MEL G641 CAD for IC Design

Project Report

GUI implementation of CAD algorithms using Python
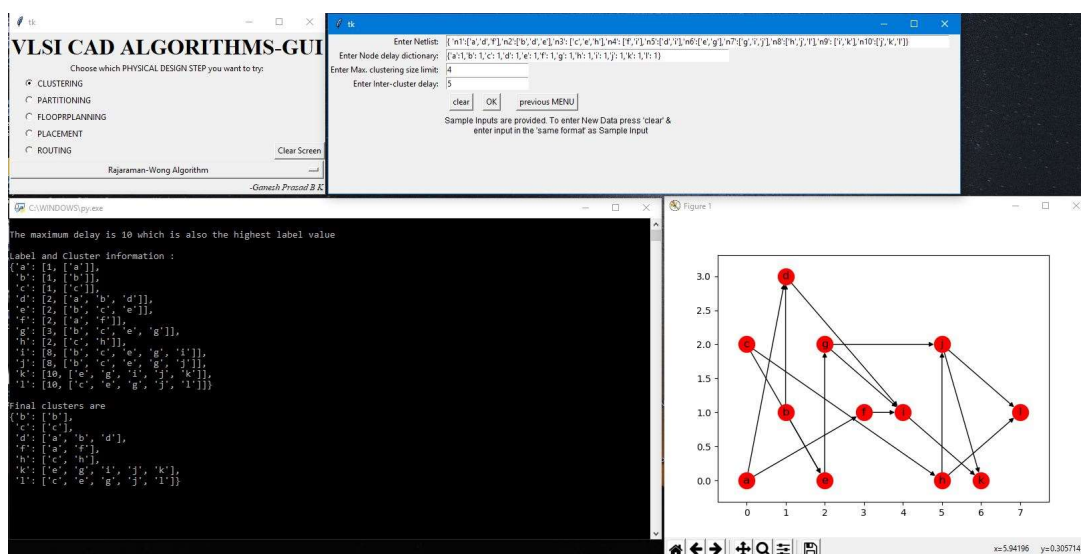
Ganesh Prasad B K (2018H1230151G)

