

Tutorial V

Discrete Structures (CS21001)

Autumn Semester 2014

September 2, 2014

1. A Fermat's number is of the form $F_n = 2^{2^n} + 1$.
 - (a) Prove $F_n = F_0 \cdot F_1 \cdots F_{n-1} + 2$.
 - (b) Using above recurrence show that no two Fermat's number share a common factor greater than 1.
2. A subset of a poset such that every two elements of this subset are comparable is called a **chain**. Show that every maximal chain in a finite poset $((S, \preceq))$ contains a minimal element of S . (A maximal chain is a chain that is not a subset of a larger chain.)
3. Prove there are infinitely many primes.
4. If n is a positive integer such that $n \pmod{4}$ is 2 or 3, then n is not a perfect square.
5. Prove that the composition of two one-to-one functions is also one-to-one.