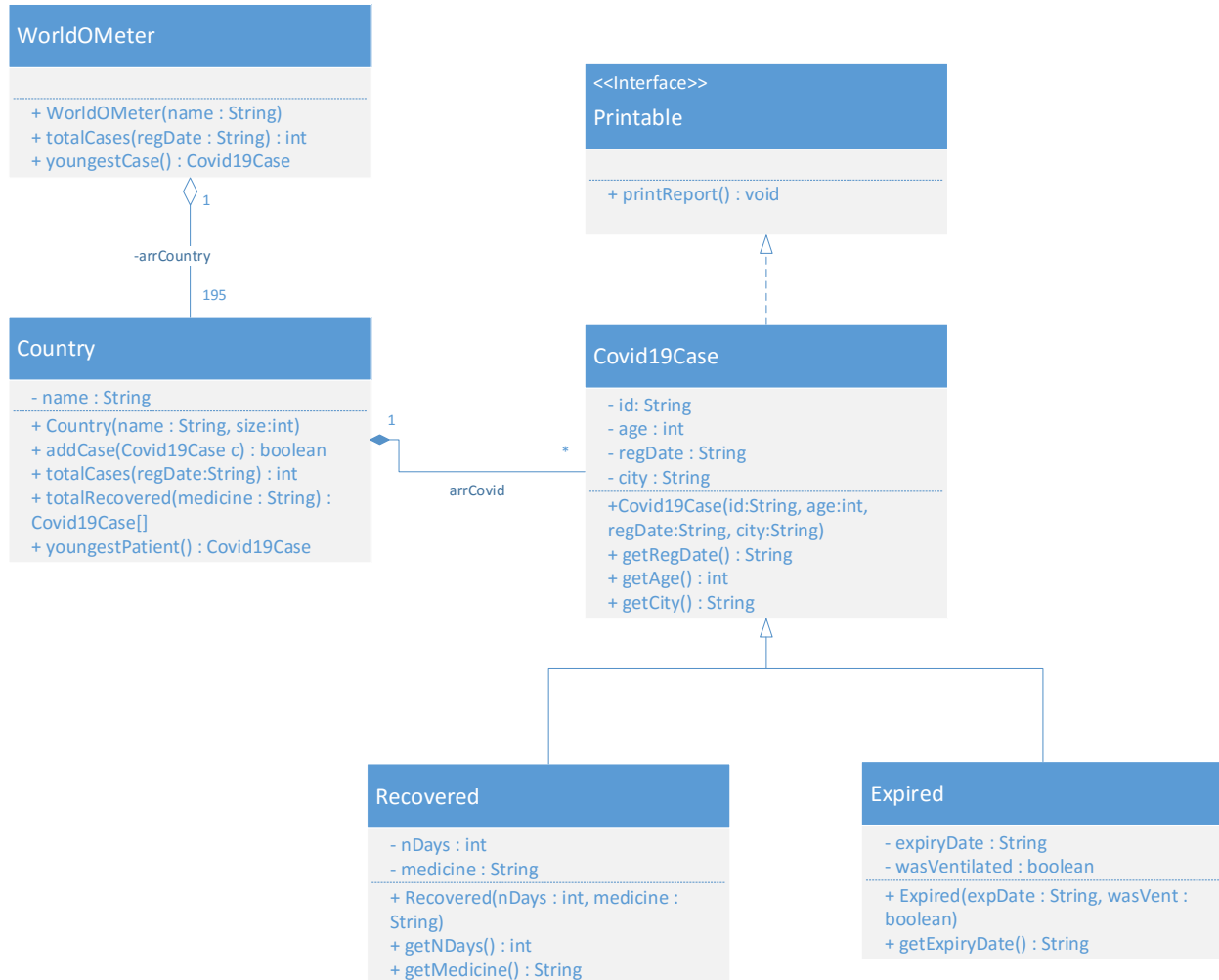


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Consider the above UML and read the following description.

Interface **Printable**:

- Methods:
 - **printReport()**: This method will do the following:
 - For **Recovered**: It will display the registration date of the case and the basic medicine used for the treatment of the patient.
 - For **Expired**: It will display the age, date of death and the ventilation status of the patient.

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Class ***Covid19Case***:

- Attributes:
 - ***id***: The id of the ***Covid19Case***.
 - ***regDate***: The registration date of the ***Covid19Case***.
 - ***city***: The city of the ***Covid19Case***.
 - ***age***: The age of the ***Covid19Case***.
- Methods:
 - ***Covid19Case (...)***: Constructor.
 - ***getRegDate()***: This method returns the registration date of the ***Covid19Case***.
 - ***getCity()***: This method returns the city of the ***Covid19Case***.
 - ***getAge()***: This method returns the age of the ***Covid19Case***.

Class ***Recovered***:

- Attributes:
 - ***nDays***: The number of days in which the patient recovered.
 - ***medicine***: The name of the basic medicine used to treat the patient.
- Methods:
 - ***Recovered(...)***: constructor
 - ***getMedicine()***: This method returns the name of the medicine.
 - ***getNDays()***: This method returns the number of days.

Class ***Expired***:

- Attributes:
 - ***expDate***: The date when the patient died or expired.
 - ***wasVentialed***: The patient was on ventilator or not.
- Methods:
 - ***Expired(...)***: constructor
 - ***getExpiryDate()***: This method returns the date of death of the patient.