M.E Microelectronics
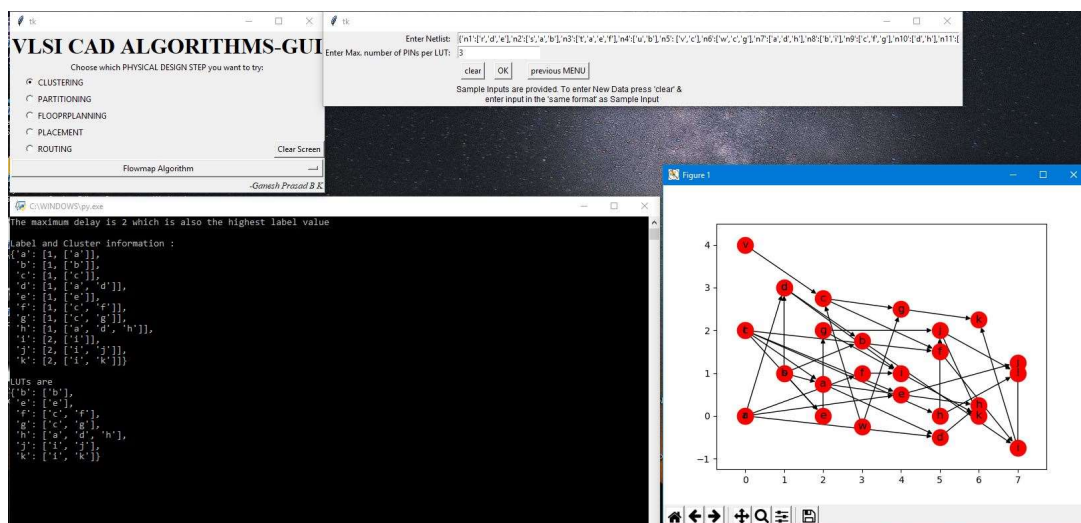Department of Electrical & Electronics
BITS Pilani – K K Birla Goa Campus
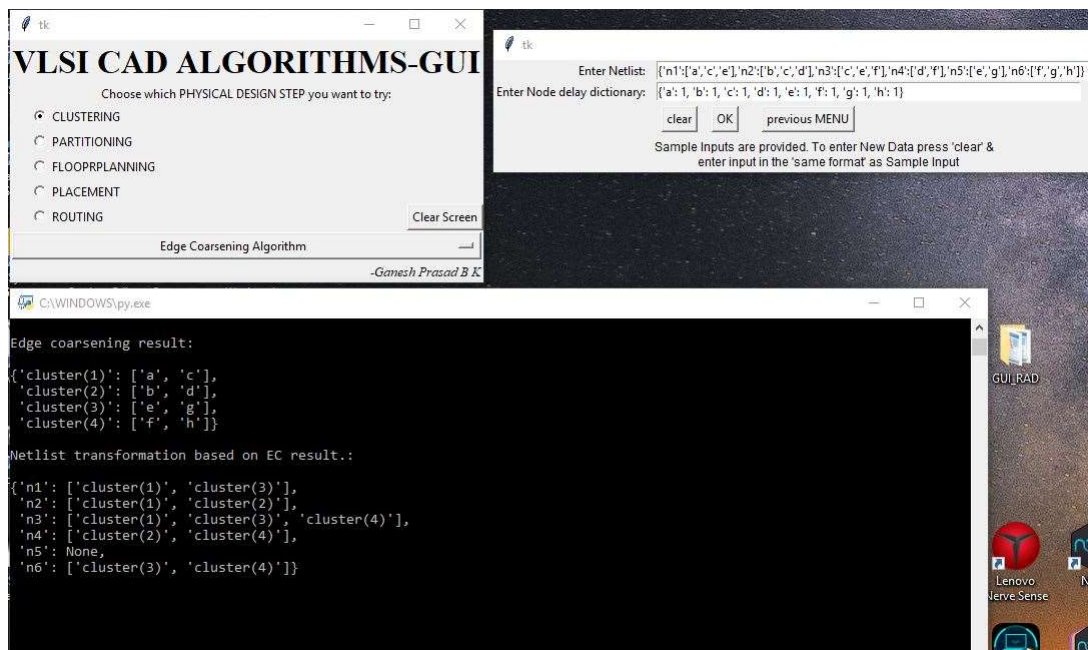Zuarinagar, Goa 403726

