

## Step-1

Consider the following problem:

Minimize cost:  $x_1 + x_2 - x_3$

Subject to:

$$2x_1 - 4x_2 + x_3 + x_4 = 4$$

$$3x_1 + 5x_2 + x_3 + x_5 = 2$$

Determine which  $x_1$  will enter the basis and which  $x_1$  will leave. Compute new pair of basic variables and cost at new corner.

## Step-2

Start from the corner,  $x_4 = 4$  and  $x_5 = 2$  are basic variables. At that corner  $x_1, x_2, x_3$  will be zero. Entering variable will be  $x_3$  as it has negative cost coefficient. As  $x_3$  will enter  $x_4$  or  $x_5$  must leave.

In first equation when  $x_3 + x_4 = 4$ ,  $x_4$  can get maximum value 4 and in second equation when  $x_3 + x_5 = 2$ ,  $x_5$  can get value 2. So choose minimum value, this means that  $x_5$  will be the leaving variable.

## Step-3

So, the new corner is:

$$x = (0, 0, 2, 4, 0)$$

New cost at the corner:

$$\begin{aligned} x_1 + x_2 - x_3 &= 0 + 0 - 2 \\ &= -2 \end{aligned}$$

New basic variables will be  $x_3, x_4$ .

## Step-4

Therefore, following is observed:

Entering variable is  $x_3$ , leaving variable is  $x_5$ , cost is -2, and new basic variables are  $x_3, x_4$ .