

LING/C SC 581:

Advanced Computational Linguistics

Lecture 3

Adminstrivia

- Homework 1
 - due next Monday midnight.
- WordNet relations: an introduction, contd.

Homework 1

- Using the online Princeton browser or your own installation of the WordNet browser.
1. Find the connection between *chair* (noun, sense 1) and *furniture* (noun, sense 1). Show the links (relations).
 2. Find the connection between *amble* (verb, sense 1) and *run* (verb, sense 1). Show the links (relations).
 3. Find a connection between *dirty* (verb) and *dirty* (adjective). Which senses? Show the links (relations).
 4. Would you expect to find a similar connection (to Q3) between *clean* (verb) and *clean* (adjective)?
 5. Install the WordNet browser (wnb) on your computer. Show the steps and screenshot. **Bonus points:** if you installed it from source code. Show the steps.

Homework 1

- **Browser:** turn on Sense Numbers
- Usual rules.
 - One PDF file.
 - Document your answer as needed using screenshots.
 - Due Monday midnight (we review it next Tuesday)
 - Email to me sandiway@email.arizona.edu
 - **Subject:** 581 Homework 1 *Your Name*

WordNet: wnb vs online browser

The screenshot shows the WordNet 3.0 Browser interface. The search word is 'virus'. A red circle highlights the left pane, which displays a list of synset relations for the noun sense of 'virus'. The list includes:

- 1. (4) **virus#1** -- ((virology) ultramicroscopic infectious agent that replicates itself only within cells of living hosts; many are pathogenic; a piece of nucleic acid (DNA or RNA) wrapped in a thin coat of protein)
- 2. **virus#2** - (a harmful or corrupting agency) "bigotry is a virus that must not be allowed to spread"; "the virus of jealousy is latent in everyone"
- 3. **virus#3**, compute causing great harm to another computer

The right pane shows the definition and examples for the first sense of 'virus'.

listed synset relations

The screenshot shows the WordNet Search - 3.1 interface. The search word is 'virus'. A red circle highlights the list of synset relations for the noun sense of 'virus'.

Noun

- **S: (n) virus#1** ((virology) ultramicroscopic infectious agent that replicates itself only within cells of living hosts; many are pathogenic; a piece of nucleic acid (DNA or RNA) wrapped in a thin coat of protein)
 - [direct hyponym](#) / [full hyponym](#)
 - [domain category](#)
 - [domain term category](#)
 - [direct hypernym](#) / [inherited hypernym](#) / [sister term](#)
 - [derivationally related form](#)
- **S: (n) virus#2** (a harmful or corrupting agency) "bigotry is a virus that must not be allowed to spread"; "the virus of jealousy is latent in everyone"

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- **Hypernyms (going up the noun hierarchy):**

Search Word: virus Redisplay Overview

Searches for virus: Noun Senses:

Senses of virus

Sense 1

virus#1 -- ((virology) ultramicroscopic infectious agent that replicates itself only within cells of living hosts; many are pathogenic; a piece of nucleic acid (DNA or RNA) wrapped in a thin coat of protein)

- => microorganism#1, micro-organism#1 -- (any organism of microscopic size)
- => organism#1, being#2 -- (a living thing that has (or can develop) the ability to act or function independently)
- => living thing#1, animate thing#1 -- (a living (or once living) entity)
- => whole#2, unit#6 -- (an assemblage of parts that is regarded as a single entity; "how big is that part compared to the whole?"; "the team is a unit")
- => object#1, physical object#1 -- (a tangible and visible entity; an entity that can cast a shadow; "it was full of rackets, balls and other objects")
- => physical entity#1 -- (an entity that has physical existence)
- => entity#1 -- (that which is perceived or known or inferred to have its own distinct existence (living or nonliving))

=> infectious agent#1, infective agent#1 -- (an agent capable of producing infection)

- => agent#1 -- (an active and efficient cause; capable of producing a certain effect; "their research uncovered new disease agents")
- => causal agent#1, cause#4, causal agency#1 -- (any entity that produces an effect or is responsible for events or results)
- => physical entity#1 -- (an entity that has physical existence)
- => entity#1 -- (that which is perceived or known or inferred to have its own distinct existence (living or nonliving))

Synset:
microorganism#1,
micro-organism#1

Synset:
infectious agent#1,
infective agent#1

multiple parent synsets

virus#1
(sense 1)

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- **Hyponyms (going down the noun hierarchy):**

Searches for virus: Noun Senses:

1 of 3 senses of virus

Sense 1

kinds of viruses

virus#1 -- ((virology) ultramicroscopic infectious agent that replicates itself only within cells of living hosts; many are pathogenic; a piece of nucleic acid (DNA or RNA) wrapped in a thin coat of protein)

=> arbovirus#1, arborvirus#1 -- (a large heterogeneous group of RNA viruses divisible into groups on the basis of the virions; they have been recovered from arthropods, bats, and rodents; most are borne by arthropods; they are linked by the epidemiologic concept of transmission between vertebrate hosts by arthropod vectors (mosquitoes, ticks, sandflies, midges, etc.) that feed on blood; they can cause mild fevers, hepatitis, hemorrhagic fever, and encephalitis)

=> bacteriophage#1, phage#1 -- (a virus that is parasitic (reproduces itself) in bacteria; "phage uses the bacterium's machinery and energy to produce more phage until the bacterium is destroyed and phage is released to invade surrounding bacteria")

=> plant virus#1 -- (a plant pathogen that is a virus consisting of a single strand of RNA)

=> animal virus#1 -- (an animal pathogen that is a virus)

=> slow virus#1 -- (a virus that remains dormant in the body for a long time before symptoms appear; "kuru is caused by a slow virus")

=> tumor virus#1 -- (a cell-free filtrate held to be a virus responsible for a specific neoplasm)

=> vector#4 -- (genetics) a virus or other agent that is used to deliver DNA to a cell

wnb

- **Hyponyms** (going down the noun hierarchy):

Searches for virus: Noun

virus#1 -- ((virology
piece of nucleic acid
=> arbovirus#1
have been rec
concept of tra
blood; they ca
=> Bunyaviri
=> Togavirid
=> Flavivirid
=> Arenavirid
=> Rhabdovi

