Software Engineering Lab-4: Class Diagrams

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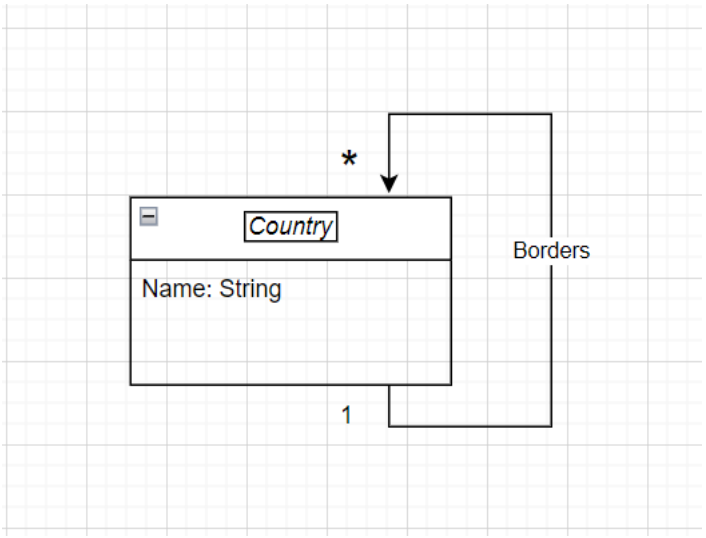
Q.1 Prepare a class diagram for the following object diagram that shows a portion of Europe.

Figure-1

Class Diagram:



Class: Country
Attribute: Name (of Country)
Attribute type: String
Association/Relationship: Borders (one to many)
Reason: A country can have multiple countries bordering it.

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.

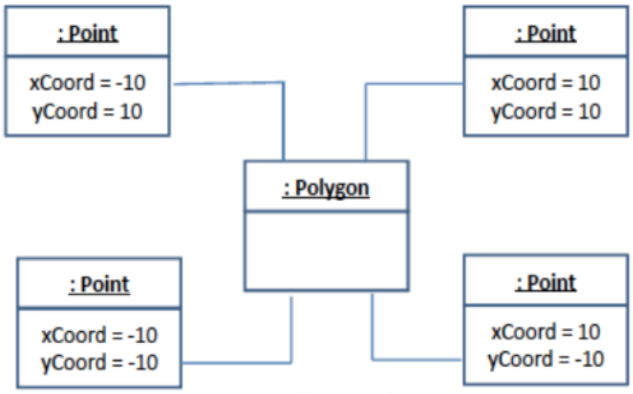
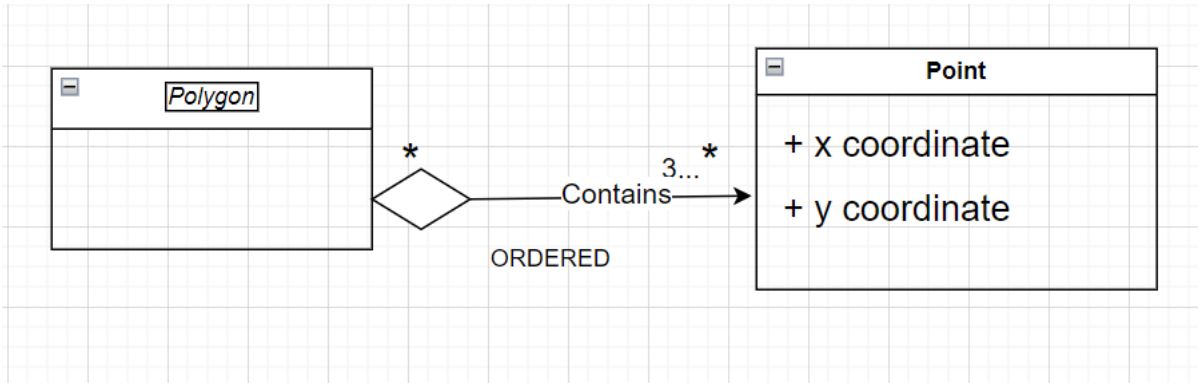


Figure - 2

Class Diagram:

