CS/Math 240: Intro to Discrete Math 3/21/2011

Grading Key for Homework 5

Instructor: Dieter van Melkebeek

Problem 1 (15 points)

- Subdivision (a) carries 7 points
  - 4 points for loop invariant for inner loop
  - 3 points for loop invariant for outer loop
- Subdivision (b) carreis 4 points
  - 2 points for partial correctness
  - 2 points for termination
- Subdivision (c) carreis 4 points
  - 1 point for giving the correct answer
  - 3 points for proof

Problem 2 (12 points)

- Subdivision (a) carries 6 points
  - 3 points for partial correctness
  - 3 points for termination
- Subdivision (b) carreis 3 points
  - 1 point for giving the correct values
  - 1 point for proof of R(k)
  - 1 point for proof of M(k)
- Subdivision (c) carreis 3 points
  - 1 point for giving recurrence relations and expression for R(k) and M(k)
  - 2 points for proof

Problem 3 (8 points)

- Subdivision (a) carries 3 points
- Subdivision (b) carries 2 points
- Subdivision (c0 carries 3 points

Problem 4 (5 points)

- 2 points for arriving at the correct expression
- 1 point for base case
- 2 points for induction step

Common Mistakes

- For problem 1c, specifying a numerical upper bound should also be accompanied by a proof justifying this number as the maximum possible and an example of how this maximum is achievable.
- For problem 2, when trying to give a proof for partial correctness of a recursive program, you need to assume that the recursive calls return correctly.
- For problem 3a, solutions should include 0 as a candidate real for the recurrence (i.e) you need to solve the equation $c^3 = c^2 + c$ instead of $c^2 = c + 1$.