```
Graph< Location >
std::vector< Vertex
< Location > * > vertexSet
~Graph()
```

+ Vertex< Location > \* findVertex(const

Location &in) const

- Vertex < Location > \* findLocationId(const int &id) bool addVertex(const
- Location &in) + bool removeVertex(const Location &in)
- + bool addEdge(const Location &sourc, const

Location &dest, double d, double w) bool removeEdge(const Location &source, const

- Location &dest)  $bool\ add Bidirectional Edge$ (const Location &sourc,
- const Location &dest, double d, double w) + int getNumVertex()
- const void avoidVertices (std::vector< int > vertices)
- void avoidEdges(std ::vector< std::pair
  < int, int > > edges) std::vector< Vertex
- < Location > \* > getVertex Set() const
- int findVertexIdx(const Location &in) const

#cityMap

## Route

# int source

# string mode

- # int dest
- + Route(Graph< Location
  - > \*map, string m, const int src, const int dt)
- + virtual ~Route()=default
- virtual bool readFromFile (const string &filename)=0
- virtual void writeToFile (ostream &outFile)=0
- virtual void processRoute (ostream &outFile)=0



## RestrictedRoute

- RestrictedRoute(Graph < Location > \*map)
- RestrictedRoute(Graph
  - < Location > \*map, string m, int src, int dt, vector
- < int, int > > avoidS, int inc) bool readFromFile(const
- string &filename) override void writeToFile(ostream
- &outFile) override void calculateRoute()
- void processRoute(ostream &outFile) override