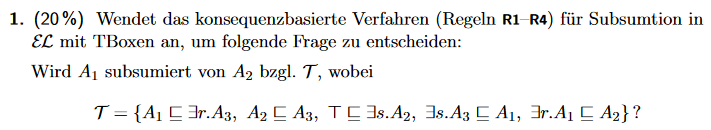
Beschreibungslogik | Übung 06

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[alma@uni-bremen.de](mailto:alma@uni-bremen.de)

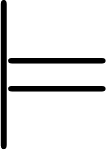
[mail@dennis-marschner.de](mailto:mail@dennis-marschner.de)

# Aufgabe 1



|  |  |
| --- | --- |
|  | **Aussprache**  C  D  D wird von C subsumiert bezüglich der T-Box?  C  D  C impliziert D |

Wird A2 subsumiert von A1 bezüglich TBox [](https://www.codecogs.com/eqnedit.php?latex=%5Cmathcal%7BT%7D#0)?

Frage:[](https://www.codecogs.com/eqnedit.php?latex=%5Cmathcal%7BT%7D#0) [](https://www.codecogs.com/eqnedit.php?latex=%5Cmodels#0) A2 [](https://www.codecogs.com/eqnedit.php?latex=%5Csqsubseteq#0) A1 ? Wobei [](https://www.codecogs.com/eqnedit.php?latex=%5Cmathcal%7BT%7D#0) wie folgt definiert ist:

[](https://www.codecogs.com/eqnedit.php?latex=%5Cmathcal%7BT%7D#0) = {

A1 [](https://www.codecogs.com/eqnedit.php?latex=%5Csqsubseteq#0) ∃r. A3 , *(1)*

A2 [](https://www.codecogs.com/eqnedit.php?latex=%5Csqsubseteq#0) A3 , *(2)*

[](https://www.codecogs.com/eqnedit.php?latex=%5Ctop#0)[](https://www.codecogs.com/eqnedit.php?latex=%5Csqsubseteq#0) ∃s. A2 , *(3)*

∃s. A3 [](https://www.codecogs.com/eqnedit.php?latex=%5Csqsubseteq#0) A1, *(4)*

∃r. A1 [](https://www.codecogs.com/eqnedit.php?latex=%5Csqsubseteq#0) A2, *(5)*

}

Die TBox [](https://www.codecogs.com/eqnedit.php?latex=%5Cmathcal%7BT%7D#0) ist bereits in NF.

Algorithmus: Subsumption mit TBox

**R1** A1 [](https://www.codecogs.com/eqnedit.php?latex=%5Csqsubseteq#0) A1 A2 [](https://www.codecogs.com/eqnedit.php?latex=%5Csqsubseteq#0) A2 A3 [](https://www.codecogs.com/eqnedit.php?latex=%5Csqsubseteq#0) A3 [](https://www.codecogs.com/eqnedit.php?latex=%5Ctop#0) [](https://www.codecogs.com/eqnedit.php?latex=%5Csqsubseteq#0) [](https://www.codecogs.com/eqnedit.php?latex=%5Ctop#0) *(6)*

**R2** A1 [](https://www.codecogs.com/eqnedit.php?latex=%5Csqsubseteq#0) [](https://www.codecogs.com/eqnedit.php?latex=%5Ctop#0) A2 [](https://www.codecogs.com/eqnedit.php?latex=%5Csqsubseteq#0) [](https://www.codecogs.com/eqnedit.php?latex=%5Ctop#0)A3 [](https://www.codecogs.com/eqnedit.php?latex=%5Csqsubseteq#0) [](https://www.codecogs.com/eqnedit.php?latex=%5Ctop#0) *(7)*

**R3** Zunächst nicht anwendbar auf *(1)-(7)*

**R4** auf *(3)*[](https://www.codecogs.com/eqnedit.php?latex=%5Ctop#0)[](https://www.codecogs.com/eqnedit.php?latex=%5Csqsubseteq#0) ∃s. A2 , *(2)* A2 [](https://www.codecogs.com/eqnedit.php?latex=%5Csqsubseteq#0) A3 ,*(4)* ∃s. A3 [](https://www.codecogs.com/eqnedit.php?latex=%5Csqsubseteq#0) A1

[](https://www.codecogs.com/eqnedit.php?latex=%5Ctop#0)[](https://www.codecogs.com/eqnedit.php?latex=%5Csqsubseteq#0) A1 *(8)*

**R3** auf *(7)* A2 [](https://www.codecogs.com/eqnedit.php?latex=%5Csqsubseteq#0) [](https://www.codecogs.com/eqnedit.php?latex=%5Ctop#0), *(8)* [](https://www.codecogs.com/eqnedit.php?latex=%5Ctop#0)[](https://www.codecogs.com/eqnedit.php?latex=%5Csqsubseteq#0) A1

