

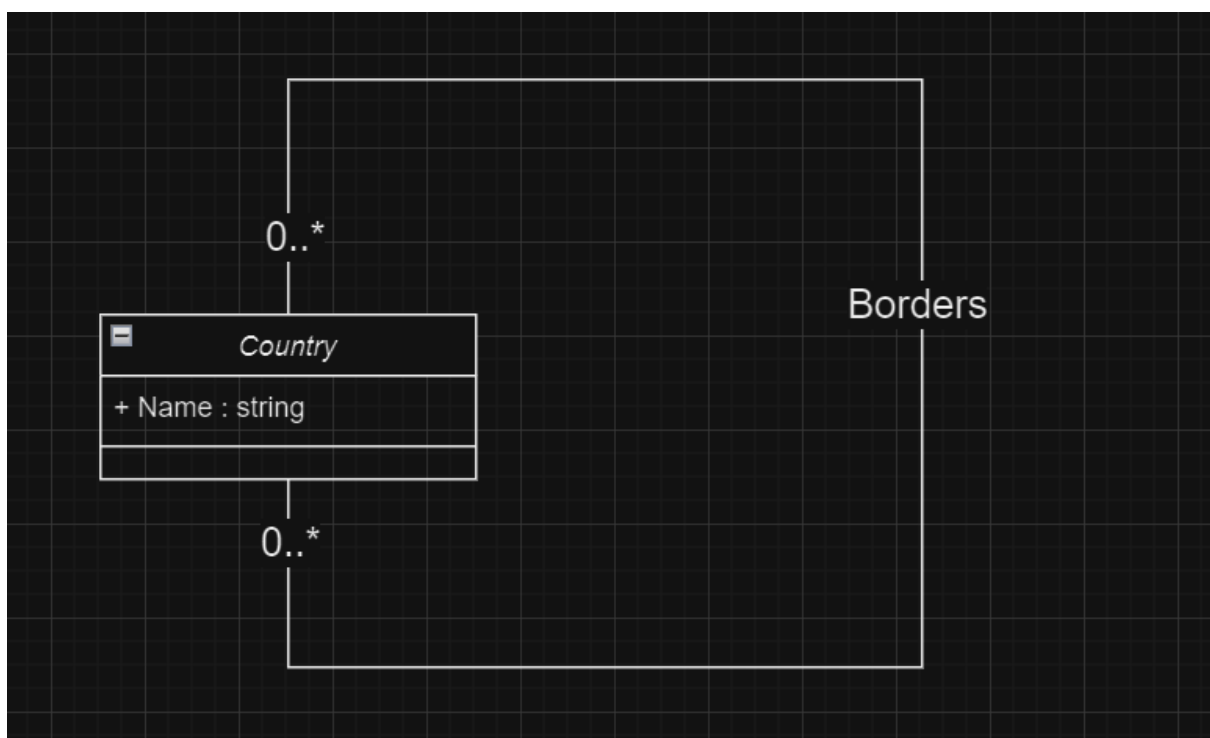
Software Engineering

Lab 4

Class Diagrams

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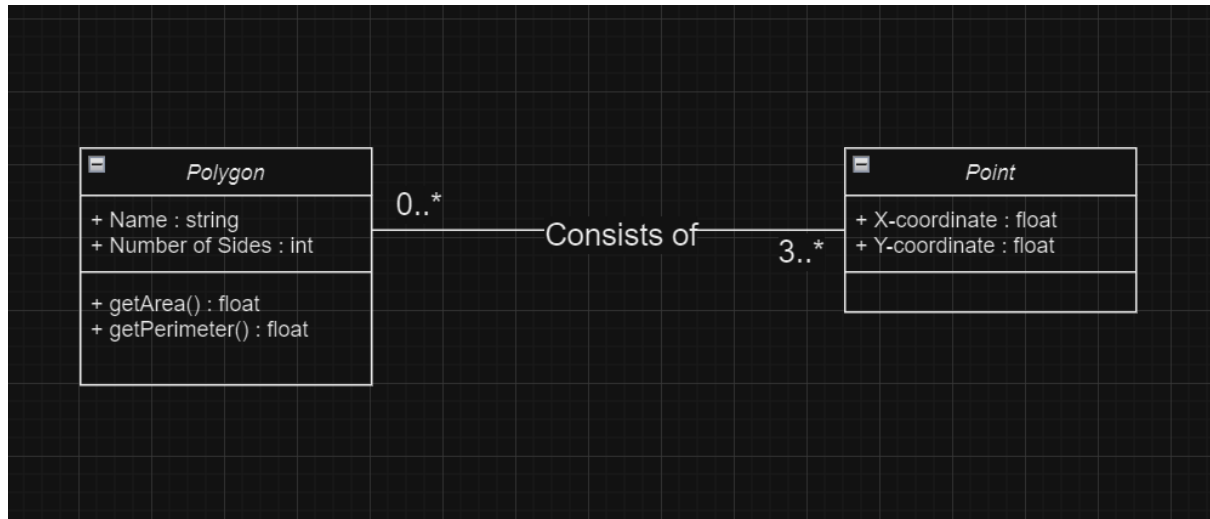
Q1. Prepare a class diagram for the following object diagram that shows a portion of Europe.



