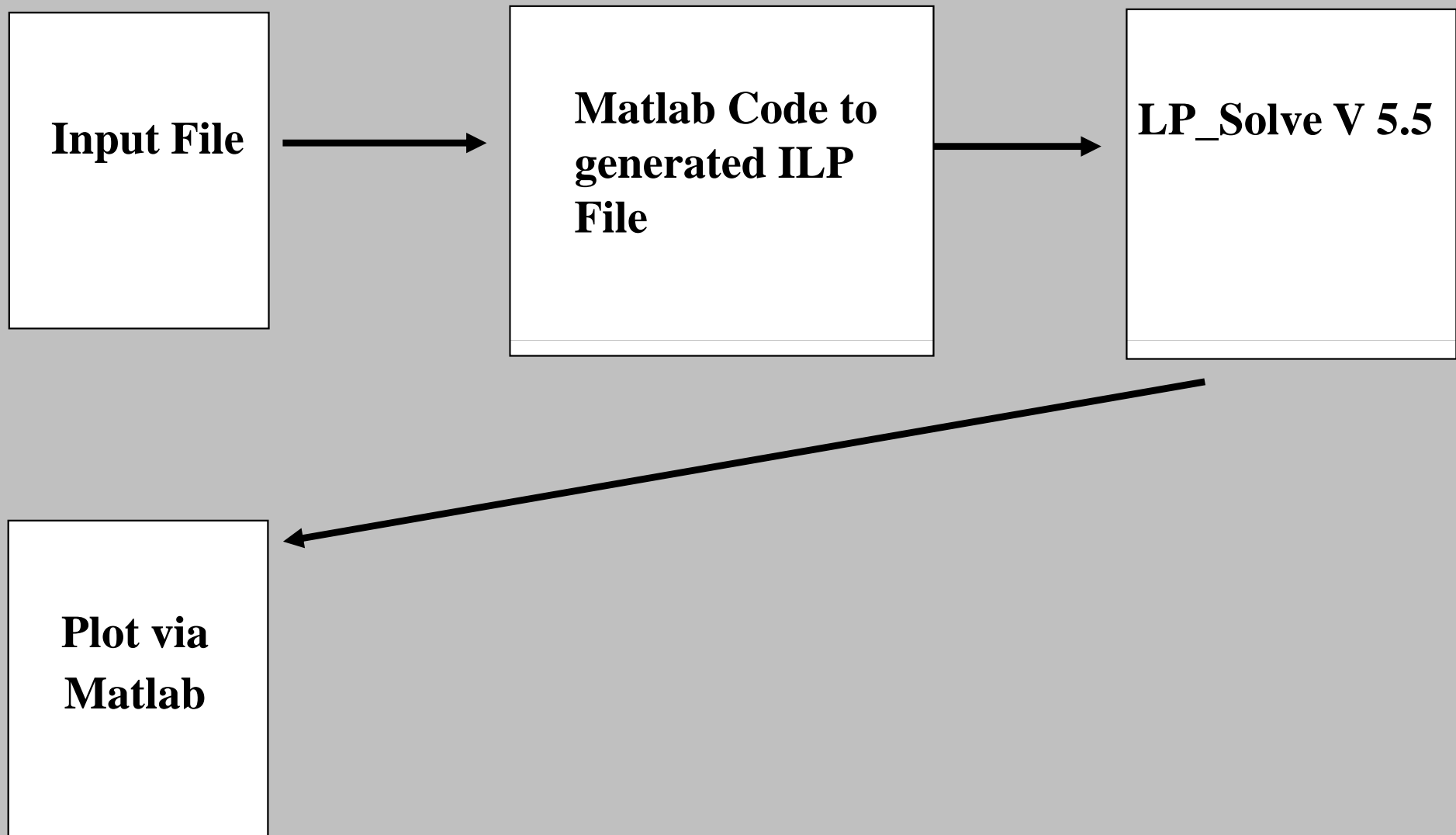# ILP Floorplanning

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Coding Algorithm and Implementation

Input File → Matlab Code to generated ILP File → LP_Solve V 5.5 → Plot via Matlab

