

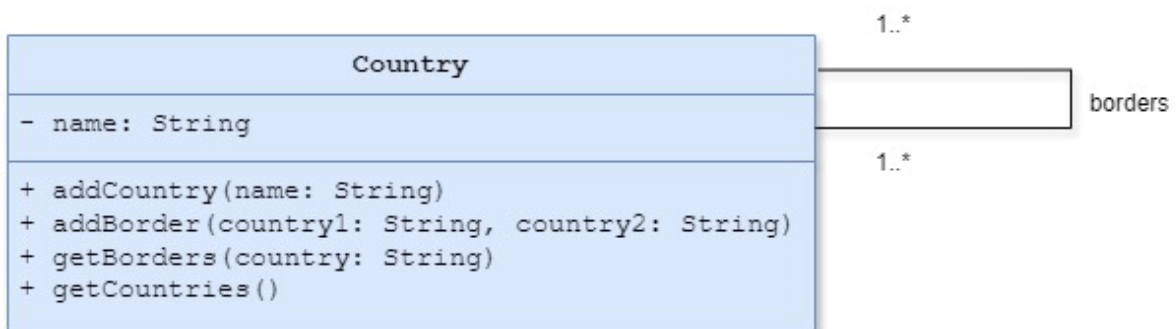
IT – 314 | SE | LAB-4

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Q1. Prepare a class diagram for the following object diagram that shows a portion of Europe.



Figure-1



(PTO)

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.