Synonyms, ordered by estimated frequency
Coordinate Terms
Hypernyms (virus is a kind of...)
Hyponyms (...is a kind of virus), brief
Hyponyms (...is a kind of virus), full
Meronyms (parts of virus), inherited
Derivationally related forms
Domain
Domain Terms
Familiarity

Search Word:	virus	Redisplay Overview
Searches for:	Noun	Senses:
virus#1 - ((virology) ultramicroscopic infectious agent that replicates itself only within cells of living hosts; many are pathogenic; they consist of nucleic acid (DNA or RNA) wrapped in a thin coat of protein)		
⇒ arbovirus#1, arbovirus#1 - (a large heterogeneous group of RNA viruses divisible into groups on the basis of the viruses; they have been recovered from arthropods, bats, rodents; most are borne by arthropods; they are linked by the epidemiologic concept of transmission between vertebrate hosts by arthropod vectors (mosquitoes, ticks, sandflies, midges, etc.) that feed on blood; some are neurotropic, hemagglutinating and cause encephalitis)		
⇒ Bunyavirus#1 - ((a large family of viruses that affect a wide range of hosts (mainly vertebrates and arthropods))		
⇒ Togaviridae#1 - ((a family of arboviruses carried by arthropods))		
⇒ Flaviviridae#1 - ((a family of arboviruses carried by arthropods))		
⇒ Arboviridae#1 - ((a family of viruses transmitted by arthropods))		
⇒ Rhabdoviridae#1 - ((a family of arboviruses carried by arthropods))		
⇒ Reoviridae#1 - ((a family of arboviruses carried by arthropods))		
⇒ bacteriophage#1, phage#1 - ((a virus that is parasitic (reproduces itself) in bacteria; "phage uses the bacterium's machinery and energy to produce more phage until the bacterium is destroyed and phage is released to invade surrounding bacteria"))		
⇒ coliphage#1 - ((a bacteriophage specific for the bacterium <i>Escherichia coli</i>))		
⇒ typhus bacilliophage#1 - ((a bacteriophage specific for the bacterium <i>Salmonella typhi</i>))		
⇒ plant virus#1 - ((plant pathogen that is a virus consisting of a single strand of RNA))		
⇒ tobacco mosaic virus#1, TMV#1 - ((the widely studied plant virus that causes tobacco mosaic; it was the first virus discovered (1892)))		
⇒ viroid#1, viroid#1 - ((the smallest of viruses; a plant virus with its RNA arranged in a circular chromosome without a protein coat))		
⇒ onion yellow dwarf virus#1 - ((the virus that produces stunting and yellowing of the leaves of onion plants))		
⇒ potato yellow dwarf virus#1 - ((the virus that produces stunting and yellowing of the leaves of potato plants))		
⇒ animal virus#1 - ((an animal pathogen that is a virus))		
⇒ adenovirus#1 - ((an group of viruses including those that in humans cause upper respiratory infections or infectious pink eye))		
⇒ parainfluenza virus#1 - ((a virus that causes upper respiratory infection (including the common cold and bronchiolitis); most often in children))		
⇒ arenavirus#1 - ((animal viruses belonging to the family Arenaviridae))		
⇒ Junin virus#1 - ((the RNA virus that causes Argentine hemorrhagic fever; carried by rats and mice))		
⇒ Lassa virus#1 - ((the RNA virus that causes Lassa fever))		
⇒ lymphocytic choriomeningitis virus#1 - ((the RNA virus that causes lymphocytic choriomeningitis; infects mice and monkeys and dogs and gains entry via the respiratory tract))		
⇒ Machupo virus#1 - ((the RNA virus that causes Bolivian hemorrhagic fever; carried by rats and mice))		
⇒ bunyavirus#1 - ((an animal virus belonging to the family Bunyaviridae; can be used as a biowarrior))		
⇒ filovirus#1 - ((animal viruses belonging to the family Filoviridae))		
⇒ Ebola virus#1 - ((a filovirus that causes Ebola hemorrhagic fever; carried by animals; can be used as a biowarrior))		
⇒ Marburg virus#1 - ((a filovirus that causes Marburg hemorrhagic fever; carried by animals; can be used as a biowarrior))		
⇒ alphavirus#1 - ((an viruses of the family Togaviridae that can cause a variety of encephalitis in horses))		
⇒ flavivirus#1 - ((animal viruses belonging to the family Flaviviridae))		
⇒ West Nile virus#1, West Nile encephalitis virus#1 - ((the flavivirus that causes West Nile encephalitis))		
⇒ vesiculovirus#1 - ((an animal virus that causes vesicular stomatitis))		
⇒ poxvirus#1 - ((any of a group of viruses that can cause pox))		
⇒ myxoma virus#1 - ((a poxvirus closely related to smallpox virus; causes benign genital tumors in humans))		
⇒ variola virus#1, smallpox virus#1 - ((the virus that causes smallpox in humans; can be used as a biowarrior))		
⇒ variola major#2, variola major virus#1 - ((a type of smallpox virus that has a fatality rate of up to 25 percent))		
⇒ variola minor#2, variola minor virus#1 - ((a type of smallpox virus that has a fatality rate of about 1 percent))		
⇒ herpes simplex virus#1, HSV#1 - ((the virus that causes cold sores and genital herpes))		
⇒ herpes simplex virus#2, HSV#2 - ((the virus that causes chickenpox and DNA viruses including viruses of ducks and woodchucks and squirrels and others as well as the virus causing hepatitis B in humans))		
⇒ retrovirus#1 - ((a group of viruses that contain two single-strand linear RNA molecules per virion and reverse transcriptase (RNA to DNA); the virus transcribes its RNA into a cDNA provirus that is then incorporated into the host cell))		
⇒ human T-cell leukemia virus#1, HTLV#1#1 - ((retrovirus causing T-cell leukemia))		
⇒ human immunodeficiency virus#1, HIV#2#1 - ((the virus that causes acquired immune deficiency syndrome (AIDS); it replicates in and kills the helper T cells))		
⇒ mycoplasma pneumoniae#1 - ((a group of viruses including those that cause influenza and mumps))		
⇒ orthomyxovirus#1 - ((a group of viruses including those causing influenza))		
⇒ paramyxovirus#1 - ((a group of viruses including those causing mumps and measles))		
⇒ respiratory syncytial virus#1 - ((a paramyxovirus that forms syncytia in tissue culture and that is responsible for severe respiratory disease such as bronchiolitis and bronchial pneumonia (especially in children)))		
⇒ picornavirus#1 - ((a group of single-strand RNA viruses with a protein coat))		
⇒ enterovirus#1 - ((a group of picornaviruses that infect the gastrointestinal tract and can spread to other areas (especially the nervous system)))		
⇒ poliovirus#1 - ((the virus causing poliomyelitis))		
⇒ hepatitis A virus#1 - ((the virus causing hepatitis A))		
⇒ hepatitis E virus#1 - ((the virus causing a disease resembling poliomyelitis but without paralysis))		
⇒ echovirus#1 - ((any of a group of viruses associated with various diseases including viral meningitis and mild respiratory disorders and diarrhea in newborn infants))		
⇒ rhinovirus#1 - ((any of a group of picornaviruses that are responsible for many upper respiratory infections))		
⇒ herpes#2, herpes virus#1 - ((any of the animal viruses that cause painful blisters on the skin))		
⇒ herpes simplex#2, HSV#2 - ((a herpes virus that affects the eye, brain, spinal cord, and peripheral nerve system))		
⇒ herpes simplex#1, HS1#1, HSV#1 - ((a herpes virus that causes oral herpes))		
⇒ herpes simplex#3, HS2#1, HSV#2 - ((a herpes virus that can cause genital herpes))		
⇒ herpes zoster#2, herpes zoster virus#1 - ((a herpes virus that causes shingles))		
⇒ herpes varicella zoster#1, herpes varicella zoster virus#1 - ((a herpes virus that causes chickenpox and shingles))		
⇒ Epstein-Barr virus#1, EBV#1 - ((the herpes virus that causes infectious mononucleosis; associated with specific cancers in Africa and Asia))		
⇒ cytomegalovirus#1, CMV#1 - ((a group of a group of herpes viruses that enlarge epithelial cells and can cause birth defects; can affect humans with impaired immunological systems))		
⇒ varicella zoster virus#1 - ((the member of the herpes virus family that is responsible for chickenpox))		
⇒ papovavirus#1 - ((any of a group of animal viruses associated with or causing papillomas or polyomas))		
⇒ human papillomavirus#1 - ((any of a group of papovaviruses associated with genital or oral carcinomas or a group associated with benign genital warts))		
⇒ polyomavirus#1, polyoma virus#1 - ((a virus the can initiate various kinds of tumors in mice))		
⇒ rhabdovirus#1 - ((any of a group of arboviruses including those causing rabies))		
⇒ lyssavirus#1 - ((a neurotropic arbovirus of the family Rhabdoviridae that causes rabies))		
⇒ reovirus#1 - ((a group of non-enveloped viruses including the rotavirus causing infant enteritis))		
⇒ norovirus#1 - ((the norovirus causing infant enteritis))		
⇒ parvovirus#1, parvo#1 - ((a group of viruses containing DNA in an icosahedral protein shell and causing disease in dogs and cattle; not known to be associated with any human disease))		
⇒ slow virus#1 - ((a virus that remains dormant in the body for a long time before symptoms appear; "kuru is caused by a slow virus"))		
⇒ kuru virus#1 - ((a cell-free filtrate held to be a virus responsible for a specific neoplasm))		
⇒ wound tumor virus#1, WTV#1 - ((a tumor virus transmitted by leeches))		
⇒ vector#4 - ((genetics) a virus or other agent that is used to deliver DNA to a cell))		
⇒ cosmid#4 - ((genetics) a large vector that is made from a bacteriophage and used to clone genes or gene fragments))		

