CS 4810 Homework Assignment 6 due in class Wednesday Oct 10

Your homework will be graded on the neatness of your write up as well as its correctness.

1. Prove that $\{a^i b^j c^k |$ either $i = j$ or $i = k$ or $j = k\}$ is not a regular set.

2. Prove that $\{(0 + 1)^n 1^n\}$ is not a regular set.

3. Prove that $\{xy | xy \in (a + b)^*$ where the number of a's in x equals the number of a's in y and the number of b's in x equals the number of b's in $y\}$ is not a regular set.

4. Prove that the set consisting of the first third of each string whose length is divisible by three in a regular set is regular.

5. Is the set obtained by deleting the middle third of each string whose length is divisible by three in a regular set a regular set?
   If 011011 was in the original set, cutting out the middle third would result in the string 0111.