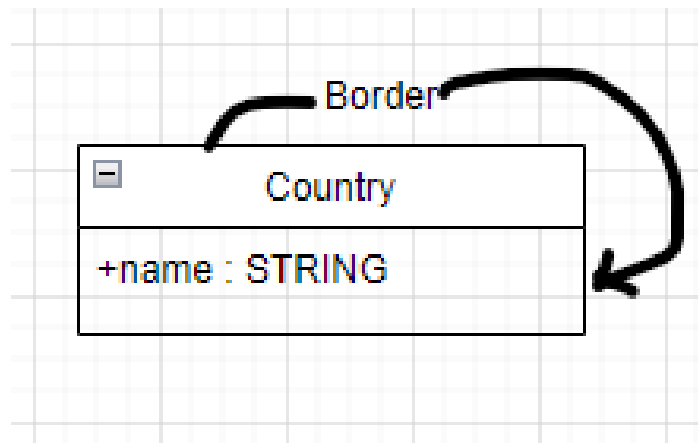


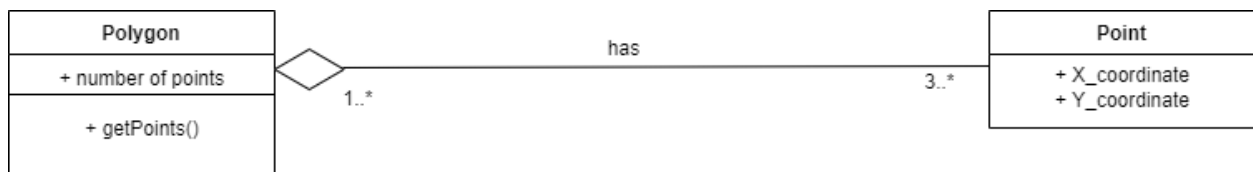
# Vivek Patel

202201025

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



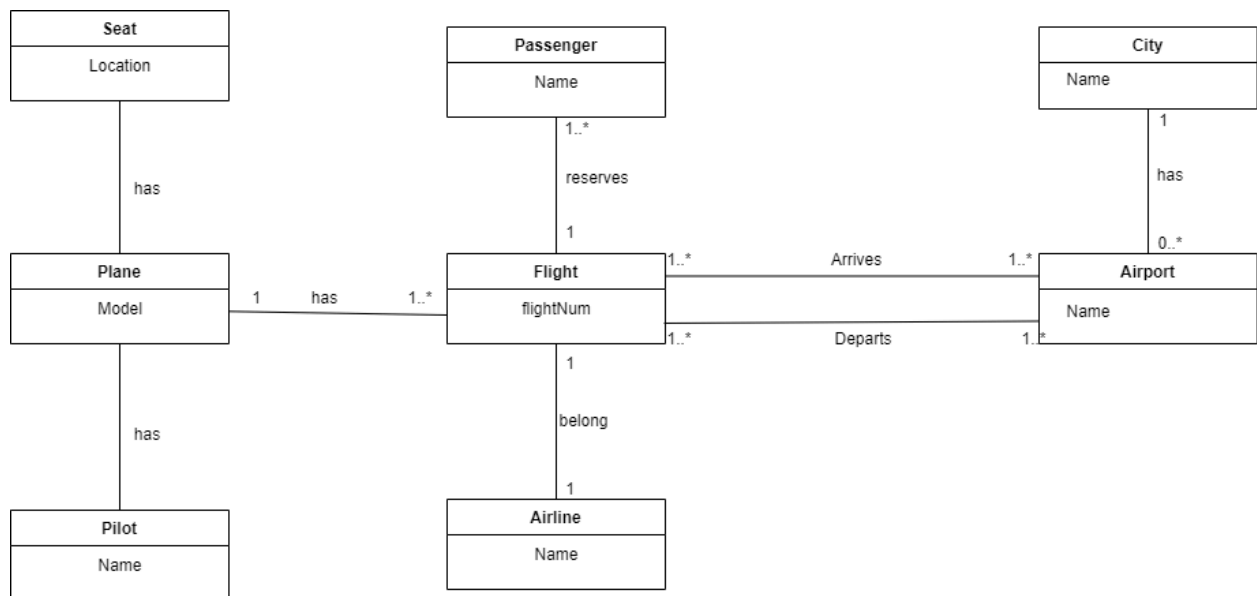
Q.2 Prepare a class diagram for the object diagram given in Figure -2. Explain your multiplicity decisions. What is the smallest number of points required to construct a polygon? Does it make a difference whether or not points may be shared between polygons? Your answer should address the fact that points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



- The smallest number of points required to construct a polygon is 3. This is because a polygon is defined as a shape with at least three sides. With only two points, you can only form a line segment, not a closed polygon.
- Yes, it does make a difference whether or not points may be shared between polygons. If points can be shared between polygons, it means that the same set of points can be used to create multiple polygons. This shared-use ability allows for more complex shapes and arrangements, as well as the reuse of points to form different polygons.

- If points cannot be shared, each polygon would need its own unique set of points, making it less flexible and requiring potentially more points overall for the same number of polygons.
- The ordering of points ensures that the polygon's shape and structure are defined clearly. The order determines which points are connected to each other, thereby defining the edges of the polygon. If points are not ordered, the resulting shape may not be a valid polygon or could be ambiguous.

**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.



**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.