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- Coordinate terms are nouns or verbs that have the same hypernym.

Searches for virus: Noun

Senses:

3 senses of virus

Sense 1

virus#1 -- ((virology) ultramicroscopic infectious agent that replicates itself only within cells of living hosts; many are pathogenic; a piece of nucleic acid (DNA or RNA) wrapped in a thin coat of protein)

=> microorganism#1, micro-organism#1 -- (any organism of microscopic size)

=> monad#3 -- ((biology) a single-celled microorganism (especially a flagellate protozoan))
=> intestinal flora#1 -- (harmless microorganisms (as Escherichia coli) that inhabit the intestinal tract and are essential for its normal functioning)
=> virus#1 -- ((virology) ultramicroscopic infectious agent that replicates itself only within cells of living hosts; many are pathogenic; a piece of nucleic acid (DNA or RNA) wrapped in a thin coat of protein)
=> moneran#1, moneron#1 -- (organisms that typically reproduce by asexual budding or fission and whose nutritional mode is absorption or photosynthesis or chemosynthesis)
=> bacteria#1, bacterium#1 -- ((microbiology) single-celled or noncellular spherical or spiral or rod-shaped organisms lacking chlorophyll that reproduce by fission; important as pathogens and for biochemical properties; taxonomy is difficult; often considered to be plants)
=> microbe#1, bug#5, germ#3 -- (a minute life form (especially a disease-causing bacterium); the term is not in technical use)
=> pathogen#1 -- (any disease-producing agent (especially a virus or bacterium or other microorganism))
=> protocyst#1 -- (any of the unicellular protists)
=> protist#1, protistan#1 -- (free-living or colonial organisms with diverse nutritional and reproductive modes)
=> microflora#1 -- (microscopic plants; bacteria are often considered to be microflora)

=> infectious agent#1, infective agent#1 -- (an agent capable of producing infection)
=> virus#1 -- ((virology) ultramicroscopic infectious agent that replicates itself only within cells of living hosts; many are pathogenic; a piece of nucleic acid (DNA or RNA) wrapped in a thin coat of protein)

=> pathogen#1 -- (any disease-producing agent (especially a virus or bacterium or other microorganism))

Synset:
microorganism#1,
micro-organism#1

Synset:
infectious agent#1,
infective agent#1

virus#1
(sense 1)

```
graph TD; A[virus#1 (sense 1)] --> B["Synset: microorganism#1, micro-organism#1"]; A --> C["Synset: infectious agent#1, infective agent#1"]; A --> D["virus#1 (sense 1)"]; B --- E["monad#3, intestinal flora#1, virus#1, moneran#1, moneron#1, bacteria#1, bacterium#1, microbe#1, bug#5, germ#3, pathogen#1, protocyst#1, protist#1, protistan#1, microflora#1, infectious agent#1, infective agent#1, pathogen#1"]
```

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- Not present for virus#n
- Holonyms (go up the part-of hierarchy):

is virus part of a
bigger
structure?