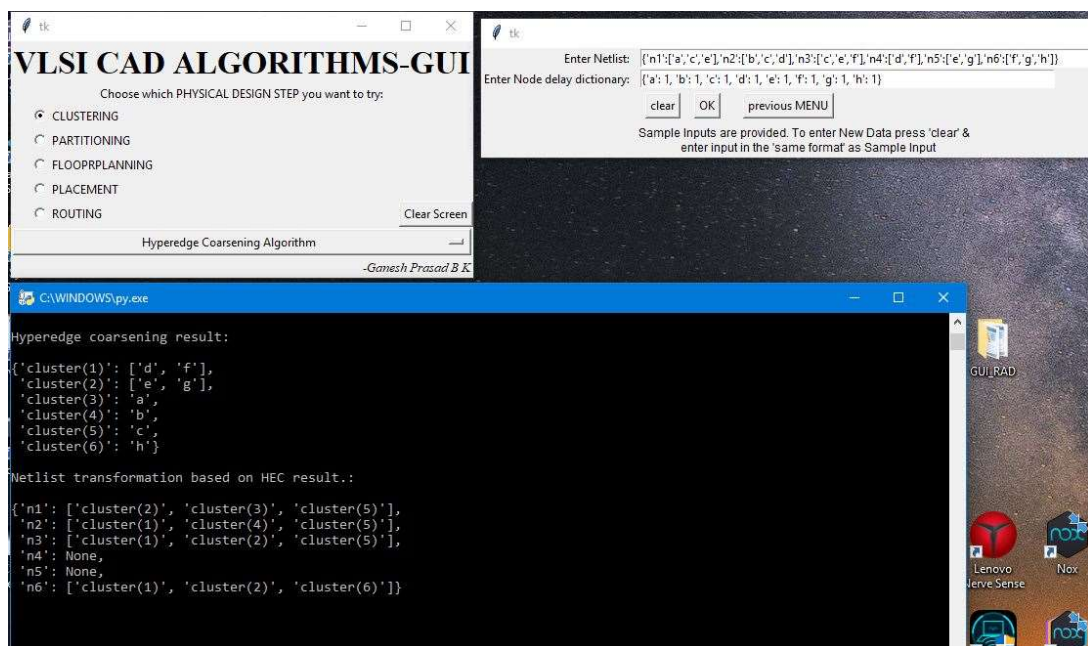Below are the output images of GUI implemented for various algorithms on CAD
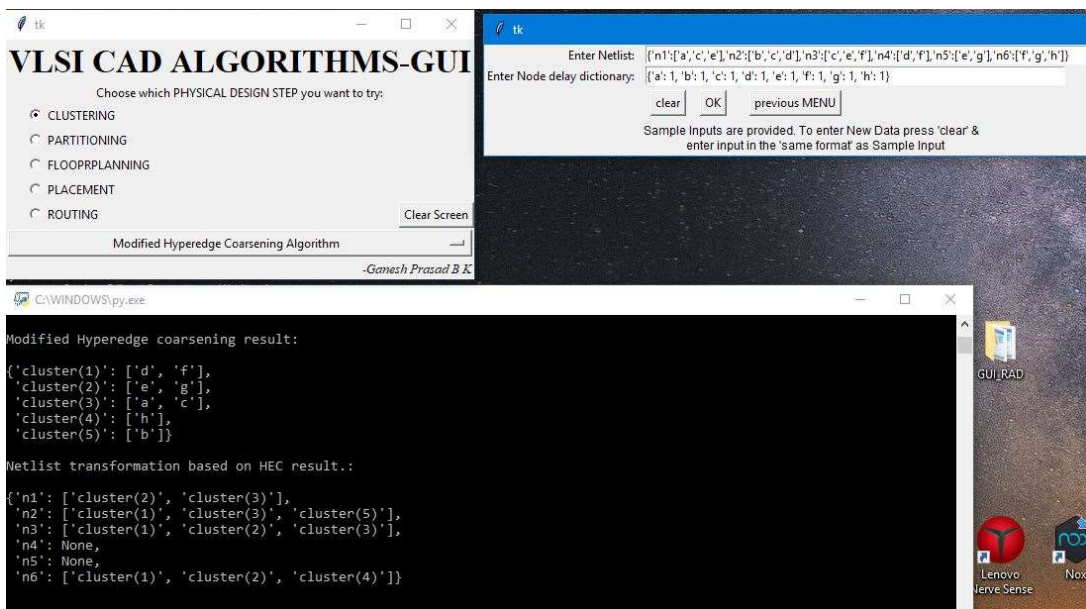

Clustering: Rajaraman-Wong Algorithm
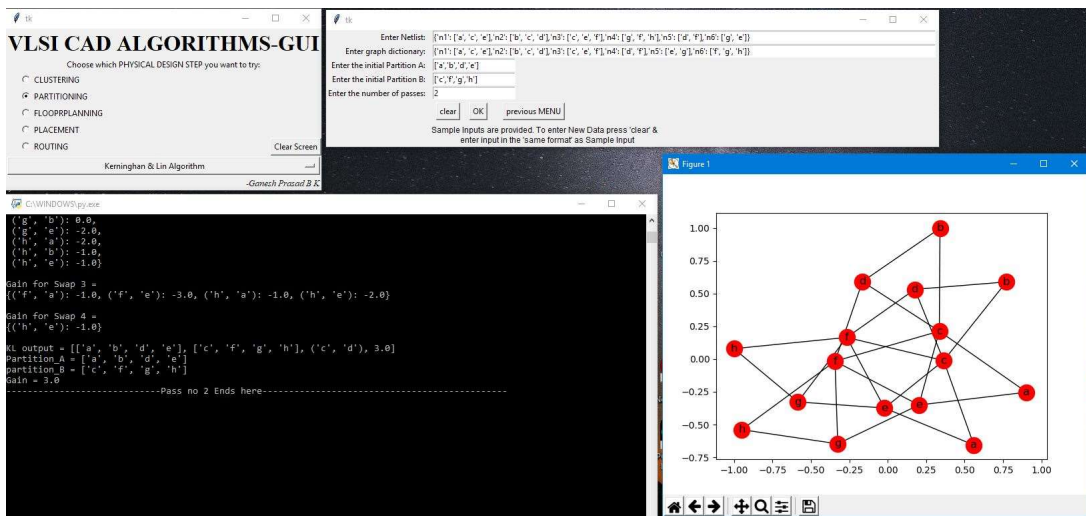

Clustering: Flowmap Algorithm

VLSI CAD ALGORITHMS-GUI

Choose which PHYSICAL DESIGN STEP you want to try:

- CLUSTERING
- PARTITIONING
- FLOORPRLANNING
- PLACEMENT
- ROUTING

Clear Screen

Edge Coarsening Algorithm

-Ganesh Prasad B K

Enter Netlist: {'n1':['a','c','e'],'n2':['b','c','d'],'n3':['c','e','f'],'n4':['d','f'],'n5':['e','g'],'n6':['f','g','h']}
Enter Node delay dictionary: {'a': 1, 'b': 1, 'c': 1, 'd': 1, 'e': 1, 'f': 1, 'g': 1, 'h': 1}

clear   OK   previous MENU

Sample Inputs are provided. To enter New Data press 'clear' &
enter input in the 'same format' as Sample Input

```
Edge coarsening result:

{'cluster(1)': ['a', 'c'],
 'cluster(2)': ['b', 'd'],
 'cluster(3)': ['e', 'g'],
 'cluster(4)': ['f', 'h']}

Netlist transformation based on EC result.:

{'n1': ['cluster(1)', 'cluster(3)'],
 'n2': ['cluster(1)', 'cluster(2)'],
 'n3': ['cluster(1)', 'cluster(3)', 'cluster(4)'],
 'n4': ['cluster(2)', 'cluster(4)'],
 'n5': None,
 'n6': ['cluster(3)', 'cluster(4)']}
```

Clustering: Edge Coarsening Algorithm

VLSI CAD ALGORITHMS-GUI

Choose which PHYSICAL DESIGN STEP you want to try:

- CLUSTERING
- PARTITIONING
- FLOOPRPLANNING
- PLACEMENT
- ROUTING

Clear Screen

Hyperedge Coarsening Algorithm

-Ganesh Prasad B K

Enter Netlist: {'n1':['a','c','e'],'n2':['b','c','d'],'n3':['c','e','f'],'n4':['d','f'],'n5':['e','g'],'n6':['f','g','h']}
Enter Node delay dictionary: {'a': 1, 'b': 1, 'c': 1, 'd': 1, 'e': 1, 'f': 1, 'g': 1, 'h': 1}

