Due: 2012/11/22

Homework 7

Problem 1. *Determine the Schur number $S(2,2)$, justify your answer.*

Problem 2. *Prove the stronger version of Schur's theorem: For any positive integers c and m, there exists $S^*(c,m)$ such that no matter how we colour $[S^*(c,m)]$ by c colours, there are* distinct *$x_1, x_2, ..., x_m, y \in [S(c)]$ with the same colour such that $\sum_{i=1}^{m} x_i = y$.*

Problem 3. *Prove that for any positive integer c, there is a number $N = N(c)$ such that for any c-colouring of all subsets of $[N]$, $f : 2^{[N]} \to [c]$, there exists non-empty disjoint sets $X, Y \subseteq [N]$ such that $f(X)$, $f(Y)$ and $f(X \cup Y)$ are the same.*