

Lab01-Proof

CS363-Computability Theory, Xiaofeng Gao, Spring 2015

* Please upload your assignment to FTP or submit a paper version on the next class.

* Name:_____ StudentId: _____ Email: _____

1. Use the method “proof by contradiction” to prove that $\sqrt{2}$ is irrational. (A real number x is *rational* if there are two integers m and n so that $x = m/n$.)
2. Prove the following statement by mathematical induction:
For any $x \in \{0, 1\}^*$, if x begins with 0 and ends with 1 (i.e., $x = 0y1$ for some string y), then x must contain the substring 01. (Note that $*$ is the *Kleene star*. $\{0, 1\}^*$ means “every possible string consisted of 0 and 1, including the empty string”.)
3. Use the method of minimal counterexample to prove that every integer $n \geq 7$ can be written as $n = 2a + 3b$, where a and b are positive integers.