Typed and negative typed properties

Multiple individuals and negation in the CIDOC-CRM

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Carlo Meghini, Martin Doerr, Shephen Stead

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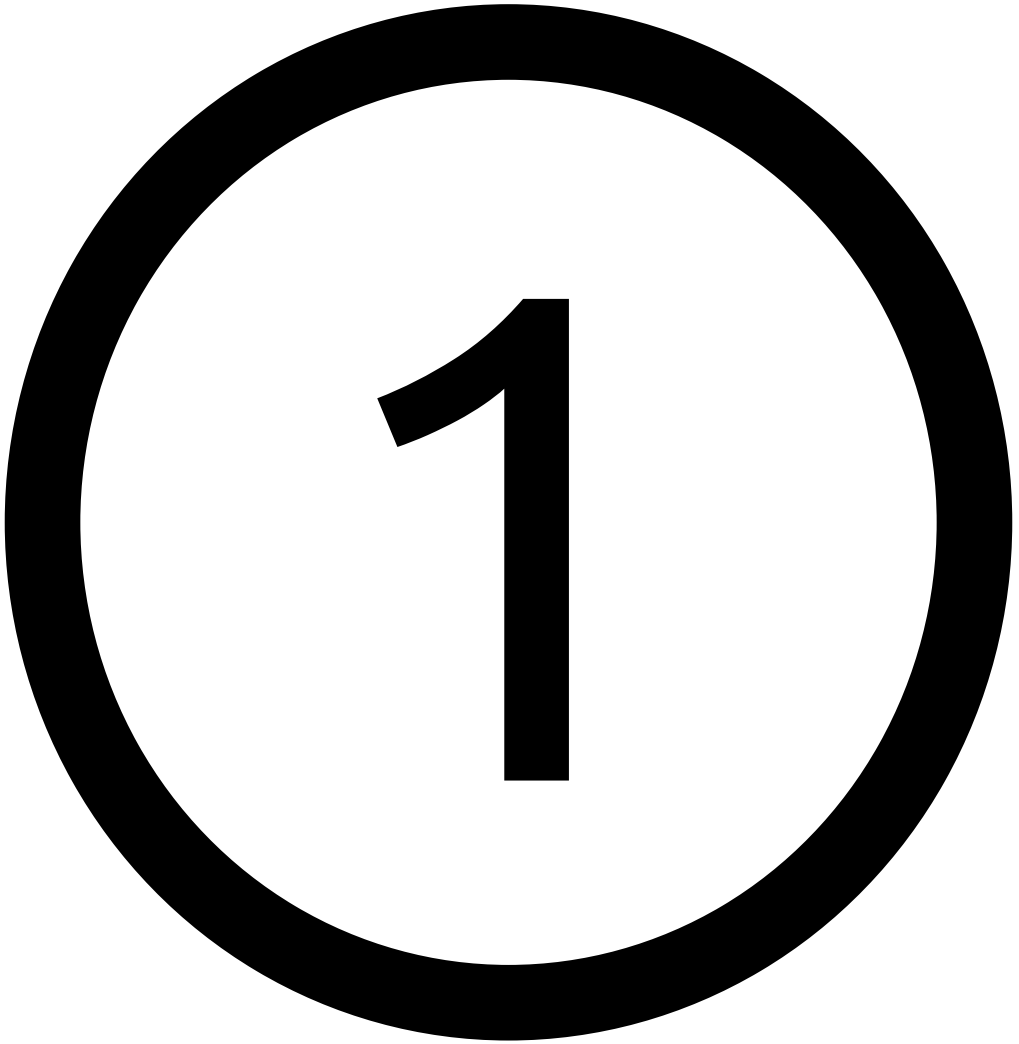
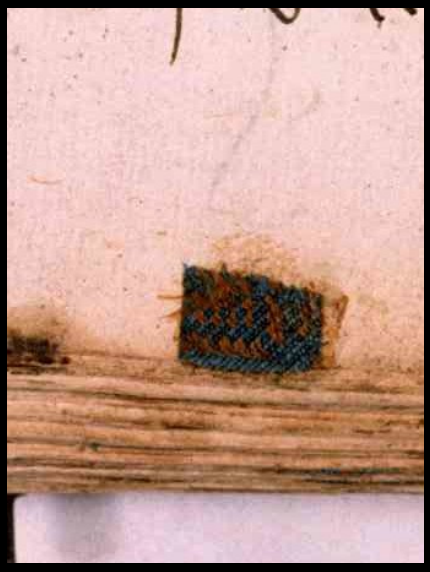
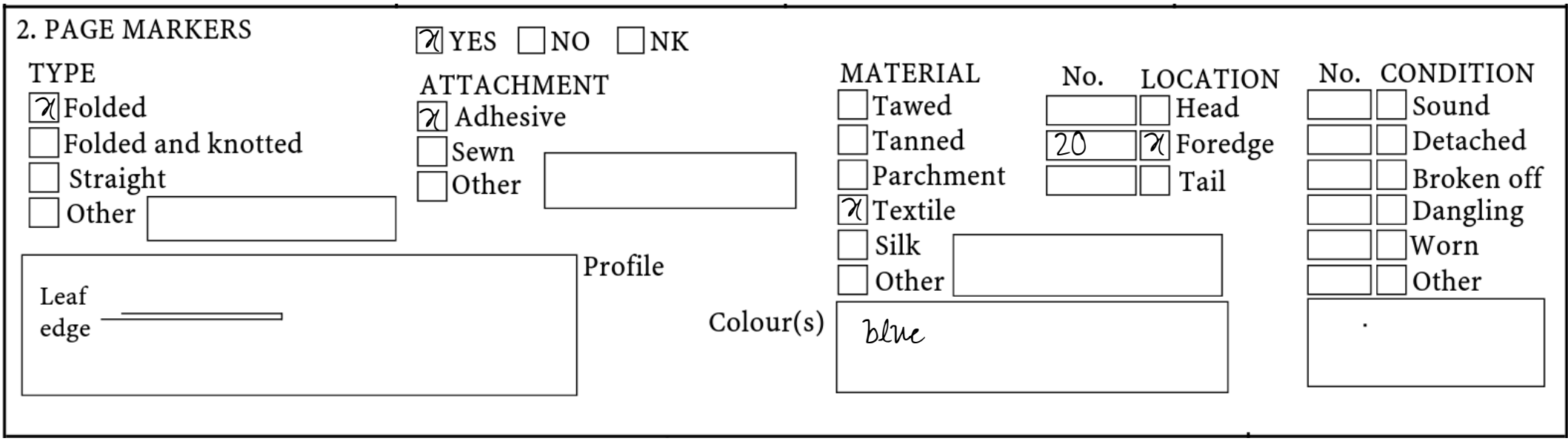
ual: university of the arts london | LIGATUS

