ADT Graph

- Dos conceptos están implicados:
  - Nodos.
  - Lados.

Vertex[G]

Observers:
- G **getData**() // gets the data.
- int **getLabel**() // gets the vertex label.
  - post-c: the label is unique for this vertex in the graph.

Mutators:
- **setData**(d:G) // set the data.
- **setLabel**(int label) //set the label
  - post-c: the label is unique for this vertex in the graph.

Edge[G]

Observers:
- G **getData**() // gets edge's data.
- Vertex **first**() //get the first vertex.
- Vertex **second**() //get the second vertex.
- bool **has**(u:Vertex) // Is vertex u an end of this edge.
- Vertex **other**(u:Vertex) // the vertex other than u.
  - pre-c: has(u).

Mutators:
- **setData**(d:G) // set the edge's data.

¿Por qué no hay constructores?

ADT Graph

ADT Graph[V,E]

Creators:

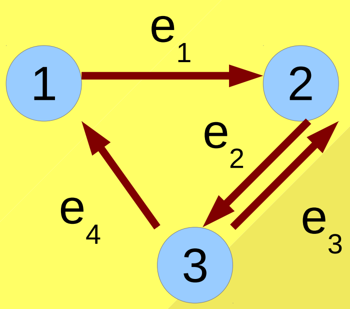
- **makeDirected**() //create a directed graph.
- **makeUndirected**() //create an undirected graph.

Observers:

- Integer **numVertexes**()
- Integer **numEdges**()
- Bool **isDirected**()
- Bool **isEmpty**()
- Bool **adjacent**(u,v:Vertex)// Is there any edge linking u,v?
  - pre-c: u,v are graph's vertexes.
- Bool **hasCurrVertex**() // true if the cursor points to a vertex.
- Vertex **currVertex**() //gets current vertex.
  - pre-c: hasCurrVertex()
- Bool **hasCurrEdge**() // true if the cursor points to a edge.
- Edge **currEdge**() //gets current edge.
  - pre-c: hasCurrEdge()

Mutators:

- **addVertex**(d:N) //create a new vertex.
- **addEdge**(u,v:Vertex, d:E) //insert edge to link u,v.
  - pre-c: u,v are graph's vertexes.
- **searchVertex**(d:N) //search vertex using data.
  - post-c: if it's found hasCurrVertex() and currVertex().getData()=d
- **goTo**(v:Vertex) //go to vertex.
  - pre-c: v is a graph's vertex.
  - post-c: currVertex().getData()=v.getdata()
- **searchEdge**(u,v:Vertex)//search the edge linking u,v.
  - pre-c: u,v are a graph's vertex.
  - post-c: if it's found hasCurrEdge() and currEdge().has(v) and currEdge.other(v)=u
- Vertex **beginVertex**()
- Vertex **nextVertex**()
- bool **afterEndVertex**()
- Edge **beginEdge**(v:Vertex)
- Edge **nextEdge**()
- bool **afterEndEdge**()



```
g.makeDirected()
g.addVertex(1)
g.addVertex(2)
g.addVertex(3)
g.searchVertex(1)
v1=g.currVertex()
g.searchVertex(2)
v2=g.currVertex()
g.addEdge(v1,v2)
```

```
g.searchVertex(3)
v3=g.currVertex()
g.addEdge(v3,v1)
g.addEdge(v3,v2)
g.addEdge(v2,v3)
```