Synonyms, ordered by estimated frequency
Coordinate Terms
Hypernyms (cat is a kind of...)
Hyponyms (...is a kind of cat), brief
Hyponyms (...is a kind of cat), full
Holonyms (cat is a part of...), regular
Holonyms (cat is a part of...), inherited
Meronyms (parts of cat), inherited
Derivationally related forms
Domain
Familiarity

1 of 8 senses of cat

Sense 7
big cat#1, cat#7
 MEMBER OF: Felidae#1, family Felidae#1
 MEMBER OF: Carnivora#1, order Carnivora#1
 MEMBER OF: Eutheria#1, subclass Eutheria#1
 MEMBER OF: Mammalia#1, class Mammalia#1
 MEMBER OF: Vertebrata#1, subphylum Vertebrata#1, Craniata#1, subphylum Craniata#1
 MEMBER OF: Chordata#1, phylum Chordata#1
 MEMBER OF: Animalia#1, kingdom Animalia#1, animal kingdom#1

wnb

- **Meronyms (has parts, plus inherited):**

Noun

Synonyms, ordered by estimated frequency

Coordinate Terms

Hypernyms (virus is a kind of...)

Hyponyms (...is a kind of virus), brief

Hyponyms (...is a kind of virus), full

Meronyms (parts of virus), inherited

Derivationally related forms

Domain

Domain Terms

Familiarity

micro-organism => organism => cell => nucleus => chromosome => gene

Searches for virus: Noun

Senses: []

Sense 1

virus#1 -- ((virology) ultramicroscopic infectious agent that replicates itself only within cells of living hosts; many are pathogenic; a piece of nucleic acid (DNA or RNA) wrapped in a thin coat of protein)

=> microorganism#1, micro-organism#1 -- (any organism of microscopic size)

HAS PART: pilus#2 -- (hairlike structure especially on the surface of a cell or microorganism)

=> organism#1, being#2 -- (a living thing that has (or can develop) the ability to act or function independently)

HAS SUBSTANCE: tissue#1 -- (part of an organism consisting of an aggregate of cells having a similar structure and function)

HAS PART: cell#2 -- ((biology) the basic structural and functional unit of all organisms; they may exist as independent units of life (as in monads) or may form colonies or tissues as in higher plants and animals)

HAS PART: cell membrane#1, cytomembrane#1, plasma membrane#1 -- (a thin membrane (a double layer of lipids) enclosing the cytoplasm of a cell; proteins in the membrane control passage of ions (like sodium or potassium or calcium) in and out of the cell; "all cells have a cell membrane")

HAS PART: energid#1, protoplast#1 -- (a biological unit consisting of a nucleus and the body of cytoplasm with which it interacts)

HAS PART: cytoplasm#1, cytol#1 -- (the protoplasm of a cell excluding the nucleus; is full of proteins that control cell metabolism)

HAS PART: cytoskeleton#1 -- (a microscopic network of actin filaments and microtubules in the cytoplasm of many living cells that gives the cell shape and coherence)

HAS PART: microsome#1 -- (a tiny granule in the cytoplasm that is where protein synthesis takes place under the direction of mRNA)

HAS PART: Golgi body#1, Golgi apparatus#1, Golgi complex#1, dictyosome#1 -- (a netlike structure in the cytoplasm of animal cells (especially in those cells that produce secretions))

HAS PART: nucleus#1, cell nucleus#1, karyon#1 -- (a part of the cell containing DNA and RNA and responsible for growth and reproduction)

HAS PART: nucleolus#1, nucleole#1 -- (a small round body of protein in a cell nucleus; such organelles contain RNA and are involved in protein synthesis)

HAS PART: chromatin#1, chromatin granule#1 -- (the readily stainable substance of a cell nucleus consisting of DNA and RNA and various proteins; during mitotic division it condenses into chromosomes)

HAS PART: achromatin#1 -- (the part of a cell nucleus that is relatively uncolored by stains or dyes)

HAS PART: linin#1 -- (an obsolete term for the network of viscous material in the cell nucleus on which the chromatin granules were thought to be suspended)

HAS PART: chromosome#1 -- (a threadlike strand of DNA in the cell nucleus that carries the genes in a linear order; "humans have 22 chromosome pairs plus two sex chromosomes")

HAS PART: nucleolus organizer#1, nucleolus organiser#1, nucleolar organizer#1, nucleolar organiser#1 -- (the particular part of a chromosome that is associated with a nucleolus after nuclear division)

HAS PART: chromatin#1, chromatin granule#1 -- (the readily stainable substance of a cell nucleus consisting of DNA and RNA and various proteins; during mitotic division it condenses into chromosomes)

HAS PART: gene#1, cistron#1, factor#7 -- ((genetics) a segment of DNA that is involved in producing a polypeptide chain; it can include regions preceding and following the coding DNA as well as introns between the exons; it is considered a unit of heredity; "genes were formerly called factors")

two identical strands into which a chromosome splits during mitosis

re#1 -- (a specialized condensed region of each chromosome that appears during s are held together to form an X shape; "the centromere is difficult to sequence")

ce end of a eukaryotic chromosome; "telomeres act as caps to keep the sticky ends of chromosomes from randomly clumping together")

HAS PART: organelle#1, cell organelle#1, cell organ#1 -- (a specialized part of a cell; analogous to an organ; "the first organelle to be identified was the nucleus")

HAS PART: vacuole#1 -- (a tiny cavity filled with fluid in the cytoplasm of a cell)

HAS PART: body part#1 -- (any part of an organism such as an organ or extremity)

HAS PART: corpus#3 -- (the main part of an organ or other bodily structure)

=> living thing#1, animate thing#1 -- (a living (or once living) entity)

