

Unstructured grid format

Two files are read by a solver.

1. Grid file:

Nodal coordinates, element connectivity, and boundary grid information.

3D unstructured grids: .ugrid, .vkt, .su2, etc.....

2D unstructured grids: a custom format, .grid...

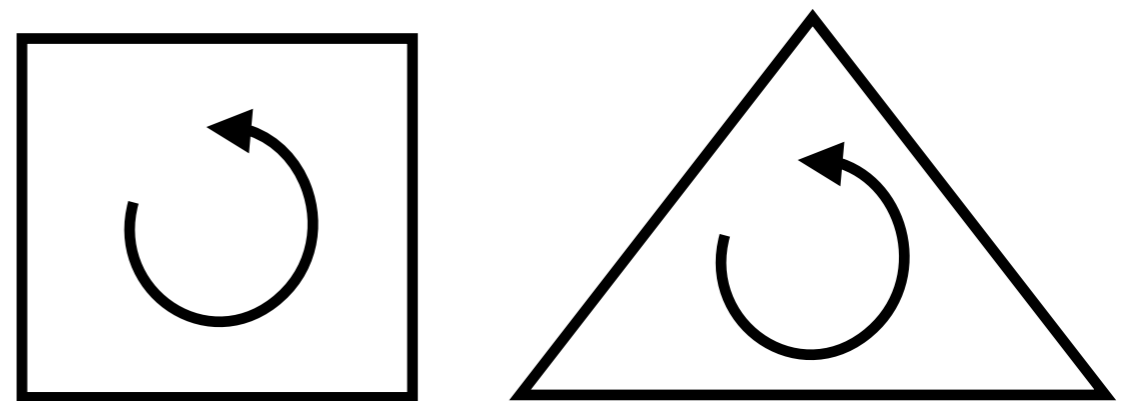
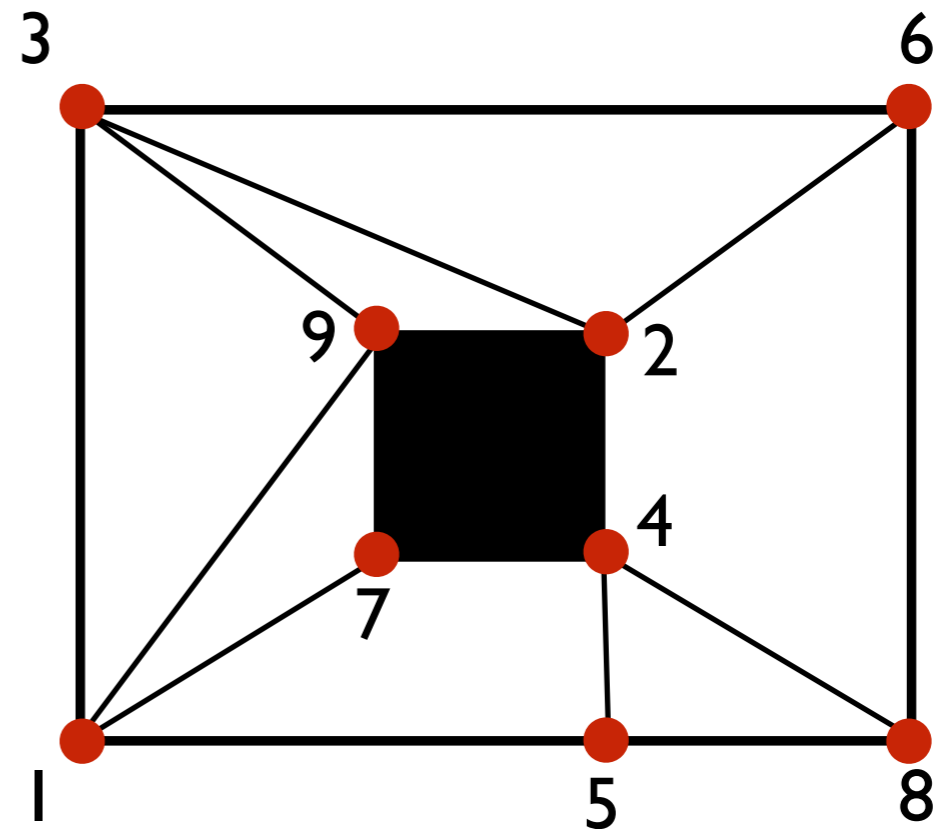
2. Boundary condition file:

It contains a boundary condition name for each boundary part.

