IT-314
Software Engineering

Lab Session: Class Modeling

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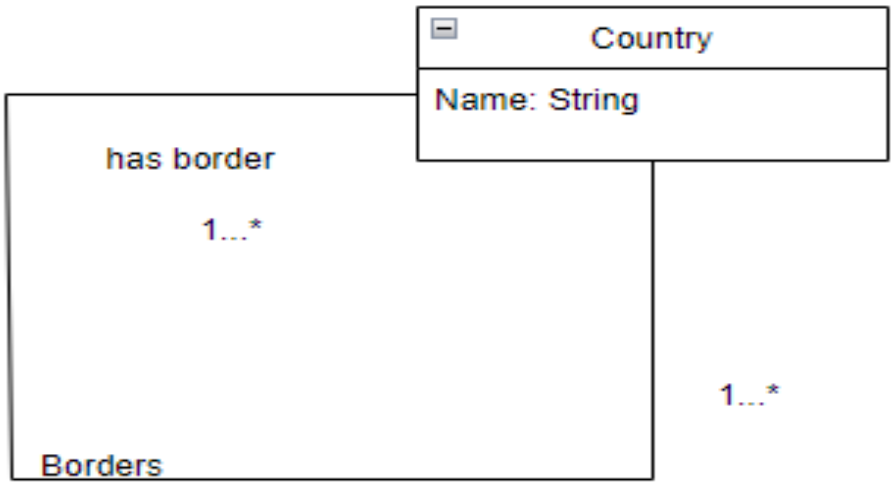
Q.1 Prepare a class diagram for the following object diagram that shows a portion of Europe.

Class Diagram:



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

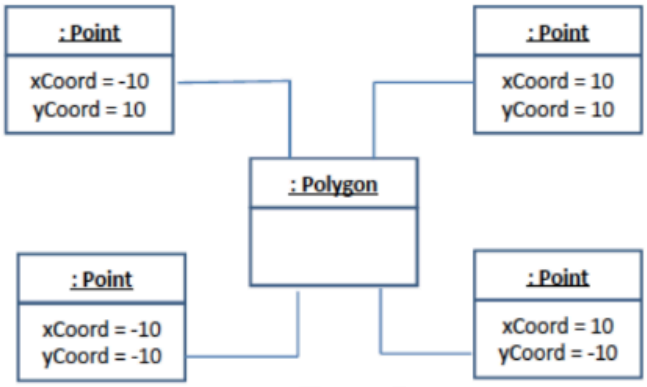


Figure - 2

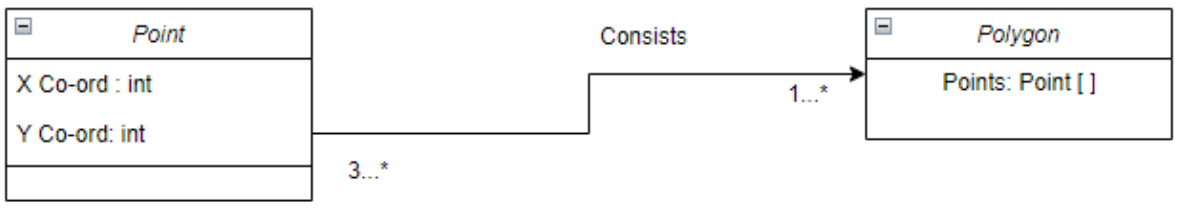
Multiplicity decisions: A Polygon requires at least 3 points to form a valid shape (multiplicity 3..*), and a Point can belong to multiple polygons or none at all (multiplicity 0..*), allowing shared points between polygons.

Smallest number of points required: The minimum number of points required to construct a polygon is 3, which forms a triangle, the simplest polygon.

Shared points between polygons: Yes, points can be shared between polygons. This is common in tessellations or complex shapes where polygons share vertices without affecting their individual structures.

