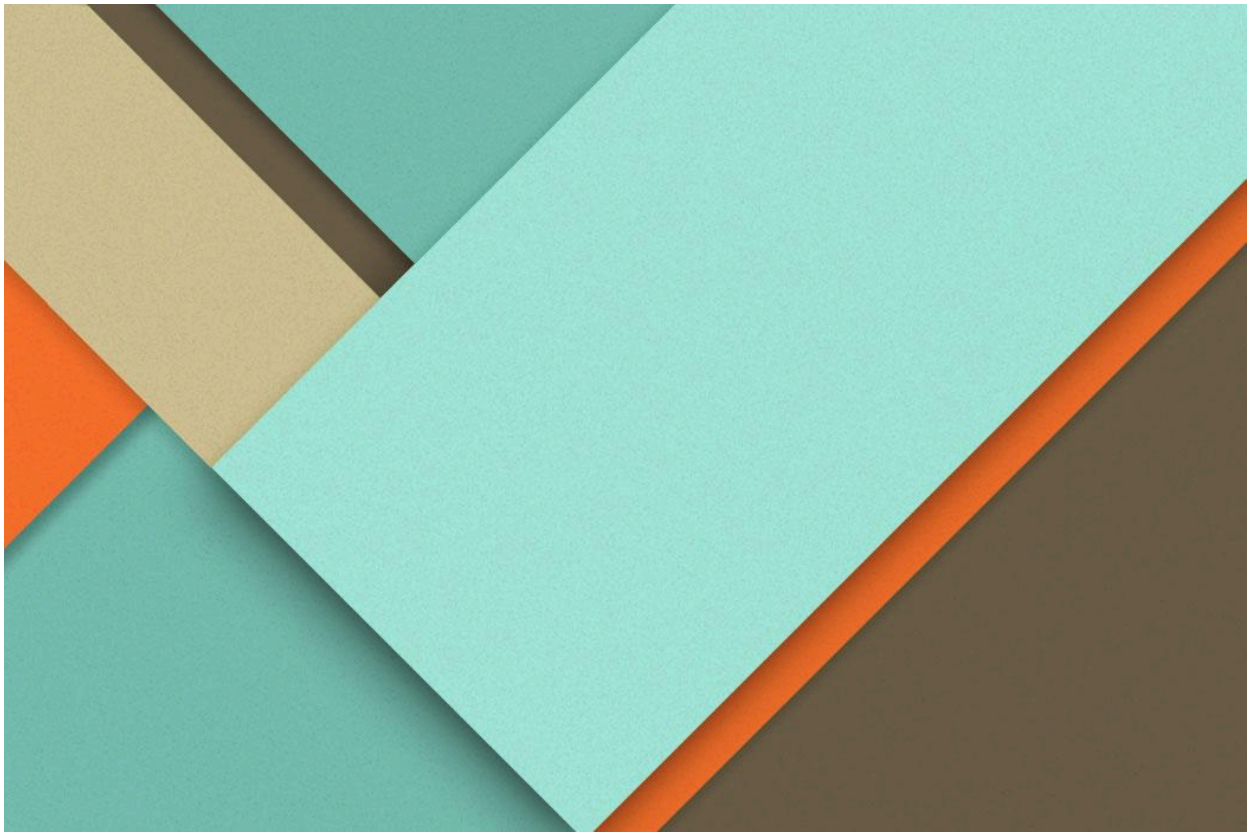

# IT314 - Lab 4

10.09.2024

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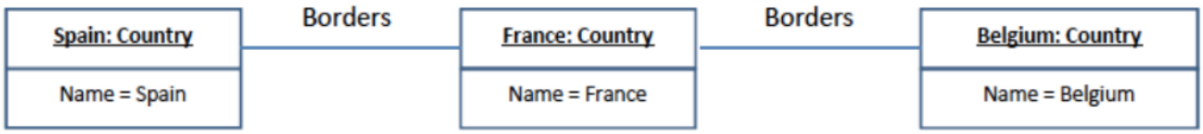
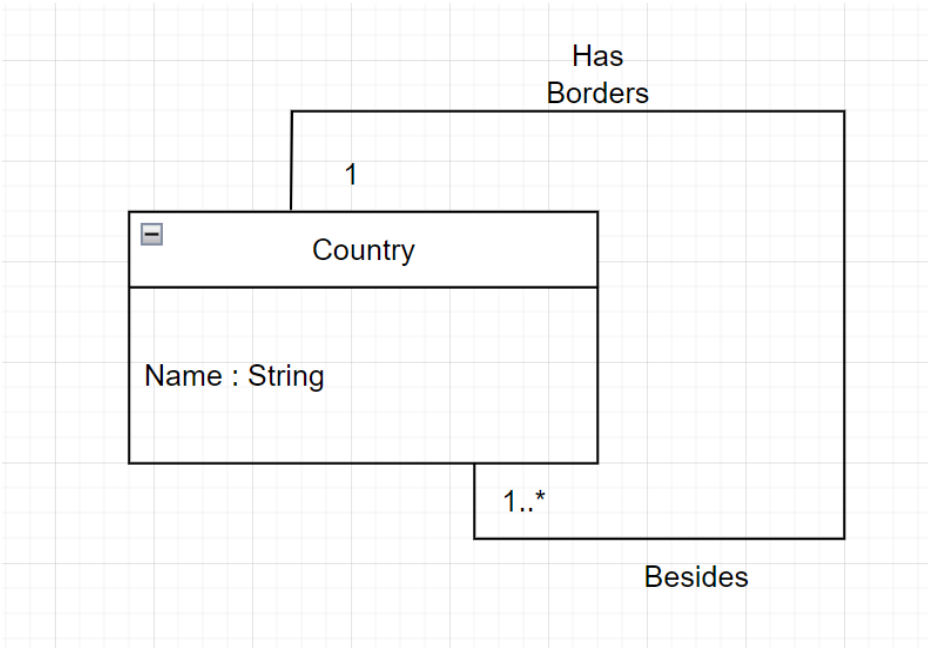
