Problem A (50%)
For this problem, we wish to show that the circuit shown in figure 1 is unstable.

Part 1 (15%)
Formulate this circuit as a set Σ of propositional logic formulas.

Part 2 (15%)
Convert Σ to a set of clauses in conjunctive normal form (CNF).

Part 3 (20%)
Use resolution to show that Σ is inconsistent.

Problem B (50%)
For this problem, state your answer in a combination of English and standard mathematical notation.

Part 1 (10%)
Define the notion of a *constraint satisfaction problem*.

Part 2 (10%)
Define what it means for a constraint satisfaction problem to be *arc consistent*.

Part 3 (10%)
Give an algorithm for making a constraint satisfaction problem arc consistent.

Part 4 (20%)
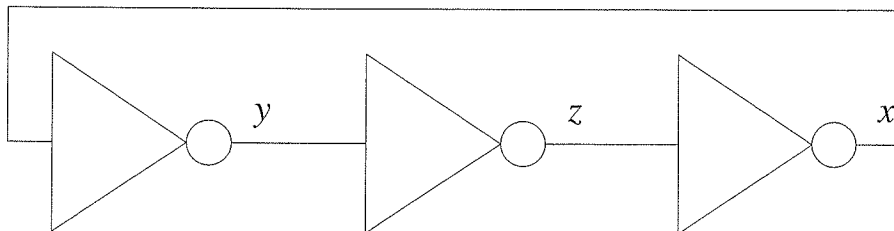Present a constraint satisfaction problem that is arc consistent yet is inconsistent.

Figure 1: An unstable circuit.

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