Specifying Participants Behaviour in Generalized Eventity Frames

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Taxonomy of STATES

- necessary for building specified semantic descriptors of verb units
- task-motivated and application-driven

SemInVeSt

- *Sem*antically *In*terpreted *Ve*rb-centered *St*ructures
  - knowledge base of the semantics of verbs
  - reflexive-verb-component of *SemInVeSt*
  - verbs in a reflexive form in Bulgarian and their semantic equivalents in French and in Hungarian

Eventity frames

- *Unified Eventity Representation* (UER) (Schalley 2004)
  - cognitive theoretical approach to verbal semantics and a graphical formalism
  - application, adaptation and extension of the *Unified Modeling Language* (UML) - an international standard for graphical representation and design of object-oriented systems in the field of Information Technologies

DESCRINHRREFLCAUSE01

A:PSS

[[x]]/Agent:Individual

ani:Animacy=animate
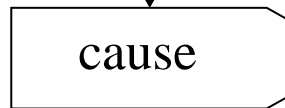
{potentially Reflexive}

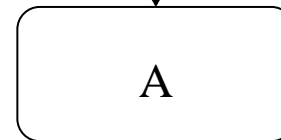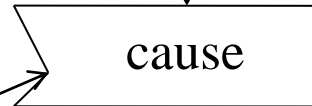[[y]]/Patient:Individual

ani:Animacy=animate

<<do>>

<<undergo>>

x

y

cause

cause

cause

A

5

The concept of STATE

- "a condition during the life of an object or an interaction during which it satisfies some condition, performs some action, or waits for some event" (UML Specifications 1.4)
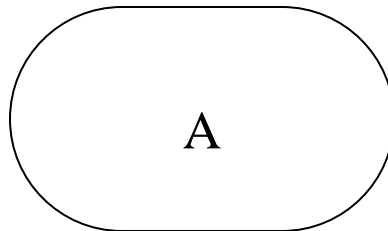
Passive Simple State (PSS)

- the participant satisfies some condition and is characterized as being passive

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┌─────────────────────┐
│                     │
│          A          │
│                     │
└─────────────────────┘
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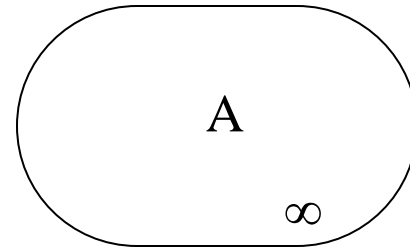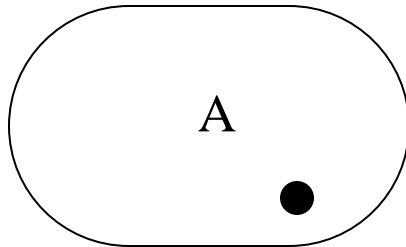
Active Simple State (ASS)

- the participant performs some action and is characterized as being active

A

Subtypes of Active Simple States

- ACT: the action is non-durative, punctiform
- ACTIVITY: the action is considered ongoing, durative

A ●

A ∞

Transition

- represents the change of state of a given object

```
┌─────────┐                    ┌─────────┐
│         │                    │         │
│    A    │────────────────────▶│    B    │
│         │                    │         │
└─────────┘                    └─────────┘
```

Specification of the STATES

- A set of STATE names is defined.

- Clusters of PROPERTIES are determined, which further specify the STATES where necessary.

- STEREOTYPES and *keywords* are defined, used for the formulation of subsets of modeling elements where necessary.

Semantic primitives

- decompositional semantic representation of the verb units

- "semantic languages" or "meta-languages"
  - special dictionary
  - special syntax

Semantic languages

- Natural Semantic Metalanguage (NSM) (Wierzbicka et al.)
- Apresjan's Semantic Metalanguage

The dictionary component is of special interest.

Natural Semantic Metalanguage

- small number (about 60) of universal concepts
- indecomposable elementary senses - "semantic atoms"
- "semantic molecules" - not indecomposable

Apresjan's semantic metalanguage

- The semantic primitives are neither that extremely simple, nor necessarily indecomposable.

