# IT314: Software Engineering
# Lab 4: Class Modeling

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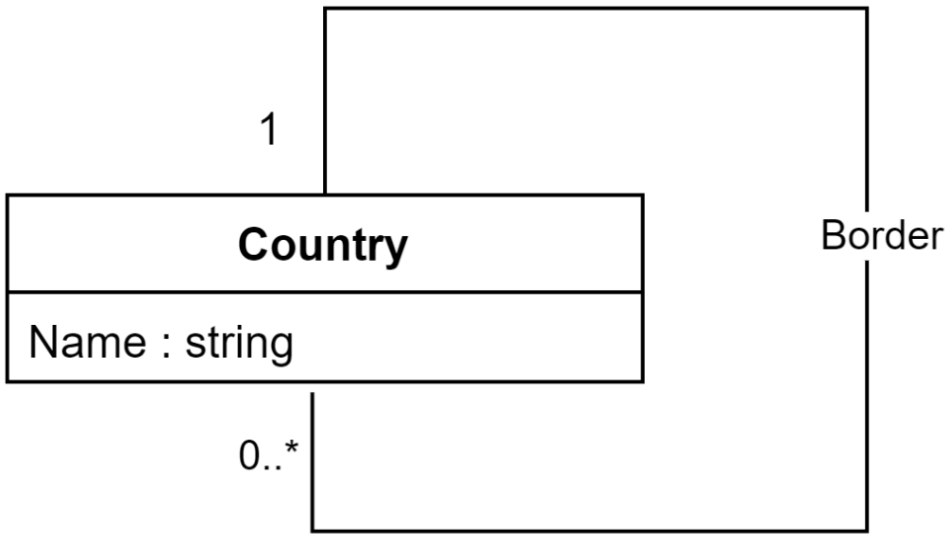
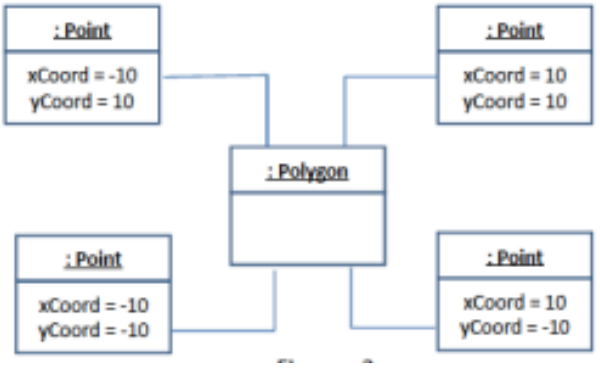
**Q.1** Prepare a class diagram for the following object diagram that shows a portion of Europe.

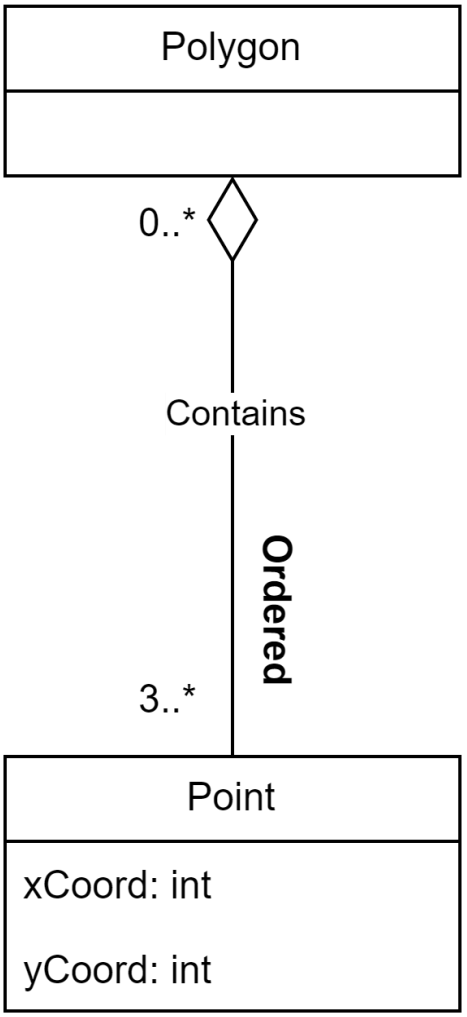

**ANS:**



**Q.2** Prepare a class diagram for the 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 points may be shared between polygons? Your answer should address the fact that points are ordered.

