Vanishing domino

Algorithms and Computability Laboratories

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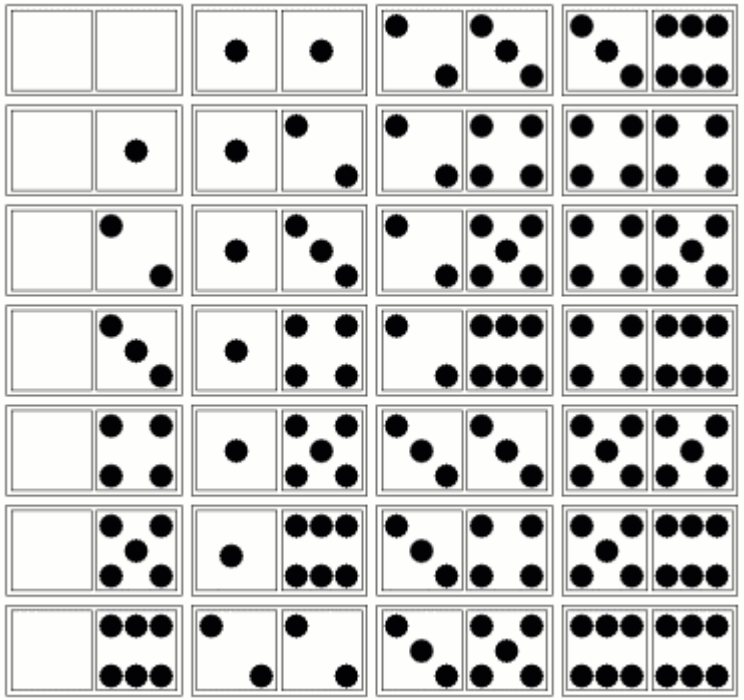
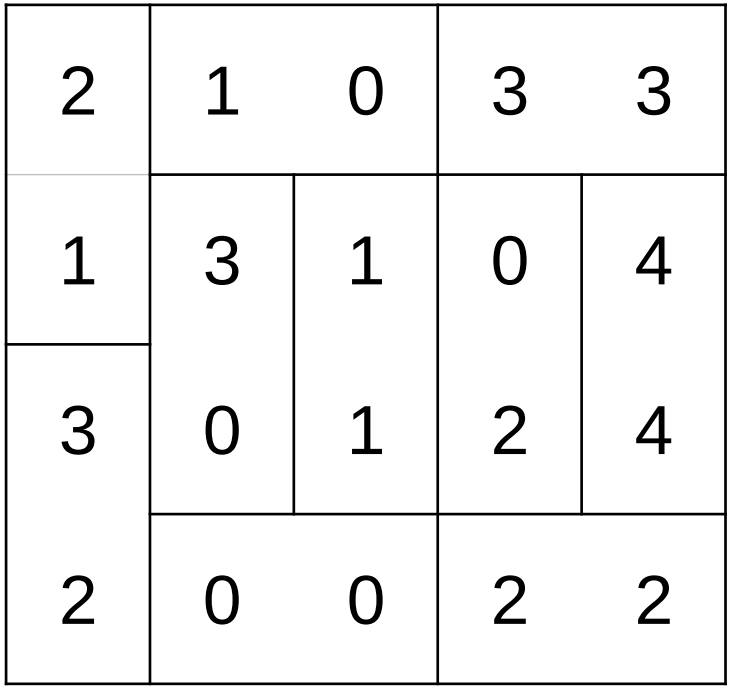
Task

- Remove as many domino pieces as possible
- A domino piece can be removed when is surrounded by suitable amount of free space



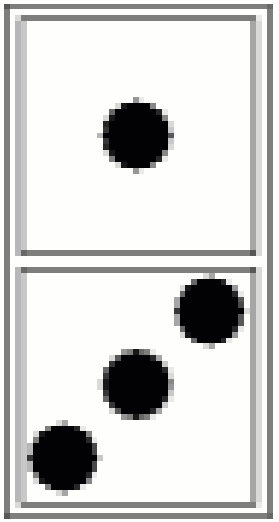
Board

- The problem is defined by an initial set of pieces on a board
- The initial set defines edges of the board
- The board is a set of squares
- A piece occupies two squares



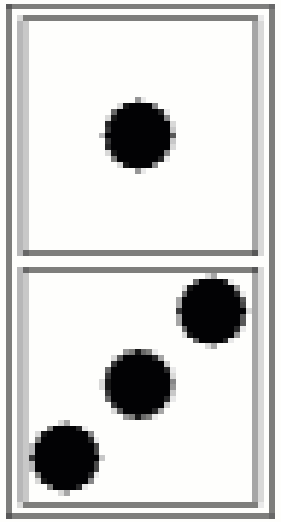
Domino piece removing rules

- A piece can be removed when a distance to a next piece or edge is equal to piece's value
- The distance is measured only for squares without pieces
- For a shorter side a single value is considered
- For a longer side both values are considered



