

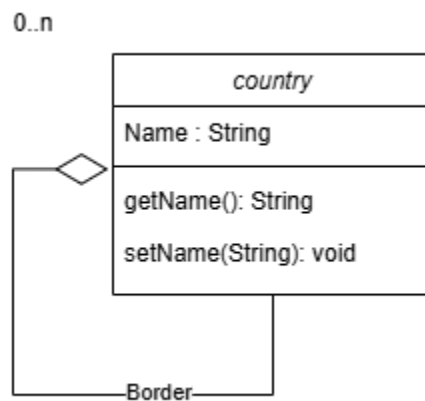
# LAB - 4

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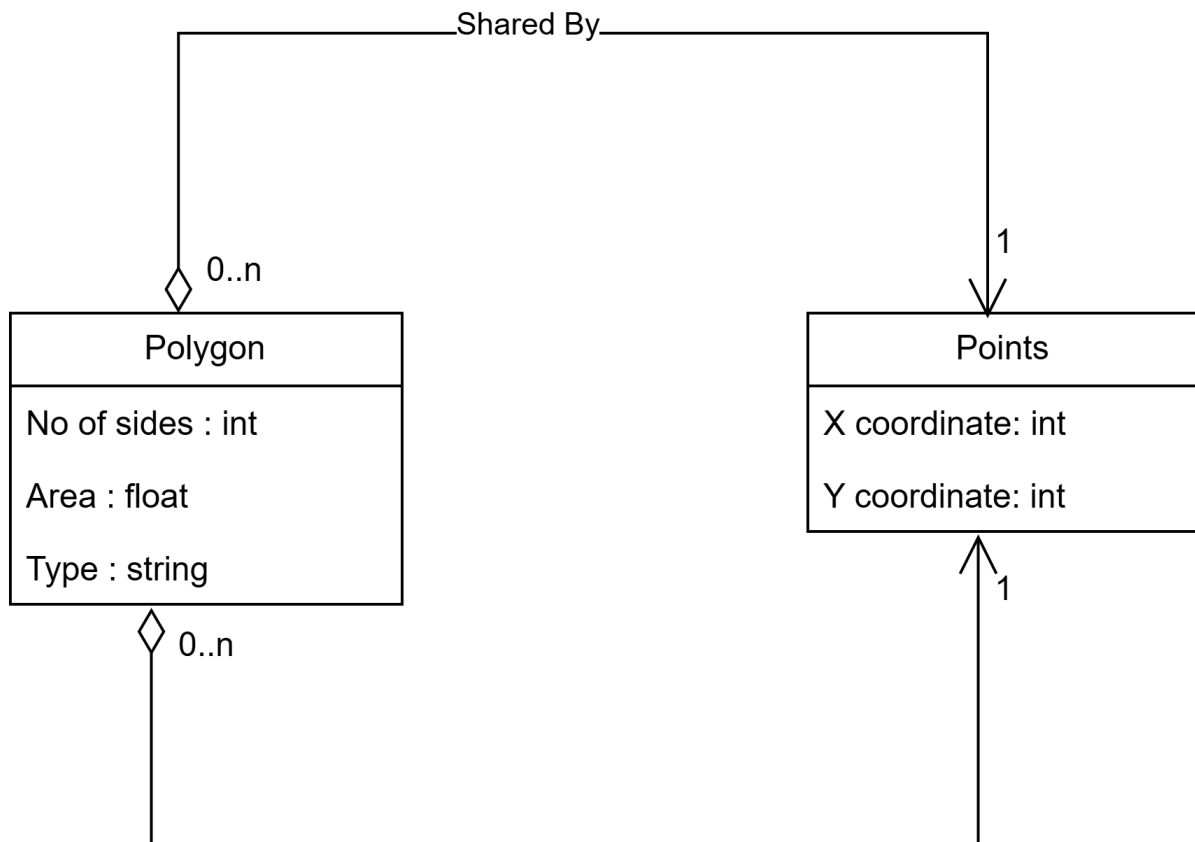
## QUESTION - 1

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



## **QUESTION - 2**

***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.***

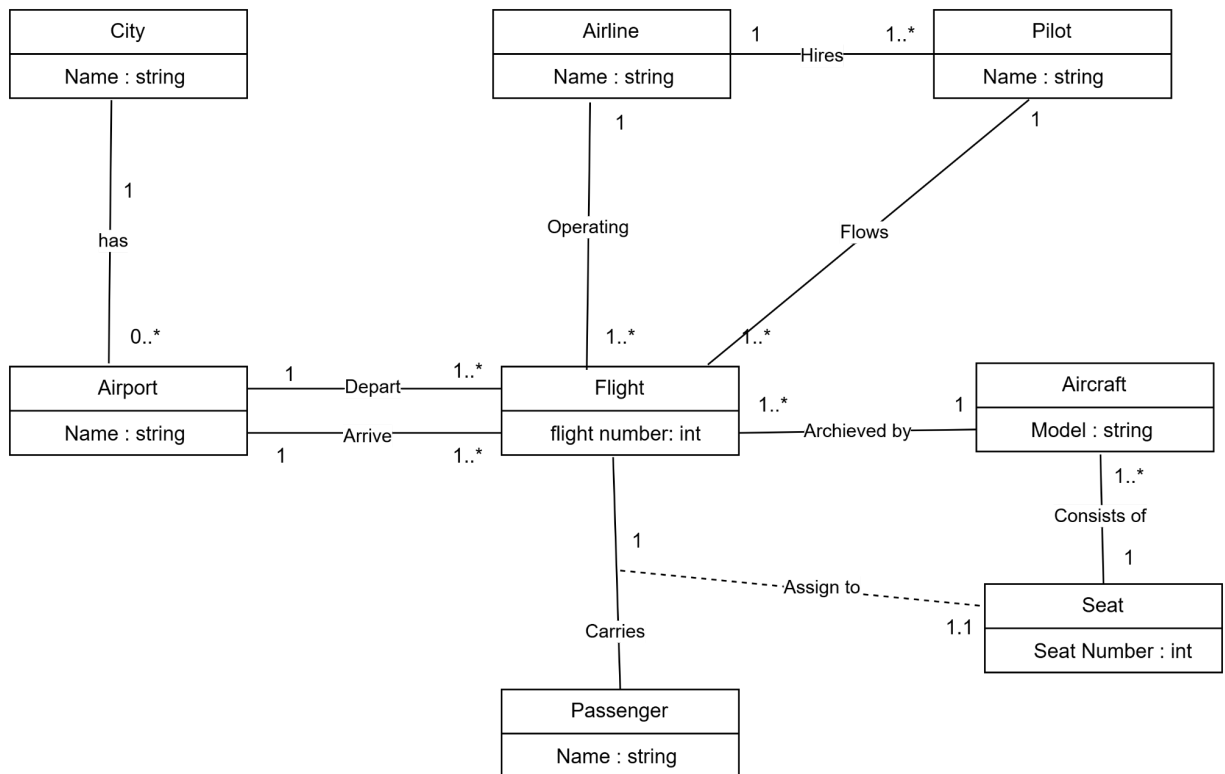


The smallest number of points needed to construct a polygon is 3 (for a triangle). For an  $n$ -sided polygon, you need  $n$  points.

Points must be ordered to define the edges of the polygon. Sharing points between polygons is possible but does not reduce the number of points needed for each polygon. The ordering of points ensures the shape is uniquely defined even if points are shared.

### **QUESTION - 3**

**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.**



## QUESTION - 4

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.

