Homework 5.

For each problem, write the (algebraic) linear programming formulation first. Give clear definitions of the decision variables as *numbers*. For example, write "R = the number of regular bags produced", not "R = regular".

Second, for each problem listed below, **create an Excel spreadsheet model of the problem and find an optimal solution with Solver.** Hand in the *standard printouts*. (See the course webpage for details.)

Don't forget to **interpret the numerical results**. For example, don't just write "R=10" (underlined twice), but "the optimal production plan is to make 10 regular bags".

I don't discuss extra credit problems before the due date in office hours.

1. (15 points) Solve problem 3 on page 117 of the textbook. (Basketweavers University.)

2. (15 points) Solve problem 15 on page 121-122 of the textbook. (Simon's Mall.)

3. (10 points, *extra credit*) Give the algebraic formulation of *Sudoku*. (You don't need to implement this one in Excel.)

4. (20 points, *extra credit*) Solving Sudoku problems is easy. (See the previous problem.) But how do you *create* puzzles? One way to make sure that there is a solution is that we start with a solved puzzle, and then erase elements one by one, until we have only a few elements left, so the problem is "hard enough". (To distinguish between "easy" and "hard" problems, magazines and websites usually just count the number of given digits.) The difficulty of the puzzlemaster here is that a "good" puzzle must have a *unique* solution, so every time we erase a number we have to check if the remaining grid is still uniquely solvable. (And if not, we have to pick another digit to erase.) Can you formulate this problem as an integer programming problem?

Due on Wednesday, October 31, in class.