Since we need to capture the relationship between countries, as to which country shares a border with which another country.

This relationship can be best captured by the above class diagram. Since a country can share a border with zero or more countries and the attributes involved in the object is the name only, hence the multiplicity and the class definition.

Q2. Prepare a class diagram for object diagram given in Figure-2. Explain your multiplicity decisions. What is the smallest number of points required to construct a polygon? Does it make a difference whether or not point may be shared between polygons? Your answer should address the fact that points are ordered.

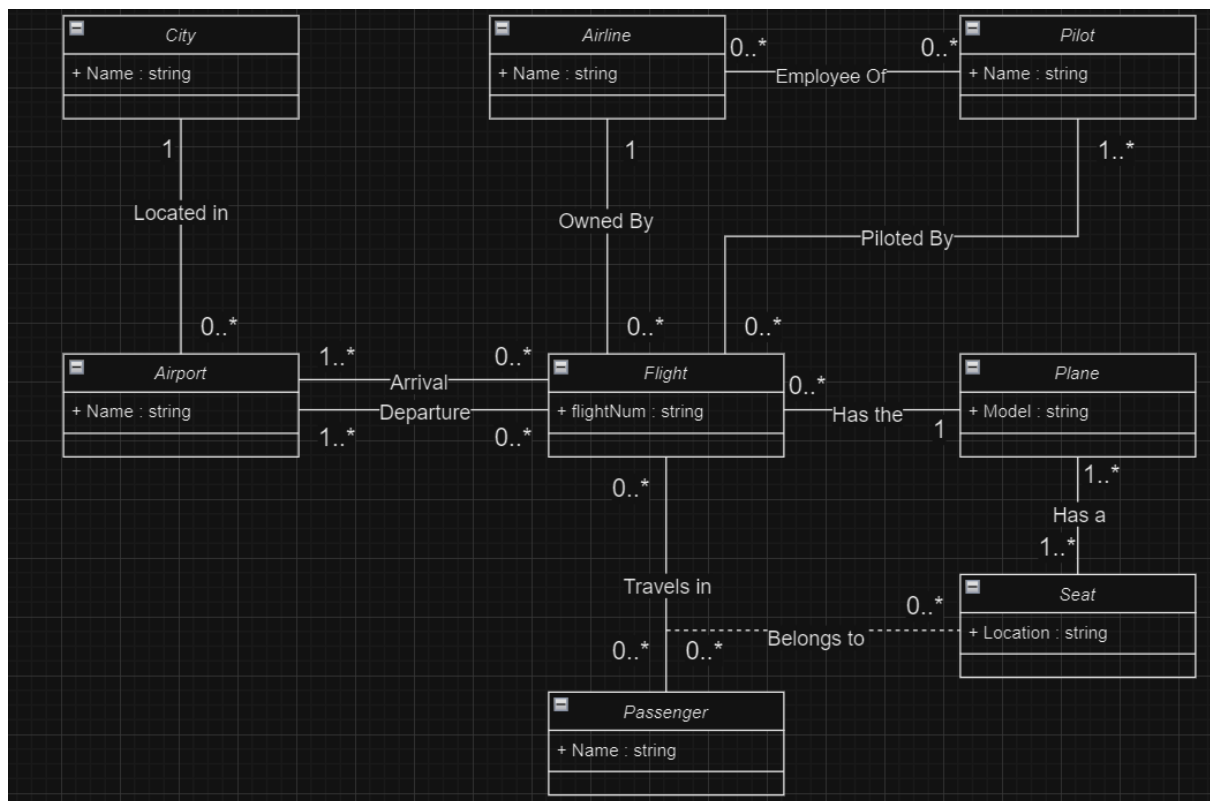


The smallest number of points that is required to construct a polygon is 3, and hence the multiplicity that is specified. A polygon consists of 3 or more points, whereas a point may or may not be a part of a polygon.

Since a point may or may not be a part of more than one polygon, the multiplicity of the points is shown as '0..*' as a point can be a part of n number of polygons.

The points must be ordered. The difference in the sequence of points while tracing would result in different polygons being formed. Hence, the order of the points in a polygon is also of importance.

Q3. Figure 3 is a partially completed class diagram of an air transportation system. Add multiplicities in the diagram. Also add association names to unlevelled associations.



Q4. We want to model a system for management of flights and pilots. An airline operates flights. Each airline has an ID. Each flight has an ID a departure airport and an arrival airport: an airport as a unique identifier. Each flight has a pilot and a co-pilot, and it uses an aircraft of a certain type; a flight has also a departure time and an arrival time. An airline owns a set of aircrafts of different types. An aircraft can be in a working state or it can be under repair. In a particular moment an aircraft can be landed or airborne. A company has a set of pilots: each pilot has an experience level: 1 is minimum, 3 is maximum. A type of aeroplane may need a particular number of pilots, with a different role (e.g.: captain, co-pilot, navigator): there must be at least one captain and one co-pilot, and a captain must have a level 3.