Input File Format

Modules

 W H
 W H
 W H

↓

Modules
Rigid Modules

 W H

 W H

 R1 R2 Area
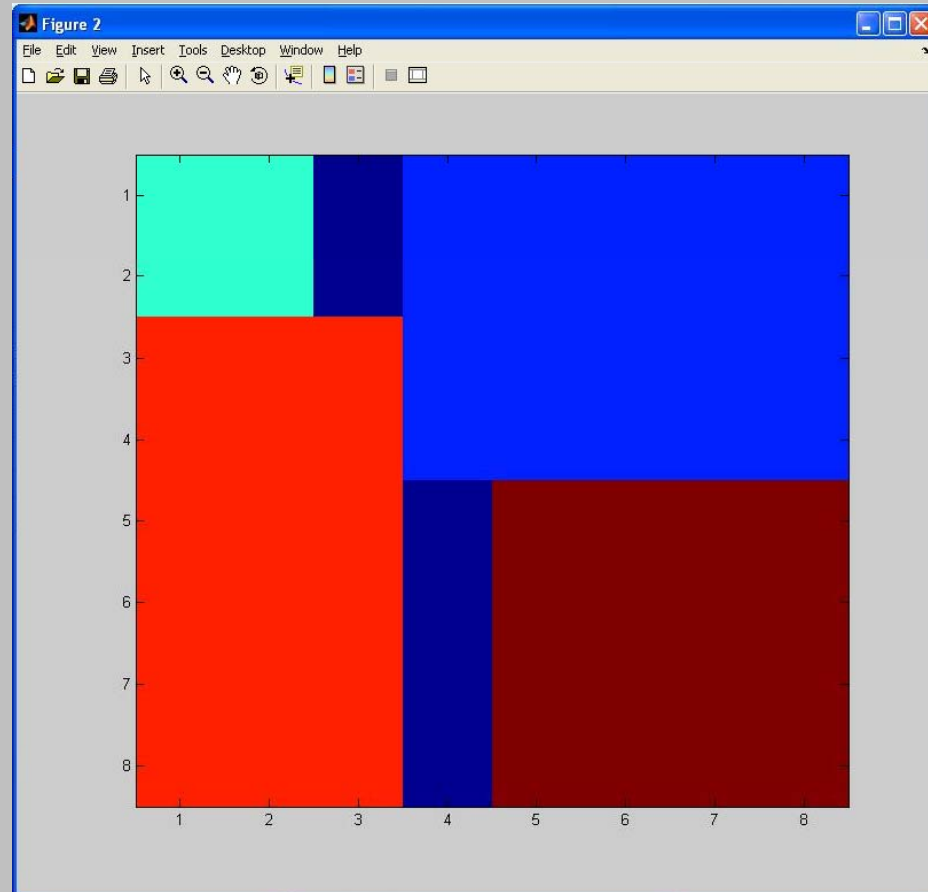
 R1 R2 Area

ILP With Rotation

Structure

| Objective Function | $\longrightarrow$ | **Minimize Chip Area** |

| Non-Overlap Constraints | $\longrightarrow$ | **Assign Relative Position Variable for Each Pair and Prevent Overlap** |

| Variable Type Constraints | $\longrightarrow$ | **Define Type and Range of Integer and Continuous Variables** |

| Chip Boundary Constraints | $\longrightarrow$ | **Make Sure Modules Are Within Chip Boundary** |

4

| 4 | 4 |

| 3 | 6 |

| 5 | 4 |

| 2 | 2 |

ILP: 5 Blocks, No Rotation

5

3	4
2	2
4	5
5	2
2	6
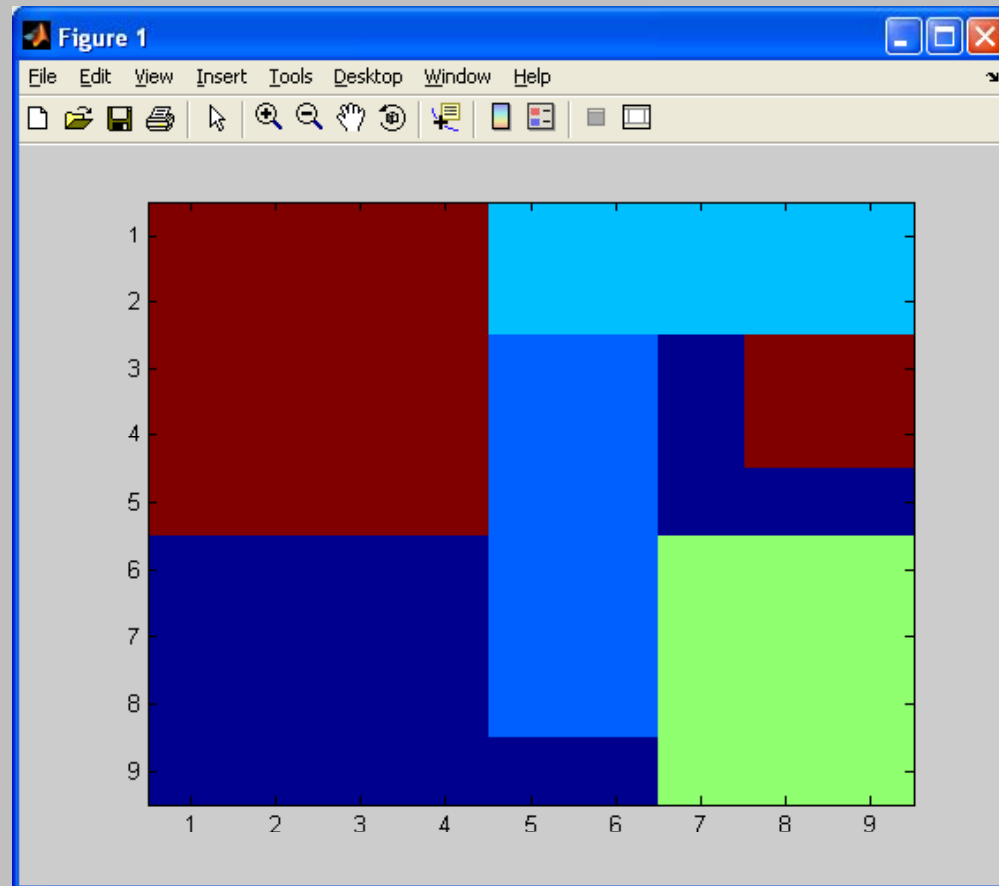
ILP: 6 Blocks, No Rotation

