The Universal Networking Language (UNL) Specifications Version 1.5

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Introduction

The Universal Networking Language (UNL) is a electronic language for describing, summarizing, refining, storing and disseminating information in a machine- and natural-language-independent form.

System architecture

The UNL system

The UNL system is a set of interrelated modules for the extraction, storage, retrieval and expression of information.

Extraction of information

Extraction of information from natural-language text is carried out (semi-)automatically by a module called an "enconverter" which transforms a text into a UNL document with the help of a humans or by a human technician who does the same with the aid of a UNL editor.
The UNL editor combines modules for enconverting and deconverting between a given language and the UNL, providing the user with tools to provide feedback about how accurate the UNL document is and to modify it until it is precise enough for the user's needs.

Storage and processing of information

Storage of information is in the form of an archive of UNL documents: the UNL Document Base. This is an archive of human-language-independent information all represented in the same format: the UNL.
Other modules of the UNL system maintain full list of Universal Words(UWs) which express concepts. This UW maintenance tool is accessible by e-mail and is called the "UW Gate". Use of this tool makes expansion of the concept inventory more efficient.
Another important tool is that which maintains the ontology or conceptual hierarchy. This tool is accessible by e-mail and is called the "KB Gate". The conceptual hierarchy plays a central role in locating new concepts on the epistemological "map" of existing concepts and again makes expansion of the concept inventory more efficient.

Retrieval of information

Search engines are being developed to take advantage of the specific properties of the UNL for optimizing search over the document base. Rather than searching for natural language character strings, this system will search for UNL expressions, regardless of the human language they were derived from. The UNL language serves as the interface between the document base and the search engines: the result of a search or retrieval operation is a UNL

document.

Expression of information

Deconverting or generation of human-language text is carried out automatically by a module called a "deconverter". This module transforms a UNL document into a text in whatever language there is a deconverter for. The same UNL document can simultaneously be routed to different users for viewing in their respective languages, with deconverting on reception.
Another module, called the UNL viewer, manages the existing human-language versions of given UNL document, for viewing in whatever language is desired.

In all cases, the interface is the UNL language specified here: it defines the interface between the enconverters and deconverters for different human languages and also for operations on the resulting archive of UNL Documents.

The UNL language

The UNL represents information, i.e. meaning, sentence by sentence for each sentence of a given text. Sentence information is represented as a hyper-graph having concepts as nodes and relations as arcs. This hyper-graph is also represented a set of directed binary relarions, each between two of the concepts present in the sentence.
Concepts are represented as character-strings called "Universal Words(UWs)". UWs can be annotated with attributes which provide further information about how the concept is being used in the specific sentence where it was found.
The conceptual relations that build structures out of UW concepts are signaled in natural language texts by different grammatical means: word order, suffixes, agreement, etc. for different languages. The UNL tools for each language define a systematic mapping between the grammatical clues of that language and the UNL relations that they signal.
A UNL document, then, will be a long list of relations between the concepts cited in the natural-language text it was generated from, independently of the specific language it was in or of the specific grammatical mechanisms used for their expression.
It is important to understand that the UNL does not provide a single way of representing a given meaning. Rather, it provides tools and an environment for exploring different alternatives for conceptual representations that are adequate for a wide variety of languages. During the development effort, sub-languages or "dialects" of the UNL will surely arise. The best of them will become de facto standards for the development community.

The Role of English in the UNL

The role of English in the UNL is limited. English-language labels are used for the relation-labels, UWs and attributes of the system. For the simple reason that almost all possible developers of the UNL will have access to English-language dictionaries, English is used as the language of communication for the project. Many of the relation-labels and UWs denote things that are not at all common in the English language or in Anglo-American culture.

Relations

Binary relations are the building blocks of UNL documents. They are made up of a conceptual relation and two UWs, with some added mechanisms for making notations on the relation or UWs. Binary relations often stand alone, but just as often can be grouped together in different ways. This section deals with the definition and interpretation of the types of conceptual relations that are used as the basis of the UNL and knowledge base relations that are used to build up a knowledge base.

Because of their similarity in name and function to "case relations" and "UWs" or "valences" in linguistics, and their close relation in practice to some grammatical structures, it may seem that the labels used for these conceptual relations are different names for special grammatical functions. This is emphatically not the case. The intention is that the labels used denote specific ideas rather than grammatical structures: the idea of "something that initiates an event," or "agent" for example, is quite different from "grammatical subject of a sentence", even though many times the subject of a sentence in English will indicate the agent of the event. The agent of an event may also appear as an adjective or noun modifier, with the preposition "by" or embedded in nouns with "er" suffixes in English. The whole point of the conceptual relations is to have a name for these very different grammatical structures which are conceptually quite the same. Thus, the conceptual relations used here are much more abstract than the grammatical relations found in sentences.

The conceptual relations between UWs in binary relations have different labels according to the different roles they play. These Relation-Labels are listed and defined below. Conventions for syntax notation are found in Appendix 1.

Internal structure of Binary relations

Binary relations are made up as follows:

<Binary Relation> ::= <Relation Label> [":"<Compound UW-ID>]
"(" {<UW1>|":" <Compound UW-ID>} "," {<UW2>|":"<Compound UW-ID>} ")"

These elements will be defined in the paragraphs below.

Example binary relations are:

mod:01(area(icl>place):02.@indef, strategic)
obj(designate(icl>event).@entry.@pred.@may, :01)
ppl(read(icl>event), home)

Relation-Labels

Relation-labels are strings of three lower-case alphabetic characters taken from the closed inventory listed below. Examples are the elements in bold face type below:

mod:01(area(icl>place):02.@indef, strategic)
obj(designate(icl>event).@entry.@pred.@may, :01)
ppl(read(icl>event), home)

Compound UW-IDs

Compound UW-IDs are digits (":" followed by two digits) used to define compound UWs which are groups of binary relations(called "Scope-Nodes") so that they can be referred to as a unit. Examples are the elements in bold face type below. The first example is an instance of compound UW-IDs being used to define a unit; the second example is an instance of compound UW-IDs being used to cite or refer to a compound UW previously defined. See Compound UWs for further information.

mod**:01**(area(icl>place):02.@indef, strategic)
obj(designate(icl>event).@entry.@pred.@may, **:01**)
ppl(read(icl>event), home(icl>place))

Note that the ":02" in the first example is NOT a Compound UW-IDs are either attached directly to Relation-Labels or appear alone, as UWs. See Instance IDs for further information.

UWs

UWs can be UWs or compound UWs. Examples are the six elements in bold face type below. Non-standard formatting has been used to make them clearer.

mod:01(**area(icl>place):02.@indef**, **strategic**)
ppl(**read(icl>event)**, **home(icl>place)**)
obj(**designate(icl>event).@entry.@pred.@may**, :01)

Conceptual relations

Conceptual relations and UWs are components of informational structures called events, states, facts, assertions, etc., which can be represented by one or more binary relations. Conceptual relations are informationally distinct and represent identifiable, general, recurring relations between the UWs cited in sentences. In the UNL, conceptual relations are represented as three-character strings called "Relation-Labels" and are defined as specified below.

There are many factors to be considered in choosing an inventory of conceptual relations. The choice below reflects the conflicting demands of:

- minimizing the number of relations for the sake of efficiency, making the fewest distinctions necessary, and
- maximizing the number of relations for the sake of ease of description and for building some redundancy into the system.

The selection below represents at attempt to find a compromise between these two principles.

agt (agent)

"Agt" defines a thing in forcus which initiates an event.

agt ({event},{thing})

Syntax
agt[":"<Compound UW-ID>] "(" {<UW1>|":"<Compound UW-ID>} "," {<UW2>|":"<Compound UW-ID>} ")"

Detailed Definition
"Agent" is defined as the relation between:
UW1 - an event, and
UW2 - a thing
where:

- UW2 initiates UW1, or
- UW2 is thought of as having a direct role in making UW1 happen, or
- UW2 can be thought of as "cause" and UW1, "effect".

