

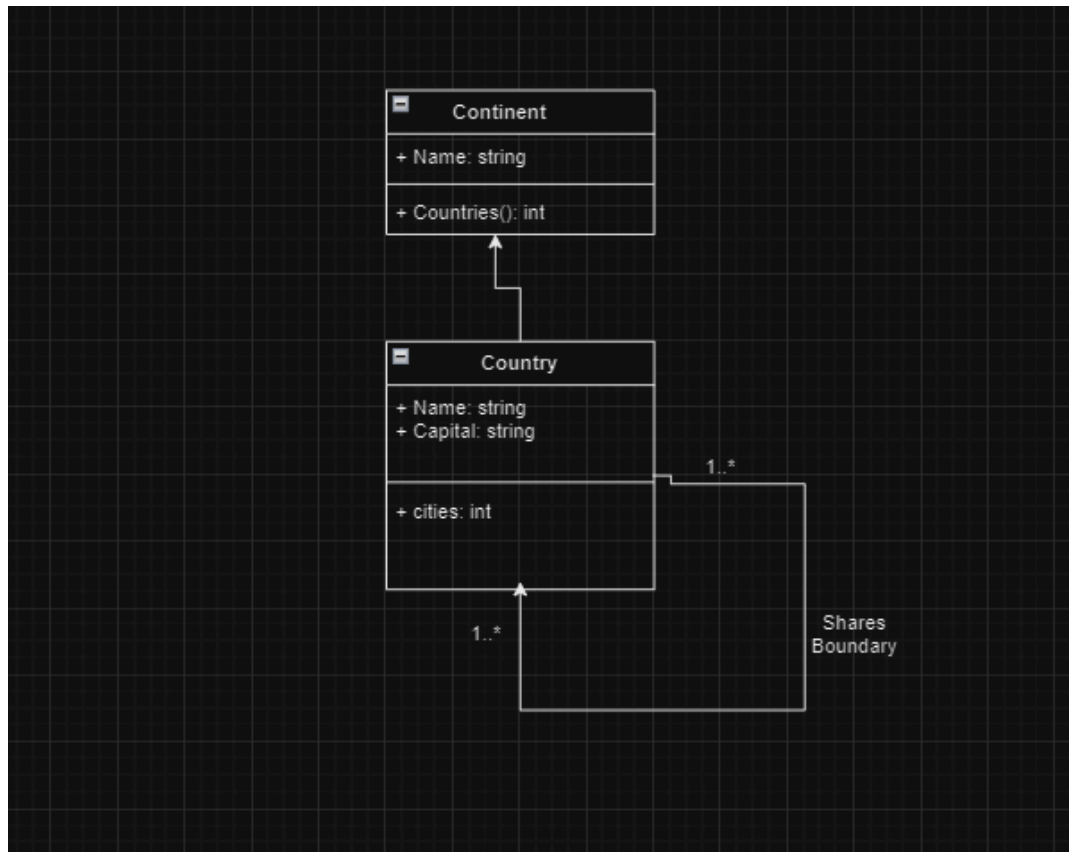
SOFTWARE ENGINEERING LAB 4

NAME: RITIK TIWARY

ROLL NO.: 202201519

Question:1

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



Question:2

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.

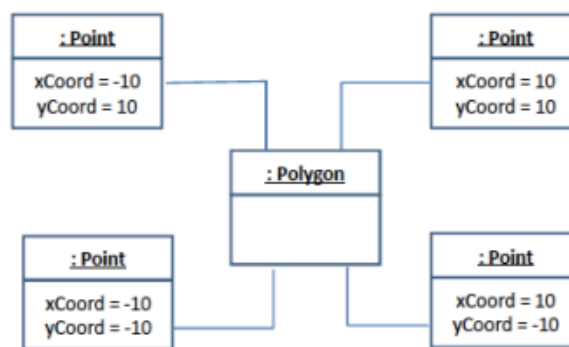
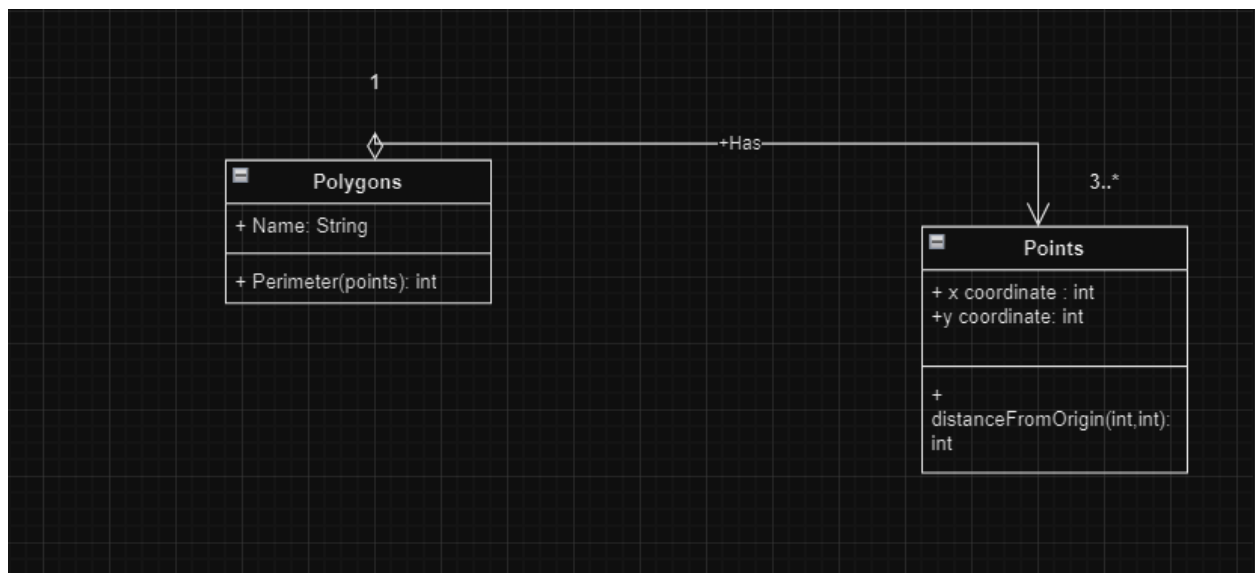