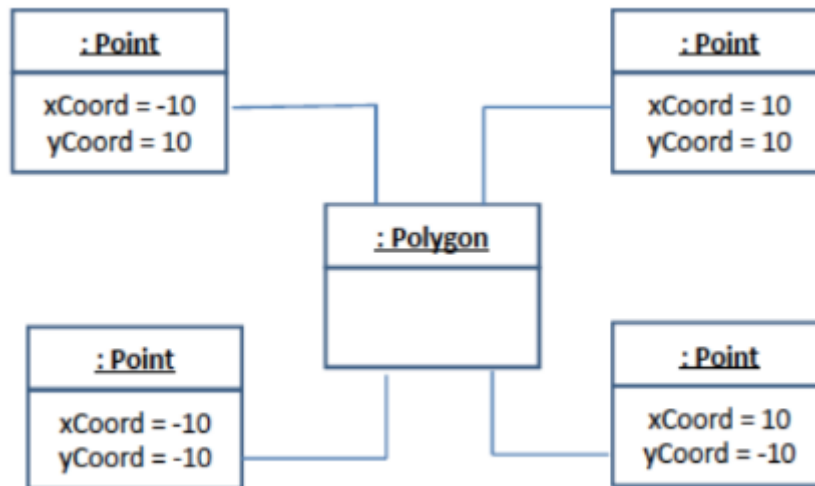
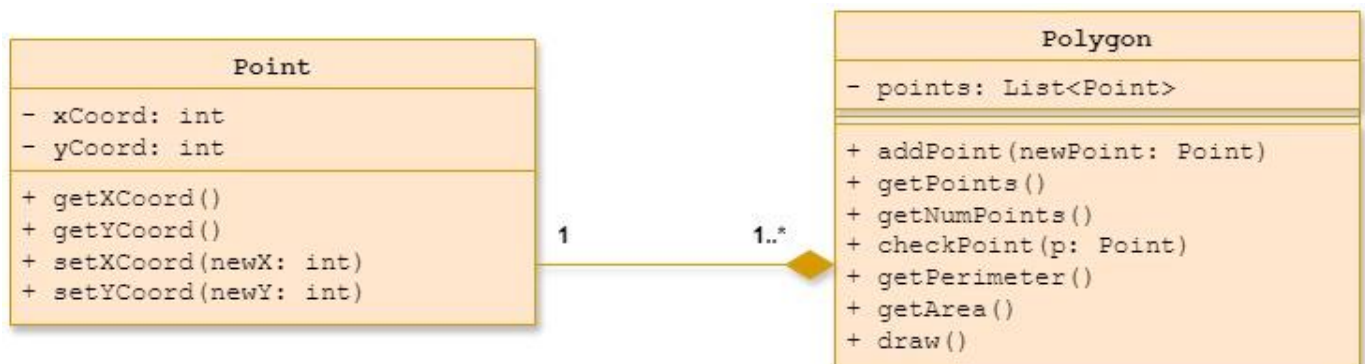
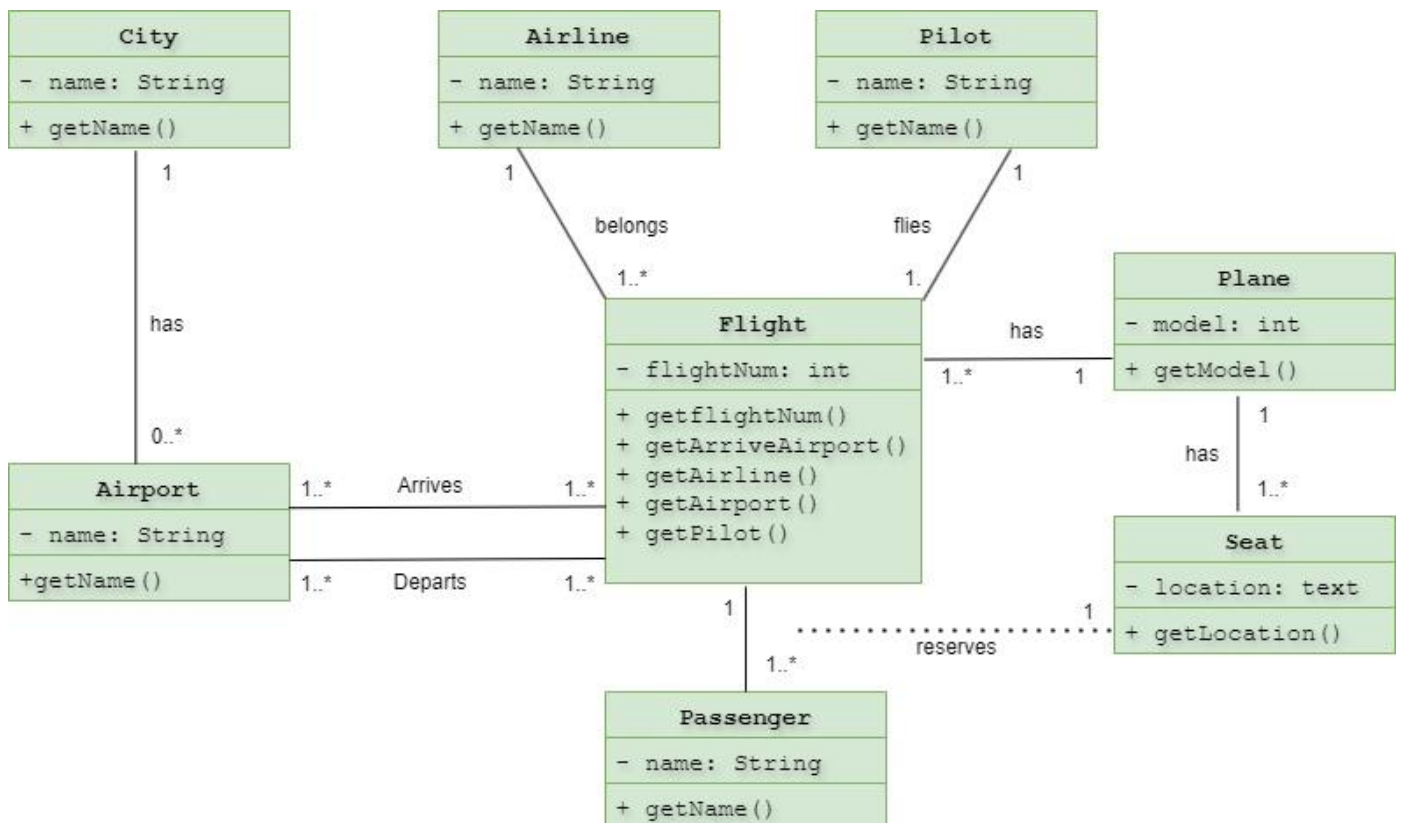
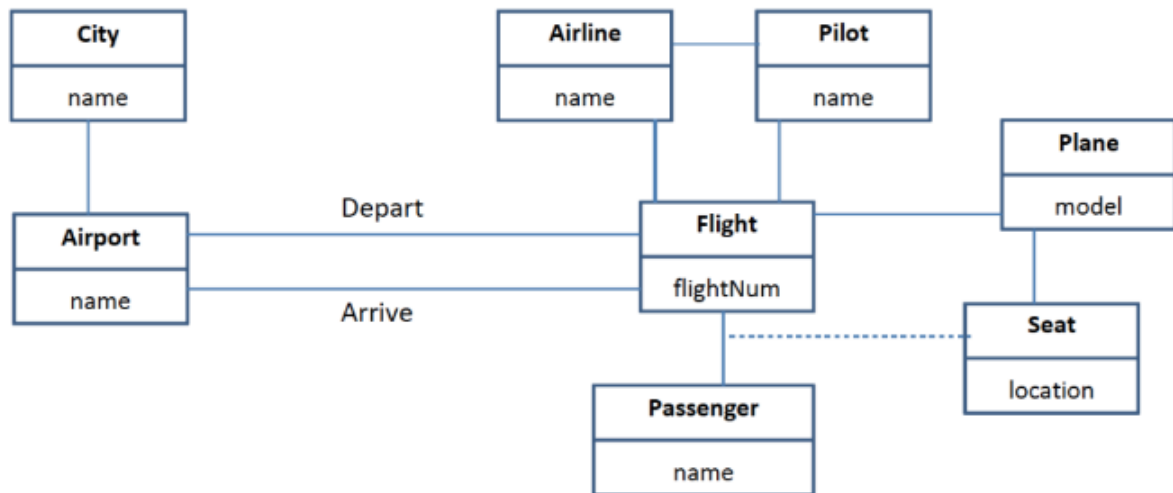


Figure - 2



- The smallest number of points required to construct a polygon is **3**. This is because a polygon must have at least three sides, and each side is defined by two points.
- If a point may be shared between polygons, then the minimum number of points required to construct a polygon is still **3**. This is because the points are ordered and each polygon is defined by a sequence of points. Therefore, even if a point is shared, it will still be counted as two separate points, one for each polygon.
- This means the multiplicity of the relationship between Point and Polygon is **1 to many** - a point can be part of multiple polygons, but a polygon must have at least three points.

Q3. 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.



Q4. 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.