- In general, the semantic primitives do not possess the property of universality.

Disputable issues

- Is there at all an objective criterion for an ultimate elementary sense?

- Is it possible at all to define a finite set of semantic primitives?

- The problem of the lexicalization of the basic concepts.

What to do?

- Try as much as possible to define a not big set of basic concepts

    WITHOUT

    striving to fix the smallest, the finite, the "once and for all properly formulated", universal set of indecomposable primary elements

Decisive factors

- the concrete task
  - the modeling granularity
- the metamodel applied
  - structural primitives: TRANSITIONS, SIGNALS
  - PROPERTIES as ENUMERATIONS of literals

Semantic Dictionary - Minimum (Kasabov 1990)

- contains semantic units comprising the core of the lexical system in Bulgarian

- the result of the iterative mapping of lists of free word associations and thematic dictionaries, as well as the iterative grouping of the semantic words into lexical-semantic fields

- the semantic words are encoded in the lexical categories of nouns, verbs, adjectives and adverbs

Organization of the dictionary

- the semantic words (about 850) are ordered alphabetically and supplied with definitions composed so that to include only semantic words belonging to the same dictionary

- the semantic words are organized in lexical-semantic fields

- a core set of about 350 semantic words that do not belong to a lexical semantic field

Inventory of specifying elements

- built on top of the following pillars:
    - heuristics
    - predefined elements in the UER
    - Semantic dictionary - minimum
    - other semantic meta-languages
    - adherence to the UER metamodel

Names of STATES

- PSS = {Be, Exist, Have, Feel, Hang, Beautiful, Obliged, Clean, Important, Famous, Full, Empty, …}
- ASS = {Perceive, Keep, Seek, Give, Remove, Put, …}

PROPERTIES

<<enumeration>> **SensoryOrgan**
eye
ear
…

<<enumeration>> **PartBody**
neck
knee
…

<<enumeration>> **CategoryEthics**
guilty
innocent
…

<<enumeration>> **Condition**
bad
good
…

<<enumeration>> **Feeling**
suffering
hatred
…

<<enumeration>> **Direction**
up
down
…

STEREOTYPES

- predefined UER STEREOTYPES: <<repetitive>>, <<be-at>>, <<move-along>>, <<aggregated>>
- new STEREOTYPES: <<be-inside>>, <<be-outside>>, <<be-near>>, <<be-far>>
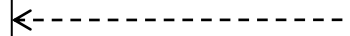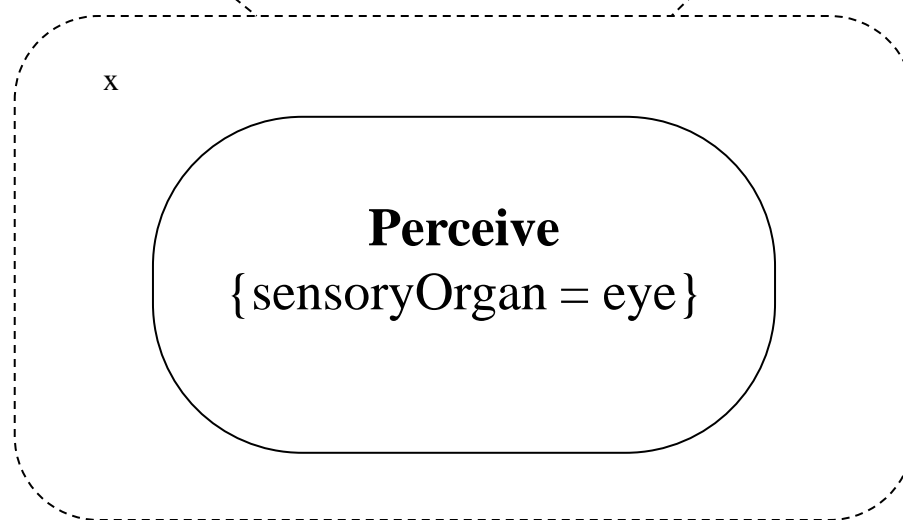
see / see one self