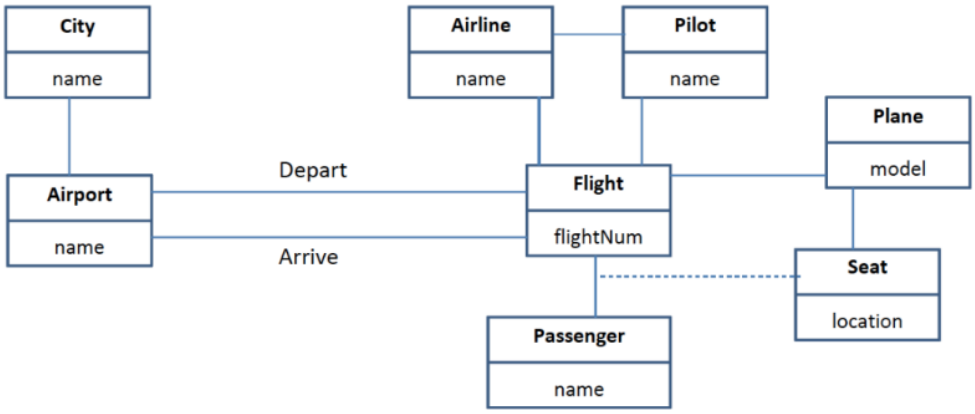


Classes: Polygon, Point

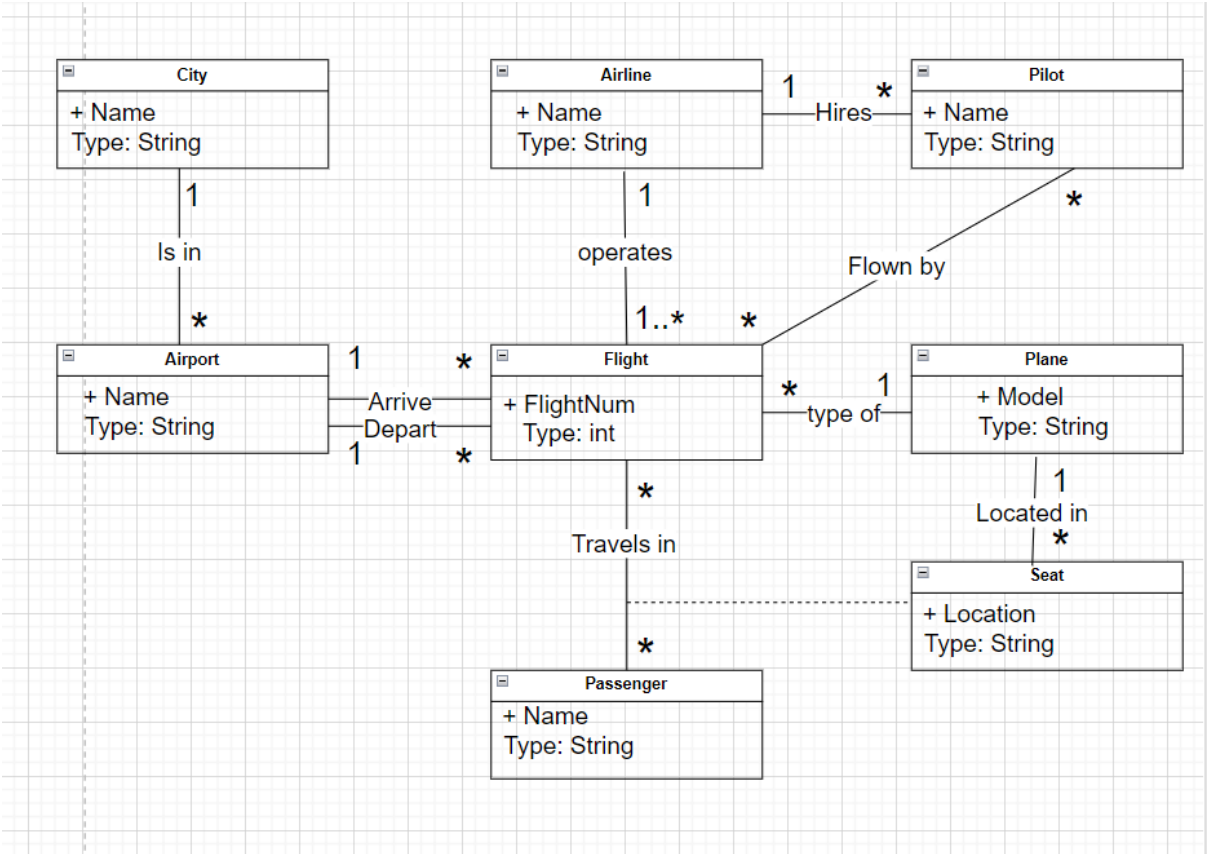
Attributes of Point: x-coordinate(float), y-coordinate(float)

Relationship:
A polygon must have minimum of three points.
Ordered: the order of the points matters when forming the shape in polygon.

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:



Assumptions for multiplicity used:

1) There can be one or many airports in a city.
2) An airport can have multiple departures and arrivals at a time.
3) A particular works for only one airline and an airline can have multiple pilots.
4) A seat is located at a specified location in a flight of a particular model.
5) A flight has multiple passengers in it and passengers can fly in multiple 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 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.