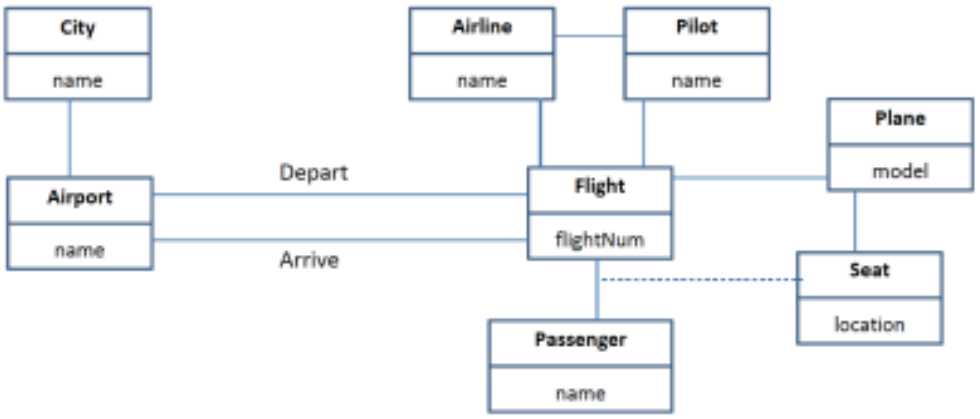



**ANS:**

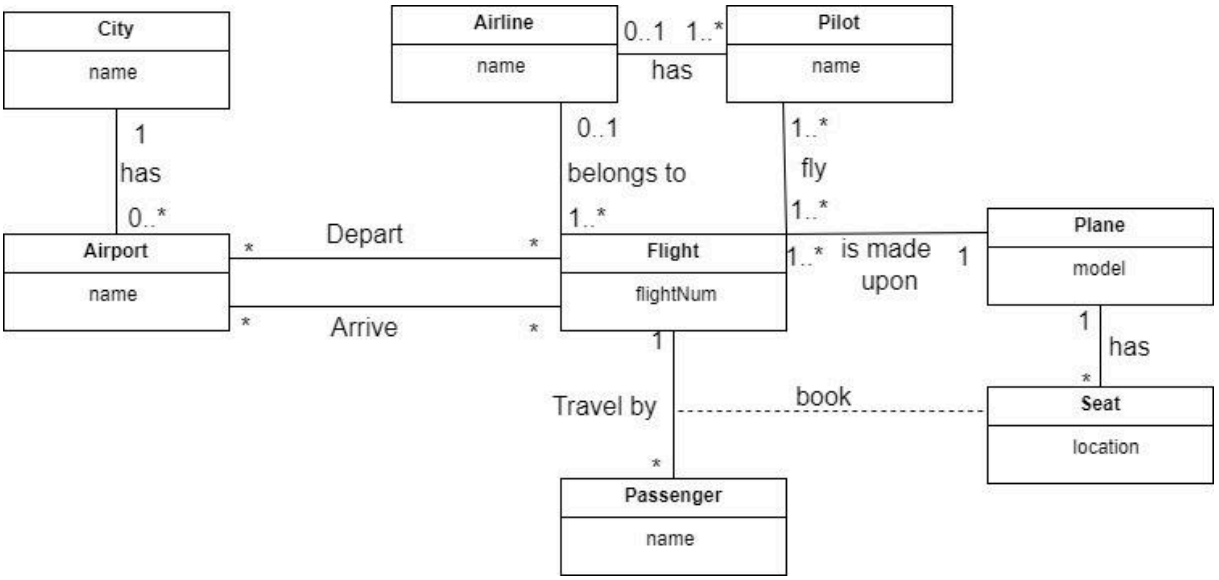



1) Smallest Number of points required to create a polygon are 3.
2) Yes, it makes a difference whether points are shared between polygons or not.

**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.




ANS:




**Assumptions for Multiplicities:**

1) A city could have 0 or multiple airports.
2) Any number of flights could arrive or depart from an airport including n0 flight arriving or departing.
3) A pilot could be an independent pilot or could be associated with a single airline.
4) A Flight could belong to an airline or be owned by an individual.
5) Different pilots could fly different flights.
6) Each flight would be made on a definite proposed model.
7) Each plane would have seats allocated for the passengers and the cabin-crew.
8) A passenger traveling by a flight could reserve his/her seat at the desired location which he wants.

**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 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.