**HOMEWORK 3 – CS 211 Spring 2010**

**Due: May 3, 2010**

(35 pts)

**Name:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Names of students you worked with on this assignment (if any): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Each student must turn in an assignment and do her/his own work. Turn in these pages with your answers written in the spaces provided. Please write clearly and large enough for me to read. Each problem is worth 5 points. Word processed homework assignments can receive 5 points extra credit, but only if all symbols, expressions and sentences are correctly represented.**

1. Let. Compute the following set,.

1. Write down all possible lists of length 2 or less over the set A= {a, b, c}.

1. Use your wits to solve each of the following language equations for the unknown language.



1. Let and be two languages. Describe the general structure of a string by writing it as a concatenation of strings that are either in or for the languages and .

\*

\* if and only for some n. Therefore:

\* if and only if either or

for some , where for .

\*

Let .

\* if and only if for some n. Therefore:

\* if and only if either or

for some , where for .

1. Let A = {a, b, c, d, e}. How many strings over A have length 6 and contain at least one a and at least one b?

Let U be the set of 6-tuples of A.

So and .

Let S be a subset of U whose 6-tuples don't contain .

So and .

Let T be a subset of U whose 6-tuples don't contain .

So and .

Then the set consists of all 6-tuples that contain at least one and one .

The cardinality of this set has the form

where

1. Let be languages. Prove is a subset of

Assume are languages.

.

if and only if and Given & Def. Product of Languages

if and only if and and Def. Intersection of Sets

if and only if and Def. Product of Languages

if and only if Def. Intersection of Sets

Therefore, .

1. Prove.

if and only if and Def. of Cartesian Product

if and only if and and Def. of Difference Of Sets

if and only if and Def. of Cartesian Product

if and only if Def. of Difference

Therefore .