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BLG 435E: Artificial Intelligence Assignment 2 Question 1

Part a) A CSP problem consists of 3 elements: domain, constraints and variables.

In my solution, there is 3 type of *variables*:

Xij: for all cells in game mat,

Rij: i: row number j: jth row block, number of blocks in a row,

Cij: i: column number j: jth column block, number of blocks in a column.

Domains for each type of variables:

[0, 1] for Xij as one slot can be either black or white,

[0, index of maximum slots for that row block could exist] for Rij, contains start index for each row,

[0, index of maximum slots for that column block could exist] for Cij, contains start index for each column.

Lastly solution consist of 2 *constraints* implemented by 4 functions to provide row-column consistency:

Main Constraint for Row: Row blocks do not intersect with each other and there is 1 block space between them,

Main Constraint for Column: Column blocks do not intersect with each other and there is 1 block space between them,

Side Constraint for Row: If a cell resides in a row block its value is 1(black).

Side Constraint for Column: If a cell resides in a column block its value is 1(black).

Part b) For solving the puzzle backtrack algorithm is used by implementing it with *simpleai* library. Output is given as follows in console, Os represent white cells and Xs represent black cells. Implemented program shows satisfactory output for sample puzzle.

```
o o x x x x x x o o
o x x x x x x x x o
x x x x x x x x x o
x o o o o o x x x x
x x o x x o x x x x
x o o o o o x o x x
o x o o x o o x x x
o x x x o o o x x o
o x o o o x o x o o
o o x x x x o x o o
```