Lab 04

IT313

Class Modeling

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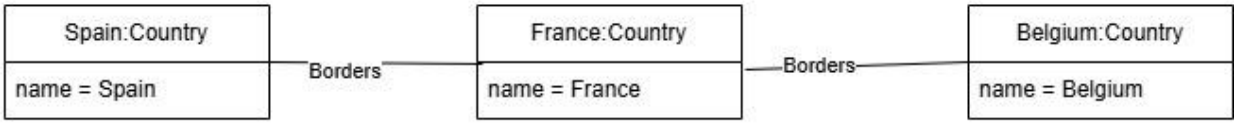
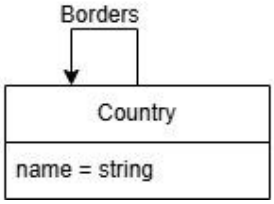
Q.1 Prepare a class diagram for the following object diagram that shows a portion of Europe.



Class Diagram :-



Q2. 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.

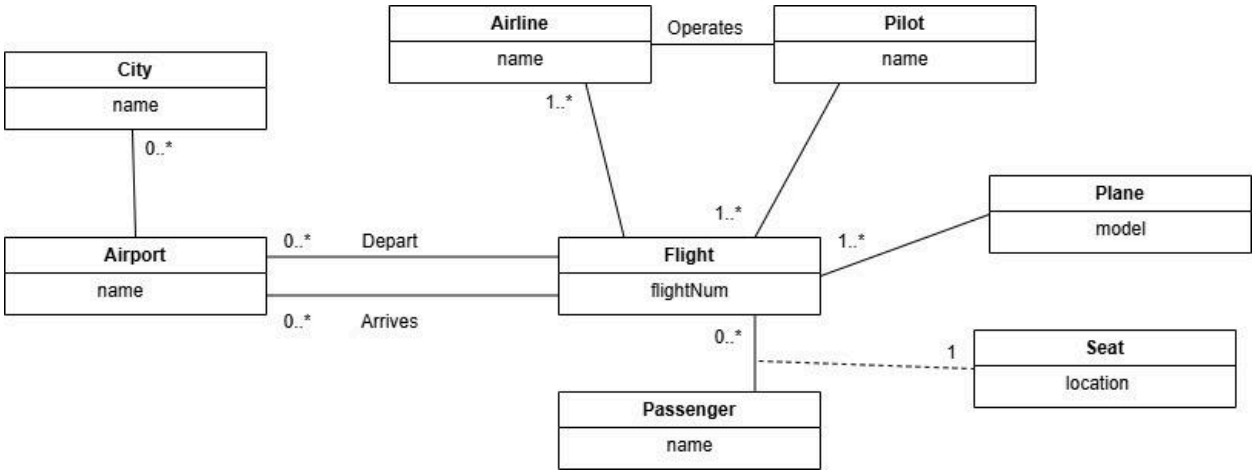
>> Multiplicity justification:
Since the smallest polygon is a triangle, which comprises 3 points a polygon will require at least 3 points.
Each point can belong to one or multiple polygons.
The points are ordered for defining a polygon shape.

>> A polygon requires at least 3 points

>> It depends on the scenario. Points can be shared between polygons, which would result in a many-to-many relationship between point and polygon. However, in simple cases, points are unique to each polygon, resulting in a one-to-many relationship.

>> The points are ordered to ensure the polygon's shape is well-defined. For example, a triangle or rectangle needs the vertices in a specific order to draw the correct shape. Without order, the polygon's structure would 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 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.