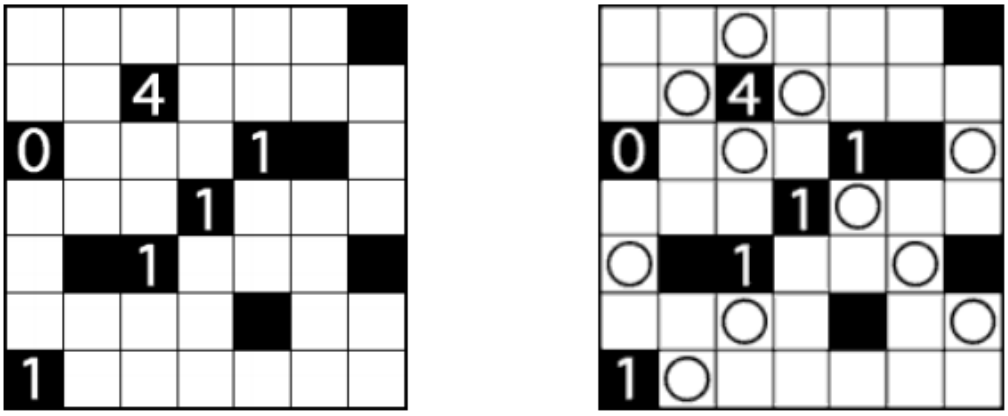
Homework Report 3

Variables are defined as V(i,j) such that i represents the x and j represents the y line in my matrix

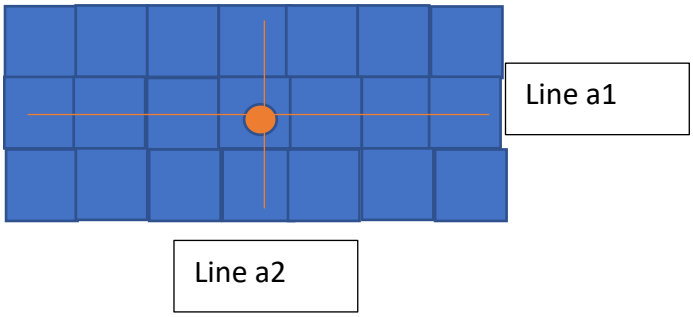


(a) (b)

In the homework, while adding the variables that I will use, I created a dictionary that holds all of the variables so that it will be easy to represent all variables.

After creating the variables used linear solver to create a rule such that there won't be more than 1 bulb in given column and row.

In addition to that it is also crucial to create a constraint such that there won't me more than 2 bulb in the row and column that bulb belongs to. So if we show these rules with an example it will be:



So in order to solve this Akari problem we need to solve 4 different kind of constraints:
1-Sum of all variables on the line a2 (if there are black areas on the way, don't take the variables after the black area into the account) should be 0 or 1
2-Sum of all variables on the line a1 (if there are black areas on the way, don't take the variables after the black area into the account) should be 0 or 1

3-Sum of all variables on both a1 and a2 (if there are black areas on the way, don't take the variables after the black area into the account) should be 1 or 2
4- If a black are with a number exists then sum of all of the variables around the black area (diagonal areas are not included) should be equal to that number.

If every variable in the board satisfies these 4 given constraints , then we can say that solution can be found by giving these constraints and variables to the CSP algorithm.

Discussion on A* or CSP: For Akari I believe that CSP is much more appropriate since there is not any early failure detection on the given algorithm if we use A* to solve this question. Hence using the constraint solving program, gives us a brief set of rules so that algorithm has less paths to discover for.