6

3	**4**

2	**2**

4	**5**

5	**2**

2	**6**

1	**1**
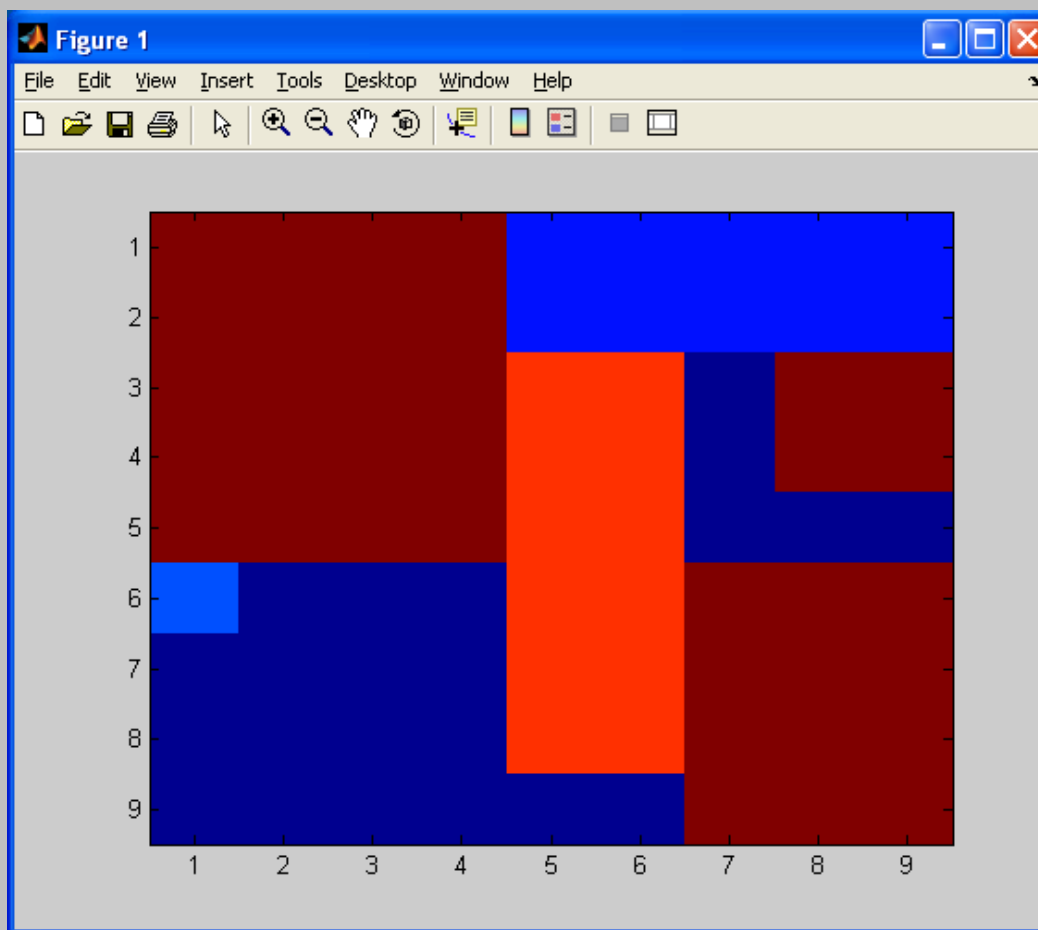
7

| 3 | 4 |

| 2 | 2 |

| 4 | 5 |

| 5 | 2 |

| 2 | 6 |

| 1 | 1 |

| 4 | 7 |
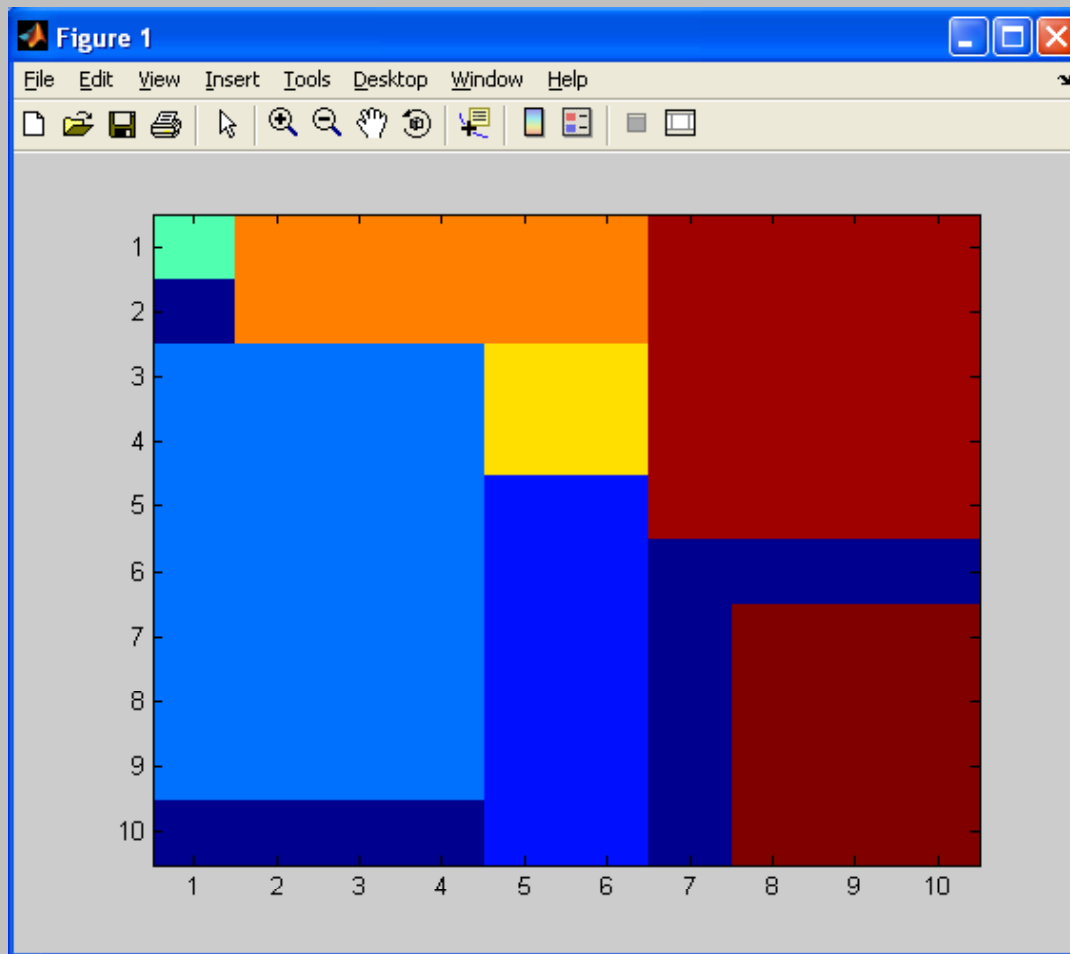
ILP With Rotation

Add rotational "z" variables

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ILP: 4 Blocks, With Rotation