Examples and readings

agt(break(icl>event), John(icl>human))	John break
agt(save(icl>event), computer(icl>machine))	computer saves …
agt(tell(icl>event), machine(icl>thing))	machine tells …
agt(break(icl>event), explosion(icl>event))	explosion … breaks

Related concepts
Agent is different from co-agent in that agent initiates the event in focus, whereas the co-agent initiates a different, secondary event.
Agent is different from partner in that agent is the focussed initiator of the event, whereas the partner is a non-focussed initiator.
Agent is different from condition in that agent is the focussed initiator of an event, whereas condition is an indirect, usually unfocussed, influence on the event.

and (conjunction)

"And" defines a conjunctive relation between concepts.

and ({concept},{concept})

Syntax
and[":"<Compound UW-ID>] "(" {<UW1>|":"<Compound UW-ID>} "," {<UW2>|":"<Compound UW-ID>} ")"

Detailed definition
"Conjunction" is defined as the relation between:
UW1 – a concept, and
UW2 – a concept,
where:
- The UWs are different, and
- UW1 and UW2 are seen as grouped together, and
- what is said of UW1 is also said of UW2.

Examples and readings

and(easily(icl>manner), quickly(icl>manner))	… easily and quickly
and(think(icl>event), dream(icl>event))	… to think and to dream
and(John(icl>human), Mary(icl>human))	… John and Mary

Related concepts
Conjunction is different from or in that with and we group things together to say the same thing about both of them, whereas with or we separate them to say that what is true about one is not true about the other.
Conjunction is different from cag in that when agents are conjoined both are initiating an explicit event, whereas with cag, the co-agent initiates an implicit event.
Conjunction is different from ptn in that when agents and partners are conjoined both are in focus, whereas with ptn, the partner is not in focus (as compared to the agent).
Conjunction is different from coo and seq in meaning, although many times the same expressions can be used for both. Conjunction only means that terms are grouped together; no information about time is implied. Coo, on the other hand, means that the terms are ordered in time, whether or not they are considered to be grouped together. In turn, seq means very clearly that the terms are ordered in time, one after the other.

aoj (attribute of things)

"Aoj" defines a thing which has an attribute.

aoj ({state},{thing})

Syntax
aoj[":"<Compound UW-ID>] "(" {<UW1>|":"<Compound UW-ID>} "," {<UW2>|":"<Compound UW-ID>} ")"

Detailed definition
"Attribute of things" is defined as the relation between:
UW1 – a characteristic or state, and
UW2 – a thing,
where:
- UW1 is a characteristic or attribute of UW2, or
- UW1 is a state associated with UW2.

Examples and readings

aoj(red(icl>color), leaf(icl>thing)) leaf is red
aoj(available(icl>characteristic), book(icl>thing)) book is available
aoj(nice(icl>characteristic), ski(icl>event)) skiiing is nice

Related Concept

Attribute of things is different from man in that aoj is used for characteristics of events treated as abstract wholes, whereas man is used for characteristics of events treated as concrete changes over time, focussing how the event occurred.

Attribute of things is different from mod in that mod gives some restriction, whereas aoj has the specific interpretation: "characteristic or state of".

bas (basis of comparison)

"Bas" defines a thing used as the basis of comparison for focussed thing.

bas ({state},{thing})

Syntax

bas[":"<Compound UW-ID>] "(" {<UW1>|":"<Compound UW-ID>} "," {<UW2>|":"<Compound UW-ID>} ")"

Detailed definition

"Basis of comparison" is defined as the relation between:
UW1 – a concept of comparison, and
UW2 – a thing,
where:

- UW1 is a concept of comparison, expressing similarity or difference, such as "more", "most", "less", "same", "similar", "like", etc., and
- UW2 is some thing used as the basis of comparison for evaluating characteristics of some other (focussed) thing.

Examples and readings

bas(more(icl>comparison), rat(icl>thing)) …er than rat; more … than rat
bas(like(icl>comparison), star(icl>thing)) … like star
bas(same(icl>comparison), b(icl>thing)) … the same as b

Related concepts

Basis of comparison is different from aoj in that bas is used to describe by reference to something different from the thing described. As well, for bas the second UW is used to characterized some different, focussed thing, whereas for aoj the second UW is in focus.

Basis of comparison is different from per in that for bas the second UW is a thing, whereas for per the second UW is a quantity or a thing seen as a quantity.

cag (co-agent)

"Cag" defines a thing not in focus which initiates an event.

cag ({event},{thing})

Syntax

cag[":"<Compound UW-ID>] "(" {<UW1>|":"<Compound UW-ID>} "," {<UW2>|":"<Compound UW-ID>} ")"

Detailed definition

"Co-agent" is defined as the relation between:
UW1 - an event, and

UW2 - a thing
where:
• There is an implicit event that is independent of, but "accompanies", UW1, and
• UW2 is thought of as initiating the implicit event, and
• UW2 and the implicit event are seen as not being in focus (as compared to the agent's event).

Examples and readings

cag(walk(icl>event), John(icl>human)) … walk with John
cag(live(icl>event),aunt(icl>human)) … lives with aunt
cag(talk(icl>event), machine(icl>thing)) … talk with machine

Related concepts

Co-agent is different from agent in that different, independent events occur for the agent and the co-agent. Moreover, the agent and its event are in focus, while the co-agent and its event are not in focus.
Co-agent is different from the partner in that the co-agent initiates an event that is independent of the agent's event, whereas the partner initiates the same event together with the agent.
Co-agent is different from condition in that the co-agent initiates a non-focussed event, whereas the condition is an indirect influence on the focussed event.

cob (co-object)

"Cob" defines a thing not in focus which is directly affected by an event.

cob ({event},{thing})

Syntax

cob[":"<Compound UW-ID>] "(" {<UW1>|":"<Compound UW-ID>} "," {<UW2>|":"<Compound UW-ID>} ")"

Detailed Definition

"Co-object" is defined as the relation between:
UW1 – an event, and
UW2 – a thing,
where:
• UW2 is not a place, and
• UW2 is thought of as changing its characteristics or location as described by a usually implicit, non-focussed event that is different from UW1 and considered to be its counterpart.

Examples and readings

cob(get(icl>event), money(icl>thing)) … get … for money

Related concepts

Co-object is different from obj in that the obj is in focus, whereas the cob is related to a second, non-focussed event.
Co-object is different from opl in that what is affected by the event is a place rather than other kinds of things.

con (condition)

"Con" defines an non-focused event or state which influences on an focused event or state.

con ({focussed event},{conditioning event})
con ({focussed event},{conditioning state})
con ({focussed state},{conditioning event})
con ({focussed state},{conditioning state})

Syntax
con[":"<Compound UW-ID>] "(" {<UW1>|":" <Compound UW-ID>} "," {<UW2>|":"<Compound UW-ID>} ")"

Detailed definition
"Condition" (or "influence") is defined as the relation between:
UW1 – a focussed event or state, and
UW2 – a conditioning event or state,
where:
• UW1 and UW2 are different and
• UW2 is thought of as having an indirect or "external" role in making UW1 happen, that is as some conditioning or possibilitating (or inhibiting) factor (real or hypothesized) which influences whether or when UW1 can happen.

Examples and readings

aoj:01(green(icl>color), light (icl>thing)) con(go(icl>event), :01)	If light is green, … go
agt:01(arrive(icl>event), Mary(icl>human)) agt:02(collaborate(icl>event), team(icl>human) con(:02, :01)	Because Mary arrive, team collaborate …

Related Concepts
See the related concepts of agent, co-agent and partner.

coo (co-occurrence)

"Coo" defines a co-occurred event or state for a focussed event or state.

coo ({focussed event},{co-occurrence event})
coo ({focussed state},{co-occurrence state})

Syntax
coo[":"<Compound UW-ID>] "(" {<UW1>|":"<Compound UW-ID>} "," {<UW2>|":"<Compound UW-ID>} ")"

Detailed definition
"Co-occurrence" is defined as the relation between:
UW1 – a focussed event or state,
UW2 – a co-occurred event or state,
where:
• UW1 and UW2 are different, and
• UW1 occurs or is true at the same time as UW2.

