Relational statements in OWL
Recipe for Failure ?
Naïve, semantic network style approach to relations

Examples
Hepatitis hasLocation Liver
Hand hasPart Thumb
Aspirin treats Headache
OWL-DL approach to relations: requires quantification

Concept C1                  Relation R                  Concept C2

some
only
=1

Examples
Hepatitis                  hasLocation            Liver
Hand                        hasPart                Thumb
Aspirin                     treats                 Headache
OWL-DL approach to relations: requires quantification

Concept C1 \( \rightarrow \) Relation R \( \rightarrow \) Concept C2

Examples:
- Hepatitis subClassOf hasLocation some Liver
- Hand hasPart some Thumb
- Aspirin treats Headache
OWL-DL approach to relations: requires quantification

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Hepatitis  subClassOf  hasLocation some  Liver
Hand       subClassOf  hasPart    some    Thumb
Aspirin    subClassOf  treats    some    Headache
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Examples

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\[
\text{some} = 1
\]
OWL-DL approach to relations: requires quantification

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OWL-DL approach to relations: requires quantification

Examples

**Hepatitis** subClassOf hasLocation some Liver
**Hand** subClassOf hasPart some Thumb
**Aspirin** subClassOf treats some Headache

**Headache** subClassOf treatedBy some Aspirin
OWL-DL approach to relations: requires quantification

Examples

- Hepatitis subClassOf hasLocation some Liver
- Hand subClassOf hasPart some Thumb
- Aspirin subClassOf treats some Headache
- Headache subClassOf treatedBy only Aspirin
Typical errors

*Tonsillectomy planned SubClassOf*

*rg some (associatedProcedure some Tonsillectomy) and…*

*Skin_Squamous_Cell_Carcinoma_in_situ SubClassOf*

*(diseaseMayHaveFinding some Erythema) and…*

*Congenital absence of bile duct SubClassOf*

*findingSite some BileDuctStructure …*

*anti-Muellerian hormone isoform 1 unmodified form equivalentTo*

*'anti-Muellerian hormone isoform 1'*

*and lacks_modification some 'post-translational protein modification'*

*absent subClassOf*

*reciprocal_of some 'lacking processual parts'*
Conclusion

- The use of OWL requires a precise ontological commitment
  - *is a hand without a thumb still a hand*
  - *what about a severed thumb*

- Many important statements cannot be adequately represented
  - OWL semantic enforces statements of the type „for all... some“ or „for all... only“
  - No way to express what is mostly or normally true