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EXERCISE 1: Translate into Java code the following:

1. *Printable*
2. *Covid19Case*
3. *Expired*

Answer:

```
..... 2
public interface Printable {    //..... 1

    public void printReport(); //..... 1

}
```

```
..... 11
public abstract class Covid19Case implements Printable { //..... 2

    private String id; ..... 0.5
    private int age; ..... 0.5
    private String regDate; ..... 0.5
    private String city; ..... 0.5

    public Covid19Case(String id, int age,
                        String regDate, String city) { //..... 2
        this.id = id; ..... 0.5
        this.age = age; ..... 0.5
        this.regDate = regDate; ..... 0.5
        this.city = city; ..... 0.5
    }
}
```

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```
Covid19Case(Covid19Case c){ //..... 2
    this.id = c.id; ..... 0.5
    this.age = c.age; ..... 0.5
    this.regDate = c.regDate; ..... 0.5
    this.city = c.city; ..... 0.5
}

public int getAge() { //..... 1
    return age;
}

public String getRegDate() { //..... 1
    return regDate;
}

public String getCity() { //..... 1
    return city;
}

}

..... 9
public class Expired extends Covid19Case{ //..... 1

    private String expiryDate; ..... 0.5
    private boolean wasVentilated; ..... 0.5

    public Expired(Expired e) { //..... 2
        super(e); ..... 1
        expiryDate = e.expiryDate; ..... 0.5
        wasVentilated = e.wasVentilated; ..... 0.5
    }
}
```

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```
    }  
    public Expired(String id, int age, String regDate, //..... 2  
        String city, String expiryDate, boolean wasVentilated ) {  
        super(id, age, regDate, city); ..... 1  
        this.expiryDate = expiryDate; ..... 0.5  
        this.wasVentilated = wasVentilated; ..... 0.5  
    }  
  
    public void printReport() { //..... 2  
        System.out.println(getAge()); ..... 1  
        System.out.println(expiryDate + " " + wasVentilated); ..... 1  
    }  
  
    public String getExpiryDate() { //..... 1  
        return expiryDate;  
    }  
  
}
```

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Exercise 2:

Let's consider the same UML above:

Class **Country**:

○ Attributes:

- **name**: The name of the **Country**.

○ Methods:

- **Country(...)**: Constructor.
- **addCase(Covid19Case c)**: This method will add the case **c** to the array. The method will return true if successfully added otherwise returns false.
- **totalCases(regDate : String)**: This method will return the total number of Covid-19 cases registered on the registration date **regDate**.
- **totalRecovered(medicine : String)**: This method will return an array of Covid-19 cases recovered with medicine **medicine**.
- **youngestPatient()**: This method will return the youngest Covid-19 patient.

Class **WorldOMeter**:

○ Methods:

- **WorldOMeter (...)**: Constructor.
- **totalCases(regDate : String)**: This method returns the total number of registered cases in the world on date **regDate**.
- **youngestCase()**: This method returns the youngest Covid-19 case in the world.

EXERCISE 2:

Translate into Java code the he classes **Country** and **WorldOMeter**.

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Answer:

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```
public class Country { ..... 25

    private String name;
    private Covid19Case[] arrCovid; //..... 0.5
    private int nbC; //..... 0.5

    public Country(String name, int size) { //..... 2
        this.name = name;
        arrCovid = new Covid19Case[size]; //..... 1
        this.nbC = 0; //..... 1
    }

    public boolean addCase(Covid19Case c) { //..... 5
        if(nbC < arrCovid.length) { //..... 0.5
            if(c instanceof Expired) //..... 1
                arrCovid[nbC] = new Expired((Expired)c); //..... 1
            else
                arrCovid[nbC] = new Recovered((Recovered)c); //..... 1
            nbC++; //..... 0.5
            return true; //..... 0.5
        }
        return false; //..... 0.5
    }

    public int totalCases(String regDate) { //..... 5
        int total = 0; //..... 0.5
        for(int i=0; i<nbC; i++) { //..... 1
            if(arrCovid[i].getRegDate().equalsIgnoreCase(regDate))//..... 1.5
                total++; //..... 1
        }
        return total; //..... 1
    }

    public Covid19Case[] totalRecovered(String medicine) { ..... 6
        Covid19Case[] temp = new Covid19Case[nbC]; ..... 1
        int j = 0; //..... 0.5
        for(int i=0; i<nbC; i++) { ..... 0.5
            if(arrCovid[i] instanceof Recovered && ..... 1
```

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((Recovered)arrCovid[i]).getMedicine().equalsIgnoreCase(medicine)) 1.5

```
        temp[j++] = arrCovid[i]; ..... 1
    }

    return temp; //..... 0.5
}

public Covid19Case youngestPatient() { ..... 5
    Covid19Case min = null; ..... 1

    for(int i=0; i<nbC; i++) { ..... 1
        if(min == null || ..... 1
            arrCovid[i].getAge() < min.getAge()) ..... 1
            min = arrCovid[i]; //..... 0.5
        }
    }
    return min; //..... 0.5
}

}
```

```
public class WorldOMeter { ..... 13

    private Country[] arrCountry; //..... 0.5
    private int nbCountry; //..... 0.5

    public WorldOMeter() {
        arrCountry = new Country[195]; //..... 1
        nbCountry = 0;
    }

    public int totalCases(String regDate) { ..... 4
        int total = 0; //..... 0.5
        for(int i=0; i<nbCountry; i++) { ..... 1
            total += arrCountry[i].totalCases(regDate); ..... 1.5
        }
    }
}
```

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```
    }  
    return total; ..... 1  
}  
  
public Covid19Case youngestCase() { ..... 7  
    Covid19Case min = null; ..... 1  
  
    for(int i=0; i<nbCountry; i++) { ..... 1  
        if(min == null || ..... 1  
            arrCountry[i].youngestPatient().getAge() <  
min.getAge()) ... 1.5  
            min = arrCountry[i].youngestPatient(); ... 1.5  
        }  
        return min; ..... 1  
    }  
}
```

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