Examples and readings

coo(leap(icl>event), look(icl>event))	… look as … leap
coo(hot(icl>characteristic), red(icl>color))	… is red while … is hot
coo(run(icl>event), cry(icl>event))	… cry and run

Related concepts
Co-occurrence is different from seq in that seq describes events or states that do not occur at the same time, but one after the other, whereas coo describes events that occur simultaneously.
Co-occurrence is different from tim in that coo relates the times of events or states with other events or states, whereas tim relates events or states directly with points or intervals of time.

exp (experiencer)

"Exp" defines a cognitive thing of an event or state.

exp ({event},{human})
exp ({state},{human})

Syntax
exp[":"<Compound UW-ID>] "(" {<UW1>|":"<Compound UW-ID>} "," {<UW2>|":"<Compound UW-ID>} ")"

Detailed Definition
"Experiencer" is defined as the relation between:
UW1 – an event or state, and
UW2 – a human or non-human, seen-as-cognitive thing,
where:
- UW1 is a subjective or physiological event or state, and
- UW2 is thought of as experiencing, feeling or perceiving UW1, or
- UW2 is thought of as the reference, perspective or point of view for defining UW1, or
- UW2 is thought of as indirectly affected by UW1, as victim or beneficiary, for example.

Examples and readings

exp(feel(icl>event), sick(icl>state))	… feel sick
exp(think(icl>event), Mary(icl>human))	Mary thinks …
exp(difficult(icl>state), John(icl>human))	… is difficult for John

Related concepts
Experiencer is different from obj in that experiencer is related to a subjective or physiological event or state, whereas obj is related to other kinds of events.
Experiencer is different from opl in that for opl what is affected by the event is a place rather than a cognitive thing.

fmt (range:from-to)

"Fmt" defines a range between two things.

fmt ({range-initial thing},{range-final thing})

Syntax
fmt[":"<Compound UW-ID>] "(" {<UW1>|":"<Compound UW-ID>} "," {<UW2>|":"<Compound UW-ID>} ")"

Detailed definition
"Range" ("from-to") is defined as the relation between:
UW1 – a range-initial thing, and
UW2 – a range-final thing,
where:
- The UWs are different, and
- UW2 describes the beginning of a range and UW1 describes the end.

Examples and readings

fmt(a(icl>letter), z(icl>letter))	… from a to z
fmt(Osaka(icl>place), New York(icl>place))	… from Osaka to New York
fmt(Monday(icl>time), Friday(icl>time))	… from Monday to Friday

Related concepts
Range is different from src and gol in that for src and gol the initial and final states of some obj are characterized with respect to some event, whereas fmt makes a similar characterization but without linking the endpoints of a range to some event.
Range is different from plf and plt or tmf and tmt in that fmt defines endpoints of a range without reference to any

sort of event, whereas plf, plt, tmf and tmt delimit events.

gol (goal: final characteristics)

"Gol" defines the final state of object or the thing finally associated with object of an event.

gol({event},{state or thing})

Syntax
gol[":"<Compound UW-ID>] "(" {<UW1>|":"<Compound UW-ID>} "," {<UW2>|":"<Compound UW-ID>} ")"

Detailed definition
"Final characteristics" (or "goal state") is defined as the relation between:
UW1 – an event, and
UW2 – a state or thing,
where:
- UW2 is the specific state describing the obj (of UW1) at the end of UW1, or
- UW2 is a thing that is associated with the obj (of UW1) and the end of UW1.

Examples and readings

gol(go(equ>change), sad(icl>characteristic))	… go … to sad
gol(change(icl>event), red(icl>color))	… change … to red
gol(transform(icl>event), strong(icl>characteristic))	… is transformed … to strong
gol(post(icl>event), account(icl>place))	… post … to account

Related concepts
Final characteristics is different from tmf and plf in that gol describes qualitative characteristics and not time or place. Final characteristics is different from src in that gol describes the characteristics of the obj at the final state of the event.

ins (instrument)

"Ins" defines the instrument to carry out an event.

ins ({event},{concrete thing})

Syntax
ins[":"<Compound UW-ID>] "(" {<UW1>|":"<Compound UW-ID>} "," {<UW2>|":"<Compound UW-ID>} ")"

Detailed definition
"Instrument" is defined as the relation between:
UW1 – an event, and
UW2 – a concrete thing,
where:
- UW2 specifies the concrete thing which is used in order to make UW1 happen.

Examples and readings

ins(look(icl>event), telescope(icl>thing))	… look … with telescope
ins(solve(icl>event), pencil(icl>thing))	… solve … using pencil
ins(separate(icl>event), knife(icl>thing))	… separate … with knife

Related concepts
Instrument is different from man in that man describes an event as a whole, whereas ins characterizes one of the components of the event: the use of the instrument.

Instrument is different from met in that met is used for abstract things (abstract means or methods), whereas ins is used for concrete things.

lpl (logical place)

"Lpl" defines logical or metaphorical place where an event occurs.

lpl ({event},{logical place})

Syntax
lpl[":"<Compound UW-ID>] "(" {<UW1>|":"<Compound UW-ID>} "," {<UW2>|":"<Compound UW-ID>} ")"

Detailed definition
"Logical place" is defined as the relation between:
UW1 – a thing,
UW2 – an abstract or metaphorical thing understood as a place,
where:
- The UWs are different, and
- UW1 is or happens in a place characterized by UW2.

Examples and readings

lpl(cook(icl>event), under(icl>place))	… cook … under pressure
mod(under(icl>place), pressure(icl>characteristic))	
lpl(win(icl>characteristic), competition(icl>event))	… win … in competition
lpl(surf(icl>event), internet(icl>thing))	… surf on internet

Related concepts
Logical place is different from ppl in that the reference place for ppl is concrete, whereas for lpl it is abstract or metaphorical.
Logical place is different from plf and plt or src and gol in that lpl describes a place metaphorically, with respect to an event as a whole, whereas these other relations describe position with respect to parts of an event.
Logical place is different from opl in that lpl is not seen as being modified by an event, merely a reference point for characterizing it, whereas opl is seen as being modified.
Lpl is used for absolute (non-relative) position or location in general.
Relative logical or metaphorical position can best be expressed using bas.

man (manner)

"Man" defines the way to carry out event or characteristics of a state.

man ({event},{manner})
man ({state},{manner})

Syntax
man[":"<Compound UW-ID>] "(" {<UW1>|":"<Compound UW-ID>} "," {<UW2>|":"<Compound UW-ID>} ")"

Detailed definition
"Manner" is defined as the relation between:
UW1 – an event or state,
UW2 – a state or characteristic,
where:
- The UWs are different, and
- UW1 is done in a way characterized by UW2, or
- UW2 is a state associated with (and simultaneous with) UW1.

Examples and readings

man(look(icl>event), quickly(icl>manner))	… look quickly
man(think(icl>event), often(icl>frequency))	… think often …
man(sleep(icl>event), hour(icl>period))	… sleep for hour

Related concepts

Manner is different from ins or met in that met describes how an event is carried out in terms of the instruments or component steps of the event, whereas man describes other quantitative or qualitative characteristics of the event as a whole.

met (method or means)

"Met" defines the means to carry out an event.

met ({event},{abstract thing})

Syntax

met[":"<Compound UW-ID>] "(" {<UW1>|":"<Compound UW-ID>} "," {<UW2>|":"<Compound UW-ID>} ")"

Detailed definition

"Method or means" is defined as the relation between:
UW1 – an event, and
UW2 – an abstract thing,
where:

- UW2 specifies the abstract thing which is used or the steps carried out in order to make UW1 happen.