clear   OK   previous MENU

Sample Inputs are provided. To enter New Data press 'clear' &
enter input in the 'same format' as Sample Input

```
Hyperedge coarsening result:

{'cluster(1)': ['d', 'f'],
 'cluster(2)': ['e', 'g'],
 'cluster(3)': 'a',
 'cluster(4)': 'b',
 'cluster(5)': 'c',
 'cluster(6)': 'h'}

Netlist transformation based on HEC result.:

{'n1': ['cluster(2)', 'cluster(3)', 'cluster(5)'],
 'n2': ['cluster(1)', 'cluster(4)', 'cluster(5)'],
 'n3': ['cluster(1)', 'cluster(2)', 'cluster(5)'],
 'n4': None,
 'n5': None,
 'n6': ['cluster(1)', 'cluster(2)', 'cluster(6)']}
```
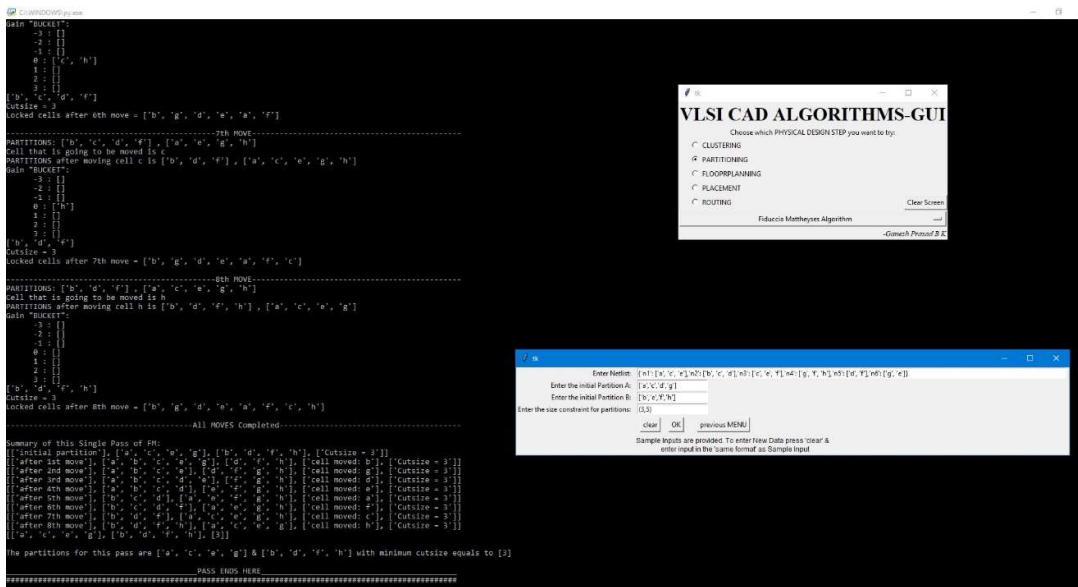
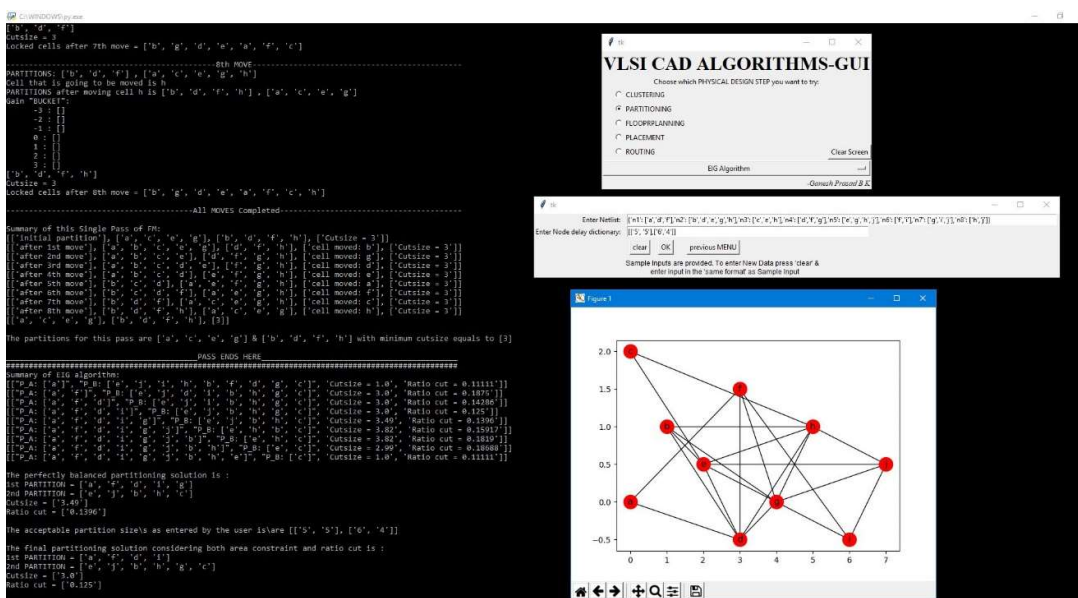**Clustering: Hyper-Edge Coarsening Algorithm**

