Implicature > Sarcasm: she is making fun of David.

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A: Have you read Shakespeare?

B: I haven't read the back of the cereal Packet.

Implicature: B hasn't read Shakespeare.

A: Do you know how to get to BZU?

B: I've got a map in my backpack.

Implicature: B Doesn't know where BZU is.

A: Are you coming to the party?

B: I have to work.

Implicature: B Doesn't want to go.

A: Where's my book?

B: It's either in the kitchen or the living room.

Implicature: B doesn't know where it is.

- B has reasons for not telling A where it is.

A: Did you buy salt:

B: I tried to.

Implicature: B didn't buy salt.

A: What do you think of Ehab's way of teaching Semantics?

B: I think he wears nice clothes.

Implicature: Ehab's way of teaching Semantics is not good.

A: Could you please grab that thing in the garage for me?

>Flouting the manner maxim.

A: What do you think of Ehab as a teacher?

B: He is a nice teacher.

Implicature: He's not

A: How much did the ticket cost? Assume it's 400\$

B: They were on sale> Flouting Quantity.

B: 200\$> Flouting Quality.

B: Let's go out for dinner tonight> Flouting Relation.

B: A Fraction of my fortune, though probably a bigger fraction of the salary of the woman who sold them to me> Flouting Quantity and Manner.

A: Do you have any pets?

B: I have two cats. All maxims are observed. B is Cooperative.

B: I'm allergic > He doesn't have pets.

**Scalar Implicature**> The Maxim of Quantity.

Dina: Who ate my pizza?

Brother: I ate some of it.

Implicature: Brother did not eat all the pizza.

A: Not all students passed the Semantics exam.

Implicature: Most of them passed.  
Or some of them passed.  
Or few of them passed.  
Or One student passed.

A: How many brothers do you have?  
B: I have 3 brothers.  
Implicature: I have 2 or I have 1.

A: Would you like some coffee?  
B: It will keep me awake.  
Implicature: B Doesn't want coffee.

Monday, November 3rd 2021

Everyone, Someone> Scalar words.  
Always, Usually, Sometimes, Rarely.  
Searle: How do we understand a promise> Chapter 6

Felicity Conditions: The conditions/ circumstances that need to be met for an utterance to mean what it means.  
e.g> Ehab: I sentence you to prison. (Misfire)

Monday, November 8th, 2021

A Proposition( Basic Semantic content): A claim (State of affairs) about the world.

> Declarative sentences:

- Truth Value> T or F. Truth conditions of a statement.

Propositional Logic.

Having Different grammars for statements:

For Example: The kid ate an apple.

An apple was eaten by....

It was the kid who ate the apple.

They tell us about the same propositions.

$P = \text{I study at BZU} > T \text{ or } F.$

$Q = \text{My dad is a teacher} > T \text{ or } F.$

I study at BZU and my dad is a teacher.

-If P is T then Q is T =  $P \wedge Q$  is T

-If P is T then Q is F =  $P \wedge Q$  is F

- If P is F then Q is T =  $P \wedge Q$  is F

- if P is F then Q is F =  $P \wedge Q$  is F.

We call the result **complex or compound.**

We use (And) because it is **connective.**

**For Example:** Andy, Harry and Dave kicked Tim > The group kicked Tim.

-The Robbers broke into the house and the police came.

>P is T, Q is T then  $P \wedge Q$  is T.

-Either Mary left or Andy came.

-P is T, Q is T > T

-P is T, Q is F > T

- P is F, Q is T > T

-P is F, Q is F > F

P and -P

P: Mary left.

-P: Mary did not leave.

P is T, -P is F.

P is F, -P is T.

-Mary left **and** Andy didn't come.

**$P \wedge \neg P.$**

If P is T, Q is T > T

If P is T, Q is F > F  
If P is F, Q is T > F  
If P is F, Q is F > F.

Mary left or Andy didn't come.

P is T, Q is T > T  
P is T, Q is F > T  
P is F, Q is T > T  
P is F, Q is F > F.

**If** you invite me to pizza, I'll come.  
**If** you study hard, you will pass.  
**If** it rains, I will go with my friend.

P->Q ( Material Implication)  
The if clause is called Antecedent.  
The Q clause is called Consequent.

**If** you study hard, you will pass.  
P is T, Q is T > T  
P is T, Q is F > F  
P is F, Q is T > T  
P is F, Q is F > T

**Wednesday, November 10th, 2021**

**Felicity conditions:**

- Propositional content: the utterance means what it means. Mutual Semantic Content.
- Preparatory condition: you can do what you say >(Authority and Status).
- Sincerity condition: you mean what you say > able to do.
- Essential condition: you say what you say.

Wednesday, November 24th, 2021

Complex Propositions:

- Conjunction
- Disjunction
- Implication
- Biconditional

Example: A cop pulled you over and you were booked.

P	Q	$P \wedge Q$
T	T	T
T	F	F
F	T	F
F	F	F

A cop pulled you over or you were booked. **Inclusive or**

T	T	T
T	F	T
F	T	T
F	F	F

A penguin is either a mammal or a bird: **Exclusive or**

T	T	F
T	F	T
F	T	T
F	F	F

If a cop pulled you over, you will be booked.  $P \rightarrow Q$   
P is Antecedent, Q is Consequent.

