P6-Set Covering-Internet Hotspots

UM has assigned you to strategically choose the locations of wifi hotspots so that the Coral Gables campus is covered with wifi internet. The campus has been partitioned into 150 locations, and these locations are the candidates for the aforementioned hotspots. The attached "problem6.mat" contains an adjacency matrix Adjecency = $(a_{ij})_{1<=i;j<=150}$. If $a_{ij} = 1$, then a hotspot at location j is able to provide wifi internet to location i as well.

(a) Find the minimum number of wifi hotspots in order to cover the whole Coral Gables campus with internet. In what locations should the hotspots be installed? Formulate a "MATLAB ready" Binary Program, i.e.,

min c *x
s.t. Ax <=b
$A_{eq}x = b_{eq}$
x binary
Clearly define A;A_{eq}; b; b_{eq}; c.

(b) Suppose the University's budget allows only the installment of 15 hotspots. Identify those 15 locations that maximize the wifi coverage. Formulate a "MATLAB ready" Binary Program.

(c) Discuss your solutions in (a) and (b); 1-2 sentences.