## Q.1 Prepare a class diagram for the following object diagram that shows a portion of Europe.




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.**

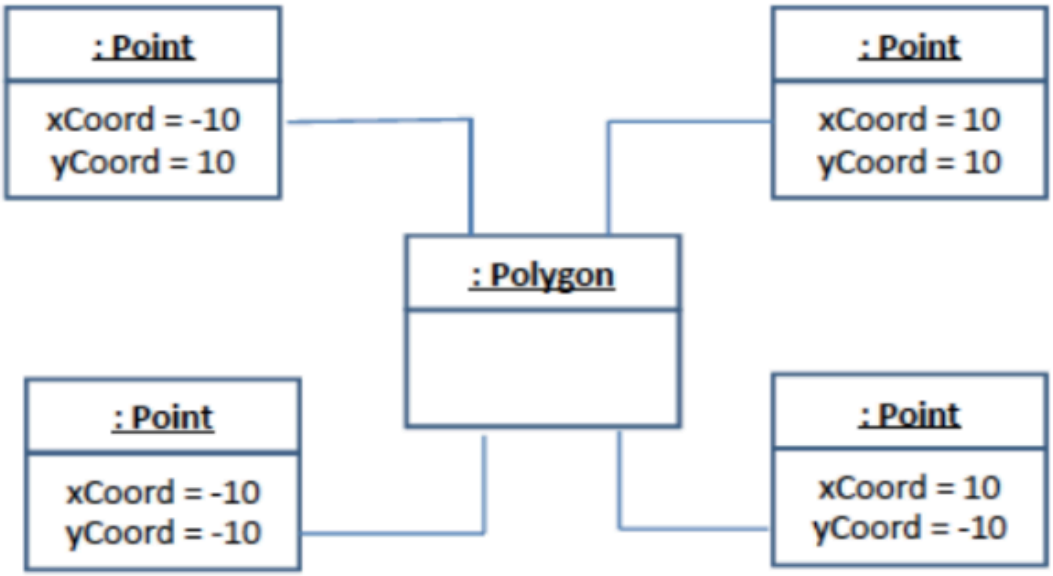
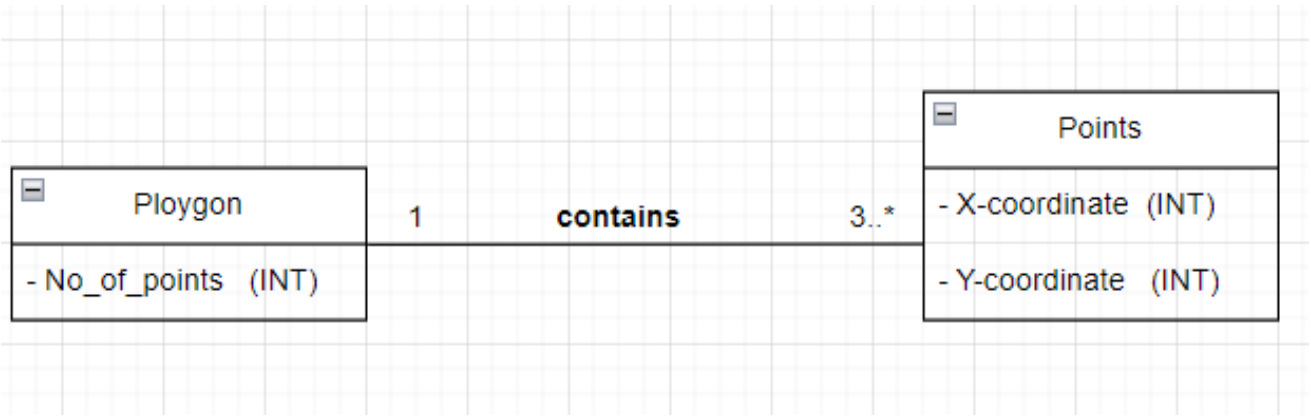



