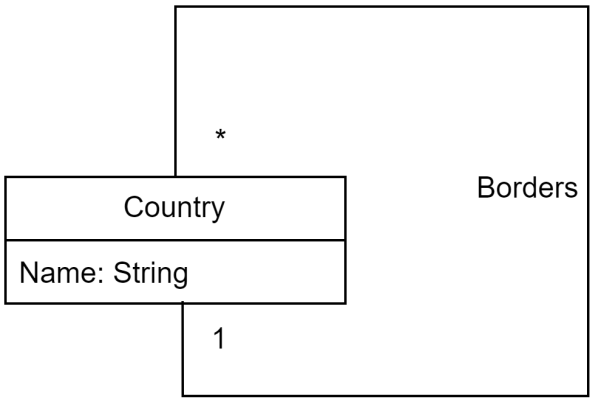
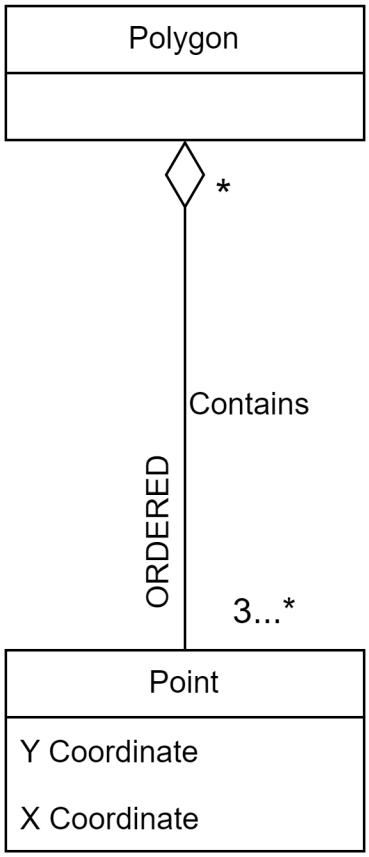
LAB 4 - 202201029

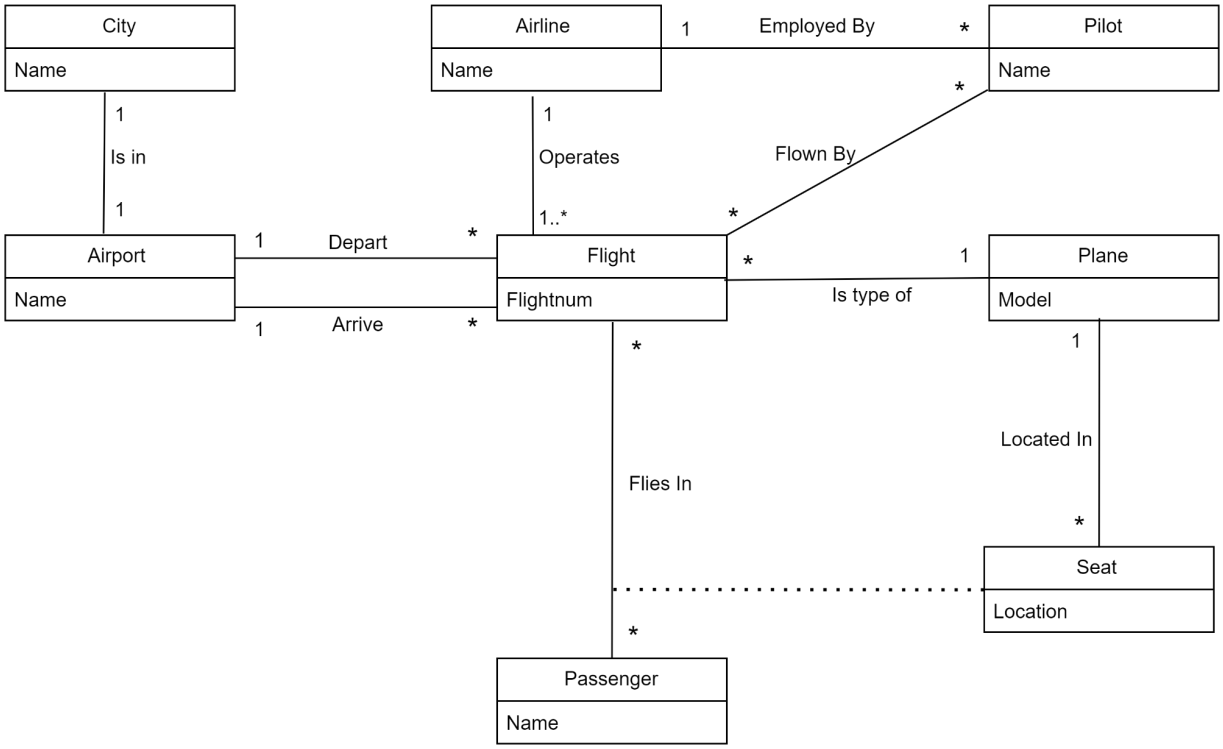
Q1. Prepare a class diagram for the following object diagram that shows a portion of Europe.



Q2. Prepare a class diagram for the 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 points may be shared between polygons? Your answer should address the fact that points are ordered.



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.



Assumptions used for multiplicities:

1. A single airport exists in a single city.
2. A given flight can depart/arrive at an airport at a time and an airport can have multiple such arrivals and departures at a time.
3. A flight is operated by a single airline and airlines can have multiple flights to operate simultaneously.
4. A pilot is employed by a single airline and an airline can have multiple such employees.
5. A pilot can fly many flights and a flight can be flown by multiple different pilots.
6. A flight has a particular model it belongs to and there can be multiple flights of the same model.
7. A seat is located at a particular location in a particular model and there are multiple seats in a model of aircraft.
8. A passenger can fly in multiple flights and a flight has multiple passengers.

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 also has 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.