CSE473 Homework #2
Due at 10:30 AM in Class on Paper
Name:

Constraint Satisfaction

The following is a cryptarithmetic problem. Each letter stands for a single digits; all of the digit values for the letters in a column must add up properly.

```
   send
+  more
-------
  money
```

Problem 1

Draw the constraint graph for this problem.

Problem 2

Suggest two heuristics for this problem (and explain them in the context of the problem).

Problem 3 - Optional

Solve this cryptarithmetic problem.

Problem 4

How would you express satisfiability as a constraint satisfaction problem?

Logic

Problem 5

Given the knowledge base

$$KB = (A \rightarrow B) \wedge (B \rightarrow C)$$

disprove the statement

$$C \rightarrow \neg A$$

using a sound method of your choice.

Problem 6

Transcribe the following english sentence into first-order logic. Use the capitalized words as your predicates.
Every PERSON does not have an EVIL TWIN.

Problem 7

Given the following statements in first-order logic

$$\forall x, y, z\, Child(x) \wedge Child(y) \wedge Parent(z, x) \wedge Parent(z, y) \rightarrow Sibling(x, y)$$

$$\forall x, y\, Sibling(x, y) \rightarrow Buddies(x, y)$$

$$Child(Bob)$$

$$Child(Mary)$$

$$Parent(Gerald, Bob)$$

$$Parent(Gerald, Mary)$$

prove that Bob and Mary are buddies using resolution. Clearly convert the statement to normal form.