4

4	**4**

3	**6**

5	**4**

2	**2**
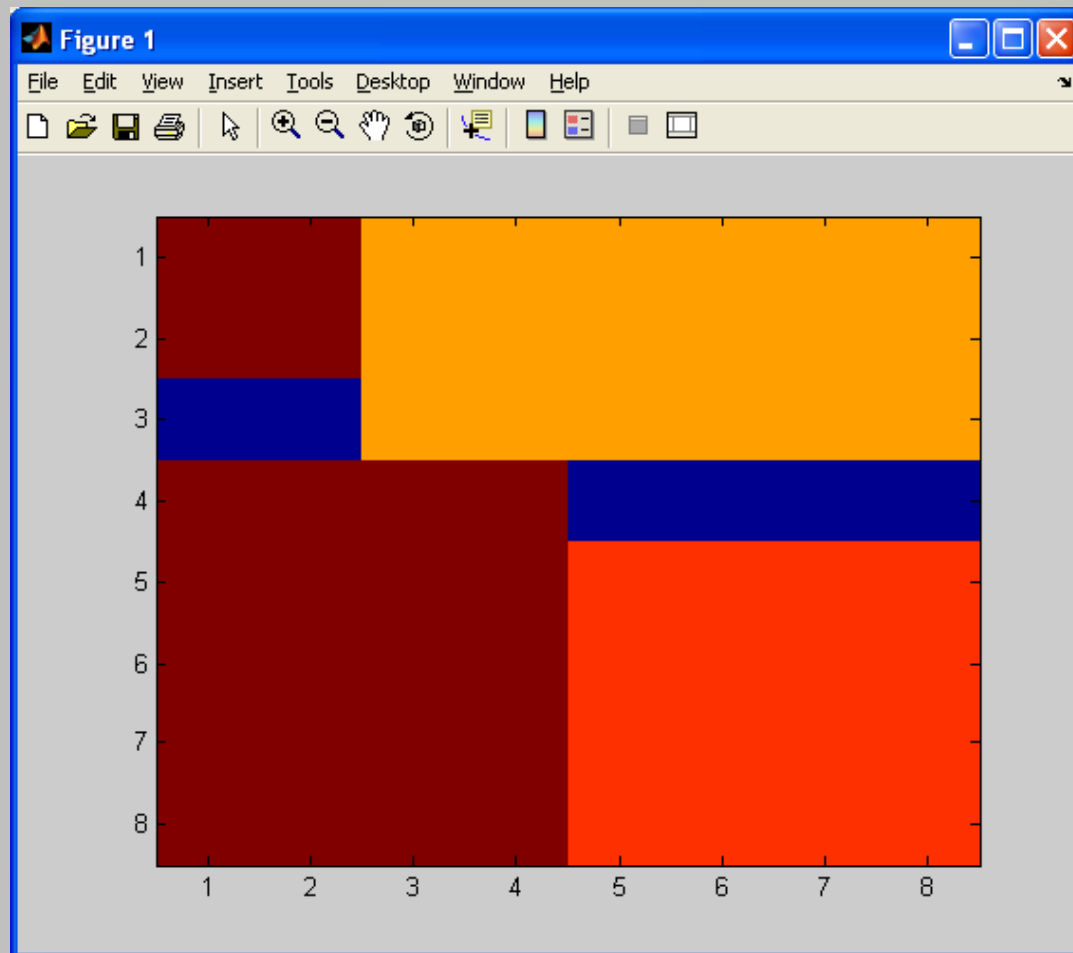
ILP: 5 Blocks, With Rotation

5

3	4

2	2

4	5

5	2

2	6
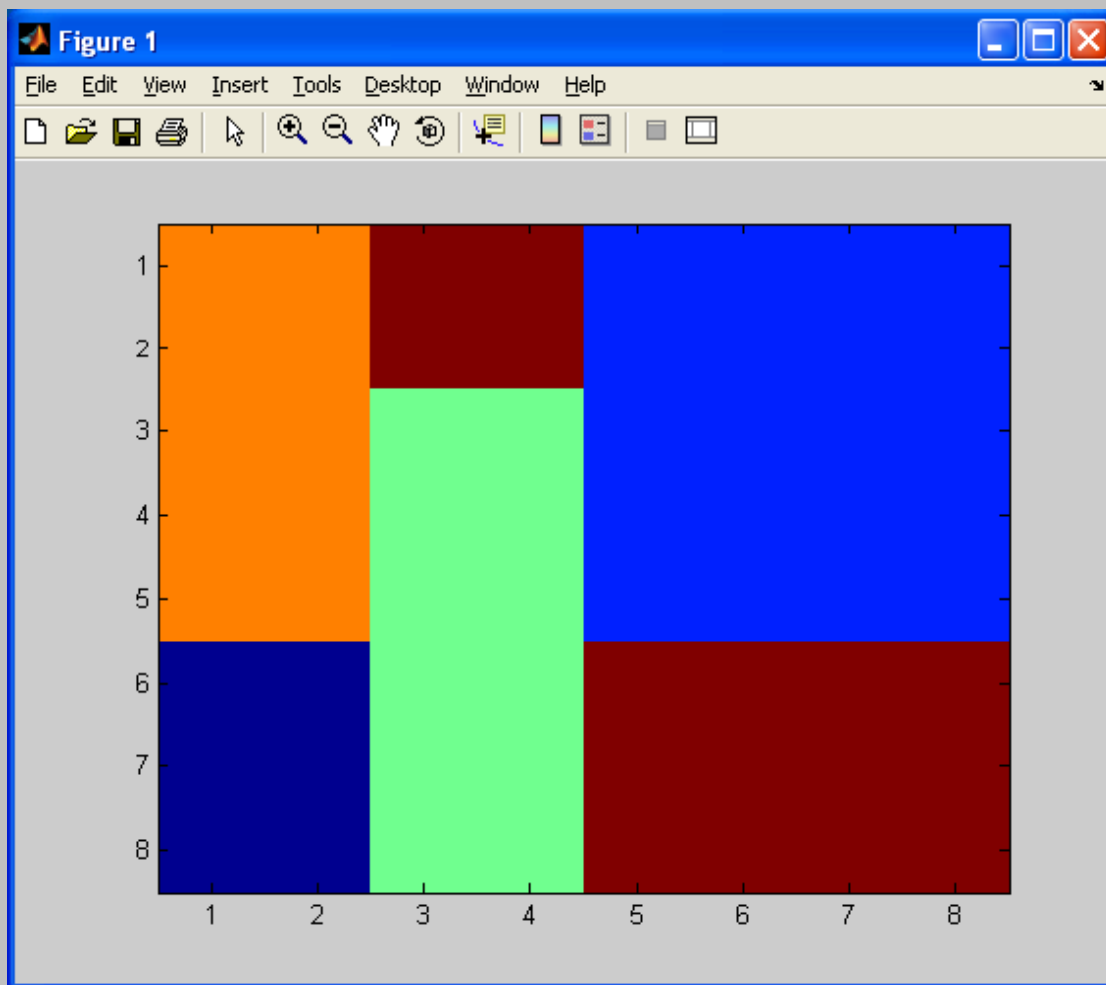
ILP: 6 Blocks, With Rotation