Clustering: Modified Hyper-Edge Coarsening Algorithm
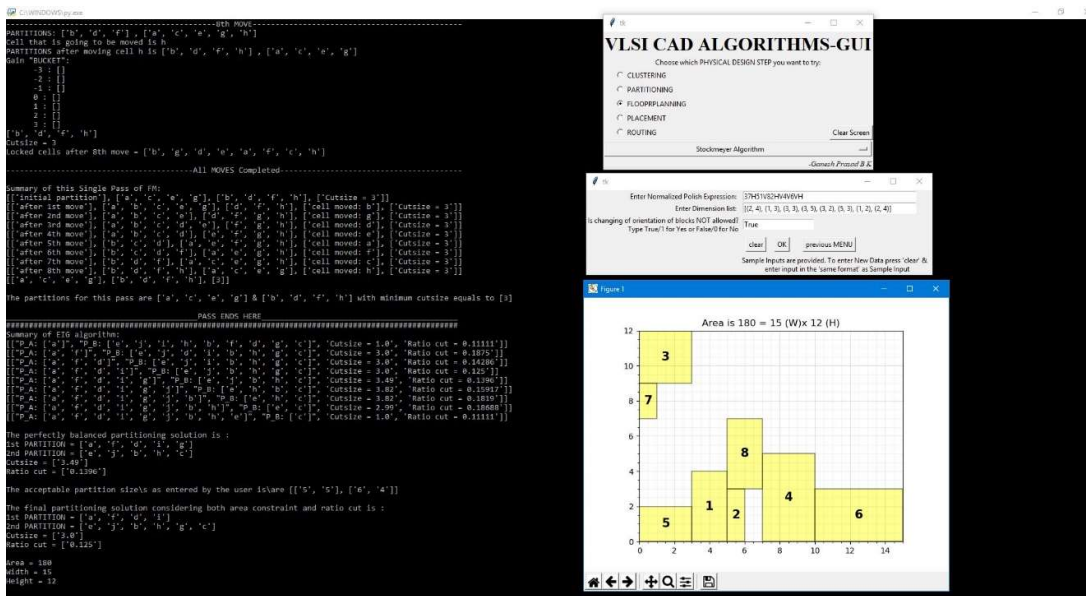