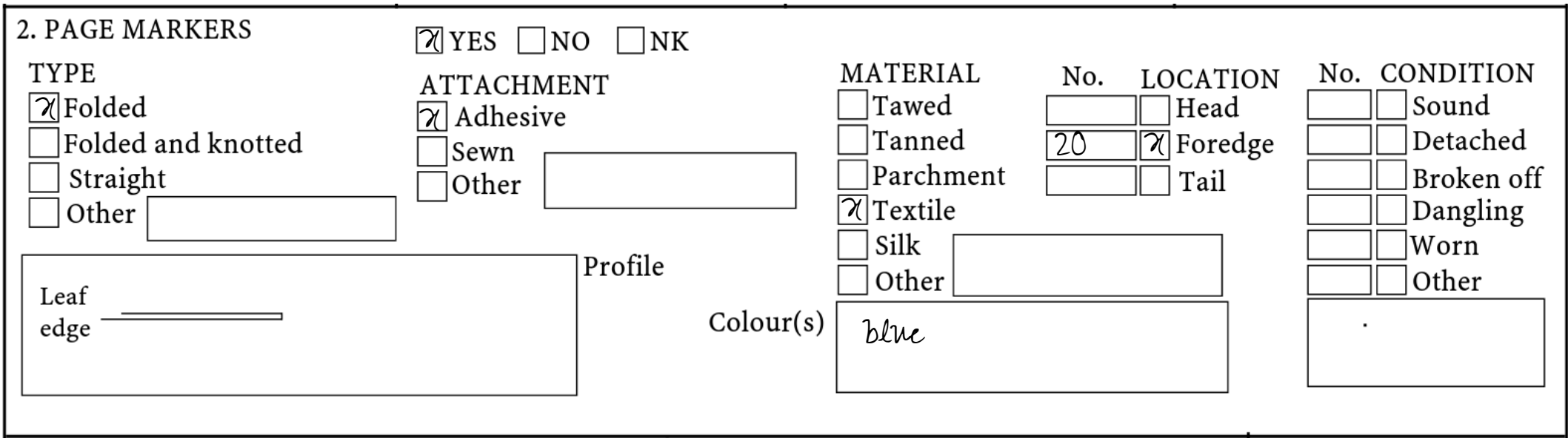


Problem: multiple individuals





- book1 → P46 is composed of → leaf marker 1
- book1 → P46 is composed of → leaf marker 2
- ...
- book1 → P46 is composed of → leaf marker 20
- leaf marker 1 → P2 has type → leaf markers
- leaf marker 2 → P2 has type → leaf markers
- ...
- leaf marker 20 → P2 has type → leaf markers


