

## Homework 8

Please answer the following questions about probabilistic modeling.

### Question 1: (Project 4)

Write a survey (3 pp+) on one of the following methods. Present it in the class on next Friday (May 17th). There is a long and interesting story behind each method. Add some details to share with your peers.

- Criss-cross algorithm
- Fourier-Motzkin elimination
- Karmarkar's algorithm
- Nelder-Mead simplicial heuristic
- Pivoting rule of Bland, which avoids cycling

### Question 2:

Study ~~my~~ <sup>my</sup> linear programming section. Write your own simplex code to display all the intermediate steps to solve a linear programming problem. Present your code in the class on next Friday (May 8th).

### Question 3:

*Solve Problems below using simplex method.*

(a)

Maximize  $10x + 35y$   
subject to

$$8x + 6y \leq 48 \quad (\text{board-feet of lumber})$$

$$4x + y \leq 20 \quad (\text{hours of carpentry})$$

$$y \geq 5 \quad (\text{demand})$$

$$x, y \geq 0 \quad (\text{nonnegativity})$$

(b)

Minimize  $5x + 7y$   
subject to

$$2x + 3y \geq 6$$

$$3x - y \leq 15$$

$$-x + y \leq 4$$

$$2x + 5y \leq 27$$

$$x \geq 0$$

$$y \geq 0$$

### Question 4:

Use the Simplex Method to find both the maximum solution and the minimum solution to Problems

Assume  $x \geq 0$  and  $y \geq 0$  for each problem.

(a)

Optimize  $2x + 3y$   
subject to

$$2x + 3y \geq 6$$

$$3x - y \leq 15$$

$$-x + y < 4$$

$$2x + 5y \leq 27$$

(b)

Optimize  $6x + 4y$   
subject to

$$-x + y \leq 12$$

$$x + y \leq 24$$

$$2x + 5y \leq 80$$

**Due: 10:00am 17 Mar Please email your homework to TA.**

# Project 5 → 6

Apply the Simplex Method to solve a real-world problem related to your major!

① Show the power of the Simplex Method!

② Dig into the research into the Simplex Method!  
latest

Due 10:1 am 31<sup>st</sup> May.

{ Pre. on 31st May!  
 { Cake.  
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