

## Step-1

Consider  $F(x, y) = x^2 + 10xy + 10y^2$ .

Compare this with  $a^2 + 2bxy + cy^2$ ,

So,  $a = 1$ ,  $2b = 10$ ,  $c = 10$

So that  $a + c = 10 + 1 = 11$  and  $b = 5$

Clearly  $a + c > 2b$  and  $ac = 10$ ,  $b^2 = 25$

## Step-2

Thus the required matrix is  $\begin{pmatrix} a & b \\ b & c \end{pmatrix} = \begin{pmatrix} 1 & 5 \\ 5 & 10 \end{pmatrix}$

So,

$$ac - b^2 < 0$$

$$\Rightarrow 10 - 25 < 0$$

$$\Rightarrow -15 < 0$$

The matrix is not positive definite.