2. PAGE MARKERS

☒ YES ☐ NO ☐ NK

TYPE
- ☒ Folded
- ☐ Folded and knotted
- ☐ Straight
- ☐ Other

ATTACHMENT
- ☒ Adhesive
- ☐ Sewn
- ☐ Other

MATERIAL
- ☐ Tawed
- ☐ Tanned
- ☐ Parchment
- ☒ Textile
- ☐ Silk
- ☐ Other

No. LOCATION
- ☐ Head
- 20 ☒ Foredge
- ☐ Tail

No. CONDITION
- ☐ Sound
- ☐ Detached
- ☐ Broken off
- ☐ Dangling
- ☐ Worn
- ☐ Other

Leaf edge

Profile

Colour(s): blue

- No individual records of each leaf marker
- Significant knowledge is only:
  - book1
  - P46 is composed of
  - leaf markers (type)

Multiple individuals

- General case: (s → P → i)(i → P2 → t)
- No i and always P2
- Significant knowledge is only:
  - s
  - P
  - t

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	☐ Tail

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	☐ Dangling
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	☐ Other

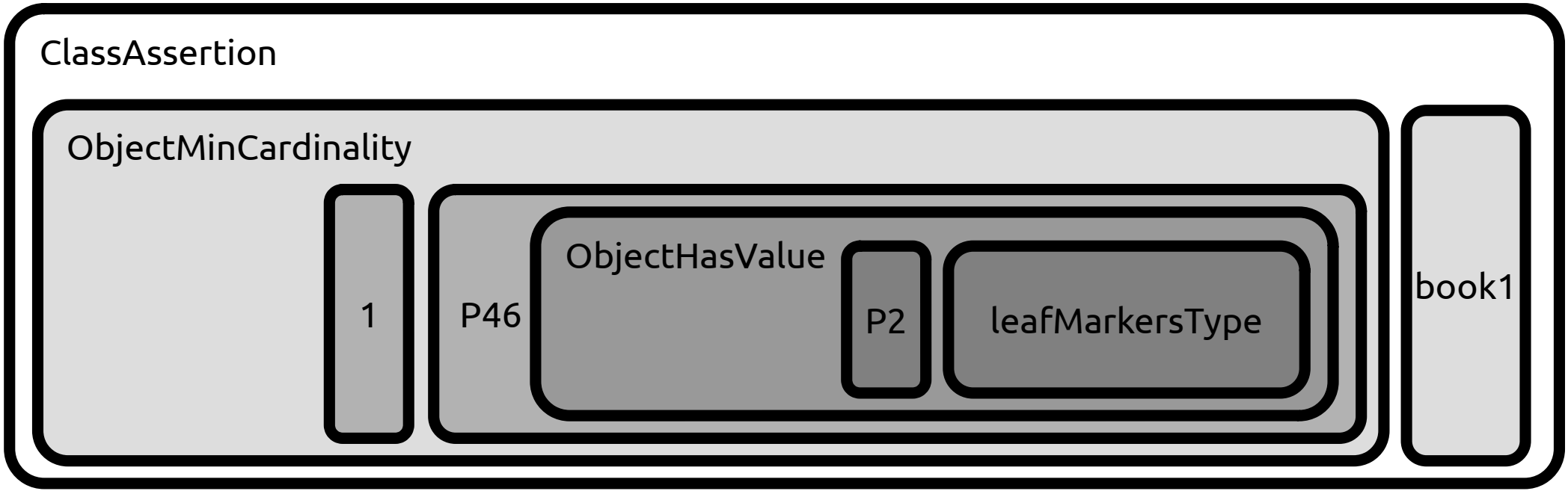
Leaf edge

Profile

Colour(s) blue

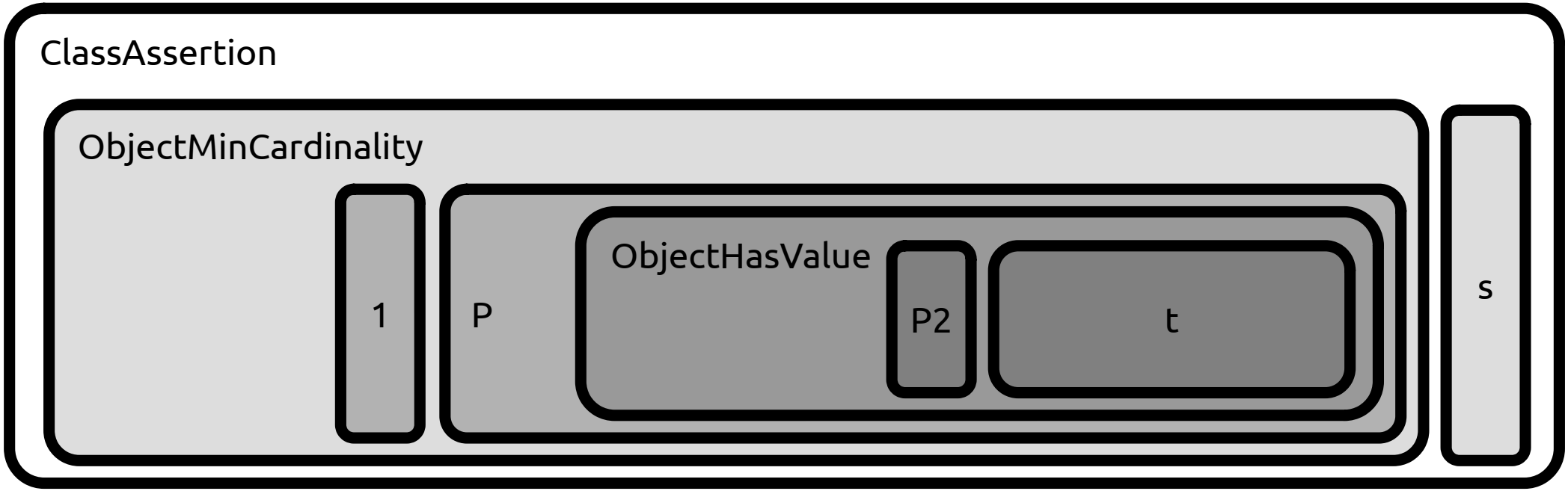
OWL solution:

ClassAssertion(ObjectMinCardinality(1 P46 ObjectHasValue(P2 leafMarkersType)) book1)



OWL solution:

ClassAssertion(ObjectMinCardinality(1 P ObjectHasValue(P2 :t)) :s)



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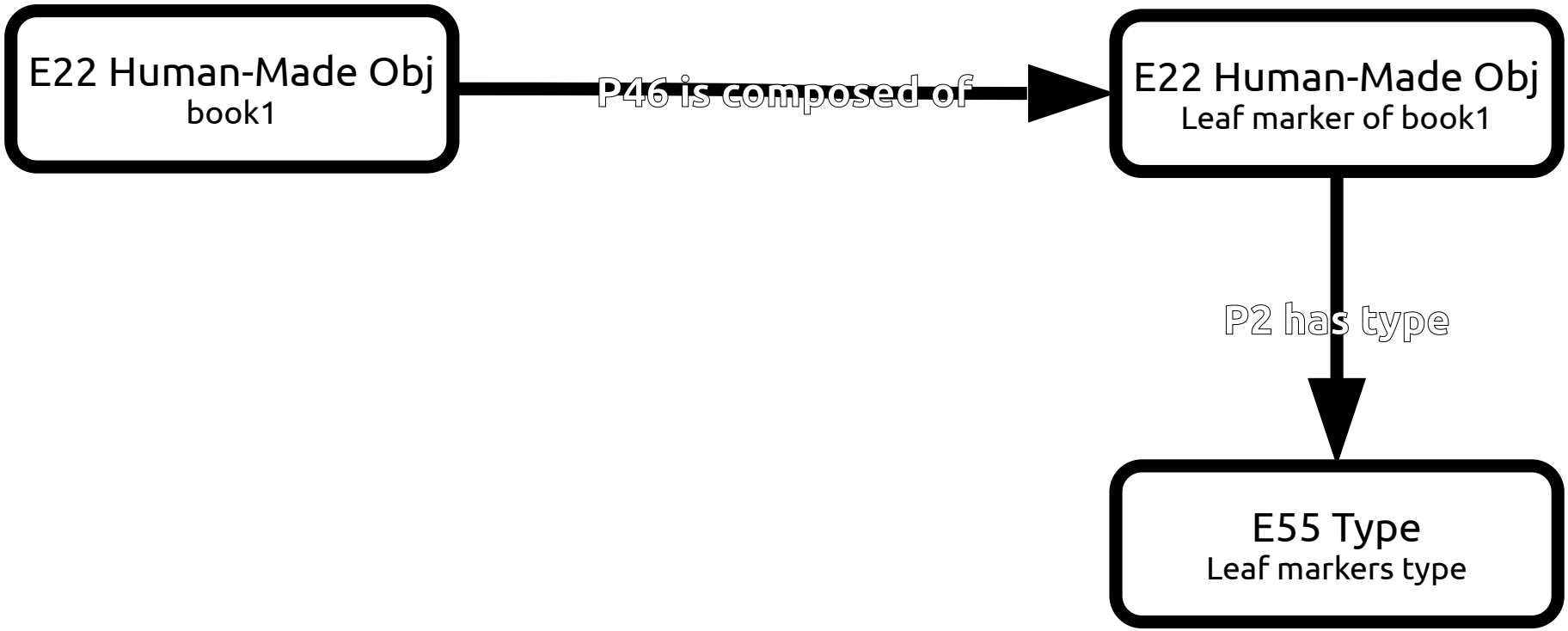
Profile

