CS 180 Homework 1

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Problem 1

An algorithm is a set of instructions that are geared towards the goal of solving a problem. A program is similar in that it contains a set of instructions that accomplish some task.
However, the big difference is that a program is a specific set of instructions written in a particular language, while an algorithm can be used more generally and described in words.
Because each program is specific, there can exist two unique programs such that they both implement the same algorithm.
Additionally, algorithms predate programs and can apply more generally.

Problem 2

The statement is false, and therefore there is not an algorithm that solves every instance of this problem.
Counterexample:

Men:	①	②
Adam	Donna	Cara
~~Brad~~	Echo	Fox
Brad	Donna	Cara
	Fox	Echo

Women:	1st	2nd
Cara	Adam	Brad
	Echo	Fox
Donna	Adam	Brad
	Fox	Echo

Yupi	1st	2nd
Echo	Adam	Brad
	Donna	Cara
Fox	~~Adam~~ Brad	Adam
	Donna	Cara

In this example, no stable triples exist.
- Adam and Donna are each others top choice, so they must be together.
  - Adam prefers Echo and Echo prefers Adam
  - Donna prefers Fox and Fox prefers Donna

Therefore, a triple of Adam, Donna, and Echo would be unstable for Donna and Fox, and a triple of Adam, Donna, and Fox would be unstable for Adam and Echo, and a triple w/o Adam & Donna is unstable for them.
Therefore, the statement is false.