

IS Lab Project |A1-06

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<https://github.com/thmasker/A1-06>

1 Task1

For this task, we found a simple, effective and easy to use library on Python, called [ElementTree](#), so after seeing other options like *minidom*, we decided to use it. After that, we created the required *Graph* class, which constructor parses the chosen *.graphml* file, and stores both nodes and edges in two independent variables. Both *belongNode* and *positionNode* methods are really easy to understand, so we won't go on further explanations.

The most complex of the three methods created is *adjacentNode* (see *Figure 1.1*). This method goes through all the node's edges, and appends to the adjacency list those which source node is the *nodeid* we are looking for. Firstly, we append each edge to the adjacency list with their *name* and *length* fields as *SinNombre* and *NULL* respectively. After that we search both fields on the inner data of each edge using the keys dictionary created on the constructor, and we refill both attributes with the real ones. If anyone of them is missing, we'll know that, as it will appear as *SinNombre* or *NULL* in the adjacency list returned.

```
1 def adjacentNode(self, nodeid):
2     adjacencyList = []
3
4     if self.belongNode(nodeid):
5         for edge in self.edges:
6             if edge.get('source') == nodeid:
7                 adjacencyList.append((edge.get('source'), edge.get('target'),
8                     'SinNombre', 'NULL'))
9
10            for data in edge:
11                if data.get('key') == self.keys['name']:
12                    lst = list(adjacencyList[-1])
13                    lst[2] = data.text
14                    adjacencyList[-1] = tuple(lst)
15                elif data.get('key') == self.keys['length']:
16                    lst = list(adjacencyList[-1])
17                    lst[3] = data.text
18                    adjacencyList[-1] = tuple(lst)
19            else:
20                adjacencyList = '[ERROR] Node does not exist on the node'
21
22    return adjacencyList
23 Keys Dictionary
24
25 for key in self.graph.findall('default:key', self.ns):      # Store edge keys
26     if key.get('for') == 'edge':
27         self.keys[key.get('attr.name')] = key.get('id')
```

Figure 1.1 Method *adjacentNode*

```

1 for key in self.graph.findall('default:key', self.ns):      # Store edge keys
2     if key.get('for') == 'edge':
3         self.keys[key.get('attr.name')] = key.get('id')

```

Figure 1.2 Keys dictionary

1.1 Some results

We coded a script (*tests.py*) to be able to test the results given by the program. We show some of them next:

```

1 Is this node on the graph? True
2 Position (latitude and longitude): (-4.3544889, '38.8808616')
3 Adjacency list: [ ('1851273807', '4587612273', 'Plaza del Pilar', '23.656'),
    ('1851273807', '1851273984', 'Plaza del Pilar', '21.923'), ('1851273807',
    '1851274092', 'Carretera de los Pozuelos', '98.36399999999999')

```

Figure 1.1.1 Result for *nodeid* 1851273807 from *Abenójar.graphml*

```

1 Is this node on the graph? True
2 Position (latitude and longitude): (-3.9227797, '38.9936719')
3 Adjacency list: [ ('764039207', '2711270344', 'Calle Pozo Santa Catalina',
    '135.996'), ('764039207', '764039210', 'Calle Extramuros de Calatrava',
    '50.307')]

```

Figure 1.1.2 Result for *nodeid* 764039207 from *Ciudad Real.graphml*

```

1 Is this node on the graph? True
2 Position (latitude and longitude): (-4.8550238, '39.5363048')
3 Adjacency list: [ ('2012263661', '2012263377', 'Calle Carmen', '51.09'),
    ('2012263661', '2012263373', 'Calle Carmen', '62.747'), ('2012263661',
    '2012263518', 'Calle Carmen', '119.99600000000001')

```

Figure 1.1.3 Result for *nodeid* 2012263661 from *Anchuras.graphml*

1.2 Timing

```

1 Graph file loaded in: 0.009773681000005752 seconds
2 Adjacency list loaded in: 0.0003832729999970752 seconds

```

Figure 1.2.1 Result for *nodeid* 4753226234 from *Abenójar.graphml*

```

1 Graph file loaded in: 0.07164645499999978 seconds
2 Adjacency list loaded in: 0.0023671510000013996 seconds

```

Figure 1.2.2 Result for *nodeid* 764039166 from *Ciudad Real.graphml*

```

1 Graph file loaded in: 0.007518905999999603 seconds
2 Adjacency list loaded in: 0.000897720000012665 seconds

```

Figure 1.2.3 Result for *nodeid* 4928063639 from *Anchuras.graphml*