A2 [](https://www.codecogs.com/eqnedit.php?latex=%5Csqsubseteq#0) A1  *(9)*

[](https://www.codecogs.com/eqnedit.php?latex=%5Cmathcal%7BT%7D#0)\* = {

A1 [](https://www.codecogs.com/eqnedit.php?latex=%5Csqsubseteq#0) ∃r. A3 ,

A2 [](https://www.codecogs.com/eqnedit.php?latex=%5Csqsubseteq#0) A3 ,

[](https://www.codecogs.com/eqnedit.php?latex=%5Ctop#0)[](https://www.codecogs.com/eqnedit.php?latex=%5Csqsubseteq#0) ∃s. A2 ,

∃s. A3 [](https://www.codecogs.com/eqnedit.php?latex=%5Csqsubseteq#0) A1,

∃r. A1 [](https://www.codecogs.com/eqnedit.php?latex=%5Csqsubseteq#0) A2,

A1 [](https://www.codecogs.com/eqnedit.php?latex=%5Csqsubseteq#0) A1,

A2 [](https://www.codecogs.com/eqnedit.php?latex=%5Csqsubseteq#0) A2m

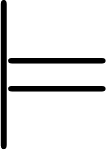
A3 [](https://www.codecogs.com/eqnedit.php?latex=%5Csqsubseteq#0) A3,

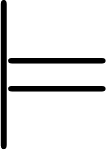
[](https://www.codecogs.com/eqnedit.php?latex=%5Ctop#0) [](https://www.codecogs.com/eqnedit.php?latex=%5Csqsubseteq#0) [](https://www.codecogs.com/eqnedit.php?latex=%5Ctop#0),

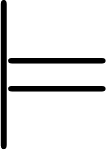
[](https://www.codecogs.com/eqnedit.php?latex=%5Ctop#0)[](https://www.codecogs.com/eqnedit.php?latex=%5Csqsubseteq#0) A1 ,

A2 [](https://www.codecogs.com/eqnedit.php?latex=%5Csqsubseteq#0) A1

}

Durch Regelanwendung **R4** kam heraus, dass gilt :[](https://www.codecogs.com/eqnedit.php?latex=%5Cmathcal%7BT%7D#0) [](https://www.codecogs.com/eqnedit.php?latex=%5Cmodels#0) [](https://www.codecogs.com/eqnedit.php?latex=%5Ctop#0)[](https://www.codecogs.com/eqnedit.php?latex=%5Csqsubseteq#0) A1.

Durch die anschließende Anwendung von **R3** kam heraus, dass gilt: [](https://www.codecogs.com/eqnedit.php?latex=%5Cmathcal%7BT%7D#0) [](https://www.codecogs.com/eqnedit.php?latex=%5Cmodels#0) A2 [](https://www.codecogs.com/eqnedit.php?latex=%5Csqsubseteq#0) A1 .

Daher ist die Frage ob [](https://www.codecogs.com/eqnedit.php?latex=%5Cmathcal%7BT%7D#0) [](https://www.codecogs.com/eqnedit.php?latex=%5Cmodels#0) A2 [](https://www.codecogs.com/eqnedit.php?latex=%5Csqsubseteq#0) A1 gilt, eindeutig mit “Ja” zu beantworten.

# Aufgabe 2 - Java Log Output

Testfall 0:

C:\Users\Dennis\development\DescriptionLogic\blatt6\java\_bl\_reasoner\tests\test0in.owl

OK. (Ontologie ist nicht in EL-Normalform)

Testfall 1:

C:\Users\Dennis\development\DescriptionLogic\blatt6\java\_bl\_reasoner\tests\test1in.owl

R1 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test1in#A> <http://www.semanticweb.org/schneider/ontologies/2019/6/test1in#A>)

R2 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test1in#A> owl:Thing)

R1 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test1in#B> <http://www.semanticweb.org/schneider/ontologies/2019/6/test1in#B>)

R2 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test1in#B> owl:Thing)

OK.

Testfall 2:

C:\Users\Dennis\development\DescriptionLogic\blatt6\java\_bl\_reasoner\tests\test2in.owl

R1 Add: SubClassOf(owl:Thing owl:Thing)

R2 Add: SubClassOf(owl:Thing owl:Thing)

R1 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test2in#A> <http://www.semanticweb.org/schneider/ontologies/2019/6/test2in#A>)

R2 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test2in#A> owl:Thing)

R1 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test2in#B> <http://www.semanticweb.org/schneider/ontologies/2019/6/test2in#B>)

R2 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test2in#B> owl:Thing)

R3 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test2in#A> owl:Thing)

R3 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test2in#B> owl:Thing)

OK.

Testfall 3:

C:\Users\Dennis\development\DescriptionLogic\blatt6\java\_bl\_reasoner\tests\test3in.owl

R1 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test3in#A> <http://www.semanticweb.org/schneider/ontologies/2019/6/test3in#A>)

R2 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test3in#A> owl:Thing)

R1 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test3in#A1> <http://www.semanticweb.org/schneider/ontologies/2019/6/test3in#A1>)

R2 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test3in#A1> owl:Thing)

R1 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test3in#B> <http://www.semanticweb.org/schneider/ontologies/2019/6/test3in#B>)

R2 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test3in#B> owl:Thing)

R3 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test3in#A> <http://www.semanticweb.org/schneider/ontologies/2019/6/test3in#A1>)

R3 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test3in#A> <http://www.semanticweb.org/schneider/ontologies/2019/6/test3in#B>)

R3 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test3in#A1> <http://www.semanticweb.org/schneider/ontologies/2019/6/test3in#B>)

OK.

