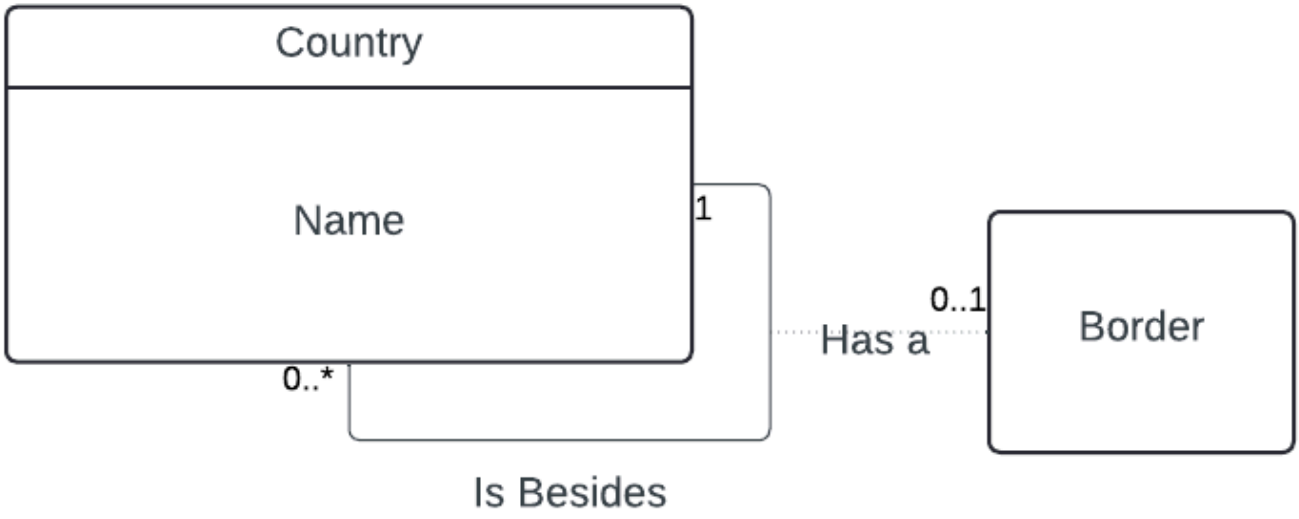
IT-314 Lab-4

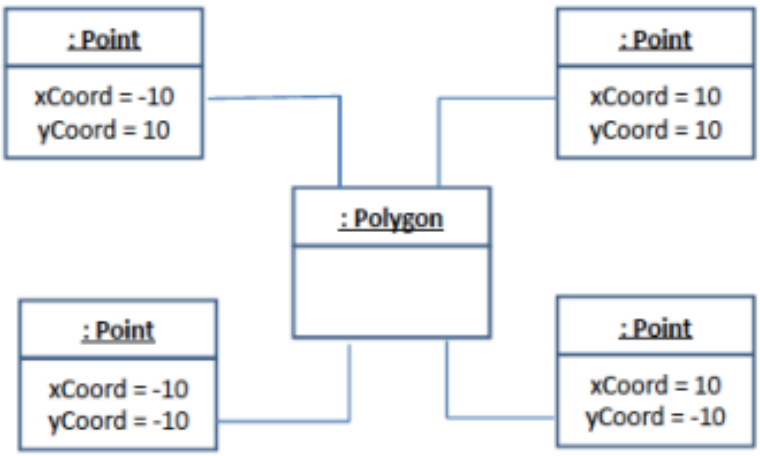
202201465

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

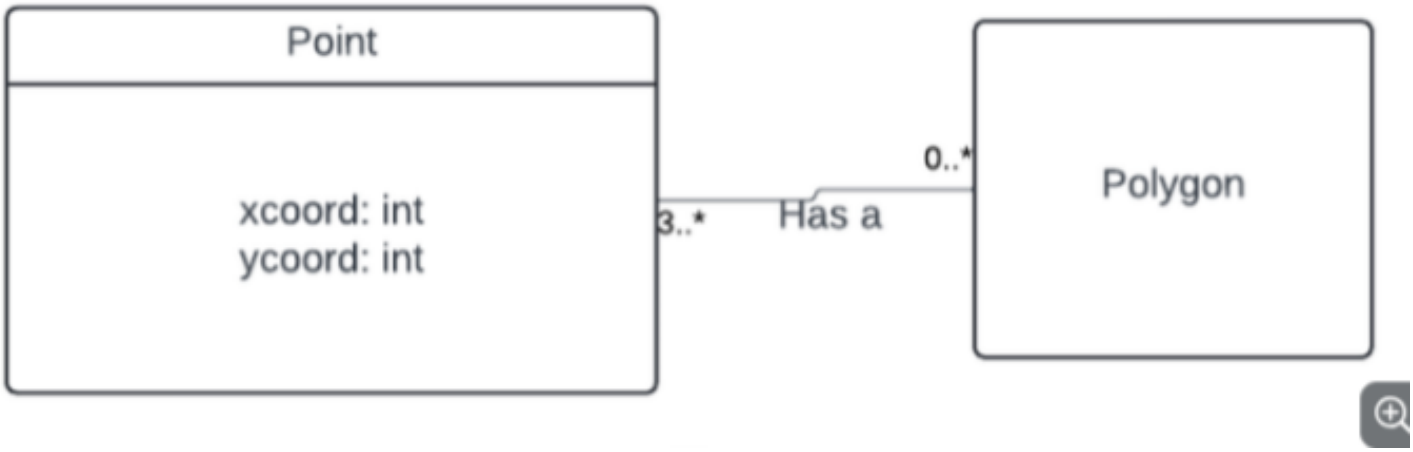
Answer:



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.



Answer:

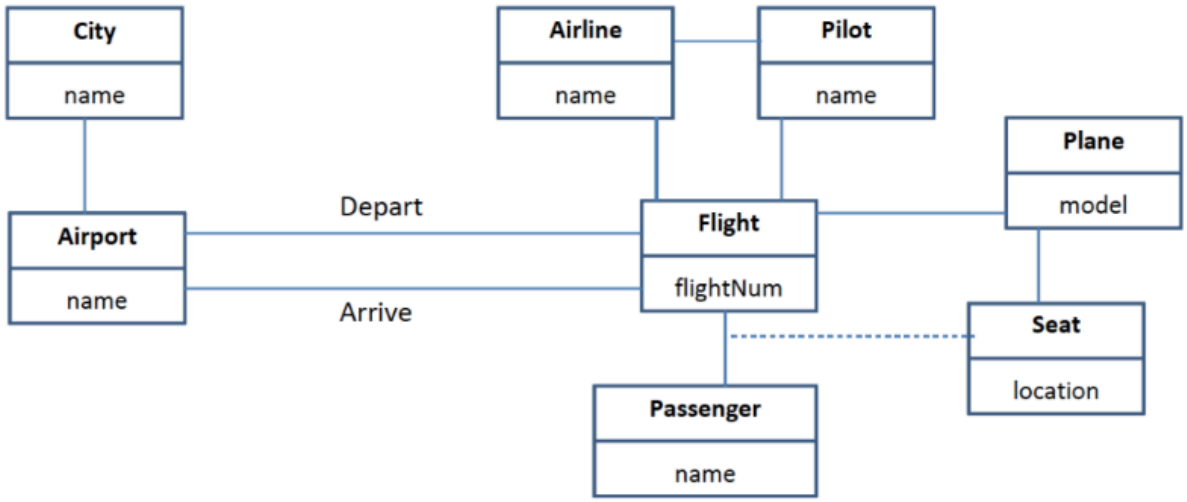


A polygon needs at least three points to exist, as two points would only form a line. Thus, a Polygon can have three or more points.

