

## 18.310 2008 Assignment Ten

1. Here is a linear program:

$$x_1 + 2x_2 - 3x_3 - x_4 \leq 1$$

$$x_1 - x_2 + x_3 + x_4 \leq 2$$

$$-x_1 + 2x_2 - x_3 + x_4 \leq 1$$

$$x_1 + x_2 + x_3 - x_4 \leq 3$$

maximize

$$x_2 + x_3 + x_4$$

subject to all  $x$ 's being non-negative

a. Write the tableau corresponding to this problem.

b. Solve this lp by pivoting on a spreadsheet

Find the maximum value of the objective function, the value of all  $x$ 's at that solution.

2. a. Write down the dual problem to the one given above

b. Find the solution to this dual problem from the solution to the primal problem

3. Suppose that you started with the dual problem, for which the origin is not a solution. Add an extra variable and extra constraint and extra objective function to obtain a problem for which the origin is feasible,

4. Write the LP that determines optimal strategy for a player in a two person zero sum game with a 3 by 3 result matrix (for the row player) is (2, 1, -2) second row is (3, -1, 2) and third row is (-2, 1, 1)