[[x]]/Experiencer:Individual

ani:Animacy=animate

{potentially Reflexive}

[[y]]/Theme:Individual

ani:Animacy=animate

<<do>>

x

Perceive
{sensoryOrgan = eye}

wash / wash one self

[[x]]/Agent:Individual
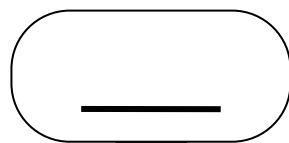
ani:Animacy = animate

{potentially
Reflexive}

[[y]]/Patient:Individual

ani:Animacy = animate

<<do>>   <<undergo>>

x   y

cause

cause

Clean

26

punish / punish one self

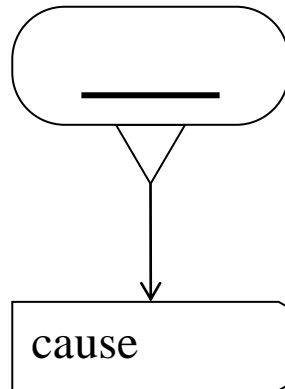[[x]]/Agent:Individual

ani:Animacy = animate

{potentially Reflexive}
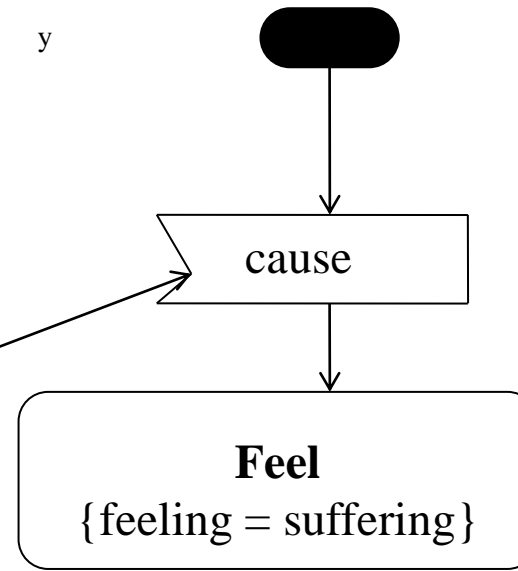
[[y]]/Patient:Individual