=> whole#2, unit#6 -- (an assemblage of parts that is regarded as a single entity; "how big is that part compared to the whole?"; "the team is a unit")

HAS PART: part#2, portion#2 -- (something less than the whole of a human artifact; "the rear part of the house"; "glue the two parts together")

HAS PART: section#4, segment#1 -- (one of several parts or pieces that fit with others to constitute a whole object; "a section of a fishing rod"; "metal sections were used below ground"; "finished the final segment of the road")

wnb

- Meronyms (has parts, plus inherited):

```
Sense 1
cat#1, true cat#
=> feline#1, felid#1
    HAS PART: paw#1
    HAS PART: pad#7
=> carnivore#1
    => placental#1, placental mammal#1, eutherian#1, eutherian mammal#1
        => mammal#1, mammalian#1
        HAS PART: coat#3, pelage#1
        HAS PART: hair#4, pilus#1
=> vertebrate#1, craniate#1
    HAS PART: belly#5
    HAS PART: tail#1
        HAS PART: dock#6
    HAS PART: caudal appendage#1
    HAS PART: rib#2, costa#2
        HAS PART: costal cartilage#1
    HAS PART: thorax#2, chest#1, pectus#1
        HAS PART: sternum#1, breastbone#1
            HAS PART: gladiolus#2, corpus sternum#1
            HAS PART: manubrium#1
            HAS PART: xiphoid process#1
```



mammal

/məməl/

noun

a warm-blooded vertebrate animal of a class that is distinguished by the possession of hair or fur, the secretion of milk by females for the nourishment of the young, and (typically) the birth of live young.

wnb

- **Derivationally related to (different part-of-speech):**

1 of 3 senses of virus

Sense 1

virus#1 -- ((virology) ultramicroscopic infectious agent that replicates itself only within cells of living hosts; many are pathogenic; a piece of nucleic acid (DNA or RNA) wrapped in a thin coat of protein)

RELATED TO->(adj) viral#1#1

=> viral#1 -- (relating to or caused by a virus; "viral infection")

2 of 8 senses of cat

Sense 3

cat#3

RELATED TO->(adj) catty#1#1
=> bitchy#1, catty#1, cattish#1

Sense 5

cat-o'-nine-tails#1, cat#5

RELATED TO->(verb) cat#1#1
=> cat#1

wnb

- verb *ski*: denominal

Search Word: **ski**

Searches for **ski**: Noun Verb Set

The noun **ski** has 1 sense (no senses from tagged texts)

1. **ski** -- (narrow wood or metal or plastic runners used in pairs for gliding over snow)

The verb **ski** has 1 sense (no senses from tagged texts)

1. **ski** -- (move along on skis; "We love to ski the Rockies"; "My children don't ski")

wnb

- But language is highly productive, WordNet pre-dates Facebook.

The screenshot shows a search interface for the word 'friend'. The search term 'friend' is entered in the search bar. The dropdown menu indicates the part of speech is 'Noun'. To the right, there is a 'Senses:' button. Below the search bar, a message states 'The noun friend has 5 senses (first 3 from tagged texts)'. A numbered list follows, detailing five distinct senses of the word 'friend':

1. (169) **friend** -- (a person you know well and regard with affection and trust; "he was my best friend at the university")
2. (1) ally, **friend** -- (an associate who provides cooperation or assistance; "he's a good ally in fight")
3. (1) acquaintance, **friend** -- (a person with whom you are acquainted; "I have trouble remembering the names of all my acquaintances"; "we are friends of the family")
4. supporter, protagonist, champion, admirer, booster, **friend** -- (a person who backs a politician or a team etc.; "all their supporters came out for the game"; "they are friends of the library")
5. **Friend**, Quaker -- (a member of the Religious Society of Friends founded by George Fox (the Friends have never called themselves Quakers))

wnb

- Domain/Domain Terms:

The "**Domain**" and "**Domain Terms**" searches show the domain that a synset has been classified in and, conversely, all of the terms that have been assigned to a specific domain. A domain is either a **TOPIC**, **REGION** or **USAGE**, as reflected in the specific pointer character stored in the database, and displayed in the output. A **Domain** search on a term shows the domain, if any, that each synset containing *searchstr* has been classified in. The output display shows the domain type (**TOPIC**, **REGION** or **USAGE**), followed by the syntactic category of the domain synset and the terms in the synset. Each term is followed by # *n* where *n* indicates the WordNet sense number of the term. The converse search, **Domain Terms**, shows all of the synsets that have been placed into the domain *searchstr*, with analogous markers.

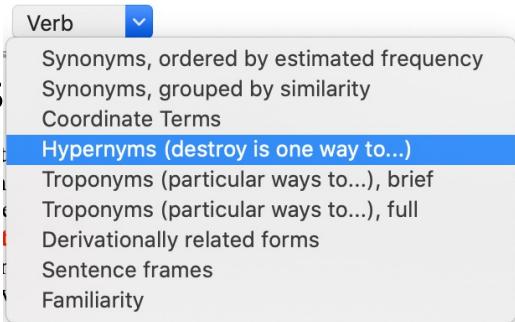
wnb

- Domain/Domain Terms:

	<p>1 of 3 senses of virus</p>
Domain	<p>Sense 1 virus#1 -- ((virology) ultramicroscopic infectious agent that replicates itself only within cells of living hosts; many are pathogenic; a piece of nucleic acid (DNA or RNA) wrapped in a thin coat of protein) TOPIC->(noun) virology#1</p>
Domain Term	<p>1 of 3 senses of virus</p> <p>Sense 1 virus#1 -- ((virology) ultramicroscopic infectious agent that replicates itself only within cells of living hosts; many are pathogenic; a piece of nucleic acid (DNA or RNA) wrapped in a thin coat of protein) TOPIC TERM->(noun) virion#1 TOPIC TERM->(noun) rheumatoid arthritis#1, atrophic arthritis#1, rheumatism#2 TOPIC TERM->(noun) inoculant#1, inoculum#1</p>
	<p>Sense 6 Caterpillar#2, cat#6 USAGE->(noun) slang#2, cant#3, jargon#1, lingo#1, argot#1, patois#1, vernacular#1 USAGE->(noun) trademark#2</p>

wnb

- Verbs



destroy (one way to):

