CS471 Homework 6

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Problem 1

The light bulb will be either on(1) or off(0). So, if we have 2 bulbs, the possible state are (0,0),(0,1),(1,0),(1,1).
Variables: we define the variable X_i to be one of m switches. If that switch toggles the bulb, the values of X_j(j = 1,2,.....,m) are a tuple of size n where each column is a 1 and 0 otherwise.
Constraints: We have n constraint where constraint(i) means that the sum of column i for all our variables X_j should be odd. We will have n constraints since our tuple is size n.

Problem 2

1.

X_1	X_2	X_3	t_1	t_2	Consistent
0	0	0	0	0	No
0	0	1	0	1	No
0	1	0	1	1	yes
0	1	1	1	0	No
1	0	0	1	0	No
1	0	1	1	1	yes
1	1	0	0	1	No
1	1	1	0	0	No

2. We made 9 calls including the initial call.
   The order matters because future choice is based on previous ones,
   and rearrange the branches emanating from each node of the search tree
   $\{[0,1],[0,1],[0,1]\}$ $\overrightarrow{X_1=0}\{0,[0,1],[0,1]\}$ $\overrightarrow{X_3=0}\{0,[0,1],1\}$ $\overrightarrow{X_3=0}\{0,1,0\}$
   $\overrightarrow{X_1=1}\{1,[0,1],[0,1]\}$ $\overrightarrow{X_3=1}\{1,[0,1],1\}$ $\overrightarrow{X_2=0}\{1,0,1\}$

3. We made 7 calls including the initial call
   $\{[0,1],[0,1],[0,1]\}$ $\overrightarrow{X_1=0}\{0,[0,1],[0,1]\}$ $\overrightarrow{X_3=0}\{0,[0,1],0\}$ $\overrightarrow{X_2=1}\{0,1,0\}$
   $\overrightarrow{X_1=1}\{1,[0,1],[0,1]\}$ $\overrightarrow{X_3=1}\{1,1,[0,1]\}$ $\overrightarrow{X_2=0}\{1,0,1\}$