



IT314 – Software Engineering

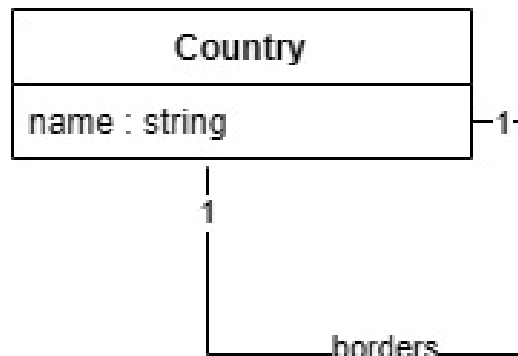
Lab: 04

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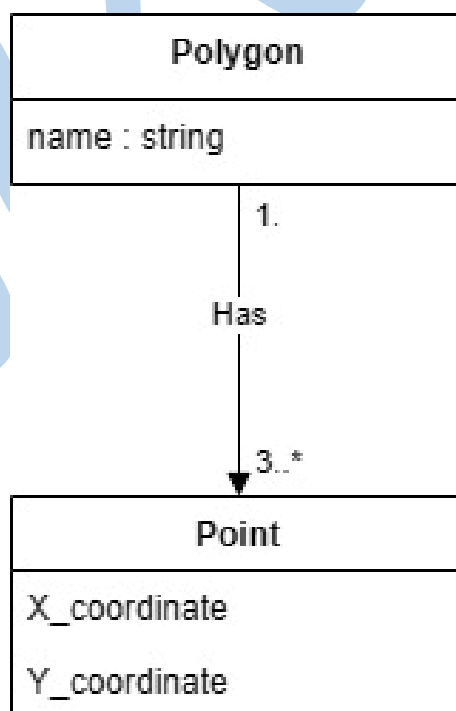
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Lab Group: 3

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

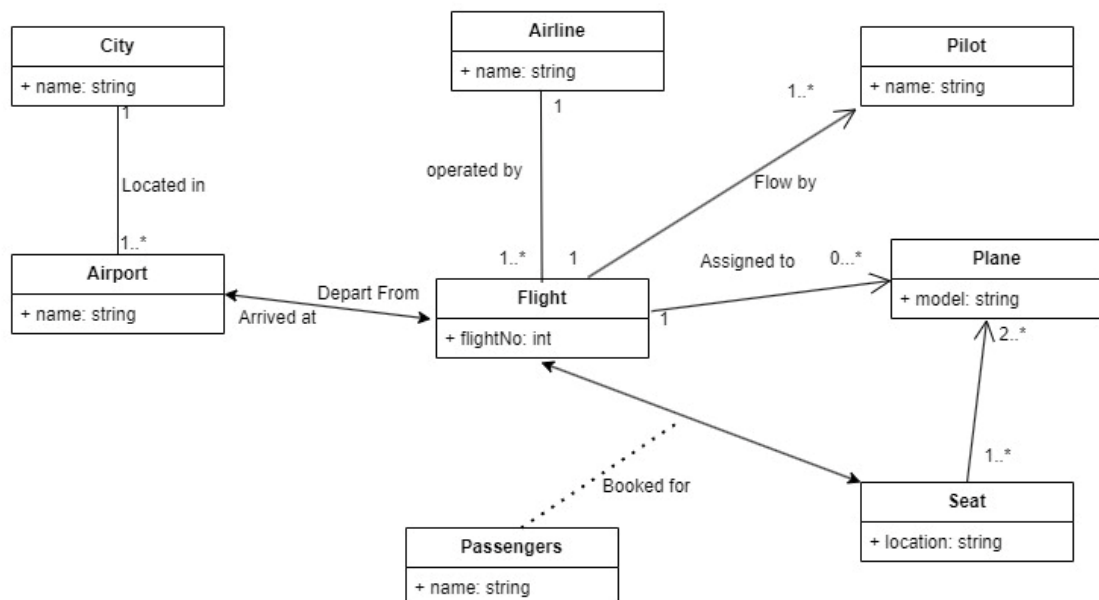


Q.2 Prepare a class diagram for the object diagram given in Figure -2. Explain your multiplicity decisions. What is the smallest number of points required to construct a polygon? Does it make a difference whether or not points may be shared between polygons? Your answer should address the fact that points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



1. We need at least three points to create a polygon.
2. The points must be arranged in a specific order; changing the order can result in a different polygon.
3. Sharing points between polygons may affect their visual structure, but the order of points within each polygon is essential to accurately define its shape.
4. The correct sequence of points ensures the polygon maintains its intended form, even when vertices are shared between polygons.

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.



Assumptions:

1. City-Airport:

- A city may have multiple airports.
- Each airport is situated in only one city.

2. Airport-Flight (Departure):

- An airport can serve as the departure point for several flights.
- A flight can depart from or arrive at only one airport at any given time.

3. Airport-Flight (Arrival):

- An airport can be the arrival destination for numerous flights.
- A flight lands at exactly one airport.

4. Airline-Flight:

- An airline operates multiple flights.
- Each flight is managed by a single airline

5. Flight-Plane:

- A plane can be used for different flights over time.
- Each flight uses one plane

6. Plane-Seat:

- A plane contains many seats.
- Each seat belongs to a single plane.

7. Flight-Passenger:

- A flight can carry numerous passengers.
- A passenger may be booked on several flights.

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 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.