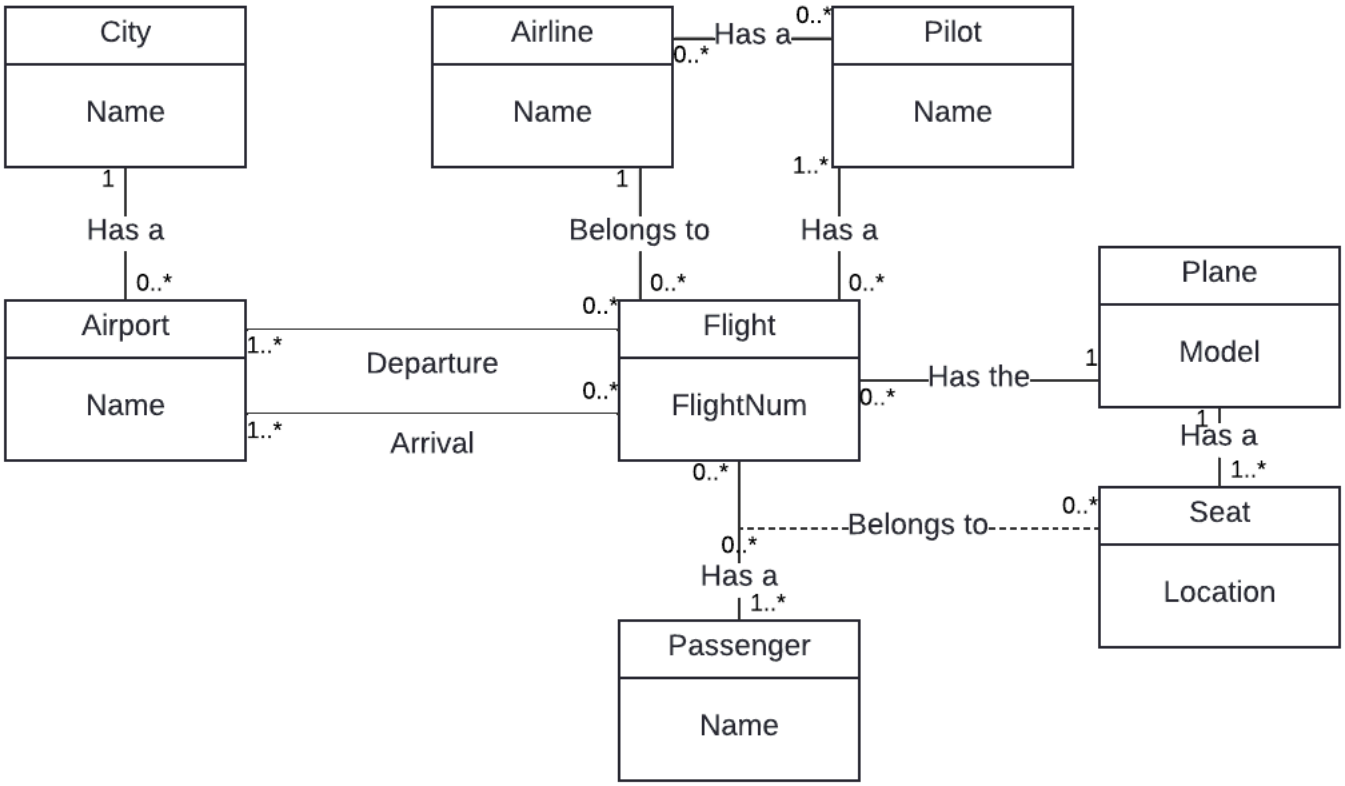
Points can be shared among polygons, meaning that a point with certain coordinates (e.g., x=10, y=10) can belong to multiple polygons. This happens when polygons share edges or vertices.

Also, the order in which points are connected is crucial for defining the polygon's shape. For example, connecting points in a specific order could result in different polygons or shapes, even if the same points are used. Therefore, the order of points must be considered when constructing a 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.