Leaf edge

Colour(s): blue



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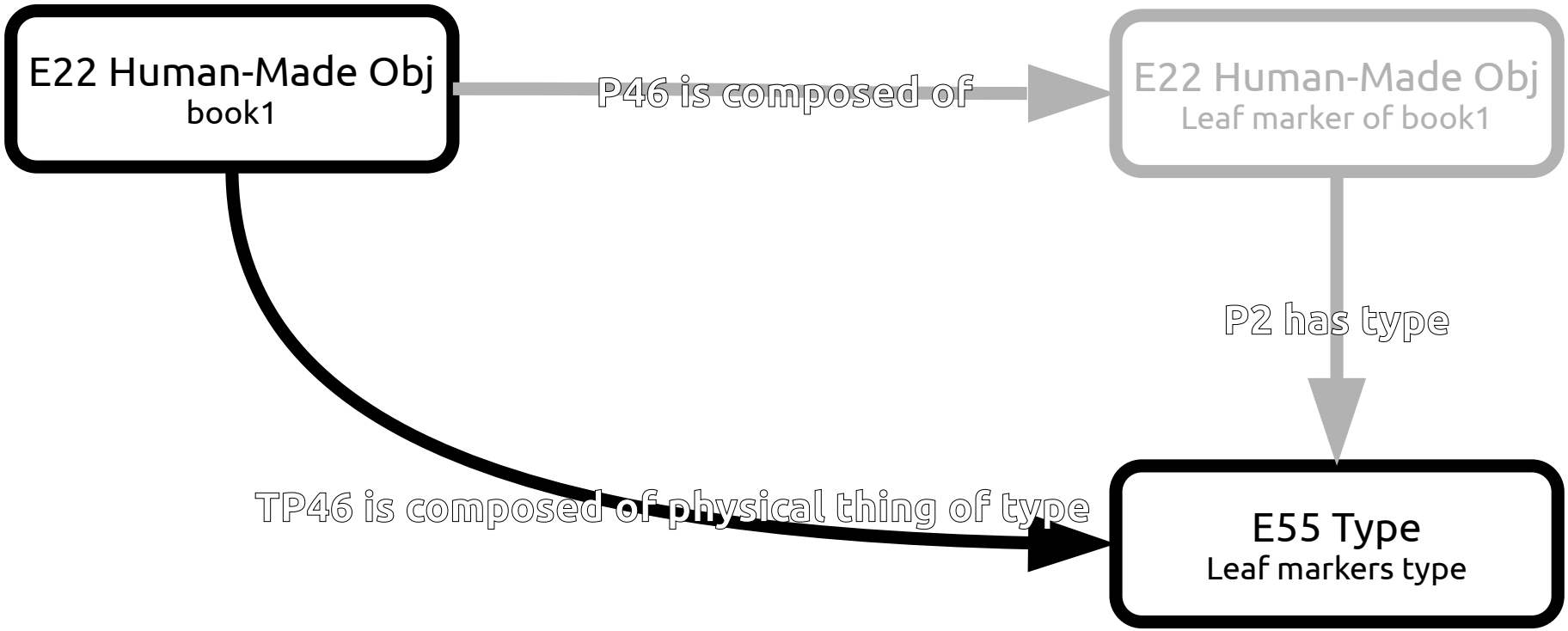
Leaf edge