Testfall 4:

C:\Users\Dennis\development\DescriptionLogic\blatt6\java\_bl\_reasoner\tests\test4in.owl

R1 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test4in#A1> <http://www.semanticweb.org/schneider/ontologies/2019/6/test4in#A1>)

R2 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test4in#A1> owl:Thing)

R1 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test4in#A3> <http://www.semanticweb.org/schneider/ontologies/2019/6/test4in#A3>)

R2 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test4in#A3> owl:Thing)

R1 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test4in#B> <http://www.semanticweb.org/schneider/ontologies/2019/6/test4in#B>)

R2 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test4in#B> owl:Thing)

R1 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test4in#A> <http://www.semanticweb.org/schneider/ontologies/2019/6/test4in#A>)

R2 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test4in#A> owl:Thing)

R1 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test4in#A2> <http://www.semanticweb.org/schneider/ontologies/2019/6/test4in#A2>)

R2 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test4in#A2> owl:Thing)

R3 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test4in#A> <http://www.semanticweb.org/schneider/ontologies/2019/6/test4in#A1>)

R3 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test4in#A> <http://www.semanticweb.org/schneider/ontologies/2019/6/test4in#A3>)

R3 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test4in#A> <http://www.semanticweb.org/schneider/ontologies/2019/6/test4in#A2>)

FEHLER:

Folgende Subsumtion wird vom Reasoner fälschlicherweise nicht erzeugt:

SubClassOf(<A> <B>)

Testfall 5:

C:\Users\Dennis\development\DescriptionLogic\blatt6\java\_bl\_reasoner\tests\test5in.owl

R1 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test5in#B> <http://www.semanticweb.org/schneider/ontologies/2019/6/test5in#B>)

R2 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test5in#B> owl:Thing)

R1 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test5in#A1> <http://www.semanticweb.org/schneider/ontologies/2019/6/test5in#A1>)

R2 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test5in#A1> owl:Thing)

R1 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test5in#A> <http://www.semanticweb.org/schneider/ontologies/2019/6/test5in#A>)

R2 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test5in#A> owl:Thing)

FEHLER:

Folgende Subsumtion wird vom Reasoner fälschlicherweise nicht erzeugt:

SubClassOf(<A> <B>)

Testfall 6:

C:\Users\Dennis\development\DescriptionLogic\blatt6\java\_bl\_reasoner\tests\test6in.owl

R1 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test6in#A> <http://www.semanticweb.org/schneider/ontologies/2019/6/test6in#A>)

R2 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test6in#A> owl:Thing)

R1 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test6in#B> <http://www.semanticweb.org/schneider/ontologies/2019/6/test6in#B>)

R2 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test6in#B> owl:Thing)

R1 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test6in#B1> <http://www.semanticweb.org/schneider/ontologies/2019/6/test6in#B1>)

R2 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test6in#B1> owl:Thing)

R1 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test6in#A1> <http://www.semanticweb.org/schneider/ontologies/2019/6/test6in#A1>)

R2 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test6in#A1> owl:Thing)

R3 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/6/test6in#A1> <http://www.semanticweb.org/schneider/ontologies/2019/6/test6in#B1>)

FEHLER:

Folgende Subsumtion wird vom Reasoner fälschlicherweise nicht erzeugt:

SubClassOf(<A> <B>)

Testfall 7:

C:\Users\Dennis\development\DescriptionLogic\blatt6\java\_bl\_reasoner\tests\test7in.owl

R1 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/7/test7in#A1> <http://www.semanticweb.org/schneider/ontologies/2019/7/test7in#A1>)

R2 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/7/test7in#A1> owl:Thing)

R1 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/7/test7in#A2> <http://www.semanticweb.org/schneider/ontologies/2019/7/test7in#A2>)

R2 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/7/test7in#A2> owl:Thing)

R1 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/7/test7in#A3> <http://www.semanticweb.org/schneider/ontologies/2019/7/test7in#A3>)

R2 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/7/test7in#A3> owl:Thing)

R3 Add: SubClassOf(<http://www.semanticweb.org/schneider/ontologies/2019/7/test7in#A2> <http://www.semanticweb.org/schneider/ontologies/2019/7/test7in#A1>)

FEHLER:

Folgende Subsumtionen werden vom Reasoner fälschlicherweise nicht erzeugt:

SubClassOf(<A1> <A2>)

SubClassOf(<A2> <A3>)

SubClassOf(<A1> <A3>)

Testfall 8:

C:\Users\Dennis\development\DescriptionLogic\blatt6\java\_bl\_reasoner\tests\test8in.owl

FEHLER: Testontologie C:\Users\Dennis\development\DescriptionLogic\blatt6\java\_bl\_reasoner\tests\test8out.owl fehlt!

Process finished with exit code 0