Partitioning: Kernighan-Lin Algorithm
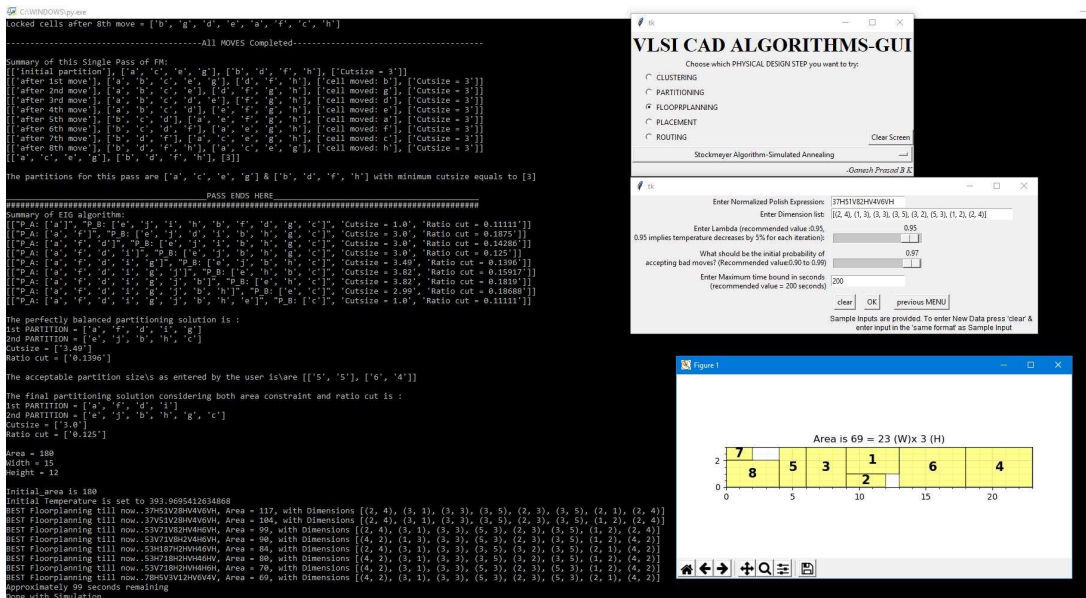
Partitioning: Fiduccia-Mattheyses algorithm
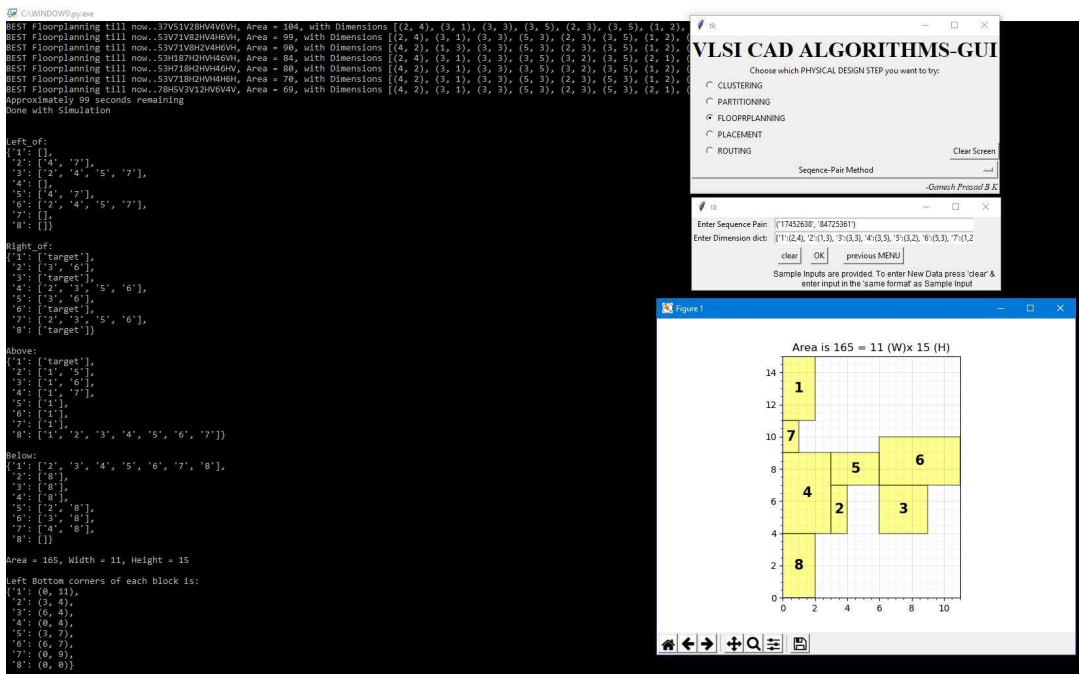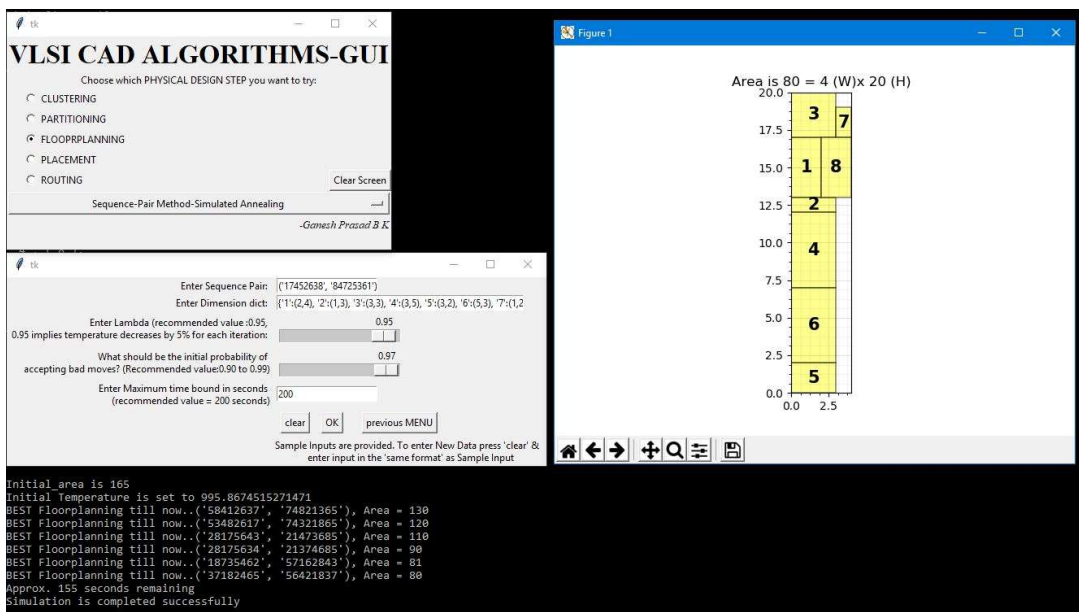