Unstructured Grid : Example: Simple 2D mixed grid

A grid can be defined by the following information.

9	— # of nodes
0.0 0.0	— (x1,y1)
2.0 2.0	— (x2,y2)
0.0 3.0	— (x3,y3)
2.0 1.0	— (x4,y4)
2.0 0.0	— (x5,y5)
3.0 3.0	— (x6,y6)
1.3 1.0	— (x7,y7)
3.0 0.0	— (x8,y8)
1.3 2.0	— (x9,y9)
4	— # of triangles
9 2 3	— T1
5 8 4	— T2
2 6 3	— T3
1 7 9	— T4
2	— # of quads
1 5 4 7	— Q1
4 8 6 2	— Q2



Node ordering within each element taken as counterclockwise.

Boundary information is needed in CFD. The ordering is induced by the element node ordering. Repeat the first node to indicate that the boundary is closed. A boundary condition will be applied to each boundary part.

2 — # of boundaries (inner B1 & outer B2)

5 — # of nodes in B1

4 — node 1 in B1

7 — node 2 in B1

9 — node 3 in B1

2 — node 4 in B1

4 — node 5 in B1 (repeat 1st)

6 — # of nodes in B2

1 — node 1 in B2

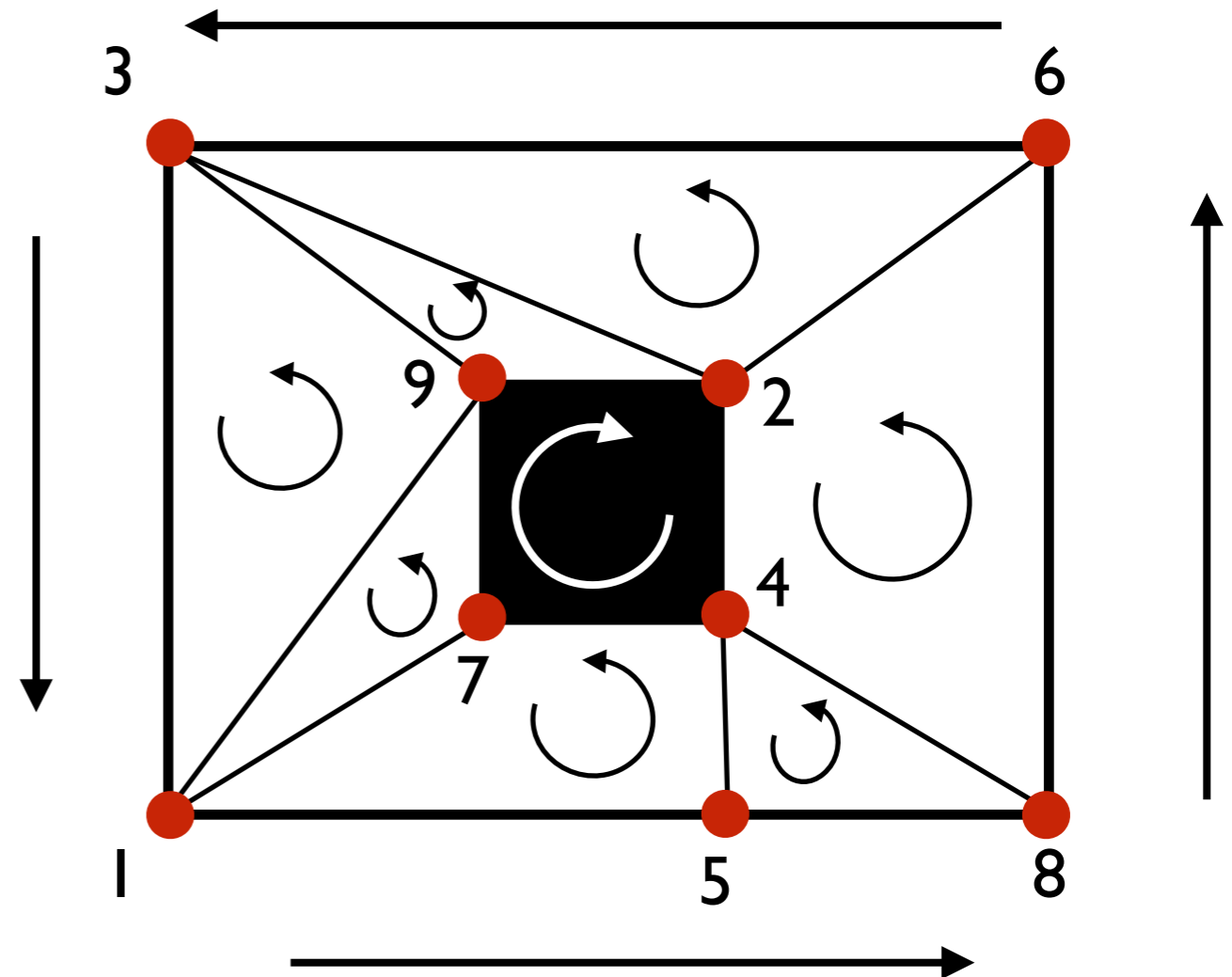
5 — node 2 in B2

8 — node 3 in B2

6 — node 4 in B2

3 — node 5 in B2

1 — node 6 in B2 (repeat 1st)

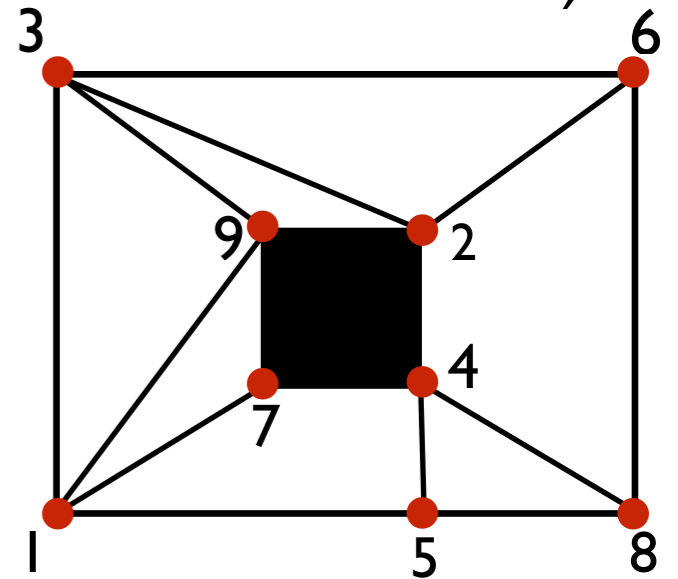


The domain is always on your left while walking along a boundary.