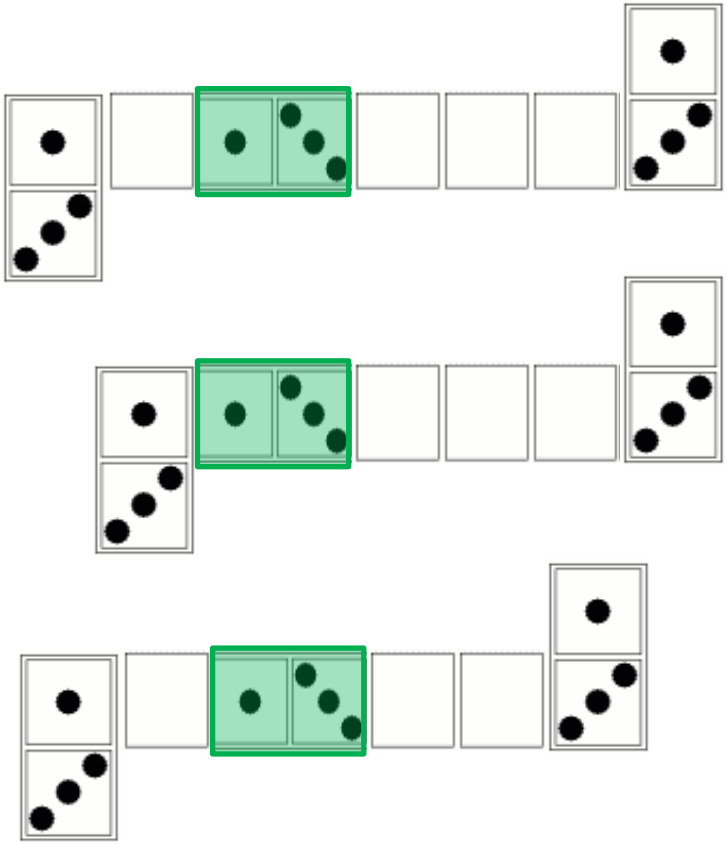
Domino piece

- Two values
- Values are positives or zero
- Two sides
  - Longer with two values
  - Shorter with one value

