

# Lab 3: OOP - Abstraction 03

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- **Subjects:** PRO192

## Submission:

- Using templates: [https://drive.google.com/drive/folders/1qTLYES8WC0TCjl9KZdaoNZh9TkqEhj33?usp=drive\\_link](https://drive.google.com/drive/folders/1qTLYES8WC0TCjl9KZdaoNZh9TkqEhj33?usp=drive_link)
- Update project name: <StudentNameCode>Lab3. Ex: NguyenCTCE172070Lab3
- Zip this project: NguyenCTCE172070Lab3.zip

## Problem Context:

You are to implement a system to manage weather records across different locations and types (urban or rural). You must:

- Define an interface WeatherRecord that includes:
  - int getId()
  - String getLocation()
  - String getType() – returns "Urban" or "Rural"
  - String getInfo() – returns formatted string with record details
- Implement 2 classes:
  - UrbanWeather (implements WeatherRecord)
    - int id, String city, double temperature, int humidity
  - RuralWeather (implements WeatherRecord)
    - int id, String village, double temperature, boolean stormAlert

Create a main class Q1 that:

- Reads commands from input
- Stores an array by WeatherRecord

Processes these commands:

- Urban
- Rural
- PrintAll
- PrintByType <Urban|Rural>

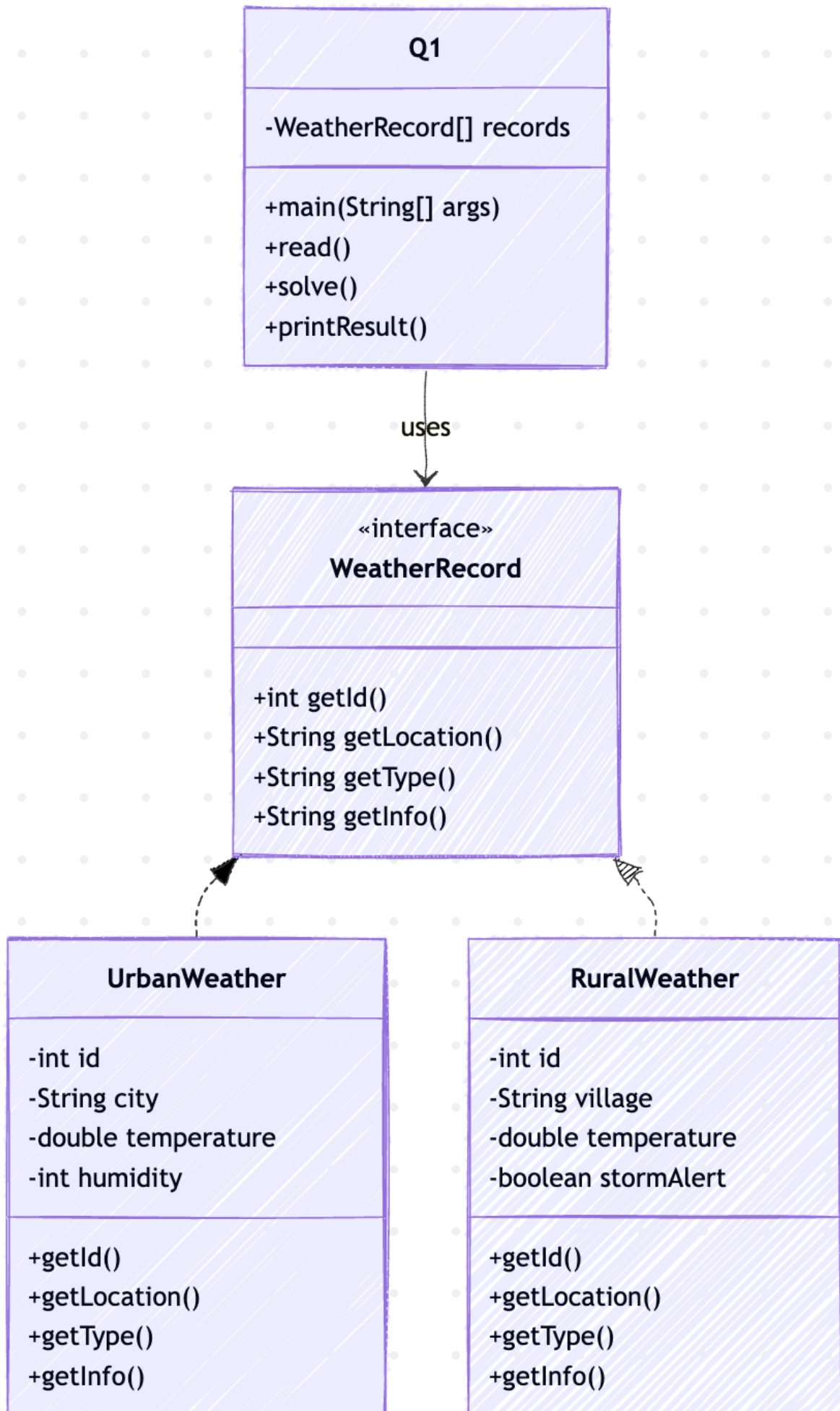
```
classDiagram
    class WeatherRecord {
        <>
        +int getId()
        +String getLocation()
        +String getType()
        +String getInfo()
    }
```

```
class UrbanWeather {
    -int id
    -String city
    -double temperature
    -int humidity
    +getId()
    +getLocation()
    +getType()
    +getInfo()
}

class RuralWeather {
    -int id
    -String village
    -double temperature
    -boolean stormAlert
    +getId()
    +getLocation()
    +getType()
    +getInfo()
}

class Q1 {
    -WeatherRecord[] records
    +main(String[] args)
    +read()
    +solve()
    +printResult()
}

WeatherRecord <|.. UrbanWeather
WeatherRecord <|.. RuralWeather
Q1 --> WeatherRecord : uses
```



## Resolve problems:

### New input file format

```
n
<command 1 of question>
<command 2 of question>
...
```

The first line contains an integer N, number of commands. Next N lines each contain one command:

- Add urban or rural weather data
- Or print all records / by type

### Test case 1

#### Input:

```
2
Urban 101 Hanoi 32.5 55
PrintAll
```

#### Output:

```
Add urban: 101 Hanoi
--PrintAll--
UrbanWeather [101] Hanoi: Temp=32.5°C, Humidity=55%
```

### Test case 2

#### Input:

```
2
Rural 201 BacKan 25.0 false
PrintByType Rural
```

#### Output:

```
Add rural: 201 BacKan
--PrintByType: Rural--
RuralWeather [201] BacKan: Temp=25.0°C, StormAlert=false
```

## Test case 3

### Input:

```
4
Urban 102 DaNang 34.0 60
Rural 202 HaGiang 28.0 true
Urban 103 Hue 33.1 65
PrintAll
```

### Output:

```
Add urban: 102 DaNang
Add rural: 202 HaGiang
Add urban: 103 Hue
--PrintAll--
UrbanWeather [102] DaNang: Temp=34.0°C, Humidity=60%
RuralWeather [202] HaGiang: Temp=28.0°C, StormAlert=true
UrbanWeather [103] Hue: Temp=33.1°C, Humidity=65%
```

## Test case 4

### Input:

```
6
Urban 1 Hanoi 35.5 60
Rural 2 DakLak 30.0 true
Urban 3 HCMC 36.1 70
PrintAll
PrintByType Urban
PrintByType Rural
```

### Output:

```
Add urban: 1 Hanoi
Add rural: 2 DakLak
Add urban: 3 HCMC
--PrintAll--
UrbanWeather [1] Hanoi: Temp=35.5°C, Humidity=60%
RuralWeather [2] DakLak: Temp=30.0°C, StormAlert=true
UrbanWeather [3] HCMC: Temp=36.1°C, Humidity=70%
--PrintByType: Urban--
UrbanWeather [1] Hanoi: Temp=35.5°C, Humidity=60%
UrbanWeather [3] HCMC: Temp=36.1°C, Humidity=70%
--PrintByType: Rural--
RuralWeather [2] DakLak: Temp=30.0°C, StormAlert=true
```

