CS/Math 240: Intro to Discrete Math 3/7/2011

Grading Key for Homework 4

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Problem 1 (8 points)

- Subdivision (a) carries 4 points
- Subdivision (b) carreis 4 points

Problem 2 (9 points)

- Subdivision (a) carries 4 points
- Subdivision (b) carreis 4 points
- Subdivision (c) carreis 1 points

Problem 3 (7 points)

- Subdivisions (a) carries 3 points
- Subdivisions (b) carries 4 points

Problem 4 (11 points)

- Subdivision (a) carries 6 points
- Subdivision (b) carreis 3 points
- Subdivision (c) carreis 2 points

Problem 5 (5 points)

Common Mistakes

- For question 1b, one cannot assume that every string can be represented as $0s1t$ or $1s0t$ where s and t are good strings. Proper steps should be shown to illustrate that a sequence with an equal number of 0's and 1's can be represented in either of these forms.
- When trying to prove a statement, be sure of what is given and what you are required to prove. For question 1, some students wrote the hypothesis and ended up writing proof statements in favor of the converse. For example, in part 1(a)a, you are asked to prove "Every good sequence contains equal number of 0s and 1s". Here you are given a good sequence and asked

to prove it contains an equal number of 0s and 1s. But some students got confused here and concluded that the given sequence was a good sequence, which is not what we wanted to show.

- For question 2(a), some students stated that a column move changes the number of errors by -3,3 or 0, which is incorrect: it is -3, -1, 1, or 3. If you stated the former, then your argument that an odd number of column moves is necessarily invalid.
- For problem 2, while arguing that an odd number of column moves and an even number of column moves will be required to solve the puzzle, you also need to give an induction proof to verify your statements.
- For problem 4(a), just proving an invariant does not mean that your program is correct. You also need to argue partial correctness and termination using the invariance proved.
- For problem 5, some students overlooked the fact that even if $1 = ua + vb$, u and v are not necessarily positive and cannot be used directly as a valid stamp combination.