**Homework #2**

**Due Date: Oct 23rd, 2020, by 9PM**

1. (20) A public library implementing the constraint satisfaction solver in Python is available at [this link:](https://labix.org/python-constraint) <https://labix.org/python-constraint>. It gives a number of examples to illustrate how different types of constraints can be specified for the program and how to interpret the outputs. Download and install this library and show how you will solve the following three puzzles using this Python library. Show your code and all possible answers for each problem. (In each of these puzzles each variable can be assigned only one of the digits and no digit can be assigned to more than one variable.)
   1. (15) SINCE + JULIUS = CAESAR
   2. (15) CHECK + THE = TIRES
   3. (15) DO + YOU + FEEL = LUCKY
2. (15) Now consider the CSP discussion in the class and in the textbook and draw the constraint graph for the problem#1 part(b) above.
3. Consider the following sentence in propositional logic:

[(Food ^ Drinks => Party) v (Drinks ^ Dance => Party)] => (Party => Drinks)

Perform the following tasks with this sentence:

* 1. (15) Convert the left-hand side of this formula (in Red Font) into CNF and then into clauses. Show all steps of deriving the clauses.
  2. (10) Convert the right-hand side of this formula (in Green Font) into CNF and then into clauses. Show all steps of deriving the clauses.
  3. (30) Consider the clauses from the left hand side (red font) as forming your knowledge-base, and those from the right-hand side (green font) as forming the goal formula. Use resolution-refutation to prove the goal formula from the knowledge-base. If a proof can be found then show the proof. If a proof cannot be found then state the stage at which we can decide to give up looking for a proof, and also the meaning of not finding a proof.