Software Engineering
Lab 4

Student ID: 202201105
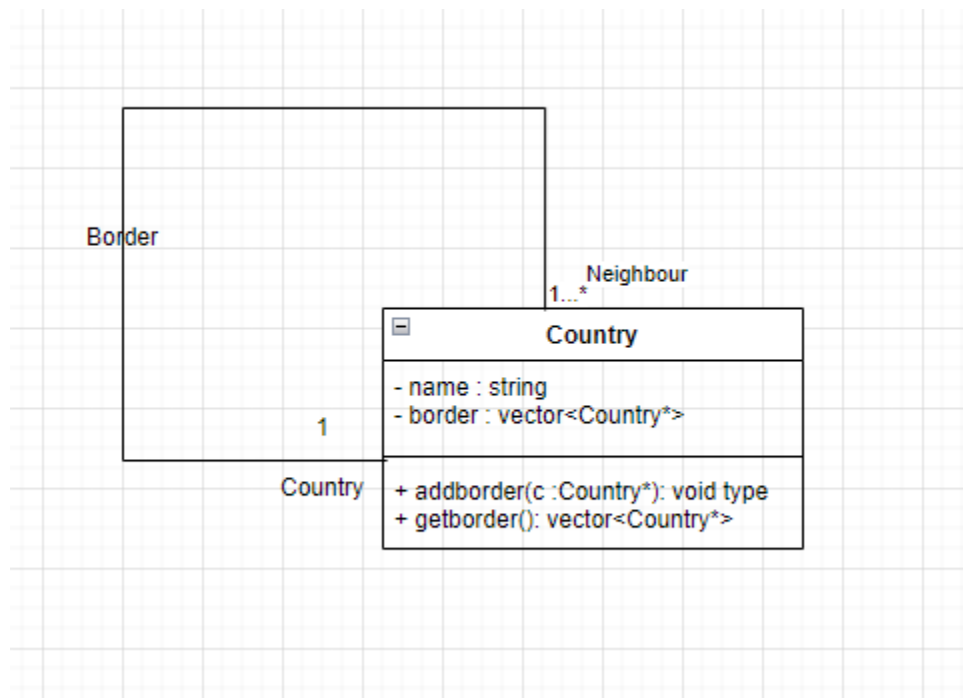Name: Rishi Shah

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

Spain: Country	Borders	France: Country	Borders	Belgium: Country
Name = Spain		Name = France		Name = Belgium

Figure-1

A.1


```
Border


                            Neighbour
                         1...*
            ┌─────────────────────────────────────┐
            │ ⊟            Country                 │
            ├─────────────────────────────────────┤
            │ - name : string                     │
      1     │ - border : vector<Country*>         │
            ├─────────────────────────────────────┤
 Country    │ + addborder(c :Country*): void type │
            │ + getborder(): vector<Country*>     │
            └─────────────────────────────────────┘
```

Q.2 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
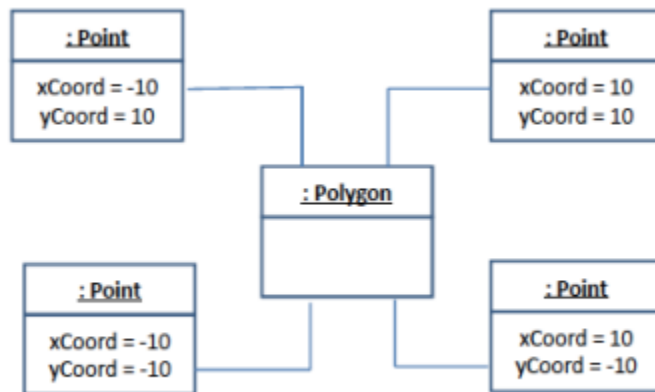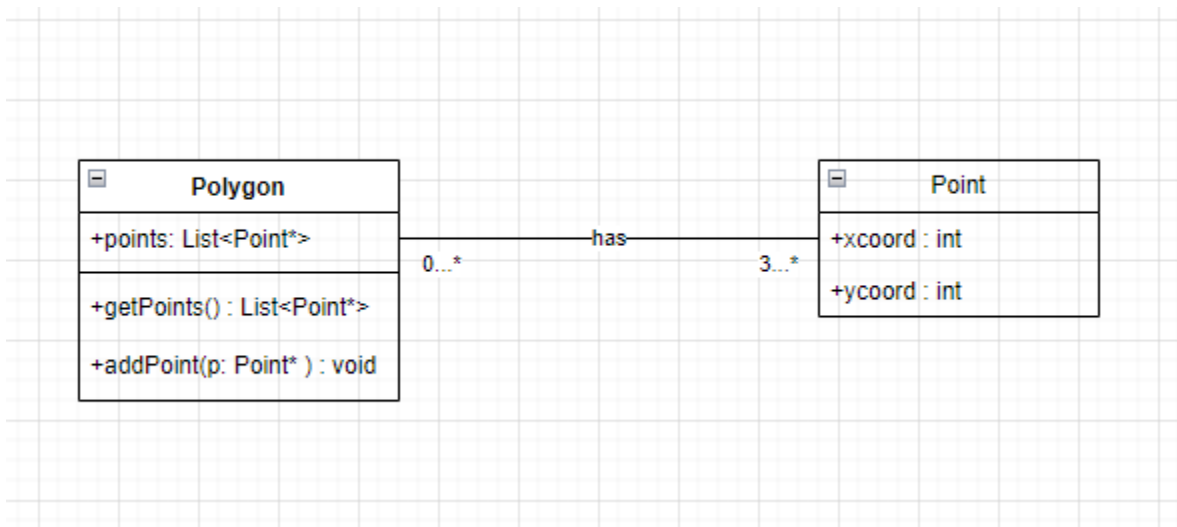points are ordered.