6

3	4

2	2

4	5

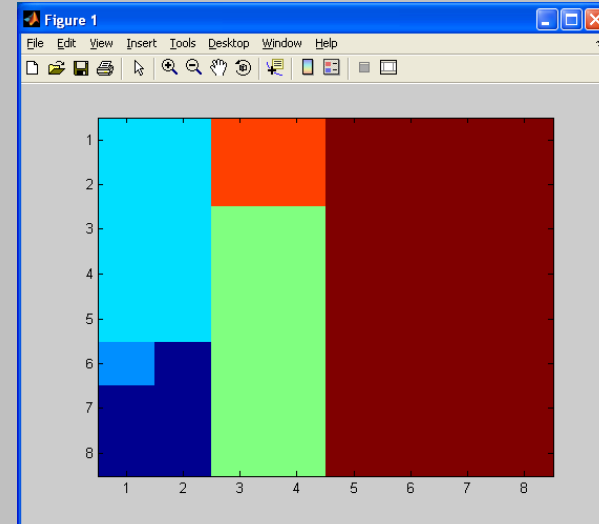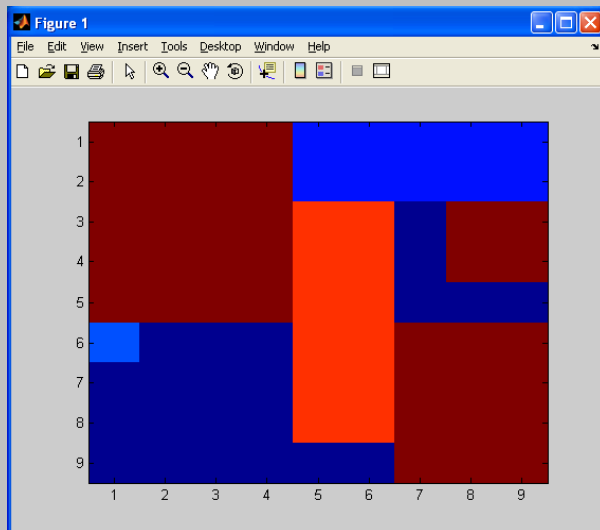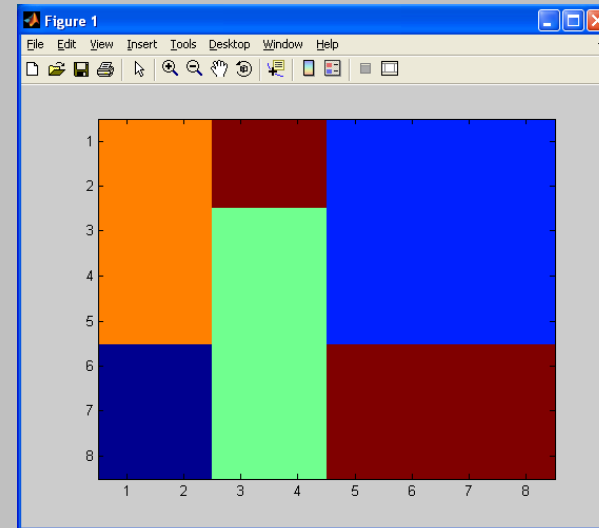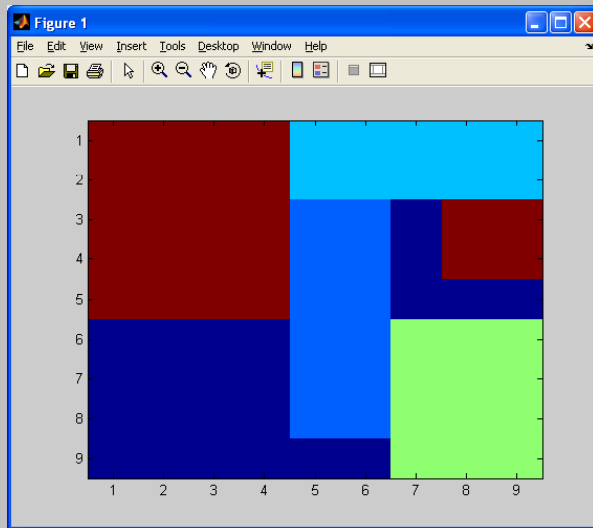| 5	2