Examples and readings

met(solve(icl>event), dynamics(icl>theory))	… solve … with dynamics
met(solve(icl>event), algorithm(icl>method))	… solve … using algorithm
met(separate(icl>event), cut(icl>event))	… separate … by cutting …

Related concepts

Method or means is different from man in that man describes an event as a whole, whereas met characterizes the component steps, procedures or instruments of the event.
Method or means is different from ins in that met is used for abstract things (abstract means or methods), whereas ins is used for concrete things.

mod (modification)

"Mod" defines a thing which restrict a focussed thing.

mod ({focussed thing},{thing})

Syntax

mod[":"<Compound UW-ID>] "(" {<UW1>|":"<Compound UW-ID>} "," {<UW2>|":"<Compound UW-ID>} ")"

Detailed definition

"Modification" is defined as the relation between:
UW1 – a focussed thing,
UW2 – a non-focussed thing,
where:

- UW2 restricts UW1 in some way.

Examples and readings
mod(pet(icl>animal), house(icl>thing)) house pet
mod(Bill Gates(icl>human), Microsoft(icl>institution)) Microsoft't Bill Gates
mod(car(icl>thing), I(icl>human)) my car

Related concepts
Modification is different from aoj in that aoj describes something that is literally and explicitly a characteristic of the thing described, whereas mod merely indicates an restriction, which might indirectly suggest some characteristics of the thing described. Most mod relations require a paraphrase introducing some implicit event to become clearer and even then many possibilities are usually available.
Modification is different from man in that UW1 for mod is a thing, whereas for man UW1 is an event or state.

obj (affected thing)

"Obj" defines a thing in focus which is directly affected by an event.

obj ({event},{thing})

Syntax
obj[":"<Compound UW-ID>] "(" {<UW1>|":"<Compound UW-ID>} "," {<UW2>|":"<Compound UW-ID>} ")"

Detailed Definition
"Affected thing" is defined as the relation between:
UW1 – an event, and
UW2 – a (concrete or abstract) thing,
where:
• UW2 is not a place, and
• UW2 is thought of as changing its characteristics or location as described by UW1, or
• UW2 is what UW1 is about or refers to, when UW1 is a "symbolic event" of perception, cognition, emotion, or communication.

Examples and readings
obj(move(icl>event), table(icl>thing)) table move
obj(melt(icl>event), snow(icl>substance)) … move table
obj(think(icl>event), Mary(icl>human)) … think of Mary

Related concepts
Affected thing is different from cob in that the obj is in focus, whereas the cob is related to a second, non-focussed event.
Affected thing is different from exp in that obj is the topic of a symbolic event, whereas exp is the human (or human-like thing) where the symbolic event occurs.
Affected thing is different from opl in that obj is not seen as a place, whereas opl is seen as a place.

opl (affected place)

"Opl" defines a place in focus where an event affects.

opl ({event},{place})

Syntax
opl[":"<Compound UW-ID>] "(" {<UW1>|":"<Compound UW-ID>} "," {<UW2>|":"<Compound UW-ID>} ")"

Detailed Definition
"Affected place" (or "obj-like place") is defined as the relation between:

UW1 – an event, and
UW2 – a place or thing defining a place,
where:
• UW2 is the specific place where the change described by UW1 is directed, or
• UW2 is a place that is seen as being modified during the event, and
• UW2 is usually a part of the thing cited as obj; both the obj and the opl are modified during the event.

Examples and readings

opl(look(icl>event), eye(icl>thing))	… look … in eye
opl(pat(icl>event), shoulder(icl>thing))	… pat … on shoulder
opl(cut(icl>event), middle(icl>place))	… cut … in middle

Related concepts
Affected place is different from obj, cob and exp in that what is affected by the event is a place rather than other kinds of things.
Affected place is different from ppl or lpl in that the Affected place is modified during the event, while the physical and logical place define the environment in which the event happens.

or (disjunction)

"Or" defines disjunctive relation between two concepts.

or ({concept},{concept})

Syntax
opl[":"<Compound UW-ID>] "(" {<UW1>|":"<Compound UW-ID>} "," {<UW2>|":"<Compound UW-ID>} ")"

Detailed definition
"Disjunction" is defined as the relation between:
UW1 – a concept, and
UW2 – a concept,
where:
• The UWs are different, and
• Some description is true for either UW1 or UW2 (but not both), or
• Some description is true for either UW1 or UW2 (and perhaps both).

Examples and readings

or(stay(icl>event), leave(icl>event))	… stay or leave
or(red(icl>color), blue(icl>color))	… red or blue
or(John(icl>human), Jack(icl>human))	… John or Jack

Related concepts
Disjunction is different from conjunction in that the disjunction things are grouped in order to say that something is true for one or the other, whereas in conjunction they are grouped to say that the same is true for both. Disjunction in formal logic permits three situations for a disjunction to be true: 1) it is true for UW1, 2) it is true for UW2, 3) it is true for both. On the other hand, conjunction only permits the third situation.

per (proportion, rate or distribution)

"Per" defines a basis or unit of proportion, rate or distribution.

per ({thing},{thing as a unit})

Syntax
per[":"<Compound UW-ID>] "(" {<UW1>|":"<Compound UW-ID>} "," {<UW2>|":"<Compound UW-ID>} ")"

Detailed definition
"Proportion, rate or distribution" is defined as the relation between:
UW1 – a quantity,
UW2 – a quantity, or a thing seen as a quantity,
where:
- UW1 and UW2 form a proportion, where UW1 is the numerator and UW2 is the denominator, or
- UW2 is the basis or unit for understanding UW1, or
- Each UW expresses a different dimension, of size, for example.

Examples and readings

per(two(icl>number), day(icl>unit))	… two … per day
per(three(icl>number), four(icl>number))	… three … by four …
per(twice(icl>frequency), week(icl>unit))	… twice a week

Related concepts
Per is different from bas in that bas relates a characteristic or state with a thing that is used as a basis for comparison, whereas per relates a quantity with another quantity that is used to establish a scale or a basis for comparison.

plf (initial place)

"Plf" defines the place an event begins or a state becomes true.

plf ({event or state},{place})

Syntax
plf[":"<Compound UW-ID>] "(" {<UW1>|":"<Compound UW-ID>} "," {<UW2>|":"<Compound UW-ID>} ")"

Detailed definition
"Initial place" (or "place-from") is defined as the relation between:
UW1 – an event or state, and
UW2 – a place or thing defining a place,
where:
- UW2 is the specific place where UW1 started, or
- UW2 is the specific place from where UW1 is true.

Examples and readings

plf(go(icl>event), home(icl>place))	… go from home …
plf(call(icl>event), New York(icl>place))	… call from New York
plf(cut(icl>event), edge(icl>place))	… cut … from edge …
plf(beautiful(icl>characteristic), side(icl>place))	… is beautiful from side …

Related concepts
Initial place is different from ppl and lpl in that ppl and lpl describe events or states taken as wholes, whereas plf describes only the initial part of an event or state.
Initial place is different from plt in that plt describes the final part of an event or state, whereas plf describes the initial part of an event or state.
Initial place is different from src in that plf describes the place where the event began, whereas src describes the initial state of the obj.

plt (final place)

"Plt" defines the place an event ends or a state becomes false.

plt ({event or state},{place})

Syntax
plt[":"<Compound UW-ID>] "(" {<UW1>|":"<Compound UW-ID>} "," {<UW2>|":"<Compound UW-ID>} ")"

Detailed definition
"Final place" (or "place-to") is defined as the relation between:
UW1 – an event or state, and
UW2 – a place or thing defining a place,
where:
- UW2 is the specific place where UW1 ended, or
- UW2 is the specific place where UW2 becomes false.