Figure - 2

Ans.



1. Smallest Number of points required to construct a polygon : 3 (Triangle)
2. Sharing between the polygons :
    a. If points are shared :

        Sharing between the polygons doesn't change the minimum number of points needed to form the polygon.Each individual polygon still requires at least 3 unique points to be defined, but those points can be shared between multiple polygons.

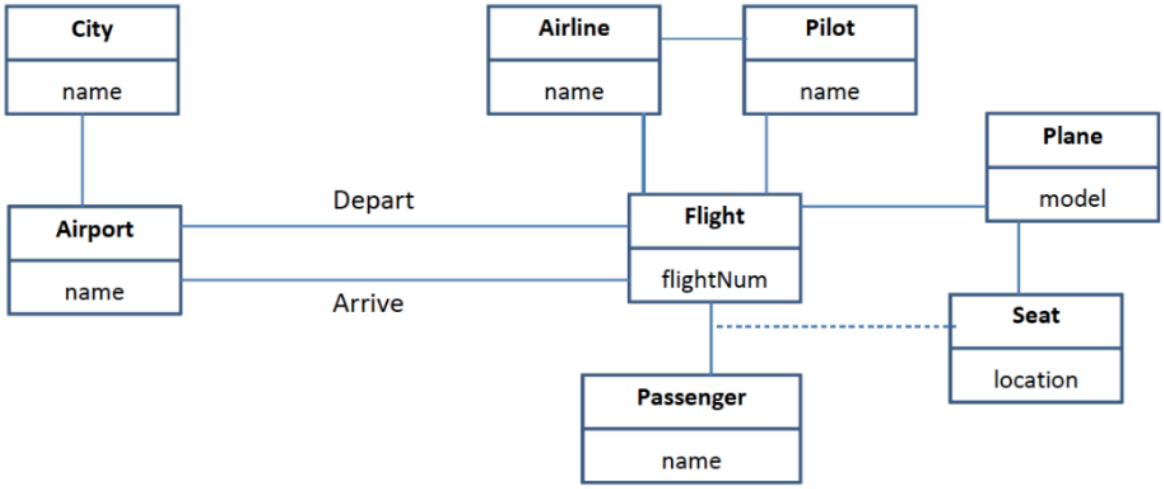
    b. If points are not shared :

        If points cannot be shared between polygons, each polygon must have its own unique set of at least 3 distinct points.

