Hint for Assignment 6 of CS6012

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January 25, 2010

1 Lagrangian Dual

Hint: The purpose of this problem is to use *Lagrangian Dual* to obtain the dual form from prime-form. In this process, you can recognize the relationship between $Ax \geq b$ in prime and $y \geq 0$ in dual.

2 Simple Algorithm

3 Linear Programming

Note: Something wrong appears in the statement. This problem asks for a *point* (x, y), not a *line*. And the *distance* between a point (a, b) and the target point (x, y) is *zigzag* distance: $d = |x - a| + |y - b|$. Under the modification, the problem becomes simple. Maybe you can ignore this problem, it does not likely to appear in the final examination, I think.

4 Linear Programming

Hint: "basic solutions associated with the initial slack forms" is $\{0, 0, \cdots, 0, b_1, b_2, \cdots, b_m\}$.

5 Linear Programming

Hint: The *foundamental theorem* is that if LP has optimal solution, then the optimal solution can be obtained on vertex.
You should summit a counterexample which satisfies: a) it has strict inequality, b) it has optimal solution, c) it has vertex and d) all vertices are not optimal solution.

6 Lineare Programming

Hint: x_j means the time spent by $j-th$ person on *forward* walking while x'_j means the time spent by $j-th$ person on *backward* walking. y_j means the time spent by $j-th$ person on *forward* bicycling while y'_j means the time spent by $j-th$ person on *backward* bicycling.

7 Linear-inequality feasibility

Hint: (a) trivial.
(b) think of dual :)