Examples and readings
plt(sing(icl>event), home(icl>place)) … sing … home …
plt(talk(icl>event), Boston(icl>place)) … talk … until Boston
plt(cut(icl>event), edge(icl>place)) … cut … to edge
plt(beautiful(icl>characteristic), fence(icl>place)) … is beautiful up to fence

Related concepts
Final place is different from ppl and lpl in that ppl and lpl describe events or states taken as wholes, whereas plt describes only the final part of an event.
Final place is different from plf in that plt describes the final part of an event or state, whereas plf describes the initial part of an event.
Final place is different from gol in that plt describes the place where an event or state ended, whereas gol described the final state of the obj.

ppl (physical place)

"Ppl" defines the place an event occurs or a state is true or a thing exists.

ppl ({event or state or thing},{physical place})

Syntax
ppl[":"<Compound UW-ID>] "(" {<UW1>|":"<Compound UW-ID>} "," {<UW2>|":"<Compound UW-ID>} ")"

Detailed definition
"Physical place" is defined as the relation between:
UW1 – a (concrete or abstract) thing,
UW2 – a physical place or concrete thing understood as a place,
where:
- The UWs are different, and
- UW1 is or happens in a place characterized by UW2.

Examples and readings
ppl(cook(icl>event), kitchen(icl>thing)) … cook … in kitchen
ppl(sit(icl>event), beside(icl>relative place)) … sit beside …
ppl(red(icl>characteristic), bottom(icl>thing)) … red on bottom

Related concepts
Physical place is different from lpl in that the reference place for ppl is concrete or physical, whereas for lpl it is abstract, logical or metaphorical.

Physical place is different from plf and plt or src and gol in that ppl describes a place with respect to an event as a whole, whereas these other relations describe position with respect to parts of an event.
Physical place is different from opl in that ppl is not seen as being modified by an event, merely a reference point for characterizing it, whereas opl is seen as being modified.

ptn (partner)

"Ptn" defines indispensable non-focused initiator of an event

ptn ({event},{thing})

Syntax
ptn[":"<Compound UW-ID>] "(" {<UW1>|":"<Compound UW-ID>} "," {<UW2>|":"<Compound UW-ID>} ")"

Detailed definition
"Partner" is defined as the relation between:
UW1 - an event, and
UW2 - a human or non-human, seen-as-volitional thing
where:
- UW2 is thought of as having a direct role in making an indispensable part of UW1 happen, and
- UW1 is the same, collaborative event as that initiated by the Agent, and
- UW2 is seen as not being in focus (as compared to the agent).

Examples and redings

ptn(compete(icl>event), John(icl>human))	… compete with John
ptn(share(icl>event),poor(icl>human))	… share … with poor
ptn(collaborate(icl>event), machine(icl>thing))	… collaborate with machine

Related concepts
Partner is different from agent in that the agent and its event are in focus, while the partner and its event are not in focus.
Partner is different from co-agent in that the co-agent initiates an event that is independent of the agent's event, whereas the partner initiates the same event together with the agent.
Partner is different from condition in that the partner initiates the same event as the agent does whereas the condition is only an indirect influence on that event.

pur (purpose or objective)

"Pur" defines the purpose or objectives of agent of an event or the purpose of a thing exist.

pur ({event},{event})
pur ({event},{thing})
pur ({thing},{event})
pur ({thing},{thing})

Syntax
pur[":"<Compound UW-ID>] "(" {<UW1>|":"<Compound UW-ID>} "," {<UW2>|":"<Compound UW-ID>} ")"

Detailed definition
"Purpose or objective" is defined as the relation between:
UW1 – a thing or an event, and
UW2 – a thing or an event,
where:
- The UWs are different, and

When UW1 is an event:
• UW2 specifies the agent's purpose or objectives, or
• UW2 specifies the thing (object, state, event, etc.) that the agent desires to attain by carrying out UW1, or
• UW1 is done so that the agent can get/receive/acquire UW2.
When UW1 is not an event:
• UW2 is what UW1 is to be used for.

Examples and readings

pur(come(icl>event), see(icl>event))	… come to see
pur(work(icl>event), money(icl>thing))	… work for money
pur(budget(icl>money), research(icl>event))	… budget for research

Related concepts
Purpose or objective is different from gol in that pur describes the desires of the agent, whereas gol describes the state of the obj at the end of the event.
Purpose or objective is different from man and met in that pur describes the reason why the event is being carried out, while man and met describe how it is being carried out.

qua (quantity)

"Qua" defines quantity of a thing or unit.

qua ({thing},{quantifier})
qua ({unit},{quantifier})

Syntax
qua[":"<Compound UW-ID>] "(" {<UW1>|":"<Compound UW-ID>} "," {<UW2>|":"<Compound UW-ID>} ")"

Detailed definition
"Quantity" is defined as the relation between:
UW1 – a (concrete or abstract) thing or unit, and
UW2 – a quantifier,
where:
• UW2 is the number or amount of UW1.

Examples and readings

qua(block(icl>thing), 3(icl>number))	three blocks of ice
mod(ice(icl>substance), block(icl>thing))	
qua(kilo(icl>unit), many(icl>quantity))	many kilos …
qua(truckload(icl>unit), 7(icl>quantity))	seven truckload …

Related concepts
Quantity is different from per in that quantity is absolute number or amount, whereas per is number or amount relative to some unit of reference (time, distance, etc.).
Quantity is also used to express iteration, or number of times an event or state occurs.

seq (sequence)

"Seq" defines a prior event or state of a focused event or state.

seq ({focused event},{prior event})
seq ({focused state},{prior state})

Syntax
seq[":"<Compound UW-ID>] "(" {<UW1>|":"<Compound UW-ID>} "," {<UW2>|":"<Compound UW-ID>} ")"

Detailed definition
"Sequence" is defined as the relation between:
UW1 – a focussed event or state,
UW2 – a prior event or state,
where:
• The UWs are different, and
• UW1 occurs or is true after UW2.

Examples and readings

seq(leap(icl>event), look(icl>event))	… look before leaping
seq(green(icl>color), red(icl>color))	… was red before … was green

Related concepts
Sequence is different from coo in that seq describes events or states that do not occur at the same time, but one after the other, whereas coo describes events that occur simultaneously.
Sequence is different from bas in that seq describes events or states in terms of order in time, whereas bas describes things or states in terms of qualitative differences or similarities.

smd (not conceptually related)

"Smd" defines not conceptually related concept for focussed concept.

smd ({focussed concept},{concept})

Syntax
smd[":"<Compound UW-ID>] "(" {<UW1>|":"<compound UW-ID>} "," {<UW2>|":"<Compound UW-ID>} ")"

Detailed definition
"Not conceptually related" is defined as the relation between:
UW1 – a concrete or abstract thing, and
UW2 – a concrete or abstract thing,
where:
• The UWs are different, and
• UW1 is not conceptually related to UW2, or
• UW2 is something arbitrarily associated with UW1.

Examples and readings

smd(item(icl>thing), "C3"))	… item C3
smd(step(icl>event), 16(icl>number))	16. Step …

src (initial characteristics)

"Src" defines the initial state of object or the thing initially associated with object of an event.

src ({event},{state or thing})

Syntax
src[":"<Compound UW-ID>] "(" {<UW1>|":"<Compound UW-ID>} "," {<UW2>|":"<Compound UW-ID>} ")"

Detailed definition
"Initial characteristics" (or "source state") is defined as the relation between:
UW1 – an event, and
UW2 – a state or thing,
where:
• UW2 is the specific state describing the obj of UW1 at the beginning of UW1, or
• UW2 is a thing that is associated with the obj of UW1 at the beginning of UW1.