2	6

1	1

4	7
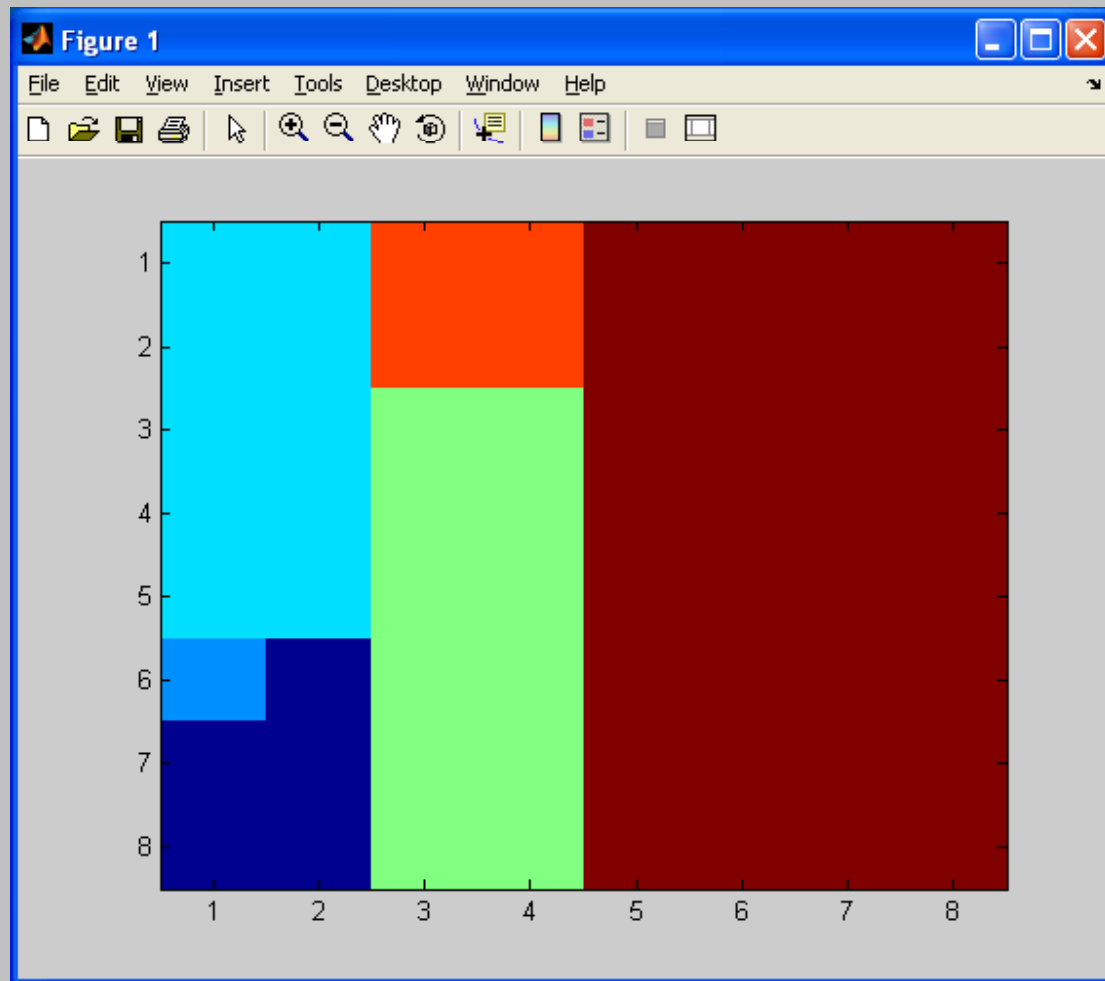
Improvements With Rotation

Rigid Rotated Blocks and Flexible Modules

Define min and max width and height for each module

