2-AIN-108: Labs #5 DL Conceptualization

Exercise 1. Given = Person, Female and = hasChild define complex concepts:

- Male

- Parent

- Father

- Mother

- GrandParent

- GrandMother

- GrandFather

- MotherHavingOnlyDaughters

Exercise 2. Formalize following sentences as composite concepts:

- A man that is married to a doctor, and all of whose children are either doctors or professors.

- A man that likes only married women.

- A parent that has a child whose children are all maried.

Exercise 3. Formalize following sentences as TBox axioms:

- Car engine is either diesel engine, petrol engine, electric engine, hybrid engine or steam engine.

- Vegetarians eat only vegetable.

- Vegan does not eat any animal product.

- Only humans can have human children.

Exercise 4. Proove following equivalences[1]:

1. $\models C \sqcap \neg C \equiv \bot$

2. $\models C \sqcup \neg C \equiv \top$

3. $\models \neg\neg C \equiv C$

4. $\models \neg(C \sqcup D) \equiv \neg C \sqcap \neg D$

5. $\models \neg(C \sqcap D) \equiv \neg C \sqcup \neg D$

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[1]Hint: realize what does $\models C \equiv D$ mean, apply interpretation rules for concept constructors and proove resulting set identities.