# Question1

## How To Run

1. Before starting, please create the folder structure as follow:

## Strategy

## Results

The strategy for solving the Nonogram can be split into three steps:

### Step 1:

At the beginning of the Nonogram solving, we need to find out every possible option to fill out the rows and columns with black squares.

### Step 2:

Explicitly fill out the cells that only have one possible option.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | √ | √ | √ |  |

Label: [4]

For example, as it is shown above, if the drawing board has the size of 5\*5 and one of the rows is labeled as [4], it means that this row is filled in black with either the first 4 cells or the last 4 cells. However, no matter in which case, the 3 cells in the middle are determinately needed to fill in black. (Check marks represent the cells to be filled in black)

### Step 3

Based on the filling result from step 2, we may remove some options which do not meet the criteria.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  | X |  |  |

Label: [3]

For example, as it is shown above, for a single row with 6 cells labeled as [3], the original possible options may be [0,1,2], [1,2,3], [2,3,4], or [3,4,5]. However, if the result from step 2 indicates that cell 4 (indexed as 3 if starting from 0), the only possible option for this row will be [0,1,2] and shown as follow (check marks represent the cells to be filled in black)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| √ | √ | √ | X |  |  |

Label: [3]