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ILP: Rigid Rotated Blocks and Flexible Modules

4

2

4	4

2	3

.7	1.7	21

.2	1.2	38
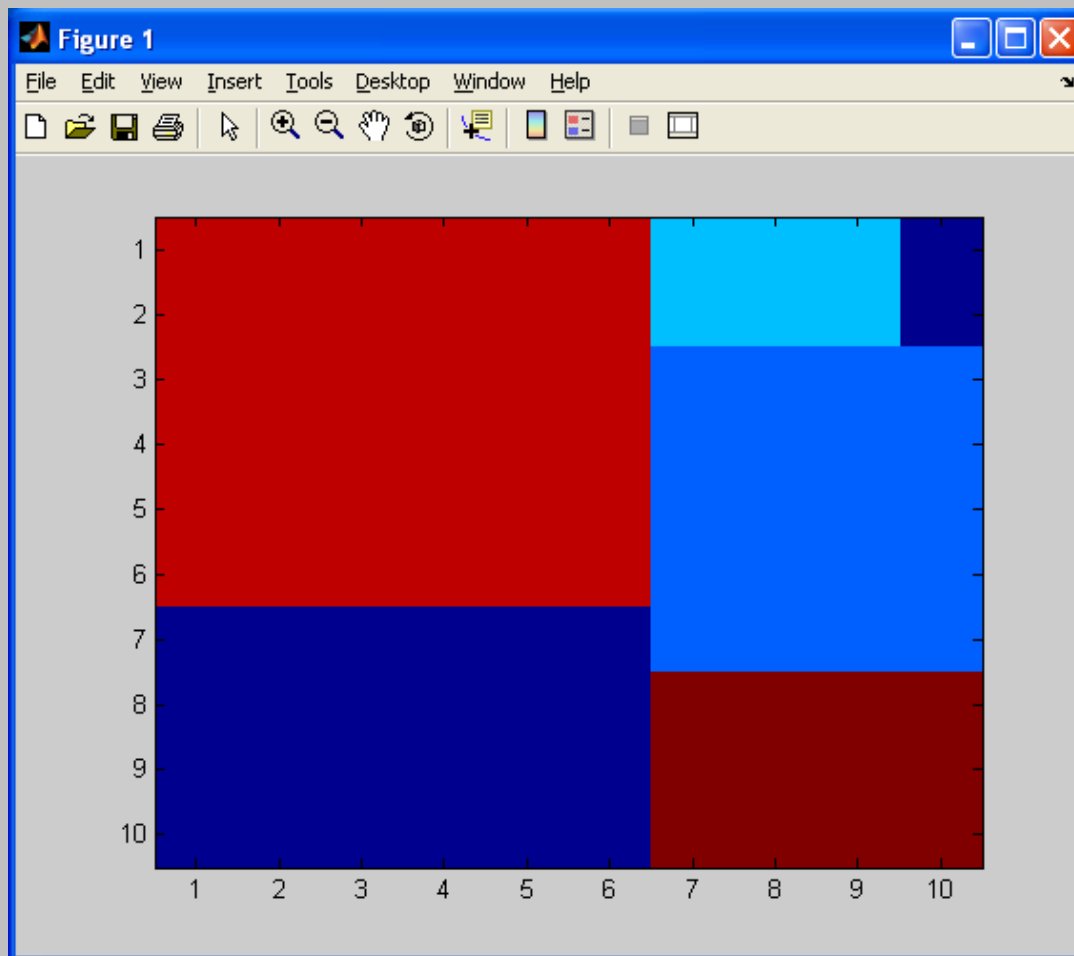
ILP: Rigid Rotated Blocks and Flexible Modules