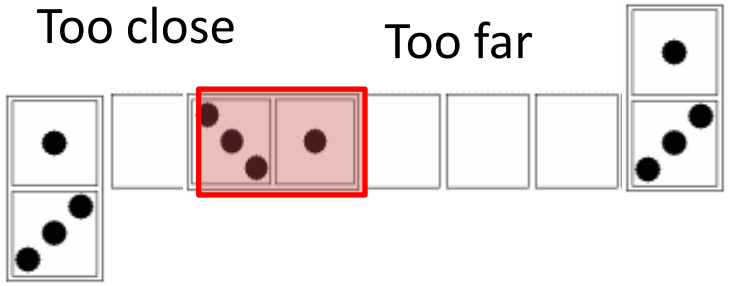


Removing shorter side

Correct

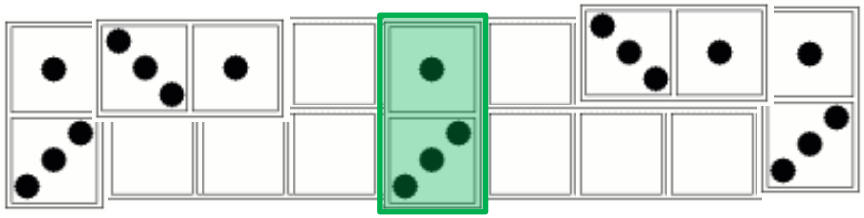


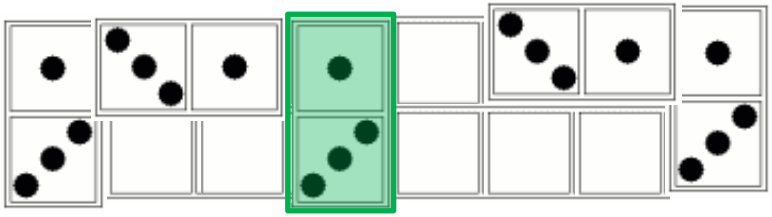
Wrong

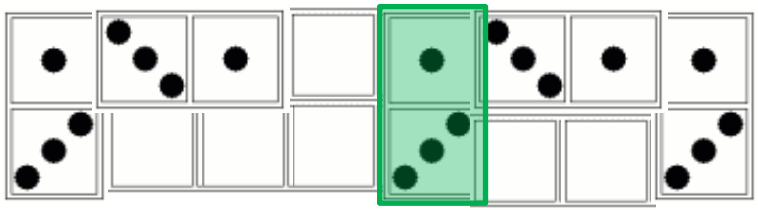


Removing longer side

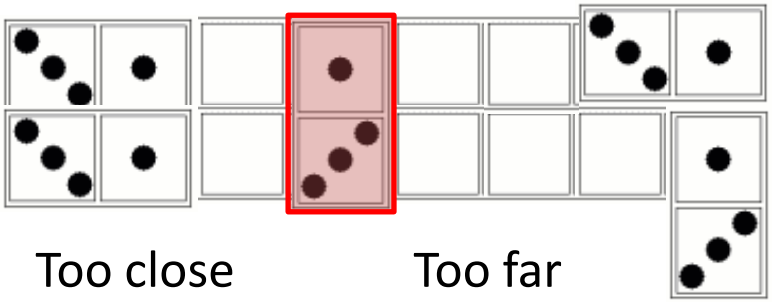
Correct







Wrong

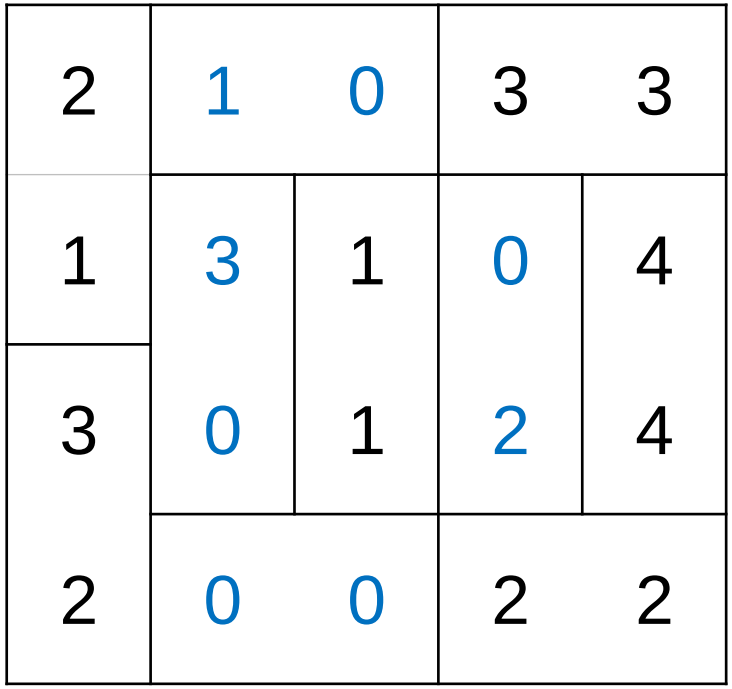


Too close

Too far

Blank value

- The same removing rules as for positive values
- On a full board a piece with the blank value can be removed at the beginning



Score

- A final score is a number of pieces, which cannot be removed
- The best score is 0

2	1	0	3	3
1	3	1	0	4
3	0	1	2	4
2	0	0	2	2

Project

- In teams (2-3 persons)
  - Design an accurate algorithm
    - One for each team
    - The algorithm finishes work with the minimum number of pieces
  - Design approximate algorithms
    - One for each member of the team
    - Finishes work with a number of pieces close to the minimal
    - Reduces calculation time
  - Implement all algorithms

Elements of the project

- Documentation (10 points)
- Algorithms (15 points)
- Application (5 points)

- The maximal number of points (30)

Documentation

- Description of the accurate algorithm (3)
  - Estimation of complexity
- Description of approximate algorithms (individually for each member) (4)
  - Estimation of complexity
- Description of an inner data structure, input (initial board) and output (solution) file formats (3)

Algorithms

- Implementation of the accurate algorithm
  - Quality (3)
  - Complexity (2)
- Implementation of the approximate algorithm (individually for each member)
  - Quality (4)
  - Complexity (6)

Application

- Visualization of the problem and the solution (2)
- Comparison of implemented algorithms (2)
- Ergonomic (1)

Deadlines

Task	Date
Documentation	17.X
Implemented accurate algorithm	24.X
Implemented approximate algorithms	7.XI
Final application	21.XI

- **Minus 3 points for each started week of delay**
- **A maximal collected delay: 4 weeks**

Marks

Max	Percent	Points	Mark
30	0,5	15	3,0
	0,6	18	3,5
	0,7	21	4,0
	0,8	24	4,5
	0,9	27	5,0