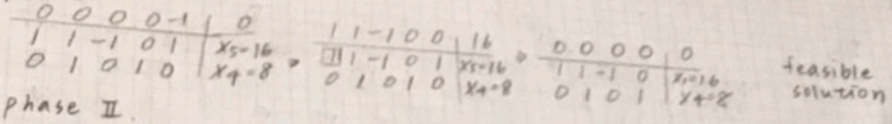
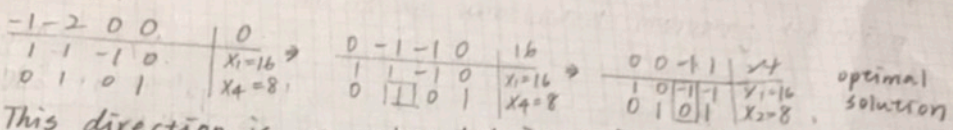
Lecture 5 – HW

2.

1(a). phase I.



phase II.



This direction is an unbounded improving direction.

⇒ This LP is unbounded.

(b) There is no optimal solution for primal.. so we can not solve the dual solution with this function. $\bar{y}^T = C_B^T A_B^{-1}$.

(c) Since we can't solve dual solution, the dual LP is infeasible. So if we have an unbounded primal, the dual must be infeasible.
It is not a coincidence.

5.

(a) X_1^* and X_4^* is primal optimal solution.
If a primal constraint is nonbinding, the corresponding dual variable is 0.
the first and the fourth dual slack variables must be zero.

(b) $\min\ 600y_1 + 400y_2$

s.t. $4y_1 + y_2 = 6$

$9y_1 + y_2 - z_1 = 10$

$7y_1 + 3y_2 - z_2 = 9$

$10y_1 + 40y_2 = 20$

$y_i \geq 0 \quad i = 1, 2, 5, 6.$

$y_1 = 1.4\overline{16}$

$y_2 = 0.1\overline{33}$

$z_1 = 3.\overline{33}$

$z_2 = 1.6\overline{6}$ #

(a) It should be zero.

(b) It should not be zero.

(c) Calculate the dual optimal solution, for those who are not zero, must be the bottleneck tasks.