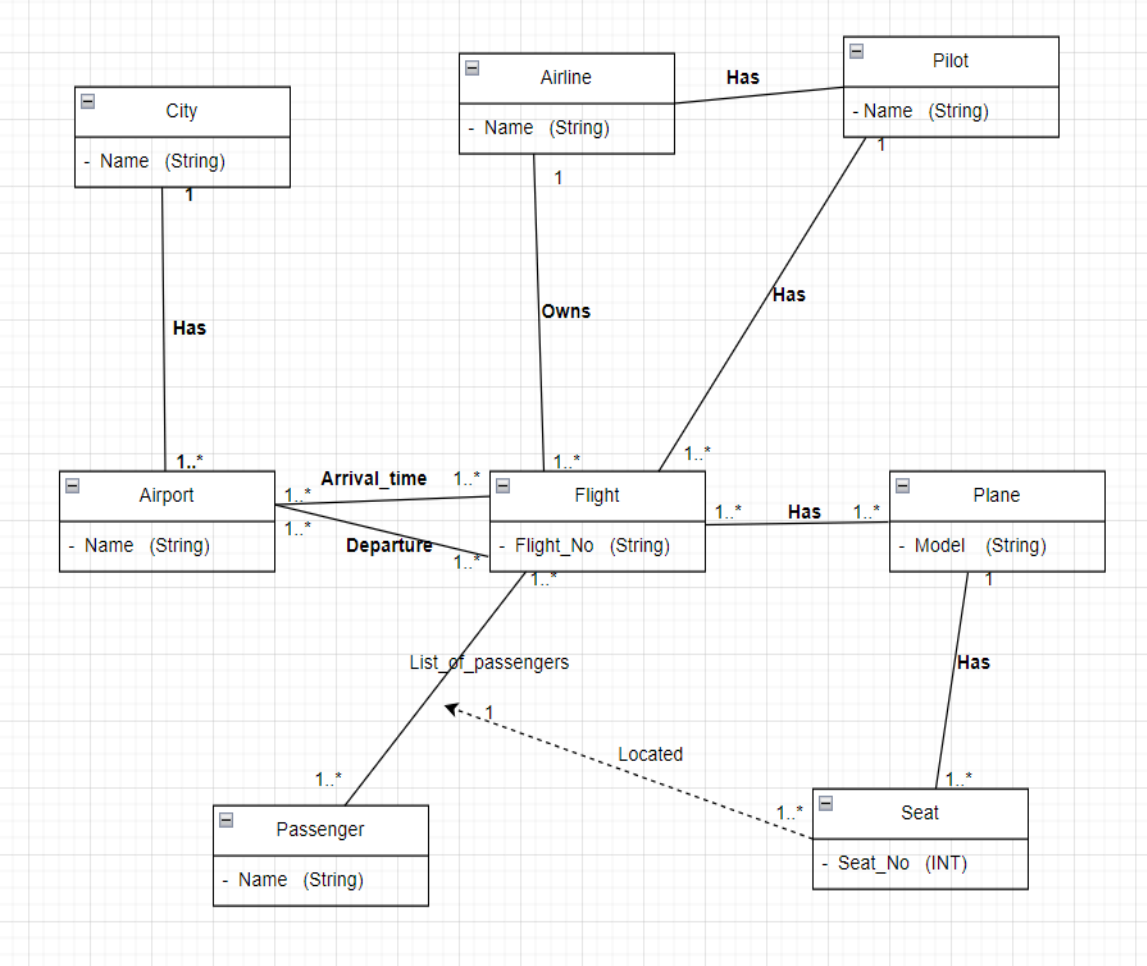
    c. Ordered Points :

        In both cases, points are typically ordered to define the sequence in which they connect to form edges. For instance, a triangle is defined by an ordered tuple of points.

