

Computer Graphics Course 2005

Data Structures for Polygonal Meshes

Polygonal Meshes

⌘ $M = \{\{p_i\}, \{F_j\}\}$

⌘ $P_i \in \mathbb{R}^3$ - Vertex Position

⌘ $F_j \in \mathbb{N}^k$ - Sequence of vertex indices (k-gon)

⌘ Access:

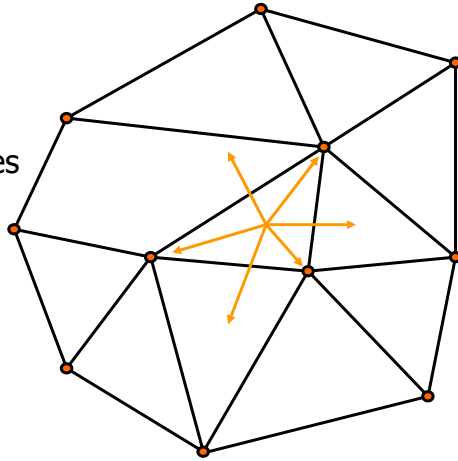
☒ Navigation

☒ Modification

Mesh Data Structures

⌘ Store Topology:

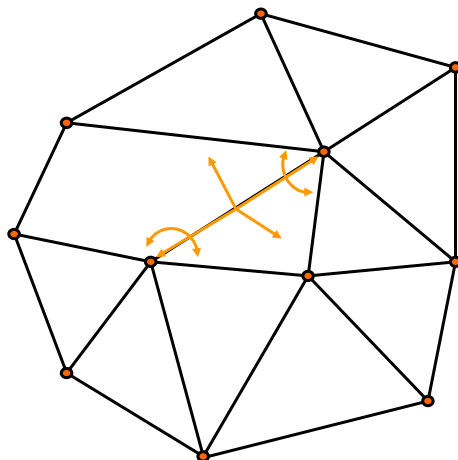
- ☒ Face based
 - ☒ k face vertices
 - ☒ k neighboring faces
- ☒ Edge based
- ☒ Halfedge based



Mesh Data Structures

⌘ Store Topology:

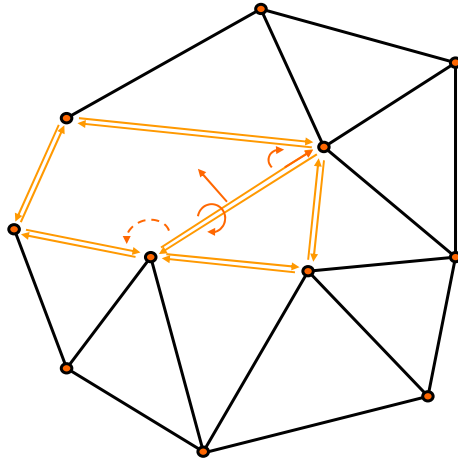
- ☒ Face based
- ☒ Edge based
 - ☒ 2 vertices
 - ☒ 2 incident faces
 - ☒ 4 edges
- ☒ Halfedge based



Mesh Data Structures

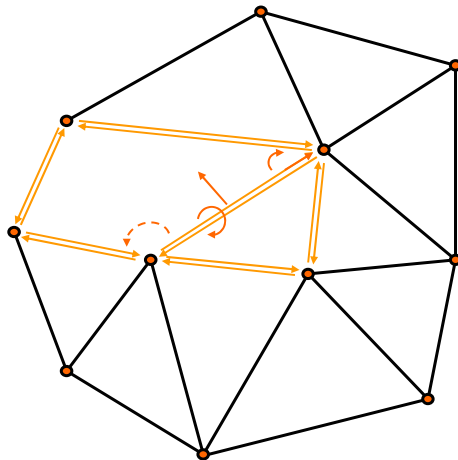
⌘ Store Topology:

- ☒ Face based
- ☒ Edge based
- ☒ Halfedge based:
 - ☒ 1 vertex
 - ☒ 1 face
 - ☒ Next halfedge
 - ☒ Opposite halfedge



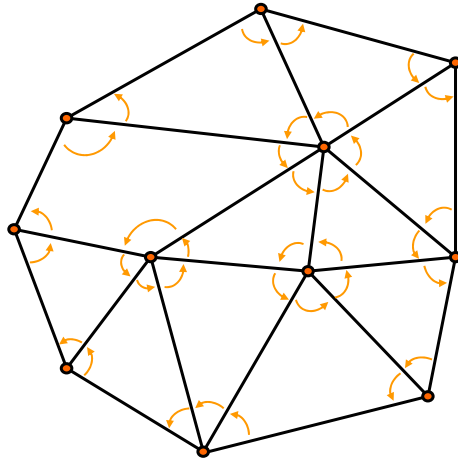
Halfedge Data Structure

```
class Edge {  
    Node A,B;  
    Edge Next;  
    Edge Prev;  
}
```



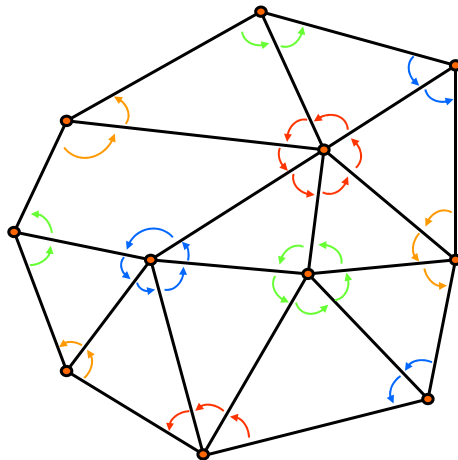
Halfedge Data Structure

```
class Edge {  
  Node A,B;  
  Edge Next;  
  Edge Prev;  
}
```



Halfedge - Navigation

```
class Edge {  
  Node A,B;  
  Edge Next;  
  Edge Prev;  
}
```



Halfedge - Navigation

```
class Edge {  
    Node A,B;  
    Edge Next;  
    Edge Prev;  
}
```