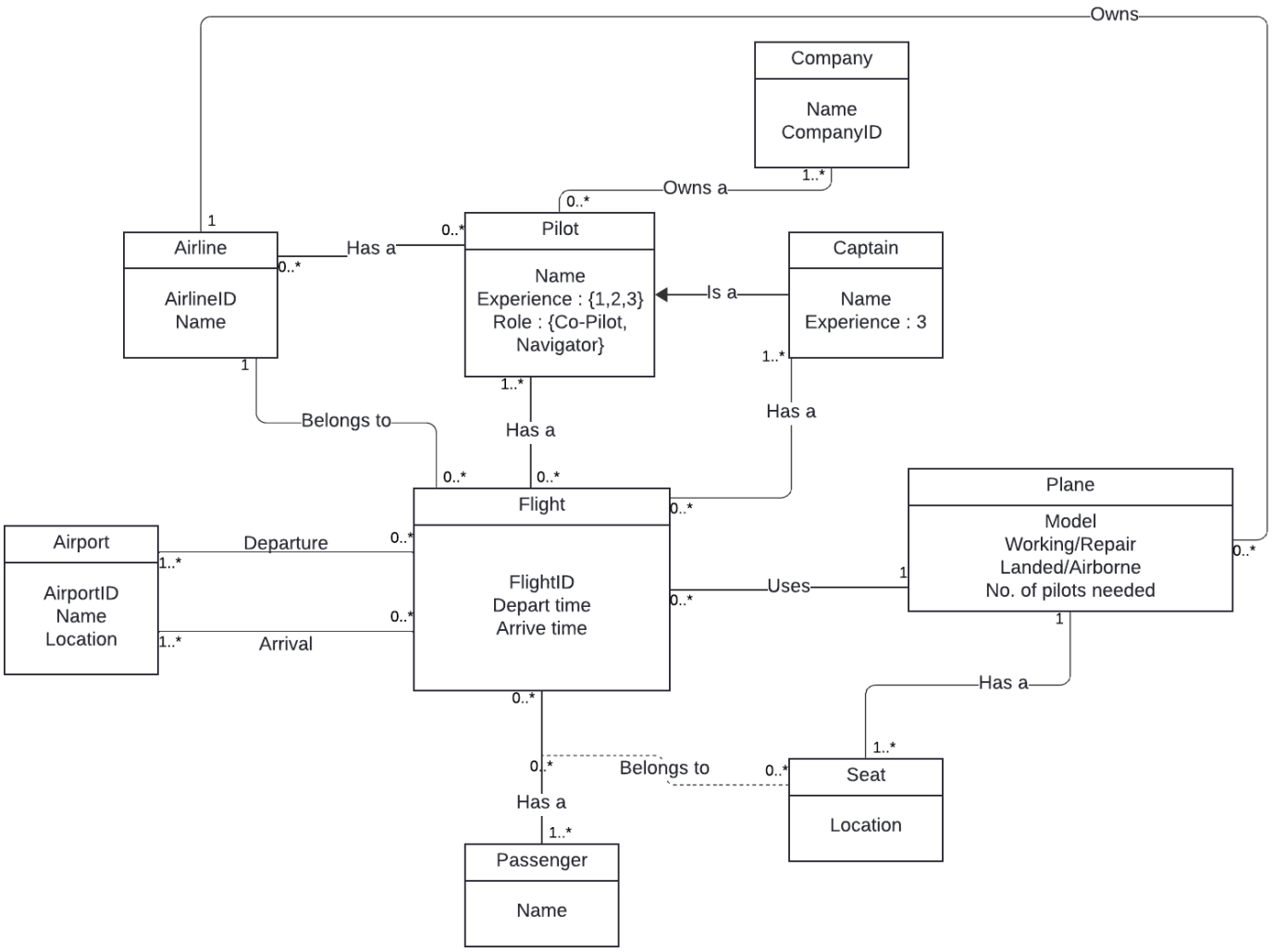


Answer:



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.

Answer:


Owns
Company
Name
CompanyID
1..*
Owns a
0..*
1
Airline
AirlineID
Name
Has a
0..*
0..*
Pilot
Name
Experience : {1,2,3}
Role : {Co-Pilot, Navigator}
Is a
Captain
Name
Experience : 3
1..*
1
Belongs to
1..*
Has a
Has a
0..*
0..*
Flight
FlightID
Depart time
Arrive time
0..*
Plane
Model
Working/Repair
Landed/Airborne
No. of pilots needed
0..*
Airport
AirportID
Name
Location
Departure
1..*
0..*
1..*
Arrival
0..*
Uses
1
0..*
1
Has a
0..*
1..*
0..*
Belongs to
0..*
Seat
Location
Has a
1..*
Passenger
Name