T	T	T
T	F	F
F	T	T
F	F	T

I will be booked if a cop pulled me over.  $Q \rightarrow P$

T T > T

T F > F

F T > F

F F > T

Today is Wednesday  $\Leftrightarrow$  yesterday was Tuesday.

T T > T

T F > F

F T > F

F F > T

If Today is Wednesday, then yesterday was Tuesday.

T T > T

T F > F

F T > F

F F > T

$(P \rightarrow Q \wedge Q \rightarrow P) = P = Q$  > Biconditional.

If today is a holiday, BZU is closed.

T T > T

T F > F

F T > T

F F > T

If BZU is closed, today is a holiday.

T T > T

T F > F

F T > T

F F > T

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I will pass if I study hard.

1- If I study hard, I will pass ( $P \rightarrow Q$ )

T T > T

T F > F  
F T > T  
F F > T

2- If I pass, then I study hard. (Q->P)

T T > T  
T F > F  
F T > T  
F F > T

P=Q: (P->Q ^ Q->P)

If Alex is a bachelor, then he's unmarried.

Alex is a bachelor <-> He's unmarried

1- If Alex is a bachelor, then he's unmarried. (P->Q)

T T > T  
T F > F  
F T > T  
F F > T

2- If Alex is unmarried, then he's a bachelor. (Q->P)

T T > T  
T F > F  
F T > T  
F F > T

P->Q ^ Q->P : P<=>Q

T T > T  
T F > F  
F T > F  
F F > F

P: Ehab teaches Semantics.

Q: The Weather is good.

P Or Q : T , T, T, F

P Or -Q: T, T, F, T  
(P or Q)- : F, F, F, T

Monday, December 6th, 2021

Propositional logic> The truth value of complex propositions.

Predicate Logic: Relationship in the inner structure of a proposition e.g:

Mary loves john.

Love: Predicate ( X,Y): arguments.

It is a 2-place predicate> 2 participants.

X and Y> m and j.

- The order of participants is important.

Mary Loves John:

Love ( mary,john)

-I fell (fall) one.

-USA is a country

Country( usa)

-Noor studies Semantics

Studies( noor, semantics)

-Hala gave her friend a sandwich

Give( hala, her friend, sandwich)

P=Hala gave her friend a sandwich and =Q went to school.

P=Give ( hala, her friend, sandwich)

Q=Hala went to school.

Q= Go( hala, school)

P^Q> Give ( hala, friend, sandwich) Go (hala, school).

1-The police shot a man.

Shoot(police, man)

2- A man shot the police.

Shoot( man, police)

3- John is tired.

Tired( john) a one place predicate.

4- John is a funny man.

Funny man(john) , Funny(john) and Man (john)

-John smokes and Mary gets angry.

$P \equiv \text{Smoke}(\text{john})$

$Q = \text{Angry}(\text{mary})$

$P \wedge Q \supset \text{Smoke}(\text{john}) \text{ and } \text{Angry}(\text{mary}).$

Translate into predicate logic:

1-If John smokes, Mary will be angry.

$P = \text{If John smokes}$

$\text{Smoke}(\text{john})$

$Q = \text{Mary will be Angry.}$

$\text{Angry}(\text{mary}).$

**$\text{Smoke}(\text{john}) \rightarrow \text{Angry}(\text{mary})$**

2-If John smokes, Mary won't be angry.

$P = \text{Smoke}(\text{john})$

$Q = \neg \text{Angry}(\text{mary})$

**$\text{Smoke}(\text{john}) \rightarrow \neg \text{Angry}(\text{mary})$**

3-John saw(two places predicate) that Mary read the book.

$P = \text{See}(\text{john})$

$Q = \text{Read}(\text{mary}, \text{book})$

**$\text{See}(\text{john}, \text{Read}(\text{mary}, \text{book}))$**

4-Alice went to london and she met John or she called Andy.

$P = \text{Alice went to London.}$

$\text{Go}(\text{alice}, \text{london})$

$Q = \text{Alice met John.}$

$Q = \text{Meet}(\text{alice}, \text{john})$

$R = \text{Alice called Andy.}$

$R = \text{Call}(\text{alice}, \text{andy})$

$\text{Go}(\text{alice}, \text{london}) \ \& \ \text{Meet}(\text{alice}, \text{john}) \ \vee \ \text{Call}(\text{alice}, \text{andy})$

$P \wedge (Q \vee R)$

$\text{Go}(\text{alice}, \text{london}) \wedge \text{Meet}(\text{alice}, \text{john}) \vee \text{Call}(\text{alice}, \text{andy}) \supset (P \wedge Q) \vee R.$

Wednesday, December 8th, 2021

Adam will invite Lucy Or Cathy and Diana.

P= Adam will invite Lucy. Invite (adam, lucy)

Q=Adam will invite Cathy.