- destroy#1 => unmake#1, undo#2
- destroy#3 => get the better of#1, overcome#1, defeat#1
- destroy#4 => kill#1

The verb **destroy** has 4 senses (first 3 from tagged texts)

1. (42) **destroy**#1, destruct#2 -- (do away with, cause the destruction or undoing of; "The fire destroyed the house")
2. (28) **destroy**#2, ruin#1 -- (destroy completely; damage irreparably; "You have ruined my car by pouring sugar in the tank!"; "The tears ruined her make-up")
3. (2) demolish#3, **destroy**#3 -- (defeat soundly; "The home team demolished the visitors")
4. **destroy**#4, put down#6 -- (put (an animal) to death; "The customs agents destroyed the dog that was found to be rabid"; "the sick cat had to be put down")

wnb

- **Troponyms** (particular ways to *destroy#v#2*):
 - e.g. you have *ruined* my car!

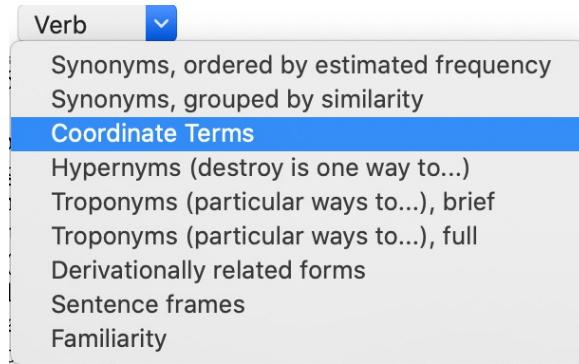
Sense 2

destroy#2, ruin#1 -- (destroy completely; damage irreparably; "You have ruined my car by pouring sugar in the tank!"; "The tears ruined her make-up")

=> burn#1, fire#8, burn down#2 -- (destroy by fire; "They burned the house and his diaries")
=> backfire#3 -- (set a controlled fire to halt an advancing forest to prairie fire)
=> cremate#1 -- (reduce to ashes; "Cremate a corpse")
=> torch#1 -- (burn maliciously, as by arson; "The madman torched the barns")
=> scorch#3 -- (destroy completely by or as if by fire; "The wildfire scorched the forest and several homes"; "the invaders scorched the land")
=> lay waste to#1, waste#9, devastate#1, desolate#3, ravage#2, scourge#3 -- (cause extensive destruction or ruin utterly; "The enemy lay waste to the countryside after the invasion")
=> ruin#4 -- (reduce to ruins; "The country lay ruined after the war")
=> harry#2, ravage#1 -- (make a pillaging or destructive raid on (a place), as in wartimes)
=> break#50 -- (find a flaw in; "break an alibi"; "break down a proof")
=> break#4, bust#1 -- (ruin completely; "He busted my radio!")
=> break down#6 -- (cause to fall or collapse)
=> vandalize#1, vandalise#1 -- (destroy wantonly, as through acts of vandalism; "vandalize the park")
=> key#3 -- (vandalize a car by scratching the sides with a key; "His new Mercedes was keyed last night in the parking lot")
=> do a job on#1 -- (destroy completely or make ugly or useless; "The dog did a job on my pillow"; "The seamstress did a job on my wedding gown")
=> subvert#4 -- (destroy completely; "we must not let our civil liberties be subverted by the current crisis")
=> get#32 -- (overcome or destroy; "The ice storm got my hibiscus"; "the cat got the goldfish")
=> devour#1 -- (destroy completely; "Fire had devoured our home")
=> rape#2, spoil#7, despoil#2, violate#6, plunder#4 -- (destroy and strip of its possession; "The soldiers raped the beautiful country")
=> explode#5 -- (destroy by exploding; "The enemy exploded the bridge")
=> consume#4 -- (destroy completely; "The fire consumed the building")
=> shipwreck#4 -- (destroy a ship; "The vessel was shipwrecked")
=> bust up#1, wreck#1, wrack#1 -- (smash or break forcefully; "The kid busted up the car")
=> kick in#3, kick down#1 -- (open violently; "kick in the doors")
=> wash out#3 -- (wear or destroy by the force of water; "The hail storms had washed out the bridges")

wnb

destroy#v#4



destroy#v#4 –up->
kill#v#1 –down-> ...

