SOFTWARE ENGINEERING (IT-314)
LAB-4
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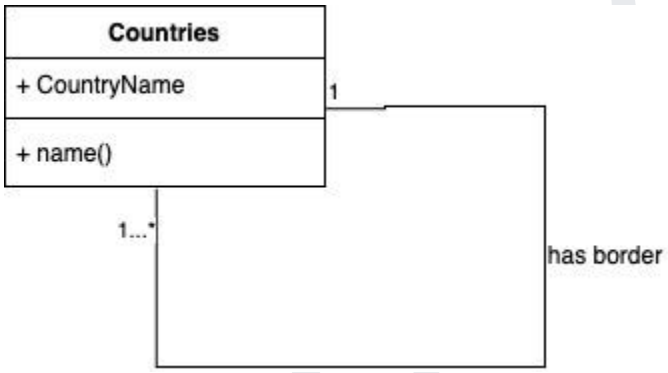
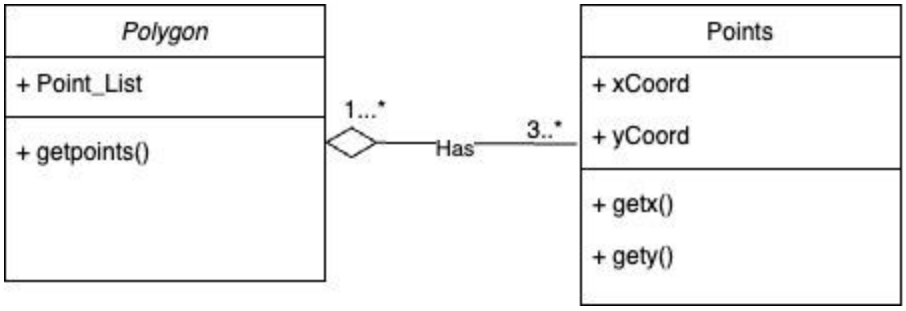
1.) Prepare a class diagram for the following object diagram that shows a portion of Europe.



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.

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

- Smallest no of points required for a polygon = 3.



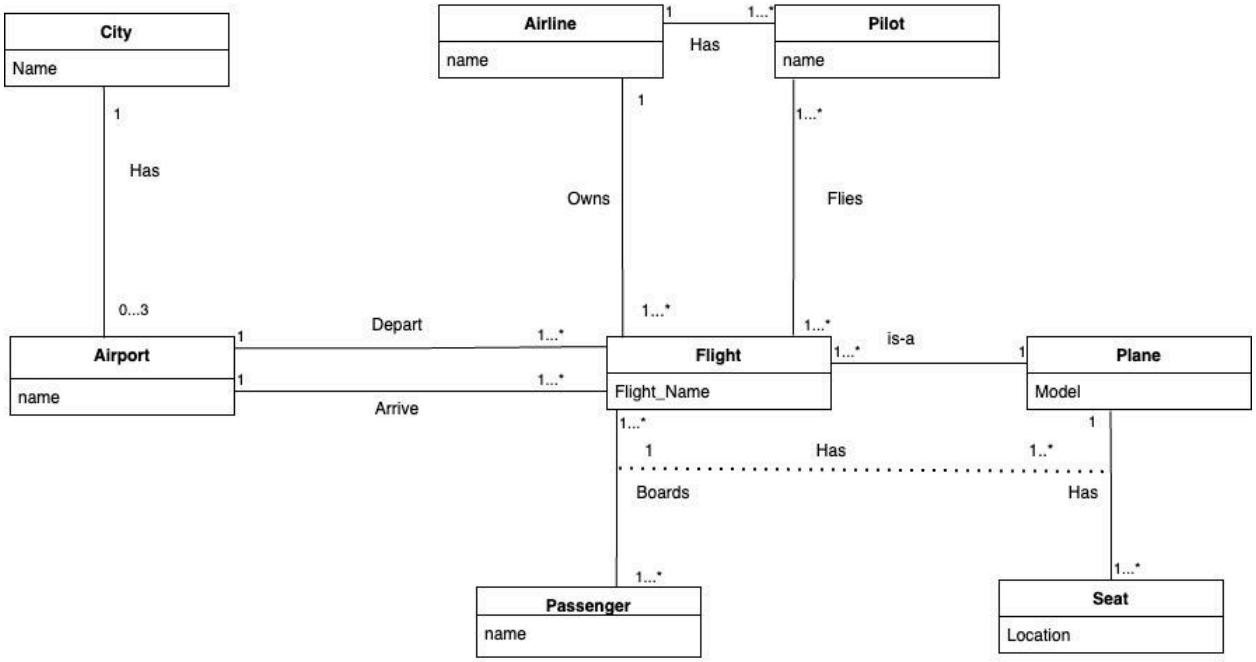
Does it make a difference whether or not point may be shared between polygons?

- Sharing points does not change the number of minimum points because each polygon requires at least 3 non-collinear points to form a polygon eg. triangle
- The points are ordered as they define the sequence in which the points are connected in the polygon.

- As we know that a polygon needs at least 3 points, therefore that explains “3..*” multiplicity.

- It may be possible that a point does not belong to any polygon, to appreciate that case, we have set the multiplicity as “1..*”.

Q3.) 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.



Assumptions for the above multiplicities :

- I have assumed that a city can have airports between 0 to 3.
- Each flight may be assigned different pilots on different days, meaning that the same flight number can be operated by various pilots over time. This ensures that no specific flight is consistently flown by the same set of pilots daily.
- A passenger might hold multiple seats on a single flight, allowing for flexibility in seating arrangements or reservations.

Q4.) 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.