University of Washington
Department of Computer Science and Engineering
CSE 311, Autumn 2011

November 10, 2011

Quiz Section, November 10, 2011

Homework Review

- Homework 6, Problem 1

  Prove that $f_1^2 + f_2^2 + \cdots + f_n^2 = f_n f_{n+1}$ when n is a positive integer.

- Homework 6, Problem 4

  Give a recursive definition of the set of bit strings that have the same number of zeros and ones.

New Stuff

1. Regular Expressions

   Express each of these sets using a regular expression:

   (a) The set of strings of odd length

   (b) The set of strings ending in 1 and not containing 000

   (c) The set of strings containing a string of 1's such that the number of 1's equals 2 mod 3, followed by an even number of 0's.

   (d) The set of binary strings with an equal number of 1's and 0's

2. Context Free Grammars

   Give a grammar for each of these languages:

   (a) The set of all strings containing an equal number of 0's and 1's

(b) The set of all strings containing more 0's than 1's

(c) The set of all strings containing more 1's than 0's

(d) The set of all strings containing an unequal number of 0's and 1's

3. CFGs for Combined Languages (Problem #21: Section 13.1 in 7th, 12.1 in 6th)

   Let G_1 and G_2 be context-free grammars, generating the languages $L(G_1)$ and $L(G_2)$ respectively. Show that there is a CFG generating each of the following:

   (a) $L(G_1) \cup L(G_2)$

   (b) $L(G_1)L(G_2)$

   (c) $L(G_1)^*$