1. What is the definition of an NP-complete problem?
2. Does there exist a decision problem that is not in P NP? Justify your answer.
3. Show that DOUBLE-SATPL SAT. You are not required to give a polynomial-time mapping reduction from DOUBLE-SATPL to SATPL. But give an air tight argument that such a mapping reduction must exist. (DOUBLE-SATPL is defined in exercise set 0911.)
4. Let be the set of all natural numbers that are prime. Does there exist a polynomial-time mapping reduction from to SAT?

1. Suppose is in NP and is NP-complete and Can you conclude that is NP-complete?
2. Suppose that is NP-complete and . Can you conclude that is NP-complete? Justify your answer.