



IT314: Software Engineering

Lab 4: Class Modeling

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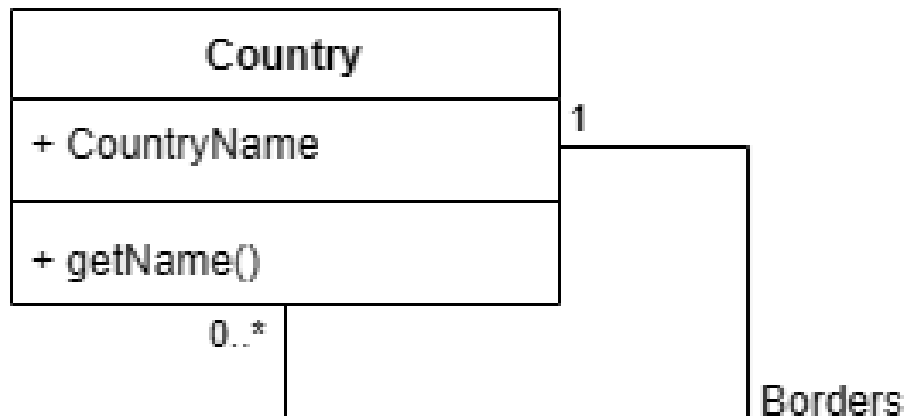
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Q.1) Prepare a class diagram for the following object diagram that shows a portion of Europe.



Figure-1

Ans.)



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.

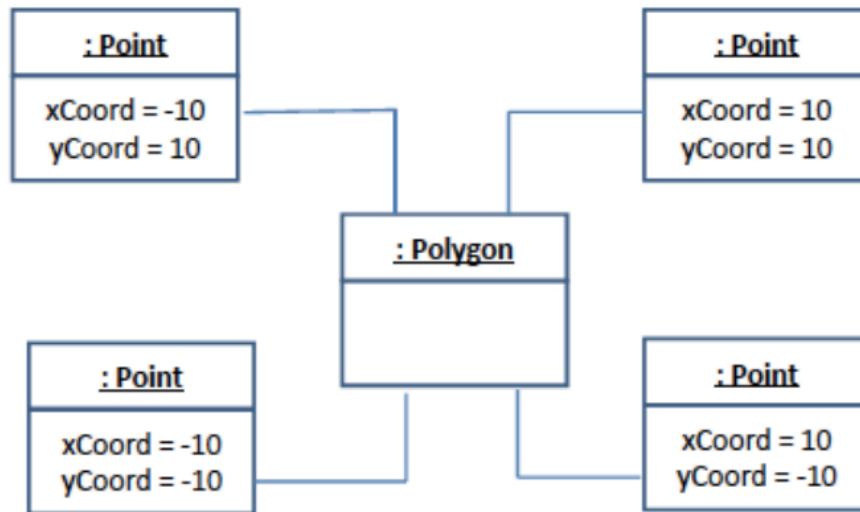
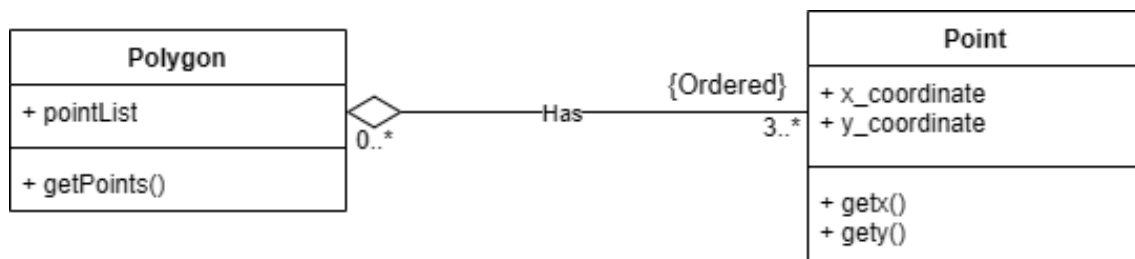


Figure - 2

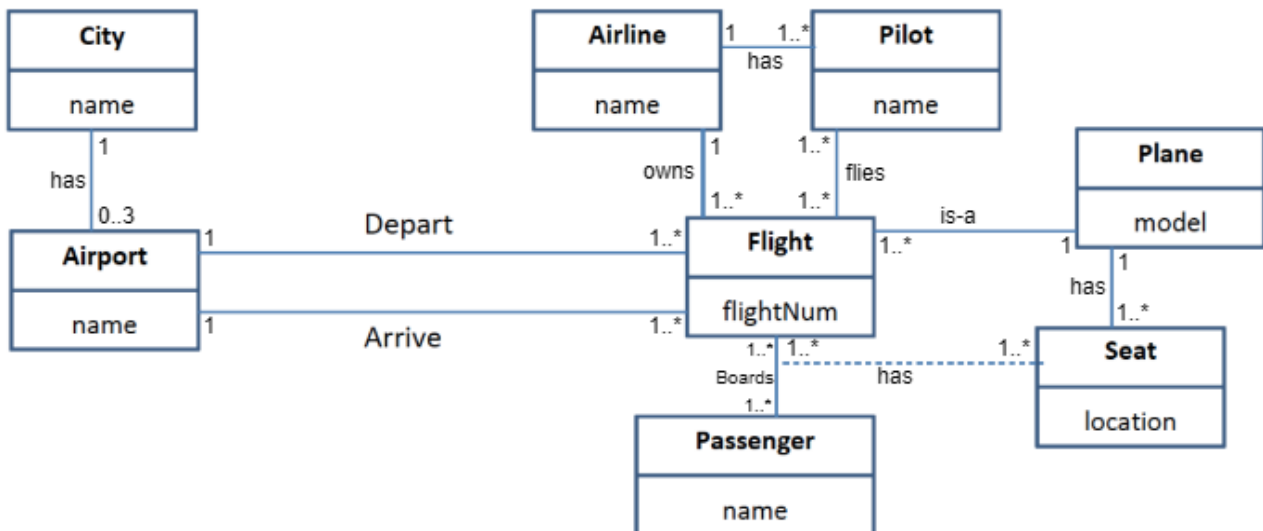
Ans.)

- Smallest Number of points required to form a polygon is 3.
- It does not make any difference in the minimum number of points because each polygon requires atleast 3 non collinear points to form a polygon.
- The points are ordered as we do not want any duplicates.



- As a polygon needs atleast 3 points, thus multiplicity on Point side is "3..*".
- It may be possible that points does not belong to any poligon, or points may be collinear, thus the multiplicity on polygon side is "0..*".

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:

- We assumed that the maximum number of airports for any city is 3 (Domestic, International, Army).
- We also assume that a passenger can have multiple flights.
- As the flight number is the same for any flight following any particular route, thus we assume that the same flight may not be operated by the same pilots everyday.

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.

Ans.)

