

CS381
Fall 2004

First Mid Term

Friday Oct 1, 2004
Hollister B14 9:05-9:55

This is a 50-minute in class closed book exam. All questions are straightforward and you should have no trouble doing them. Please show all work and write legibly. Thank you.

1. Write a regular expression denoting all strings in which every third symbol is a 0. Some strings in the set are ε , 010, 1101101, 0001101001, etc

2. Express the set

$$\{0^n 10^{n-1} 10^{n-2} 1 \dots 1000100101 \mid n \geq 1\}$$

in terms of intersection, \cup , \bullet , and $*$ and the set $\{0^{i+1}10^i \mid i \geq 1\}$.

3. Use the pumping lemma to prove that $L = \{a^i b^j \mid i \leq j\}$ is not regular.

4. Use homomorphism, inverse homomorphisms and intersection with regular sets to express the set obtained from an arbitrary set L by deleting in each string every 1 appearing in an even numbered position and preceded by a 0.