Examples and readings

src(go(equ>change), sad(icl>characteristic))	… go from sad …
src(change(icl>event), red(icl>color))	… change from red
src(transform(icl>event), weak(icl>characteristic))	… is transformed from weak …
src(steal(icl>event), account(icl>place))	… steal … from account

Related concepts
Initial characteristics is different from tmf and plf in that src describes qualitative characteristics and not time or place.
Initial characteristics is different from gol in that gol describes the characteristics of the obj at the final state of the event.

tim (time)

"Tim" defines the time an event occurs or a state is true.

tim ({event or state},{time})

Syntax
tim[":"<Compound UW-ID>] "(" {<UW1>|":"<compound UW-ID>} "," {<UW2>|":"<Compound UW-ID>} ")"

Detailed definition
"Time" is defined as the relation between:
UW1 – an event or state,
UW2 – a (point or interval of) time,
where:
• UW1, taken as a whole, occurs at the time indicated by UW2.

Examples and readings

tim(look(icl>event), Tuesday(icl>time))	… look on Tuesday
tim(red(icl>event), morning(icl>time))	… red in morning
tim(cut(icl>event), o'clock(icl>time))	… cut … at … o'clock

Related concepts
Time is different from tmf and tmt in that time characterized the event or state as a whole, whereas tmf and tmt describe only parts of the event.
Time is different from coo and seq in that time does not describe states and events relatively, with respect to each other, but with respect to certain points in time.
Duration of events is described using man.

tmf (initial time)

"Time-from" defines a time an event starts or a state become true.

tmf ({event},{time})
tmf ({state},{time})

Syntax
tmf[":"<Compound UW-ID>] "(" {<UW1>|":"<Compound UW-ID>} "," {<UW2>|":"<Compound UW-ID>} ")"

Detailed definition
"Initial time" (or "time-from") is defined as the relation between:
UW1 – an event or state, and
UW2 – a time,
where:
- UW2 specifies the time at which UW1 started, or
- UW2 specifies the time at which UW1 is/was true.

Examples and readings
tmf(look(icl>event), morning(icl>time)) … look since morning
tmf(full(icl>characteristic), noon(icl>time)) … is full at noon

Related concepts
Initial time is different from tim in that tmf expresses the time at the beginning of the event or state whereas tim expresses a time for the event taken as a whole.
Initial time is different from src in that tmf expresses the time at the beginning of the event or state whereas src expresses characteristics of the obj at the beginning of the event.
Initial time is different from tmt in that tmf expresses the time at the beginning of the event or state whereas tmt expresses the time at the end of the event.

tmt (final time)

"Time-to" defines the time an event ends or a state becomes false.

tmt ({event},{time})
tmt ({state},{time})

Syntax
tmt[":"<Compound UW-ID>] "(" {<UW1>|":"<Compound UW-ID>} "," {<UW2>|":"<Compound UW-ID>} ")"

Detailed definition
"Final time" (or "time-to") is defined as the relation between:
UW1 – an event or state, and
UW2 – a time,
where:
- UW2 specifies the time at which UW1 ended, or
- UW2 specifies the time at which UW1 became/becomes false.

Examples and readings
tmt(think(icl>event), morning(icl>time)) … think until moning
tmt(cut(icl>event), noon(icl>time)) … cut until noon
tmt(full(icl>characteristic), tomorrow(icl>time)) … be full until tomorrow

Related concepts
Final time is different from tim in that tmt expresses the time at the end of the event or state, whereas tim expresses a time for the event taken as a whole.
Final time is different from gol in that tmt expresses the time at the end of the event or state, whereas gol expresses characteristics of the obj at the end of the event.
Final time is different from tmf in that tmt expresses the time at the end of the event or state, whereas tmt expresses the time at the beginning of the event.

via (intermediate place)

"Via" defines the intermediate place of an event.

via ({event},{place})
Syntax
via[":"<Compound UW-ID>] "(" {<UW1>|":"<Compound UW-ID>} "," {<UW2>|":"<Compound UW-ID>} ")"

Detailed definition
"Intermediate place" is defined as the relation between:
UW1 – an event, and
UW2 – a concrete or abstract place,
where:
• UW2 is the specific place describing the obj of UW1 at some time in the middle of UW1, or
• UW2 is a thing that describes a place that the obj of UW1 passed by or through during UW1.

Examples and readings

via(go(icl>event), New York(icl>place))	… go … via New York
via(bike(icl>event), Alp(icl>place))	… bike … through the Alps
via(drive(icl>event), tunnel(icl>thing))	… drive … by way of tunnel

Related concepts
Intermediate place is different from src, plf and tmf in that these all refer to the beginning of an event, whereas via describes the middle of an event.
Intermediate place is different from gol, plt and tmt in that these all refer to the end of an event, whereas via describes the middle of an event.

Knowledge-base relations

The following labels are for binary relations between UWs within the knowledge base only. In addition, the conceptual relation labels can be used to further characterize UWs.

ant(antonym)

"Ant" defines an oppisite concept for a focussed concept.

ant ({focussed concept},{opposite concept})

Syntax
ant "(" <UW1> "," <UW2> ")"

Examples
ant(good(icl>state), bad(icl>state))

equ(synonym)

"Equ" defines an equal concept for a focussed concept.

equ ({concept},{equal concept})

Syntax
equ "(" <UW1> "," <UW2> ")"

Examples

equ(book(equ>reserve), reserve(icl>event))

fld(semantic field)

"Fld" defines a semantic field in which a concept is to be interpreted.

fld ({concept},{field-concept})

Syntax

fld "(" <UW1> "," <UW2> ")"

Examples

fld(hit(fld>baseball), baseball(icl>thing))

icl(inclusion)

"Icl" defines a concept of which a focussed concept is a proper subset.

icl ({focussed concept},{concept})

Syntax

icl "(" UW1 "," UW2 ")"

Detailed definition

"Inclusion" is defined as the relation between:
UW1 – an focussed concept
UW2 – a concept,
where:
• UW2 is the super concept UW1.

Examples

icl(dog(icl>animal), animal(icl>thing))

pof(part-of)

"Pof" defines a concept of which a focussed concept is a part.

pof ({focussed concept},{concept})

Syntax

pof "(" UW1 "," UW2 ")"

Detailed definition

"Part-of" is defined as the relation between:
UW1 – a part concept, and
UW2 – a whole concept,
where:
• UW1 is the part of UW1.

Examples

pof(wing(icl>body), bird(icl>animal))

Universal Words

Introduction

Binary relations are made up of conceptual relations or knowledge base relations and two UWs. The UWs of binary relations are labeled with character strings and represent simple or compound concepts. In the UNL, there are two classes of UWs:

• simple, unit concepts called "UWs" (Universal Words).

and

• compound structures of binary relations grouped together and called "Compound UWs". These are indicated with Compound UW-IDs, as described below.

UWs

Syntax

Informally, UWs are made up of a character string (an English-language word) followed by a list of constraints and a list of attributes. These can also be followed by an Instance ID. The meaning and function of each of these parts is described in the next section, on Interpretion.

The following expressions provide a more formal statement of the syntax of UWs. See Appendix 1 for notational conventions.

<UW> ::= <Head Word> [<Constraint List>],["." <Attribute List>],[":" <Instance ID>]
<Head Word> ::= <character>…
<Constraint List> ::= "(" <Constraint> ["," <Constraint>]… ")"
<Attribute List> ::= <Attribute> ["." <Attribute>]…
<Instance ID> ::= <digit> <digit>
<Constraint> ::= <Relation Label> {">" | "<"} <UW>
<Attribute> ::= "@" Attribute Label
<Relation Label> ::= "and" | "aoj" | "obj" | "icl" | ...
<Attribute Label> ::= "reason" | "volitional" | "past" | ...
<digit> ::= 0 | 1 | 2 | ... | 9
<character> ::= "a" | ... | "z" | "A" | ... | "Z" | "_"

Interpretation

HeadWord

The Head Word is an English word/compound word/phrase/sentence that is interpreted as a label for a set of concepts: the set made up of all the concepts that may correspond to that in English. An Elementary UW (with no restrictions or Constraint List) denotes this set. Each Restricted UW denotes a subset of this set that is defined by its Constraint List. Extra UWs denote new sets of concepts that do not have English-language labels.

