INFOIAG: Intelligent Agents 2020
DL Exercises

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1. Given the following classes “person”, “parent”, “happyPerson”, “marriedPerson”, “malePerson” and the relation “hasChild”. Represent the following in DL:
   - Father
   - A parent is brave if and only if she/he has exactly two children
   - Strange people are parents who have only married or happy kids
   - Retired people are happy people who have at least one happy married child
   - Married men do not have children
   - Michael is a father with children named Alice and Bob
   - Charlie is a married man
2. The following ontology has been defined in DL:
   - instructor $\equiv$ person $\sqcap$ $\exists$teaches.(course $\sqcup$ lab)
   - projectCourse $\equiv$ course $\sqcap$ lab
   - busyInstructor $\equiv$ instructor $\sqcap$ $\forall$teaches.projectCourse
   - john: instructor
   - simulation: projectCourse
   - (john, simulation): teaches

   Apply the tableaux algorithm to answer the following and show your steps:
   - What is the T-box? What is the A-box? Is this ontology consistent? If not, what has to change to make it consistent?
   - Is simulation a lab? (Put the negation of the query $\{$simulation: $\neg$lab$\}$ in A)
   - Is John a busy instructor? (Put the negation of the query $\{$john: $\neg$busyInstructor$\}$ in A)
   - If you cannot conclude that John is a busy instructor, what else do you need in your ontology to conclude this?