CSCE476/876 **Fall 2020**

Homework 7 UPDATED

Assigned on: Friday Oct 23, 2020.

Due: Wednesday Nov 4, 2020.

This is a pen-and-paper homework, to be returned in class or with web handin.
The homework is worth 45 bonus points for ugrads and 20 points + 25 bonus points for grads .

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1 Bonus Researching Description Logic (Bonus 25 points)

Description Logic is a cornerstone of the Semantic Web technology. In this question, you are asked to research Description Logic *beyond what is in your textbook*. Write a two-page (typed) structured summary about DL addressing whatever aspects you find meaningful and interesting. Below is a list of ideas *you may want to include*, they are mere suggestions. Make sure you cite all your references.

1. What is the goal of DL?
2. To the extent possible, explain/state the syntax and semantics of DL.
3. How does DL relate to other types of Logic that we may or may not have studies?
4. Explain some proof techniques used for DL and give their complexity.
5. Briefly describe the history/evolution of DL.
6. Discuss and compare various implementations of DL.
7. Investigate the industrial impact of DL: list practical systems implements some version of DL; are they public domain; have they generated economic growth/benefit, etc.

2 Algorithms for Propositional Logic (Mandatory for grad, bonus for ugrads) (20 points)

Consider the following algorithms:

1. TT-ENTAILS?, AIMA Figure 7.10 page 248.
2. PL-RESOLUTION, AIMA Figure 7.12 page 255.
3. PL-FC-ENTAILS?, AIMA Figure 7.15 page 258.
4. DPLL-SATISFIABLE?, AIMA Figure 7.17 page 261.
5. WALKSAT, AIMA Figure 7.18 page 263.

For each of the above algorithms, carefully study the algorithm and explain how it operates by

- Clearly stating the input
- Providing the representation on which it operates
- Explaining when and why the algorithm stops
- Stating what mechanism the algorithm implements (for example by relating it to a known theorem.)

(4 points for each algorithm)