Partitioning: EIG Algorithm

Floor planning: Stockmeyer Algorithm

Floor planning: Stockmeyer Algorithm with Simulated annealing

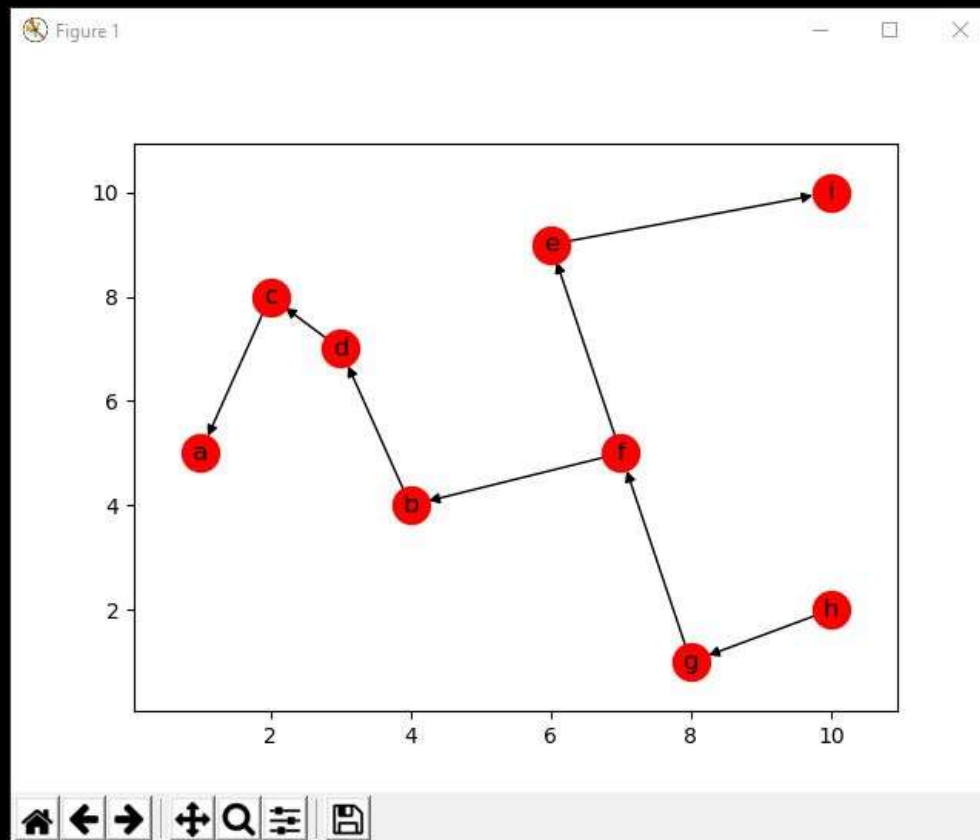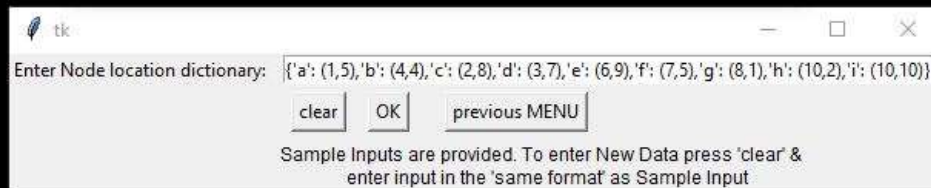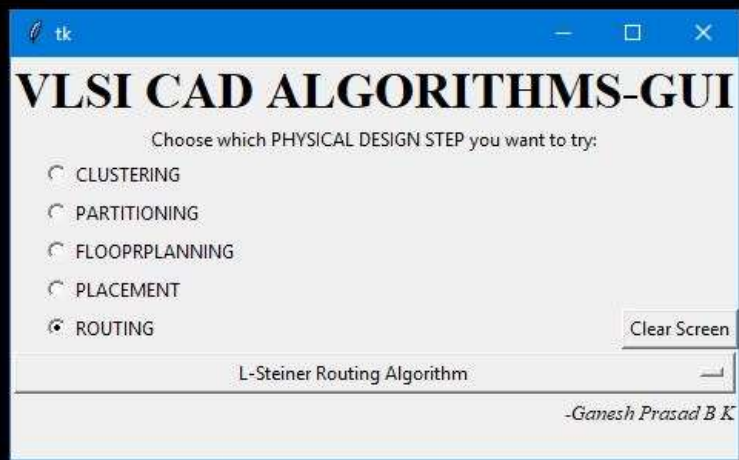**Floor planning: Sequence-Pair Method**

Floor planning: Sequence-Pair Method with Simulated annealing

Placement: Gordian Algorithm

Routing: Steiner Routing Algorithm