Colour(s): blue



Definition of TP46

TP46 → H1 → P46

TP46 → H2 → P2

TP46 → rdfs:domain → E18

TP46 → rdfs:range → E55

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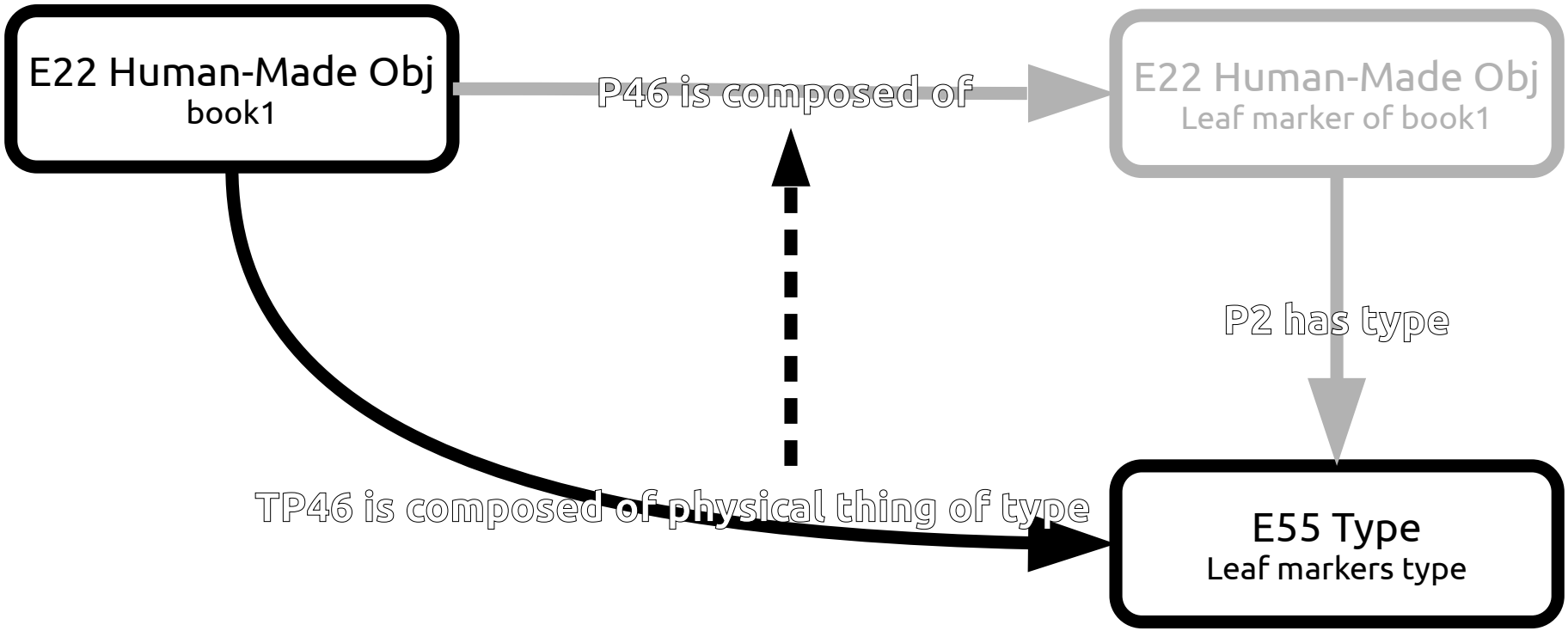
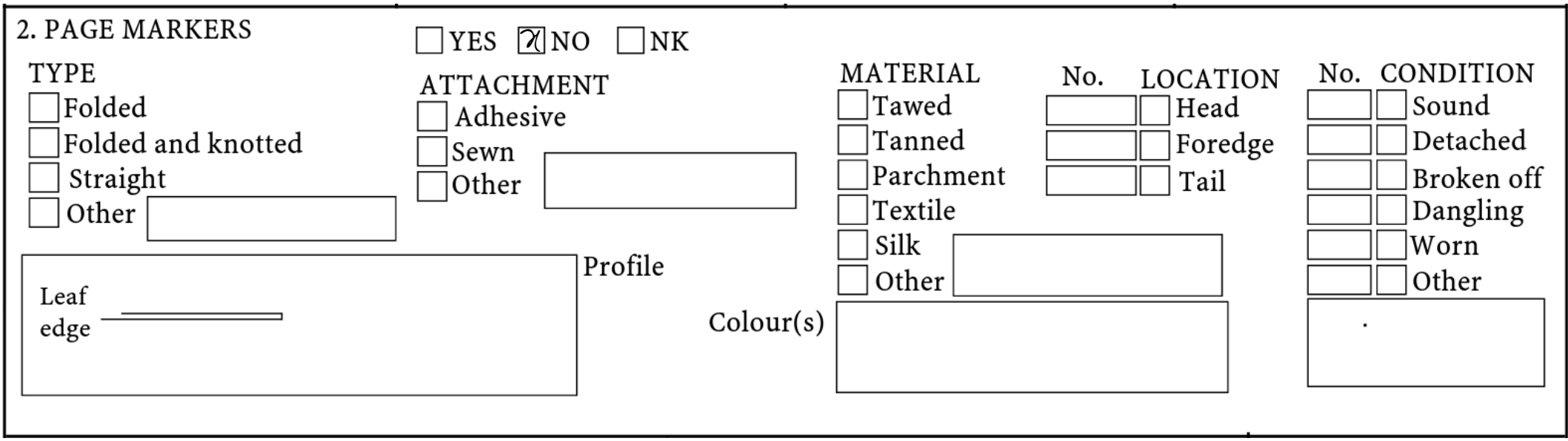


Problem: no individuals



Open World means that absence of statements does **not** mean non-existence of leaf markers

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Colour(s)

OWL solution:

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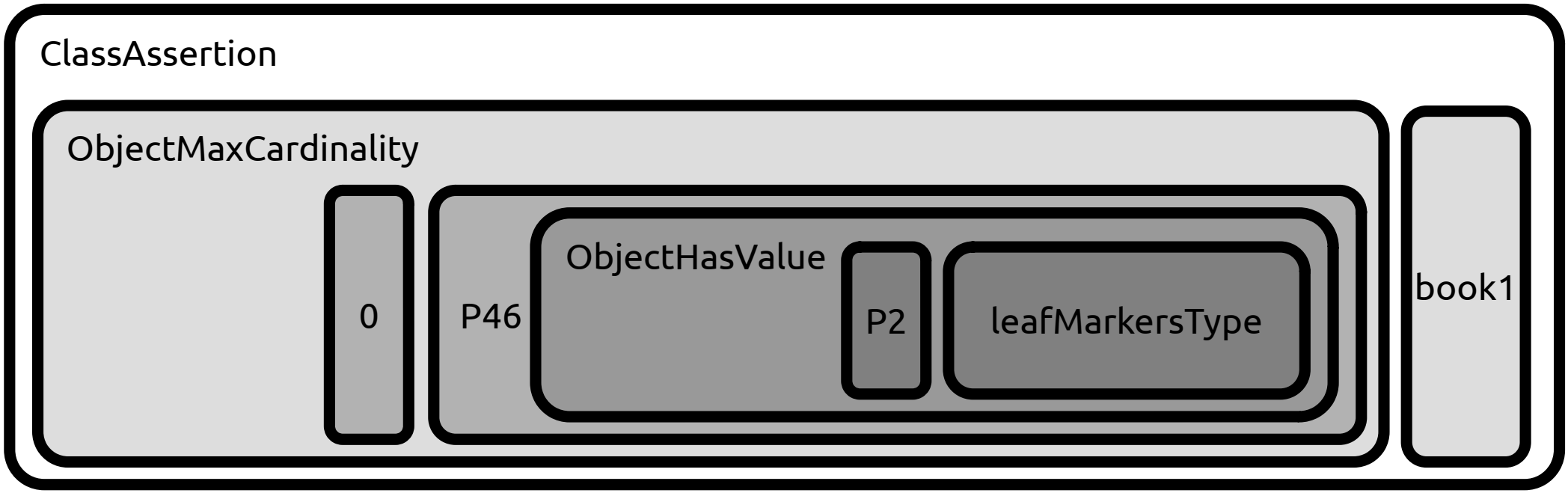
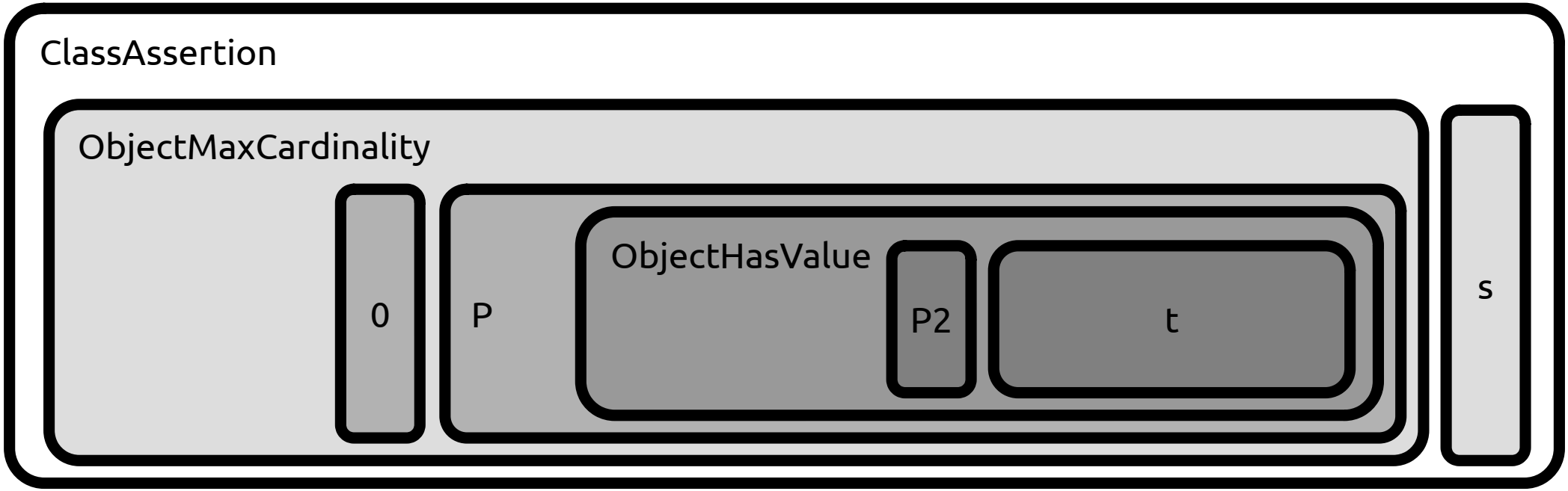