destroy#4, put down#6 -- (put (an animal) to death; "The customs agents destroyed the dog that was found to be rabid"; "the sick cat had to be put down")
-> kill#1 -- (cause to die; put to death, usually intentionally or knowingly; "This man killed several people when he tried to rob a bank"; "The farmer killed a pig for the holidays")
=> eliminate#3, annihilate#1, extinguish#5, eradicate#1, wipe out#2, decimate#2, carry off#3 -- (kill in large numbers; "the plague wiped out an entire population")
=> decimate#1 -- (kill one in every ten, as of mutineers in Roman armies)
=> drown#4 -- (kill by submerging in water; "He drowned the kittens")
=> massacre#1, slaughter#2, mow down#1 -- (kill a large number of people indiscriminately; "The Hutus massacred the Tutsis in Rwanda")
=> erase#1, wipe out#4 -- (remove from memory or existence; "The Turks erased the Armenians in 1915")
=> butcher#1, slaughter#1 -- (kill (animals) usually for food consumption; "They slaughtered their only goat to survive the winter")
=> poison#2 -- (kill with poison; "She poisoned her husband")
=> stone#1, lapidate#1 -- (kill by throwing stones at; "People wanted to stone the woman who had a child out of wedlock")
=> poison#4 -- (kill by its poison; "These mushrooms can poison")
=> commit suicide#1 -- (kill oneself; "the terminally ill patient committed suicide")
=> dispatch#5 -- (kill without delay; "the traitor was dispatched by the conspirators")
=> zap#2, vaporize#1 -- (kill with or as if with a burst of gunfire or electric current or as if by shooting; "in this computer game, space travellers are vaporized by aliens")
=> sacrifice#2 -- (kill or destroy; "The animals were sacrificed after the experiment"; "The general had to sacrifice several soldiers to save the regiment")
=> take off#8 -- (prove fatal; "The disease took off")
=> tomahawk#2 -- (kill with a tomahawk)
=> destroy#4, put down#6 -- (put (an animal) to death; "The customs agents destroyed the dog that was found to be rabid"; "the sick cat had to be put down")
=> saber#2, sabre#2 -- (kill with a saber)
=> overlie#2, overlay#2 -- (kill by lying on; "The sow overlay her piglets")
=> brain#2 -- (kill by smashing someone's skull)
=> put away#5, put to sleep#2 -- (kill gently, as with an injection; "the cat was very ill and we had to put it to sleep")
=> neutralize#4, neutralise#1, liquidate#1, waste#5, knock off#1, do in#1 -- (get rid of (someone who may be a threat) by killing; "The mafia liquidated the informer"; "the double agent was neutralized")
=> exterminate#1, kill off#1 -- (kill en masse; kill on a large scale; kill many; "Hitler wanted to exterminate the Jews, Gypsies, Communists, and homosexuals of Europe")
=> smother#2, asphyxiate#1, suffocate#1 -- (deprive of oxygen and prevent from breathing; "Othello smothered Desdemona with a pillow"; "The child suffocated herself with a plastic bag that the parents had left on the floor")
=> strangle#1, strangulate#1, throttle#2 -- (kill by squeezing the throat of so as to cut off the air; "he tried to strangle his opponent"; "A man in Boston has been strangling several dozen prostitutes")
=> decapitate#1, behead#1, decollate#1 -- (cut the head of; "the French King was beheaded during the Revolution")
=> impale#2, stake#5 -- (kill by piercing with a spear or sharp pole; "the enemies were impaled and left to die")
=> dismember#1 -- (separate the limbs from the body; "the tiger dismembered the tourist")
=> martyr#1 -- (kill as a martyr; "Saint Sebastian was martyred")
=> shed blood#1 -- (kill violently; "They will never stop shedding the blood of their enemies")
=> murder#1, slay#1, hit#11, dispatch#3, bump off#1, off#1, polish off#2, remove#7 -- (kill intentionally and with premeditation; "The mafia boss ordered his enemies murdered")
=> assassinate#1 -- (murder; especially of socially prominent persons; "Anwar Sadat was assassinated because many people did not like his peace politics with Israel")
=> execute#1, put to death#1 -- (kill as a means of socially sanctioned punishment; "In some states, criminals are executed")
=> draw#23, quarter#2, draw and quarter#1 -- (pull (a person) apart with four horses tied to his extremities, so as to execute him; "in the old days, people were drawn and quartered for certain crimes")
=> lynch#1 -- (kill without legal sanction; "The blood-thirsty mob lynched the alleged killer of the child")
=> shoot#2, pip#1 -- (kill by firing a missile)
=> electrocute#2, fry#3 -- (kill by electrocution, as in the electric chair; "The serial killer was electrocuted")

wnb

nothing for destroy#v#4

Verb

- Synonyms, ordered by estimated frequency
- Synonyms, grouped by similarity
- Coordinate Terms
- Hypernyms (destroy is one way to...)
- Troponyms (particular ways to...), brief
- Troponyms (particular ways to...), full
- Derivationally related forms
- Sentence frames
- Familiarity

destroy#v#3 -down-> ...

3 of 4 senses of destroy

Sense 1

destroy#1, **destruct**#2 -- (do away with, cause the destruction or undoing of; "The fire destroyed the house")
=> kill#15 -- (destroy a vitally essential quality of or in; "Eating artichokes kills the taste of all other foods")
=> extinguish#4, eliminate#1, get rid of#2, do away with#1 -- (terminate, end, or take out; "Let's eliminate the course on Akkadian hieroglyphics"; "Socialism extinguished these archaic customs"; "eliminate my debts")
=> self-destruct#1, self-destroy#1 -- (do away with oneself or itself; "The machine will self-destruct if you tamper with it")
=> destruct#1 -- (destroy (one's own missile or rocket); "The engineers had to destruct the rocket for safety reasons")
=> end#4 -- (put an end to; "The terrible news ended our hopes that he had survived")
=> fracture#2 -- (interrupt, break, or destroy; "fracture the balance of power")
=> wipe out#3, sweep away#1 -- (eliminate completely and without a trace; "The old values have been wiped out")
=> interdict#1 -- (destroy by firepower, such as an enemy's line of communication)
=> demolish#1, pulverize#2, pulverise#1 -- (destroy completely; "the wrecking ball demolished the building"; "demolish your enemies"; "pulverize the rebellion before it gets out of hand")
=> disassemble#1, dismantle#2, take apart#1, break up#8, break apart#1 -- (take apart into its constituent pieces)
=> level#2, raze#1, rase#1, dismantle#1, tear down#1, take down#3, pull down#1 -- (tear down so as to make flat with the ground; "The building was levelled")
=> uproot#2, eradicate#2, extirpate#1, root out#2, exterminate#2 -- (destroy completely, as if down to the roots; "the vestiges of political democracy were soon uprooted" "root out corruption")
=> dilapidate#1 -- (bring into a condition of decay or partial ruin by neglect or misuse)
=> demyelinate#1 -- (destroy the myelin sheath of; "the disease demyelinated the nerve fibers")

Sense 2

destroy#2, **ruin**#1 -- (destroy completely; damage irreparably; "You have ruined my car by pouring sugar in the tank!"; "The tears ruined her make-up")
=> burn#1, fire#8, burn down#2 -- (destroy by fire; "They burned the house and his diaries")
=> lay waste to#1, waste#9, devastate#1, desolate#3, ravage#2, scourge#3 -- (cause extensive destruction or ruin utterly; "The enemy lay waste to the countryside after the invasion")
=> harry#2, ravage#1 -- (make a pillaging or destructive raid on (a place), as in wartimes)
=> break#50 -- (find a flaw in; "break an alibi"; "break down a proof")
=> break#4, bust#1 -- (ruin completely; "He busted my radio!")
=> vandalize#1, vandalise#1 -- (destroy wantonly, as through acts of vandalism; "vandalize the park")
=> do a job on#1 -- (destroy completely or make ugly or useless; "The dog did a job on my pillow"; "The seamstress did a job on my wedding gown")
=> subvert#4 -- (destroy completely; "we must not let our civil liberties be subverted by the current crisis")
=> get#32 -- (overcome or destroy; "The ice storm got my hibiscus"; "the cat got the goldfish")
=> devour#1 -- (destroy completely; "Fire had devoured our home")
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=> explode#5 -- (destroy by exploding; "The enemy exploded the bridge")
=> consume#4 -- (destroy completely; "The fire consumed the building")
=> shipwreck#4 -- (destroy a ship; "The vessel was shipwrecked")
=> bust up#1, wreck#1, wrack#1 -- (smash or break forcefully; "The kid busted up the car")
=> kick in#3, kick down#1 -- (open violently; "kick in the doors")
=> wash out#3 -- (wear or destroy by the force of water; "The hail storms had washed out the bridges")