Figure - 2

A.2

A point can be part of one or more polygons. Also a point can be present without being a part of the polygon.
A polygon must have more than two points.
At Least 3 points are required to construct a polygon.
Yes, it makes a difference whether the points are shared or not. If points are not shared its multiplicity will be (1…*)

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.
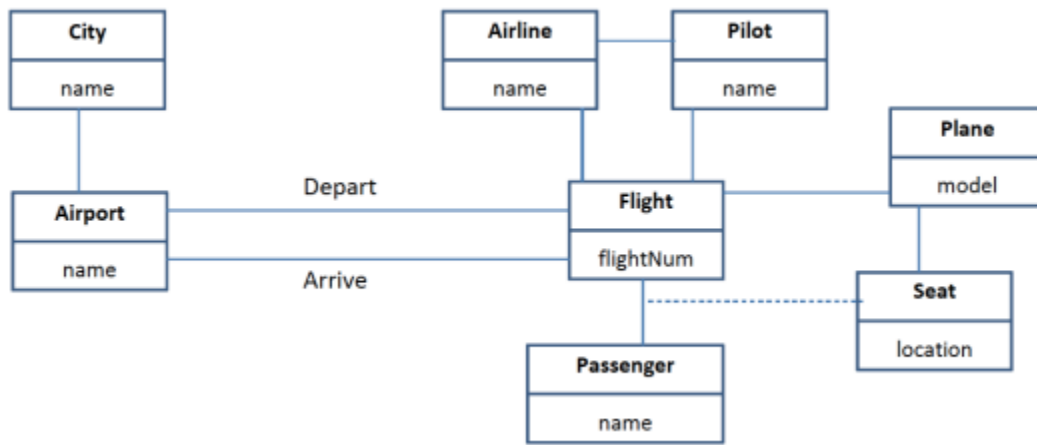
A.3
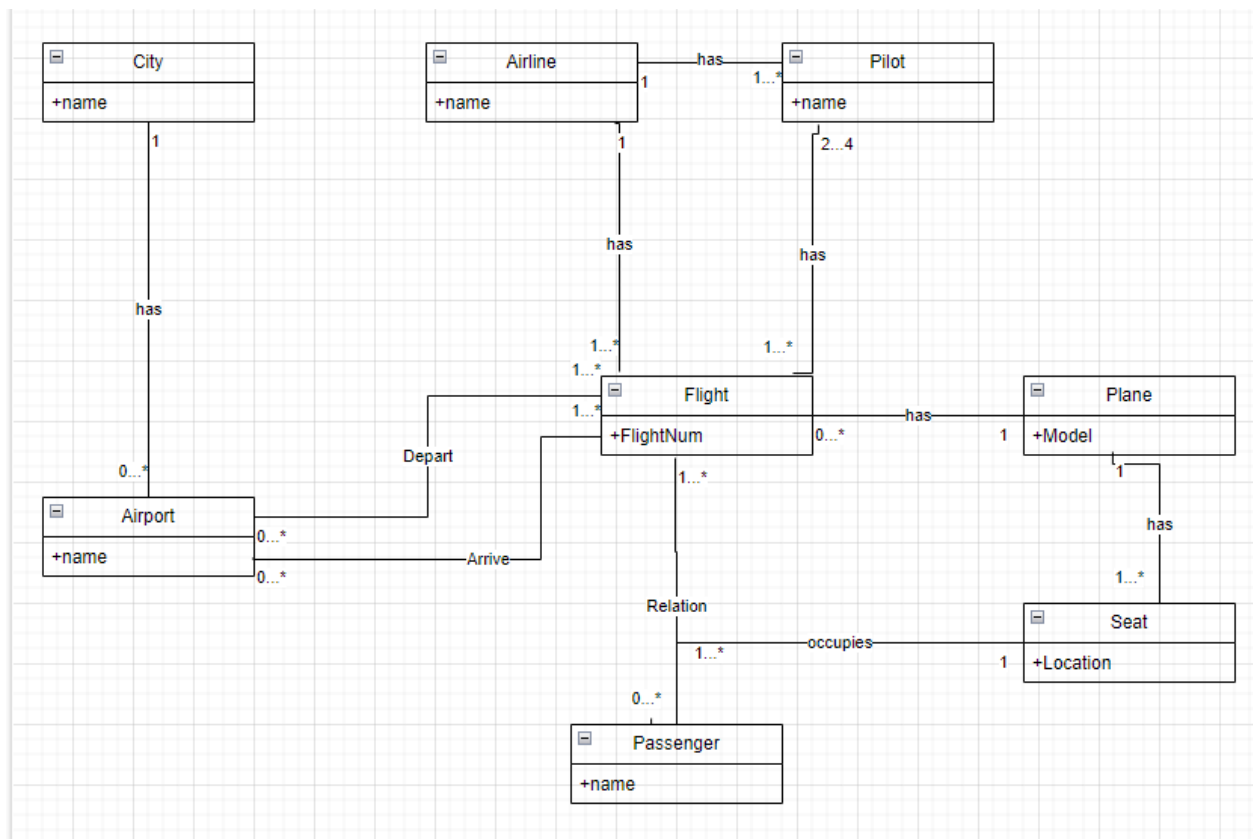
Q.4 We want to model a system for management of flights and pilots. An airline operates flights. Each airline has an ID. Each flight has an ID, a departure airport and an arrival airport: an airport as a unique identifier. Each flight has a pilot and a co-pilot, and it uses an aircraft of a certain type; a flight 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.

A.4