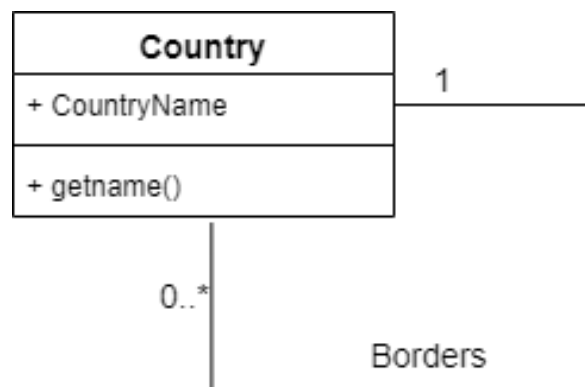


# SOFTWARE ENGINEERING LAB-4

## 202201037

### Rishi Patel

**Q.1 Prepare a class diagram for the following object diagram that shows a portion of Europe.**



**Q.2 Prepare a class diagram for the object diagram given in Figure -2. Explain your multiplicity decisions.**

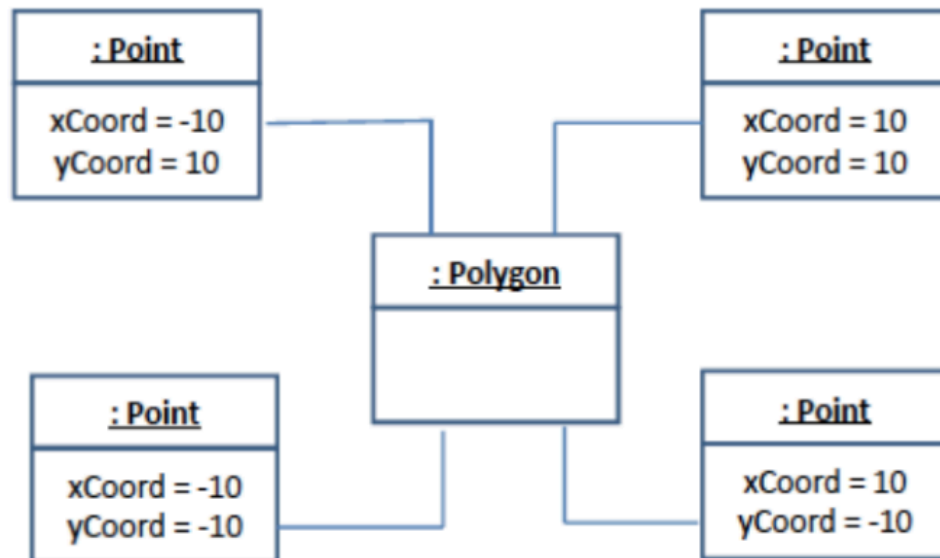
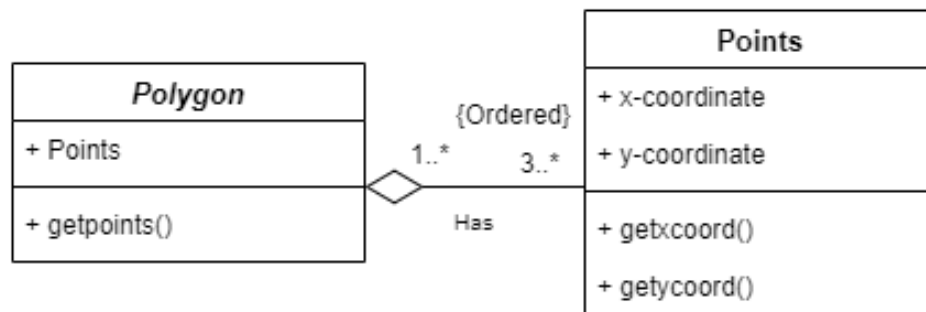


Figure - 2



-As we know that a polygon needs at least 3 points, therefore it has “3..\*” multiplicity. Since this corresponds to 1 polygon, this explains the “1..\*” multiplicity.

-Here we are assuming that all the points are different(are not collinear).

**What is the smallest number of points required to construct a polygon?**

-Smallest number of points required to construct a polygon is **3**.