4

2

4	4

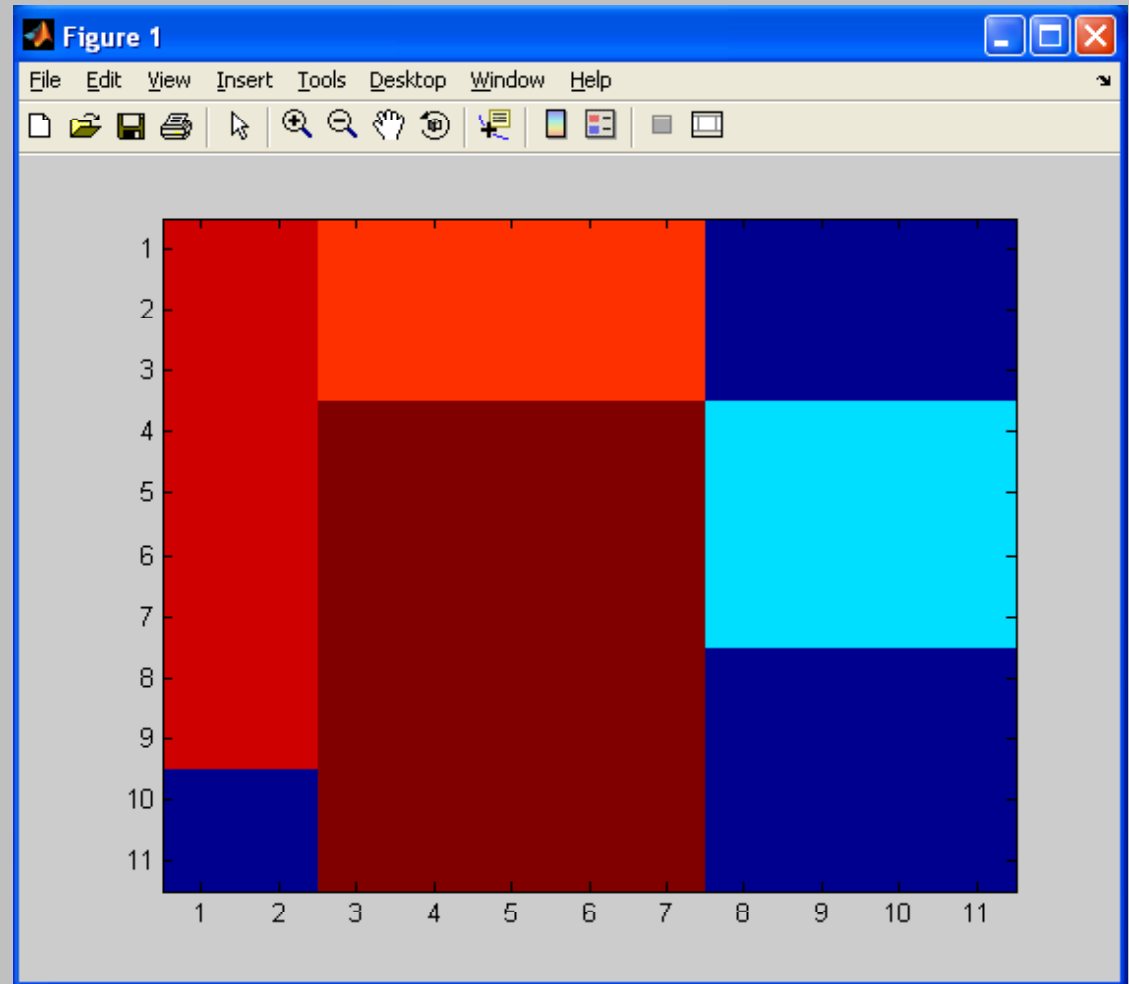| 2	9

.9	1.3	25

.6	2	40

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