CS5114 Spring 2010
Solution to Homework Assignment 1

Pledge: I (we) have not received unauthorized aid on this assignment. I (we) understand the answers that I (we) have submitted. The answers submitted have not been directly copied from another source, but instead are written in my (our) own words.

,

1. Manber 2.13: Prove that, for all $n > 1$,

$$1 + \frac{1}{2} + \frac{1}{3} + \cdots + \frac{1}{n} = \frac{k}{m},$$

where k is an odd number and m is an even number.

---

2. Manber 2.14: Consider the following series, 1, 2, 3, 4, 5, 10, 20, 40, ..., which starts as an arithmetics series, but after the first 5 terms, becomes a geometric series. Prove that any positive integer can be written as a sum of distinct numbers from this series.

---

3. Manber 2.21: Prove that the regions formed by a planar map all of whose vertices have even degree can be colored with two colors such that no two neighboring regions have the same color. [A planar map is a graph whose edges are straight line segments, and whose edges may not intersect except where they meet at a vertex.]