Thus, the headword serves to organize concepts and make it easier to remember which is which.

Constraints or Restrictions

The Constraint List restricts the interpretation of a UW to a subset or to a specific concept included within the Elementary UW, thus the term "Restricted UWs".

The Elementary UW "drink", with no Constraint List, includes the concepts of "putting liquids in the mouth", "liquids that are put in the mouth", "liquids with alcohol", "absorb" and others.

The Restricted UW "drink(icl>event,obj>liquid)" denotes the subset of these concepts that includes "putting liquids in the mouth", which in turn corresponds to verbs such as "drink", "gulp", "chug" and "slurp" in English.

The restrictions of Restricted UWs, their Constraint Lists, are Constraints. The Constraints that use the Relation Labels defined above can be seen as an abbreviated notation for full binary relations: drink(icl>event,obj>liquid) is the same as obj(drink(icl>event),liquid) which means something like "cases of drinking where the obj is a liquid".

Constraints can use Relation Labels, as they are defined in the previous sections.

Attributes

The Constraint List can be followed by a list of Attributes, which provide information about how the concept is being used in a particular sentence.

Instance ID

Finally, a UW can include an Instance ID. The Instance ID is simply used to indicate some referential information: that there are two different occurrences of the same concept (they are not co-referent). Normally, if the same UW occurs more than once, it is in all cases understood to refer to the same entity or occurrence. For example, if one man greeted another man, the same UW would be used twice -- "man(icl>human)" and we could distinguish distinguish one from the other with Instance IDs:

man(icl>human):01 for the first and
man(icl>human):02 for the other, to make it clear that the first man did not greet himself.

Types

UWs, then, are character strings (words or expressions) that can be given specifications, attributes and Instance IDs. Their function in the UNL system is to represent simple concepts. The three types of UWs, in order of practical importance are:

- Restricted UWs, which are Head Words with a Constraint List,

For example:
state(agt>human,obj>information)
state(equ>nation)
state(icl>situation)
state(icl>government)

- Extra UWs, which are a special type of Restricted UW,

For example:
ikebana(icl>activity,obj>flowers)
samba(icl>dance)
souflé(icl>food,pof<egg)
murano(icl>glass,aoj>colorful)

- and Elementary UWs, which are bare Head Words with no Constraint List, for example:

go
take
house
state

Restricted UWs

Restricted UWs are by far the most important. Each Restricted UW represents a more specific concept, or subset of concepts.

Consider again the examples of Restricted UWs given above:

state(agt>human,obj>information) is more specific concept (arbitrarily associated with the English word "state") that denotes situations in which humans produce some information, or state something.

state(equ>nation) is more specific sense of "state" that denotes a nation.

state(icl>situation) is more specific sense of "state" that denotes a kind of situation.

state(icl>government) is more specific sense of "state" that denotes a kind of government.

The information in parentheses is the Constraint List and it describes some conceptual restrictions, that's why these are called Restricted UWs. Informally, the restrictions mean "restrict your attention to this particular sense of the word". Thus, the focus is clearly the idea and not the specific English word.

It often turns out that for a given language there is a wide variety of different words for these concepts and not, coincidentally, all the same word, as in English.

Notice that by organizing these senses around the English words, we can simplify the task of making a new UW/Specific Language dictionary: we can use a bilingual English/Specific Language dictionary and proceed from there, specifying the number different concepts necessary for each English word.

This of course does not mean that we're translating English words; we're just using the English dictionary to remind

us of the concepts that we will want to deal with and thus to organize work more efficiently.

Extra UWs

Extra UWs denote concepts that are not found in English and that have to be introduced as extra categories. Foreign-language labels are used as Head Words. Consider again the examples given above:

ikebana(icl>activity, obj>flower)	"something you do with flowers"
samba(icl>dance)	"a kind of dance"
soufflé(icl>food, pof<egg)	"a kind of food made with eggs"
murano(icl>glass, aoj>colorful)	"a kind of colorful glass"

To the extent that these concepts exist for English speakers, they are expressed with foreign-language loanwords and don't always appear in English dictionaries. So, they simply have to be added if we are going to be able to use these specific concepts in the UNL system. Notice that the Constraint List or restrictions already give some idea of what concept is associated with these Extra UWs and the Constraints binary relation this concept to other concepts already present (activity, flower, egg, food, etc.).

Elementary UWs

Elementary UWs are character strings that correspond to an English word. They are used to structure the knowledge base and as a fall-back method for establishing correspondences between different language words when more specific correspondences cannot be found.

Compound UWs

Introduction

Compound UWs are a set of binary relations that are grouped together so that we can talk about them as if they were a single unit. This allows us to deal with situations like:
[Women who wear big hats in movie theaters] should be asked to leave.
Without Compound UWs, or something similar, we wouldn't be able to build up complex ideas like "women who wear big hats in move theaters" and then relate them to other ideas.

Syntax

Compound UWs are indicated by Compound UW-IDs, which are a colon ":" followed by two digits. Compound UW-IDs can also be followed by an AttributeList.
More formally, their syntax can be described as follows:
<Compound UW-ID> ::= ":" <digit> <digit> ["."<Attribute List>]
<Attribute List> ::= <Attribute> ["." <Attribute>]…
<Attribute> ::= "@" <Attribute Label>
<Attribute Label> ::= "reason" | "volitional" | "past" | ...
digit ::= 0 | 1 | 2 | ... | 9

Interpretation

Compound UWs denote complex concepts that are to be interpreted as unit-concepts, understood as a whole so that we can talk about their parts all at the same time. Consider again the example given above.
[Women who wear big hats in movie theaters] should be asked to leave.
The example does not mean that [women] or [women who wear big hats] should be asked to leave. Only when we group the structure together and talk about it as a whole unit do we get the correct interpretation.
Just as we can relate such complex units to other concepts with conceptual relations, we can attach Attributes to them to express, negation, speaker attitudes, etc. which are usually interpreted as modifying the main predicate within the Compound UW.

How to define Compound Uws

Compound UWs are defined by placing a Compound UW-ID immediately after the Relation Label in all of the binary

relations that are to be grouped together. Thus, in the example below, ":01" indicates all of the elements that are to be grouped together to define Compound UW number 01.

agt:01(wear(icl>event), woman(icl>human).@pl)
obj:01(wear(icl>event), hat(icl>thing))
aoj:01(big(icl>state), hat(icl>thing))
ppl:01(wear(icl>event, theater(icl>place))
mod:01(theater(icl>place), movie(icl>thing))

After this group has been defined, wherever ":01" is used as an UW, it means that the UW should be understood as all of these Binary relations.

How to cite Compound UWs

Once defined, Compound UWs can be cited or refered to by simply using the Compound UW-ID as an UW. To complete the example above, we could continue with:

exp(ask(icl>event).@should, :01)
obj(ask(icl>event), leave(icl>event))

Again, ":01" is interpreted as the whole set of binary relations defined above. Compound UWs can be cited within other Compound UWs.

Attributes of UWs

Introduction

Attribute of UWs are used to describe what is said from the speaker's point of view: how the speaker views what is said. This includes phenomena technically called "speech acts", "propositional attitudes", "truth values", etc. Conceptual relations and UWs are used to describe objectively things, events and states-of-affairs in the world. Attributed of UWs enrich this description with more information about how the speaker views these states-of-affairs and his attitudes toward them.

Types of Attributes

Speaker's view of truth

A set of binary relations describes something in the world, but does the speaker think the description is true? false? possible? The first set of attributes deal with the extent to which the speaker thinks something is true or not. They are attached to the main predicate.