R=Adam will invite Diana. Invite (adam, diana)

1-Invite(adam, cathy) Invite (adam, lucy)  $\vee$  (Invite (adam, cathy)  $\wedge$  Invite(adam, diana))

2- (Invite(adam, lucy)  $\vee$  Invite(adam, cathy))  $\wedge$  Invite(adam, diana).

Sally is John's mother or David's grandmother and Andy's aunt.

P=Sally is John's mother. Mother( sally, john)

Q=Sally is David's grandmother. Grandmother(sally, david)

R= Sally is Andy's aunt. Aunt(sally, andy)

1-  **$(P \vee Q) \wedge R$** : (Mother(s, j)  $\vee$  Grandmother(s, d))  $\wedge$  Aunt(s, a)

2-  **$P \vee (Q \wedge R)$** : Mother(s, j)  $\vee$  (Grandmother(s, d)  $\wedge$  Aunt(s, a))

If David is Alice's brother, then Tanya is his aunt or Bob is his uncle.

P= David is Alice's brother. Brother( david, alice)

Q= Tanya is David's aunt. Aunt(tanya, david)

R= Bob is David's uncle. Uncle(bob, david)

**$P \rightarrow (Q \vee R)$** : Brother(d, a)  $\rightarrow$  (Aunt(t, d)  $\vee$  Uncle(b, d))

**$(P \rightarrow Q) \vee R$** : (Brother(d, a)  $\rightarrow$  Aunt(t, d))  $\vee$  Uncle(b, d)

Amanda will marry Steve and Ehab will resign if Andy passes semantics.

P= Amanda will marry Steve. Marry(amanda, steve)

Q= Ehab will resign. Resign(ehab)

R= Tanya passes semantics. Pass(tanya, semantics)

$\supset \text{Marry}(a, s) \wedge (\text{Resign}(\text{ehab}) \rightarrow \text{Pass}(t, \text{semantics}))$

$\supset \text{Pass}(t, \text{semantics}) \rightarrow (\text{Marry}(a, s) \wedge \text{Resign}(\text{ehab}))$

- Linguists are bald >  $\text{Bald}(\text{linguists})$
- All Linguists are bald >  $\text{Bald}(\text{linguists}) \vee x (\text{Linguist}(x) \rightarrow \text{Bald}(x))$
- Some Linguists are bald >  $\text{Bald}(\text{linguists})$
- Robert loves all Italian women >  $\vee x \text{Italian}(x) \wedge \text{woman}(x) \rightarrow \text{Love}(r,x)$ .

**All** >  $\vee x$  (Universal Quantifier). And **Every**

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Linguists are bald.  $\text{Bald}(\text{linguists})$

**All** linguists are bald >  $\vee x (\text{Linguist}(x) \rightarrow \text{Bald}(x))$

1-All girls love Andy >  $\vee x (\text{Girl}(x) \rightarrow \text{Love}(x,a))$

2-**Some girls love Andy** >  $\exists x (\text{Girl}(x) \wedge \text{Love}(x,andy))$  Existential quantifier.

3- Girls don't love Andy. Negative quantifier.

$\neg x (\text{Girl}(x) \rightarrow \text{Love}(x,a))$

More Examples:

-All students will receive a point.

$\vee x (\text{Student}(x) \rightarrow \text{Receive}(x,\text{point}))$

-Everybody is happy.

$\vee x (\text{Person}(x) \rightarrow \text{Happy}(x))$

-John likes some animals.

$\exists x (\text{Animal}(x) \wedge \text{Like}(\text{john},x))$

-All students who smile will receive a point.

$\vee x (\text{Student}(x) \wedge \text{Smile}(x) \rightarrow \text{Receive}(x,\text{point}))$

-Every student likes the moon.

$\vee x (\text{Student}(x) \rightarrow \text{Like}(x,\text{moon}))$

-Some students like the moon.

$\exists x (\text{Student}(x) \wedge \text{Like}(x, \text{moon}))$

-No student likes the moon.

$\neg x (\text{Student}(x) \rightarrow \text{Like}(x,\text{moon}))$

- A man sneezed

$\exists x (\text{Man}(x) \wedge \text{Sneeze}(x))$

-Nobody likes school.

$\neg \exists x ( \text{Person}(x) \rightarrow \text{Like}(x, \text{school}) )$

-All snakes are venomous.

$\forall x ( \text{Snake}(x) \rightarrow \text{Venomous}(x) )$

-All black snakes are venomous.

$\forall x ( \text{Snake}(x) \wedge \text{Black}(x) \rightarrow \text{Venomous}(x) )$

-All black or red snakes are venomous.

$\forall x ( \text{Snake}(x) \wedge ( \text{Black}(x) \vee \text{Red}(x) ) \rightarrow \text{Venomous}(x) )$

-All snakes are venomous or All snakes are harmless.

$\forall x ( \text{Snake}(x) \rightarrow \text{Venomous}(x) ) \vee \forall x ( \text{Snake}(x) \rightarrow \text{Harmless}(x) )$

-Some swans are white and small.

$\exists x ( \text{Swan}(x) \wedge \text{White}(x) \wedge \text{Small}(x) )$

Wednesday, December 15th, 2021