.grid for 2D Unstructured Grid

9	— # of nodes
0.0 0.0	— (x1,y1)
2.0 2.0	— (x2,y2)
0.0 3.0	— (x3,y3)
2.0 1.0	— (x4,y4)
2.0 0.0	— (x5,y5)
3.0 3.0	— (x6,y6)
1.3 1.0	— (x7,y7)
3.0 0.0	— (x8,y8)
1.3 2.0	— (x9,y9)
4	— # of triangles
9 2 3	— T1
5 8 4	— T2
2 6 3	— T3
1 7 9	— T4
2	— # of quads
1 5 4 7	— Q1
4 8 6 2	— Q2

2	— # of boundaries (inner B1 & outer B2)
5	— # of nodes in B1
4	— node 1 in B1
7	— node 2 in B1
9	— node 3 in B1
2	— node 4 in B1
4	— node 5 in B1 (repeat 1st to close)
6	— # of nodes in B2
1	— node 1 in B2
5	— node 2 in B2
8	— node 3 in B2
6	— node 4 in B2
3	— node 5 in B2
1	— node 6 in B2 (repeat 1st to close)



Boundary Condition File for Solver

```
Boundary tag  boundary condition name/number
```

```
tag1 #      [boundary condition 1]
```

```
tag2 #      [boundary condition 2]
```

```
  .          .  
  .          .  
  .          .  
  .          .  
  .          .
```

Example

EDU2D/3D Codes: .bcmmap

```
! Boundary tag  BC name
```

```
1 freestream
```

```
2 subsonic_outflow
```

```
3 viscous_wall
```

Example

FUN3D: .mapbc

```
! Boundary tag  BC #
```

```
1 5050
```

```
2 5051
```

```
3 4000
```