OWL solution:

ClassAssertion(ObjectMaxCardinality(0 P ObjectHasValue(P2 :t)) :s)



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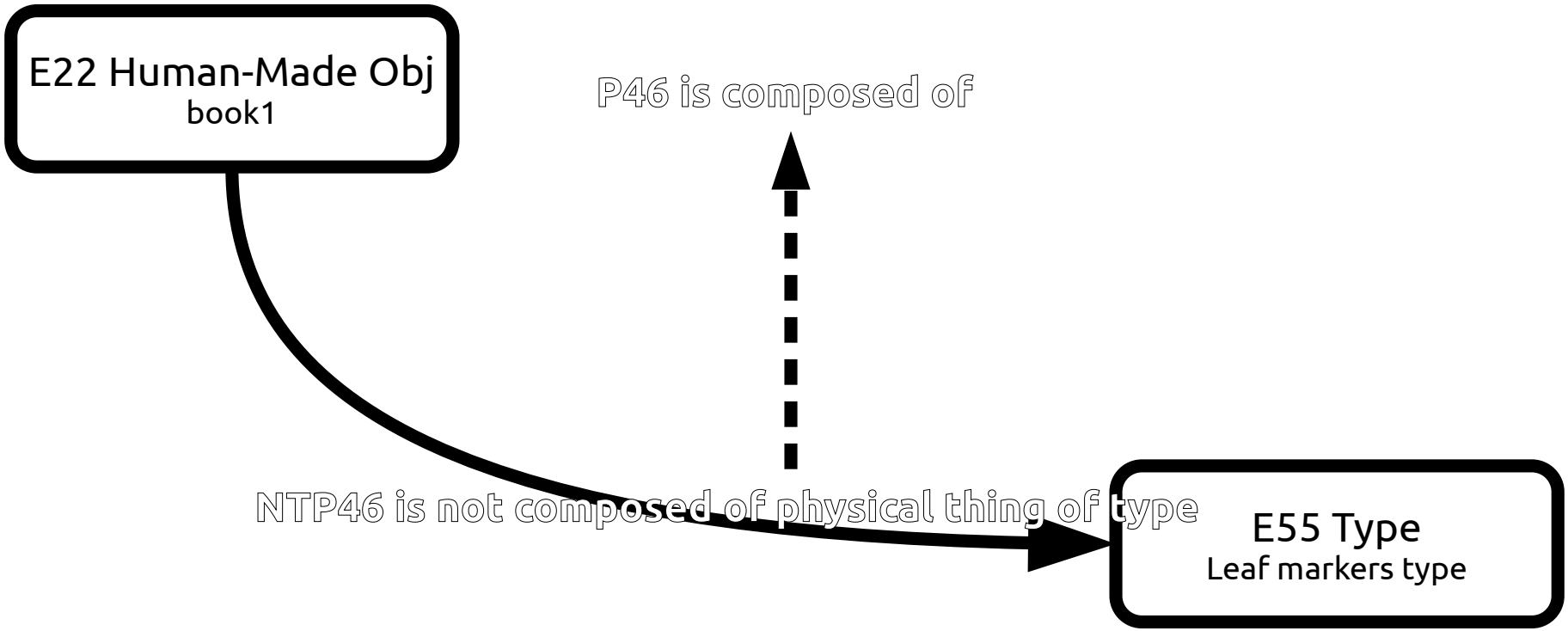

Definition of NTP46

NTP46 → H1 → P46

NTP46 → H2 → P2

NTP46 → Hn → true

NTP46 → rdfs:domain → E18

NTP46 → rdfs:range → E55

Definition of TP46

TP46 → H1 → P46

TP46 → H2 → P2

TP46 → Hn → false

TP46 → rdfs:domain → E18

TP46 → rdfs:range → E55

More in the paper

- thesauri reasoning is reversed for NTPs
- RDFS solution works with sub and super properties of Pxx
- property hierarchy applies to TPs and NTPs
- TPs are shortcuts, but NTPs are not

Issues

- Review the CRM base for existing properties that are TPs and deprecate them
- Issue 476: ‘represents entity of type’ is a proposal for a TP property

Paper and extension

- Paper to read on SWJ:
  https://content.iospress.com/articles/semantic-web/sw223159
- Implementation to test on GitHub:
  https://github.com/linked-conservation-data/crmntp/blob/main/cidoc-crm-typed.ttl