作业三

58119125 蒋卓洋

Q1. Express the following sentences in Description Logics.

1. Every teacher must teach someone

Solution:

$$Teacher \sqsubseteq \exists Teach.Human$$

2. Every finger is a bodypart and is a part-of hand.

Solution:

$$Finger \sqsubseteq Bodypart \sqcap \exists PartOf.Hand.$$

3. Zhang is a teacher of SEU

Solution:

$$TeachIn(Zhang, SEU)$$

Q2. Give a model of the following ontology:

$$PhD_{student} \sqcup Undergraduatge_{student} \sqsubseteq Student,$$
$$PhD_{student}(John),$$
$$Undergraduatge_{student}(Jack),$$
$$Sister(Lisa, Jack),$$
$$Employee(Lisa)$$

Solution:

$\Delta = \{j0, ja, l\}$

$I_I(John) = \{j0\}$

$I_I(Jack) = \{ja\}$

$I_I(Lisa) = \{l\}$

$I_C(PhDstudent) = \{j0\}$

$I_C(Undergrautge_{student}) = \{ja\}$

$I_C(Student) = \{j0, ja\}$

$I_C(Employee) = \{l\}$

$I_R(Sister) = \{(l, ja)\}$

Q3. Write the inferred axioms using description logics after conducting classification in forward reasoning on the following axioms.

Endocarditis ⊑ Heart_Disease

Miocardial_Infarction ⊑ Heart_Disease

Heart_Disease ⊑ Disease

Enterococcal_Endocarditis ⊑ Endocarditis

Solution:

$$Endocarditis \sqsubseteq Disease$$
$$Miocardial\_Infarction \sqsubseteq Disease$$
$$Enterococcal\_Endocarditis \sqsubseteq Heart\_Disease$$
$$Enterococcal\_Endocarditis \sqsubseteq Disease$$