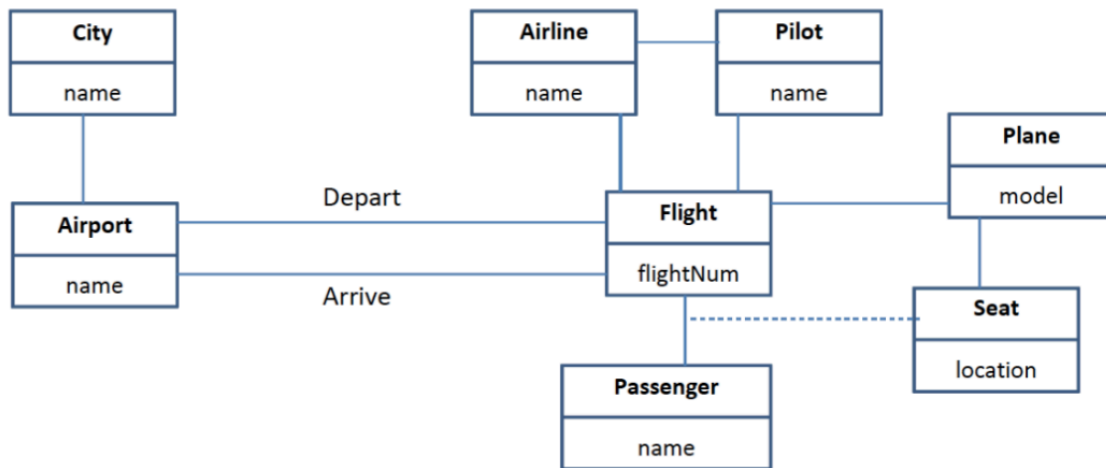
**Does it make a difference whether or not points may be shared between polygons?**

-Sharing points between polygons does not change the fact that each polygon requires 3 distinct points. Thus sharing or not sharing it won't change the polygon unless the points are collinear.

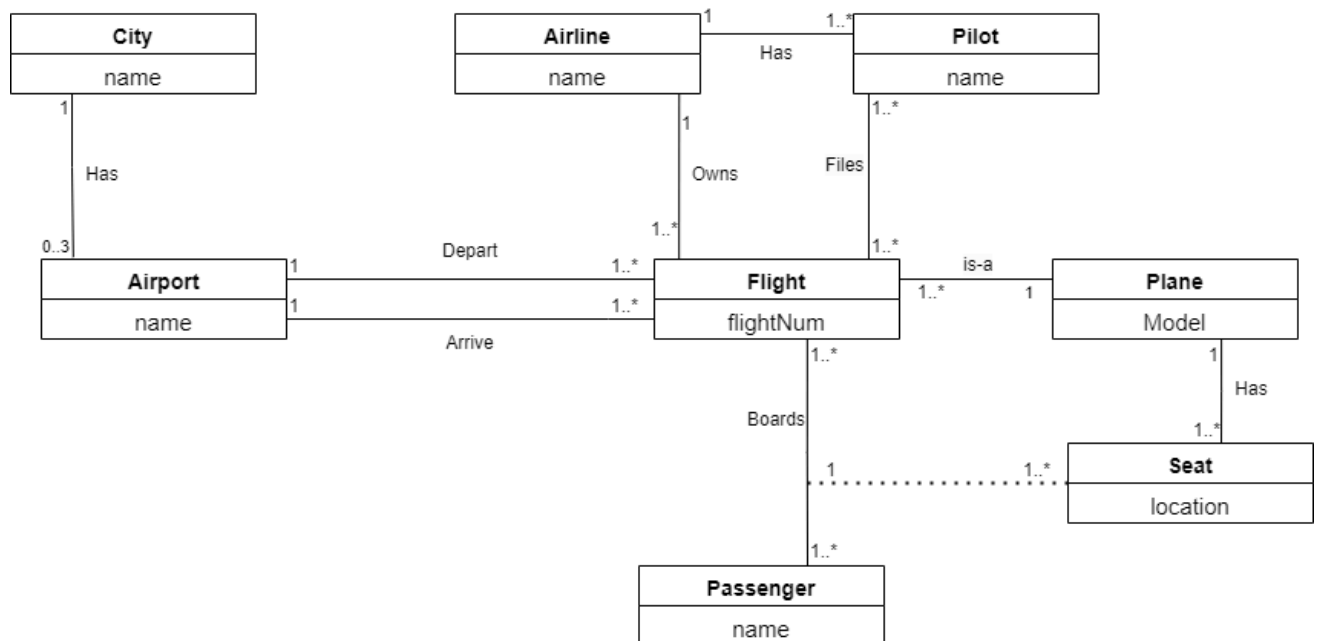
**Your answer should address the fact that points are ordered.**

-Sharing or not sharing, ordered points are the sequence in which the points are connected.

**Q.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.**



Completed Class Diagram



-Assumptions made in the above class diagram :-

1. We assume that each city has atmost 3 airports.
2. We assume that the seat number (location) is unique to every plane model.
3. We assume that a passenger can book multiple tickets for a flight.

**Q.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 also has 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 airplane 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.**