Sense 3

demolish#3, **destroy**#3 -- (defeat soundly; "The home team demolished the visitors")
=> smash#9 -- (overthrow or destroy (something considered evil or harmful); "The police smashed the drug ring after they were tipped off")
=> swallow#2 -- (engulf and destroy; "The Nazis swallowed the Baltic countries")
=> cut to ribbons#1 -- (defeat totally; "We must cut the other team to ribbons!")

wnb

destroy#v#3 -up->
get_the_better_of#1
-down-> ...

Verb

- Synonyms, ordered by estimated frequency
- Synonyms, grouped by similarity
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- Troponyms (particular ways to...), brief
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destroy#v#3 -down-> ...

Sense 3

- demolish#3, **destroy**#3 -- (defeat soundly; "The home team demolished the visitors")
=> get the better of#1, overcome#1, defeat#1 -- (win a victory over; "You must overcome all difficulties"; "defeat your enemies"; "He overcame his shyness"; "He overcame his infirmity"; "Her anger got the better of her and she blew up")
=> demolish#3, destroy#3 -- (defeat soundly; "The home team demolished the visitors")
=> beat#1, beat out#1, crush#3, shell#6, trounce#2, vanquish#1 -- (come out better in a competition, race, or conflict; "Agassi beat Becker in the tennis championship"; "We beat the competition"; "Harvard defeated Yale in the last football game")
=> wallop#2 -- (defeat soundly and utterly; "We'll wallop them!")
=> down#3 -- (bring down or defeat (an opponent))
=> overrun#4 -- (seize the position of and defeat; "the Crusaders overran much of the Holy Land")
=> lurch#5, skunk#1 -- (defeat by a lurch)
=> rout#1, rout out#3, expel#3 -- (cause to flee; "rout out the fighters from their caves")
=> upset#6 -- (defeat suddenly and unexpectedly; "The foreign team upset the local team")
=> nose#6 -- (defeat by a narrow margin)
=> conquer#3 -- (overcome by conquest; "conquer your fears"; "conquer a country")
=> survive#2, pull through#1, pull round#1, come through#3, make it#1 -- (continue in existence after (an adversity, etc.); "He survived the cancer against all odds")

Sense 3

- demolish#3, **destroy**#3 -- (defeat soundly; "The home team demolished the visitors")
=> smash#9 -- (overthrow or destroy (something considered evil or harmful); "The police smashed the drug ring after they were tipped off")
=> swallow#2 -- (engulf and destroy; "The Nazis swallowed the Baltic countries")
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wnb

Verb ▾

Synonyms, ordered by estimated frequency

Synonyms, grouped by similarity

Coordinate Terms

Hypernyms (destroy is one way to...)

Troponyms (particular ways to...), brief

Troponyms (particular ways to...), full

Derivationally related forms

Sentence frames

Familiarity

Sense 1

destroy#1, destruct#2 -- (do away with, cause the destruction or undoing of; "The fire destroyed the house")

RELATED TO->(adj) destructible#1#1

=> destructible#1 -- (easily destroyed; "destructible glassware")

RELATED TO->(adj) destructive#1#1

=> destructive#1 -- (causing destruction or much damage; "a policy that is destructive to the economy"; "destructive criticism")

RELATED TO->(noun) destruction#1#1

=> destruction#1, devastation#5 -- (the termination of something by causing so much damage to it that it cannot be repaired or no longer exists)

RELATED TO->(noun) destroyer#2#2

=> destroyer#2, ruiner#1, undoer#3, waster#2, uprooter#1 -- (a person who destroys or ruins or lays waste to; "a destroyer of the environment"; "jealousy was his undoer"; "uprooters of gravestones")

RELATED TO->(noun) destroyer#1#1

=> destroyer#1, guided missile destroyer#1 -- (a small fast lightly armored but heavily armed warship)

Senses:

- **destroy#v#1:** *fire destroyed the house*
- **destroy#v#2:** *you have ruined the house*
- **destroy#v#3:** *UA destroyed UCLA*
- **destroy#v#4:** *she destroyed the rabid bat*

wnb

Verb ▾

Synonyms, ordered by estimated frequency

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Coordinate Terms

Hypernyms (destroy is one way to...)

Troponyms (particular ways to...), brief

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Senses:

- **destroy#v#1:** *fire destroyed the house*
- **destroy#v#2:** *you have ruined the house*
- **destroy#v#3:** *UA destroyed UCLA*
- **destroy#v#4:** *she destroyed the rabid bat*

Sense 2

destroy, ruin -- (destroy completely; damage irreparably; "You have ruined my car by pouring sugar in the tank!"; "The tears ruined her make-up")

RELATED TO->(adj) **destructible#1**

=> **destructible** -- (easily destroyed; "destructible glassware")

RELATED TO->(noun) **destruction#2**

=> **destruction**, demolition, wipeout -- (an event (or the result of an event) that completely destroys something)

RELATED TO->(noun) **destruction#1**

=> **destruction**, devastation -- (the termination of something by causing so much damage to it that it cannot be repaired or no longer exists)

RELATED TO->(noun) **destroyer#2**

=> **destroyer**, ruiner, undoer, waster, uprooter -- (a person who destroys or ruins or lays waste to; "a destroyer of the environment"; "jealousy was his undoer"; "uprooters of gravestones")

RELATED TO->(noun) **destroyer#1**

=> **destroyer**, guided missile destroyer -- (a small fast lightly armored but heavily armed warship)