ani:Animacy = animate

<<do>>

<<undergo>>

x

y

cause

cause

Feel
{feeling = suffering}

rise, ascend

[[x]]/Agent:Ineventity

<<do >>

x

Move
{Direction = up}

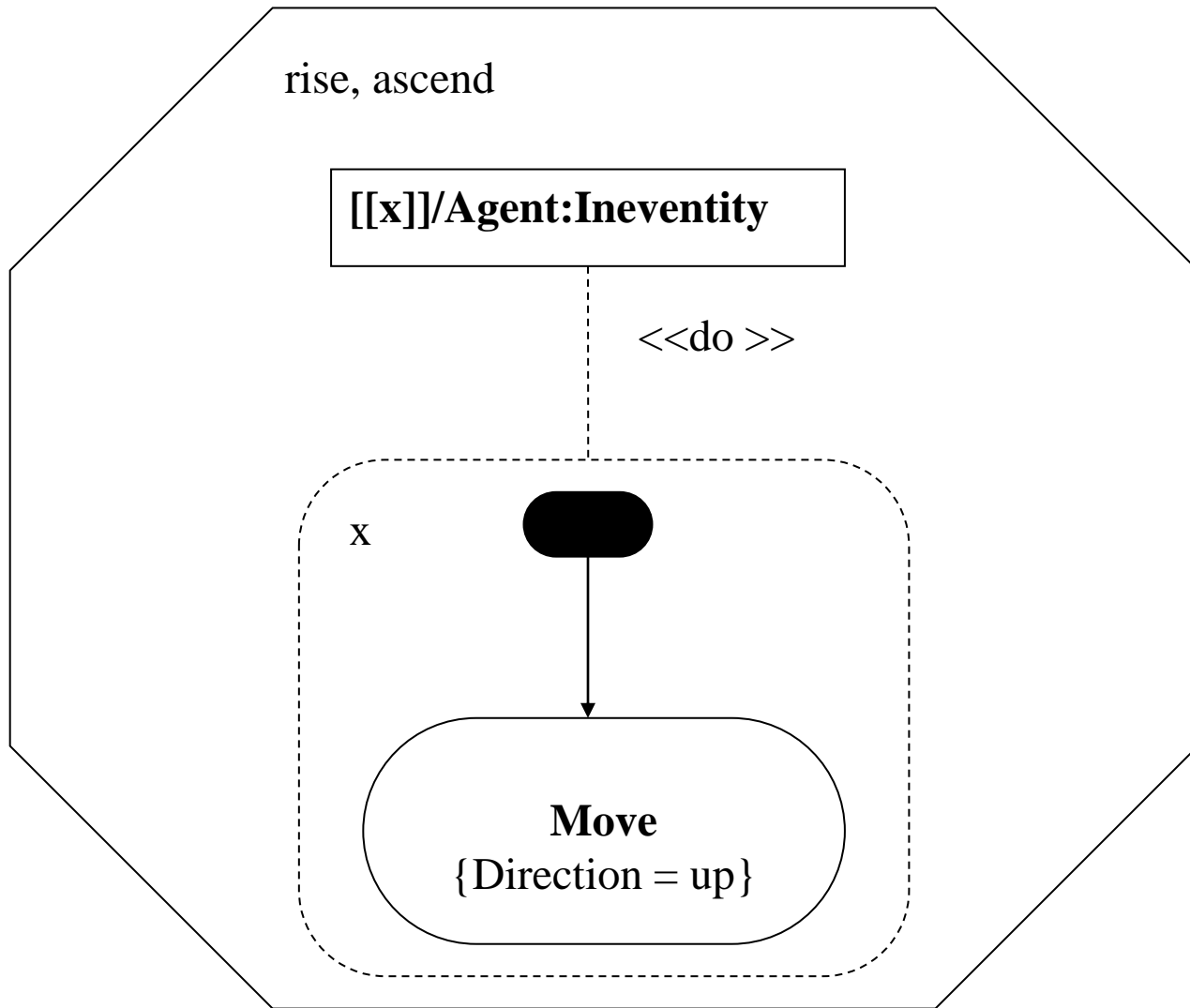get empty

[[x]]/Effected:Ineventity

<<undergo >>

x

Empty
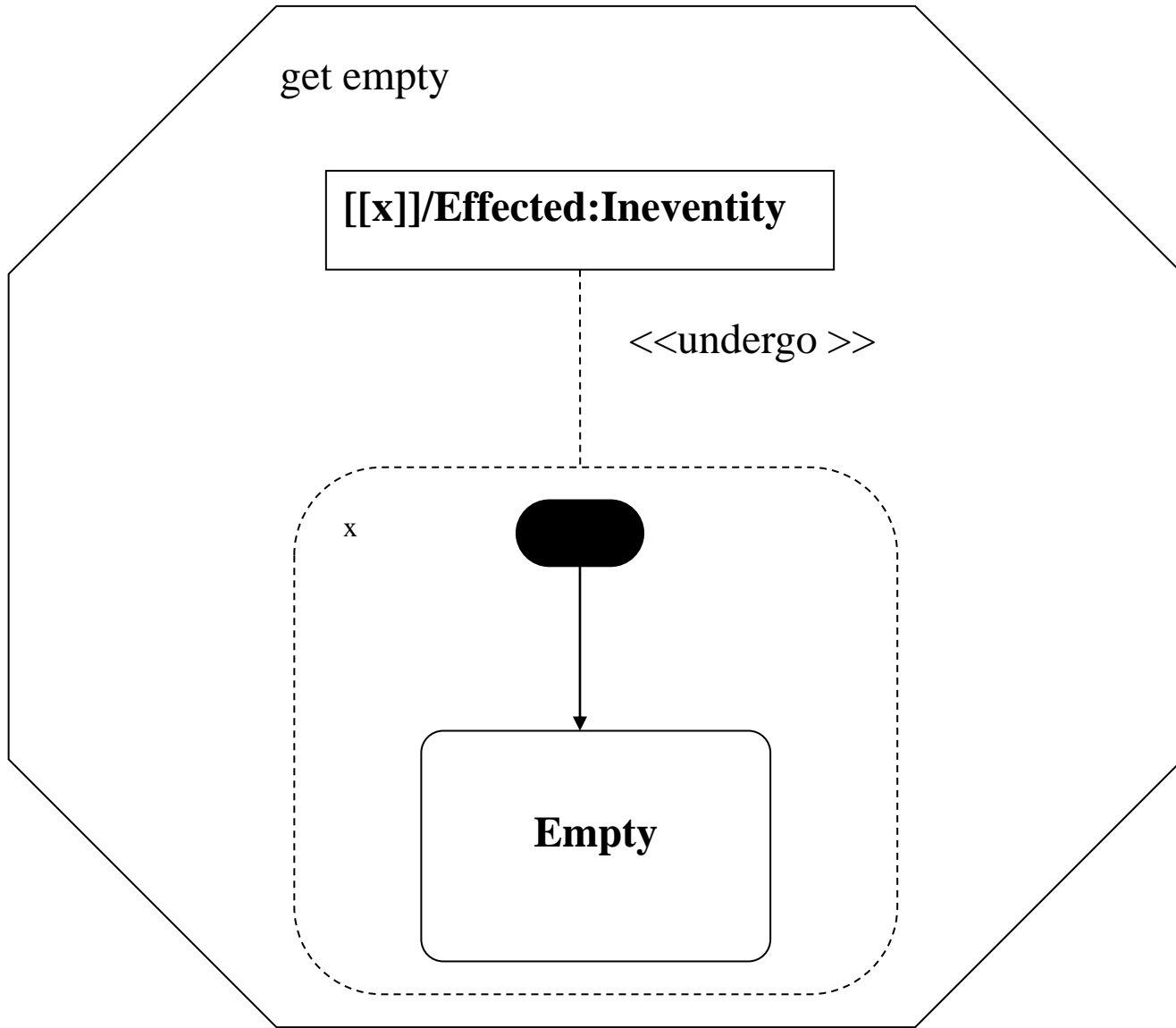
Comparison with ontologies

- Ontologies have specific formalization and inference engines
  - SUMO (Suggested Upper Merged Ontology)
  - OpenCyc

SUMO (Seeing)

Seeing is a subclass of perception.

The sensing is done by an ocular organ.

The agent of this sensing is assumed to be an animal.

SUMO (rise, ascend)

SUMO Mappings: MotionUpward

MotionUpward is a subclass of motion.

MotionUpward: motion where an object is moving away from the ground.

SUMO (jumping)

Jumping is a subclass of MotionUpward.

Jumping is a subclass of body motion.

Jumping is any MotionUpward which is done by one's body and which results in a situation where one's feet are unsupported.

OpenCyc Collection: washing
Unique ID: [Mx4rvVichJwpEbGdrcN5Y29ycA]
English ID: [Washing]

A specialization of Cleaning.

In each Washing event, some Water is being employed in the cleaning. Typically there will be some surfactant such as soap (cf. Soap_Personal) dissolved in the water. If only water (i.e., no soap) is used in a Washing, then the event also belongs to the more specialized Rinsing. Other notable specializations include Bathing and PersonalWashing. Scrubbing is not a specialization of this collection, since such events may occur without any water being involved.

A Type of: cleaning
Instance of: change of state topic, type of temporally stuff-like thing
Subtypes: car washing, laundering, rinsing, washing dishes, washing in water

Thank you!