Figure - 2



Explanation:

For a polygon to form, it requires a minimum of 3 points. This relationship is captured as `Polygon` having a "1 to many" (`1..*`) relationship with `Point`.

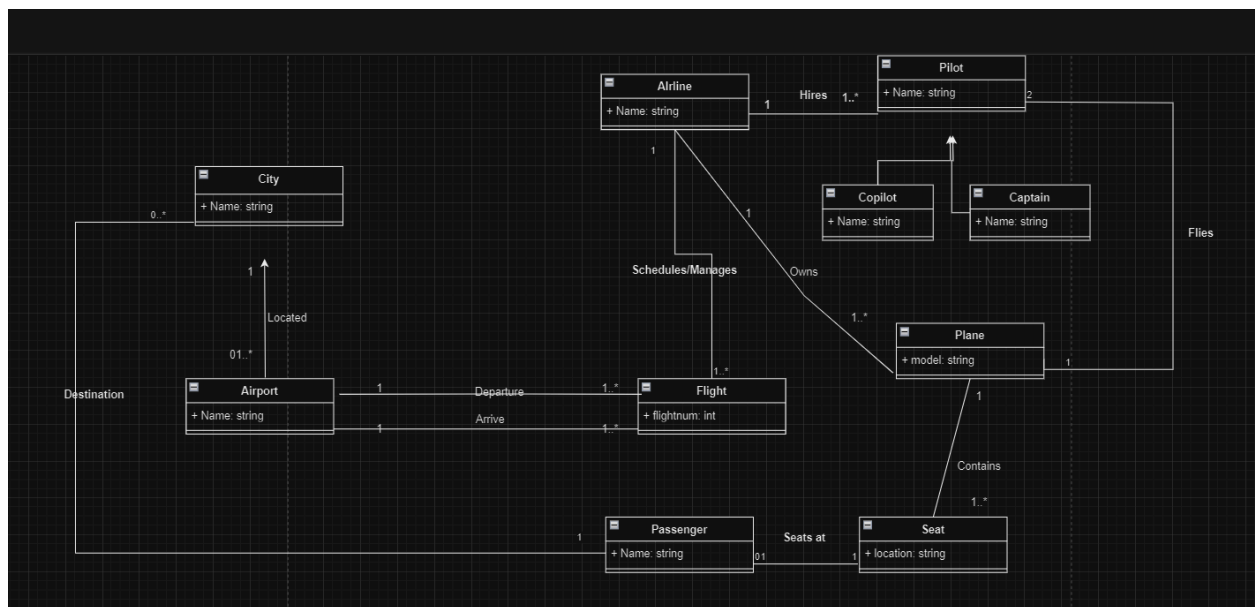
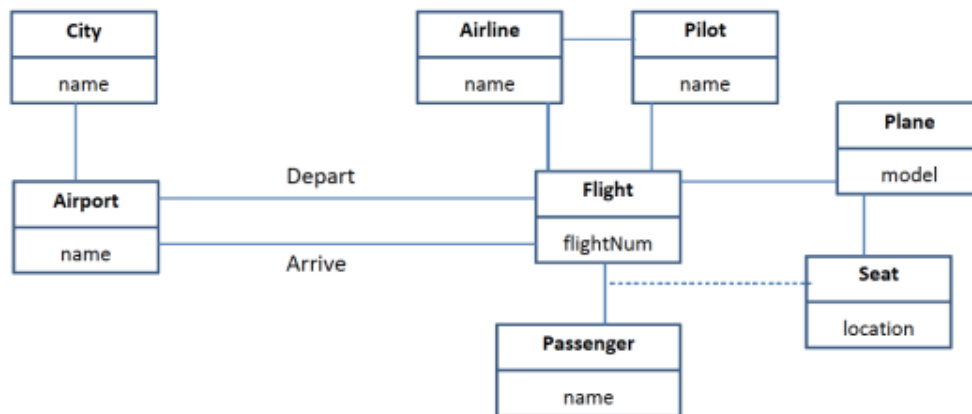
If points can be shared between polygons, then **Point** will have a "many to many" (0..*) relationship with **Polygon**.

If points cannot be shared, the multiplicity from **Point** to **Polygon** might be 0..1, indicating each point is part of one or no polygon.

The smallest number of points required to construct a polygon is **three**. This is because a polygon is defined as a closed shape with straight sides, and three sides are the minimum needed to form a closed shape (a triangle).

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.



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.