## 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.

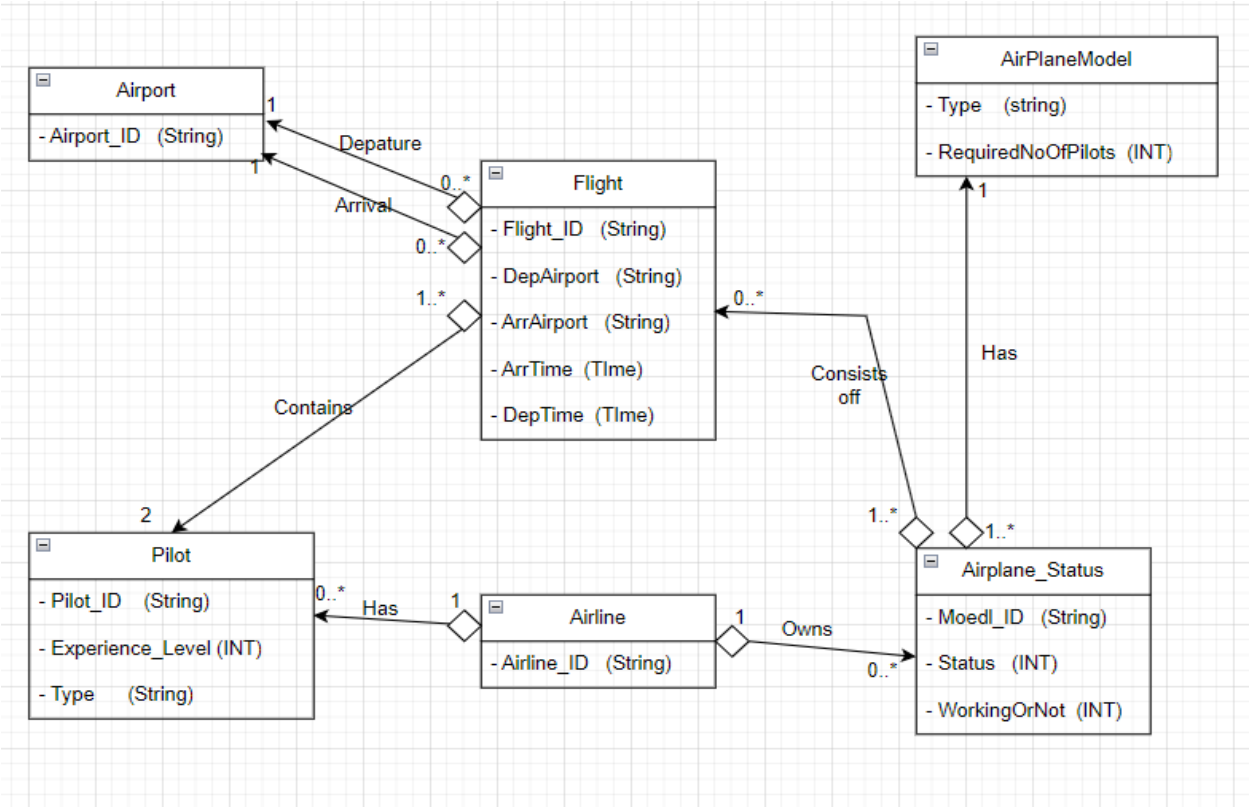



Ans.


City
- Name (String)
Airline
- Name (String)
Has
Pilot
- Name (String)
1
1
Has
Owns
Has
1..*
1..*
1..*
Airport
- Name (String)
Arrival_time
Departure
Flight
- Flight_No (String)
Has
Plane
- Model (String)
List_of_passengers
1
Located
Has
Passenger
- Name (String)
Seat
- Seat_No (INT)

**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 :


Airport
- Airport_ID (String)
AirPlaneModel
- Type (string)
- RequiredNoOfPilots (INT)
Flight
- Flight_ID (String)
- DepAirport (String)
- ArrAirport (String)
- ArrTime (TIme)
- DepTime (TIme)
Pilot
- Pilot_ID (String)
- Experience_Level (INT)
- Type (String)
Airline
- Airline_ID (String)
Airplane_Status
- Moedl_ID (String)
- Status (INT)
- WorkingOrNot (INT)
Depature
Arrival
Contains
Consists off
Has
Has
Owns
1
0..*
1..*
2