The speaker thinks something is true or has to become true:

.@affirmative
.@inevitable
.@obligation
.@insistence

The speaker thinks something is not true or cannot become true:

.@not
.@obligation-not

The speaker wants to know if something is true:

.@interrogative

The speaker thinks something might be true, might become true or should become true:

.@invitation
.@thought
.@grant
.@grant-not
.@may
.@should
.@doubt
.@probable
.@possible
.@may

The variety of possibilities reflects degrees of belief, emphasis, and the extent to which what is said should be interpreted as a suggestion or order, as well as many other social factors such as the relative status of the speakers

Time with respect to the speaker

Where does the speaker situate his description in time, taking his moment of speaking as a point of reference? A time before he spoke? After? At approximately the same time? This is is the information that defines "narrative time" as past, present or future. These Attributes are attached to the main predicate.
Although in many languages this information is signalled by tense markings on verbs, the concept is not tense, but "time with respect to the speaker". The clearest example is the simple present tense in English, which is not interpreted as present time, but as "independently of specific times".

Consider the example: The earth is round.
This sentence is true in the past, in the present and in the future, independently of speaker time, so although the tense is “present” it is not interpreted as present time.
.@past
.@present
.@future
[no attribute]

Speaker’s view of Aspect

A speaker can emphasize or focus on a part of an event or treat it as a whole unit. This is closely linked to how the speaker places the event in time. These Attributes are attached to the main predicate.
He can focus on the beginning of the event, looking forward to it (.@begin-soon), or backward to it (.@begin-just).
He can focus on the middle of the event (.@progress).
He can also focus on the end of the event, looking forward to it (.@end-soon) or backward to it from nearby (.@end-just) or from farther away (.@complete).
The speaker can choose to focus on the lasting effects or final state of the event (.@state) or on the event as a repeating unit (.@repeat).
Many other possibilities are available in the world’s languages.

Speaker’s view of Reference

Whether an expression refers to a single individual, a small group or a whole set is often not clear. The expression “the lion” is not sufficiently explicit for us to know whether the speaker means “one particular lion” or “all lions”. Consider the following examples:
The lion is a feline mammal.
The lion is eating an antilope.
In the first example, it seems reasonable to suppose that the speaker understood “the lion” as “all lions”, whereas in the second example as “one particular lion”.
The following Attributes are used to make explicit what the speaker’s view of reference seems to be.
.@generic
.@def
.@indefsg
.@indefpl
These Attributes are usually attached to UWs that denote things.

Speaker’s Focus

The speaker can choose to focus or emphasize the parts of a sentence to show how important he thinks they are in the situation described. This is often related to sentence structure.
.@focus
.@topic
.@emphasis
.@theme
.@pred predicate

.@entry entry point or main UW
One UW marked with "@entry" is essential to each UNL expression.

.@sub dominating UW in a hyper node
One UW marked with "@sub" is essential in a Compound UW to mark its “entry” point..

.@title the head UW in a title

Speaker's attitudes

The speaker can also express, directly or indirectly, what his attitudes or emotions are toward what is being said or who it is being said to. This includes respect and politeness toward the listener and surprise toward what is being said.

.@exclamation
.@politeness
.@respect
.@confirmation-req

Speaker's viewpoint

Many aspects of the speaker's viewpoint can be expressed, in English, using modal auxiliaries in different ways. They are attached to predicates, but a special notation has been developed for them:

<Aux-verb>@attribute-label

e.g. can@ability

The following labels are used to clarify the speaker's viewpoint information that is represented with UWs of modal auxiliaries.

@ability	Ability, capability of doing things; be able to, be capable of
@apodosis	Apodosis: could, should, would
@custom	Habitual action: would, used to
@grant	To give consent to do: can, could, may, might
@grant-not	To not give consent to: mustn't, be not allowed to, may not
@insistence	Strong will to do: shall, will, would
@intention	Will, intention to do: shall, will
@inevitability	Supposition that something is inevitable: must
@may	Supposition of actual possibility: may, might
@obligation	To oblige someone: shall, must, have to
@obligation-not	Forbid to do: mustn't, needn't, don't have to
@possibility	Assume reasonable possibility: can, could
@probability	Assume probability: would
@should	To feel duty: should, ought to
@will	Will to do: shall, will

The following list shows the set of UWs derived from English modal auxiliaries and their combinations with Attribute labels, to more clearly define each meaning.

CAN

ability, capability	can@ability
=be able to, be capable of	
He can speak English but he can't write it very well.	
To grant, to give consent	can@grant
=be allowed to, be permitted to	
Can I smoke in here? = Am I allowed to smoke in here?	
Logical possibility	can@possibility
(compare : may = capability, actual possibility)	
Anybody can make mistakes.	
The road can be blocked = It is possible to block the road.	

COULD

Ability in the past	could@ability
I never could play the banjo.	
To grant in present or future	could@grant
Could I smoke in here ?	
Possibility at present (logical)	could@possibility
The road could be blocked.	

Possibility at present (actual) could@may
We could go to the concert.
A supposed result from a supposition contrary to reality could@apodosis
If we had more money, we could buy a car.

MAY
To grant may@grant
=be allowed to
You may borrow my car if you like.
1') Not to grant may@grant-not
You {mustn't/are not allowed to/may not} borrow my car.
Actual possibility may@may
The road may be blocked.

MIGHT
Actual possibility might@may
We might go to the concert.
What you say might be true.

SHALL
Speaker's intention toward the second or third person shall@intention
He shall get this money.
You shall do exactly as you wish.
Speaker's intention upon himself shall@will
I shall not be long.
We shall let you know our decision.
We shall overcome.
Strong will toward the second or third person shall@insistence
You shall do as I say.
He shall be punished.
To show legal obligation shall@obligation
The vendor shall maintain the equipment in good repair.

SHOULD
Obligation should@should
= ought to
You should do as he says.
Logical inevitability should@inevitability
= ought to
They should be home by now.
Presumption contrary to a wish or expectation should@unexpected
It is odd that you should say this to me.
I am sorry that this should have happened.
A supposed result from a supposition contrary to
reality (In the first person) should@apodosis
= would
We should (would) love to go abroad if we had the chance.

WILL
Expectation to other's will will@will
He'll help you if you ask him.
Will you have another cup of coffee?
Will you (please, kindly,etc.) open the window?
Speaker's own intention will@intention
I'll write as soon I as can..

We won't stay longer than two hours.
Strong will will@insistence
He will do it, whatever you say.(=He insists on doing it…)
He will keep interrupting me.
Inevitability, logical inevitability, or habitual fact will@inevitability
Inevitability
The game will (must / should) be finished by now.
logical inevitability,
Oil will float (floats) on water.
habitual fact
He'll (always) talk for hours if you give him the chance.

WOULD
Expectation to other's will would@will
Would you excuse me ?
Strong will would@insistence
It's your own fault; you would take the baby with you.
Habit in the past would@custom
Every morning he would go for a long walk.
John would make a mess of it.
A supposed result from an assumed condition would@apodosis
He would smoke too much if I did not stop him.
Probability would@probability
That would be his mother.

MUST
Compulsory obligation must@obligation
=be obliged to, have (got) to
1') In negation must@obligation-not
=not be obliged to : needn't, don't have to;
=be obliged not to : :mustn't
You must be back by 10 o'clock.
Yesterday you had to be back by 10 o'clock.
Yesterday you said you must {had to} be back by 10 o'clock.
You {needn't/don't have to/are not obliged to} be back by 10 o'clock.
Logical inevitability must@inevitability
There must be a mistake.
In interrogation, the answer is rhetorically implied.
Mustn't there be another reason for his behavior?

OUGHT (TO)
Obligation vitability
They ought to be here by now.

Appendix 1: Conventions for syntax notation

Symbol	Definition
::=	...is defined as...
|	disjunction, “or”
[ ]	optional element
…	one or more occurences
“ ”	encloses string of literal characters
<xxx>	variable name
...	intervening values