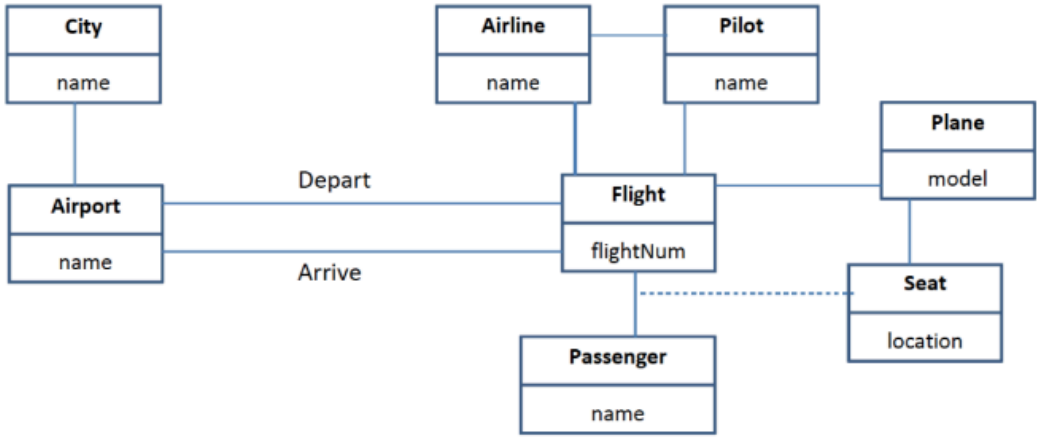
Ordered points: Points must be ordered in a specific sequence (clockwise or counterclockwise) to define the polygon's edges correctly and ensure a valid, closed shape.

Class Diagram:

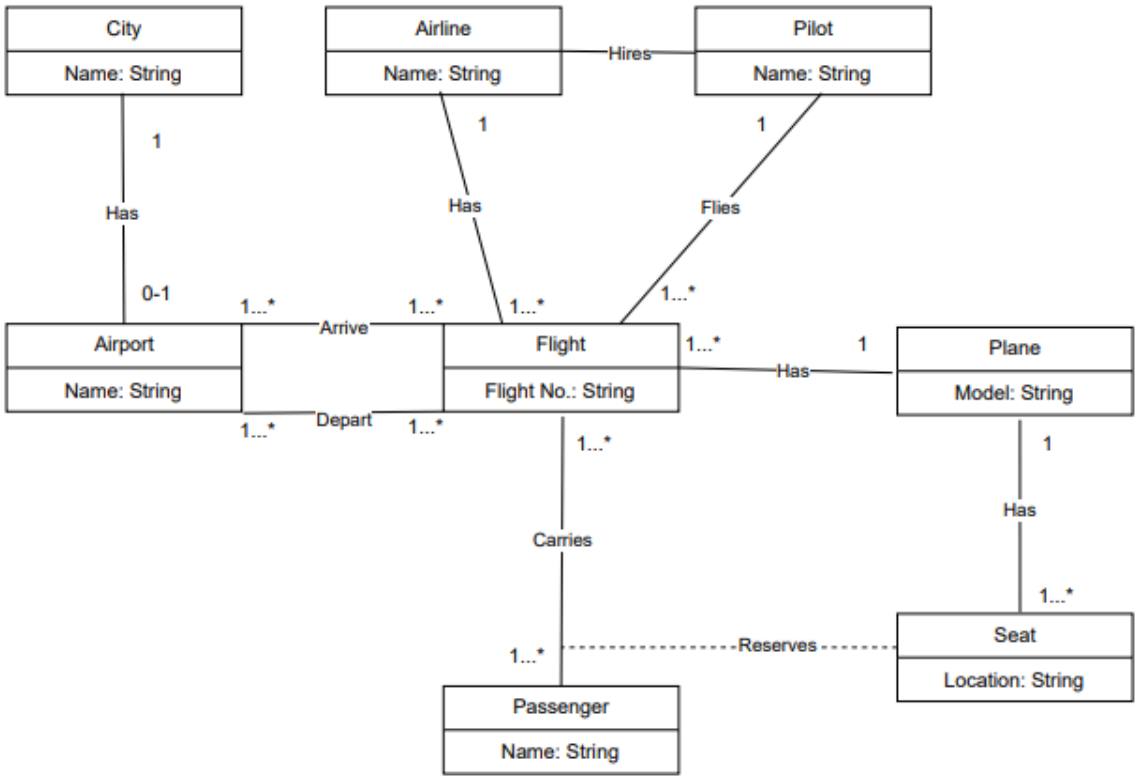


- Smallest polygon is triangle and it has 3 points so a polygon must have 3 points

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.



Class Diagram:



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.

Class Diagram: