

Java Programming II

Lab5

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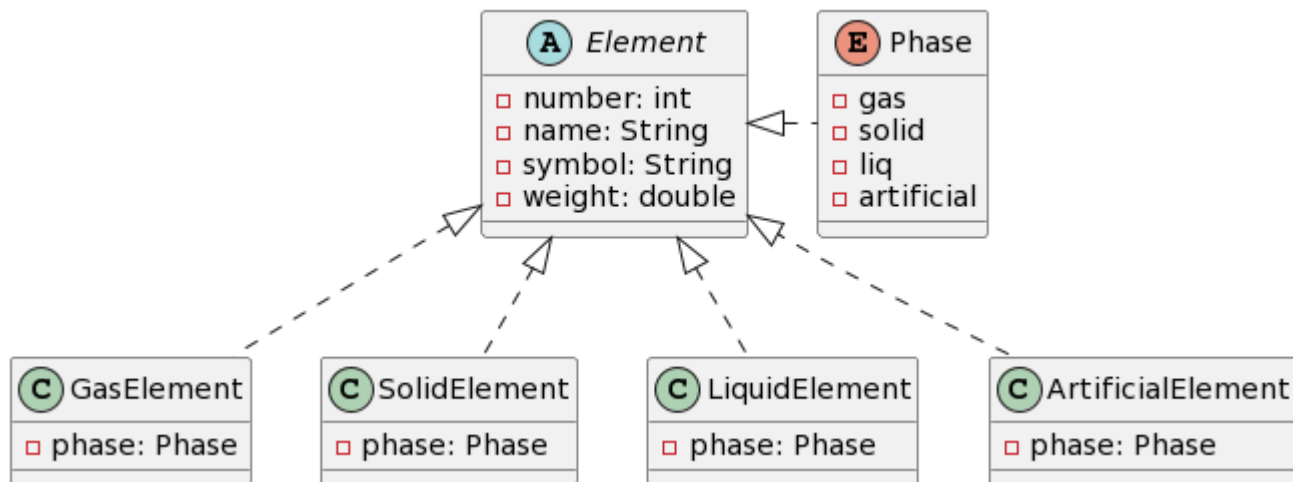
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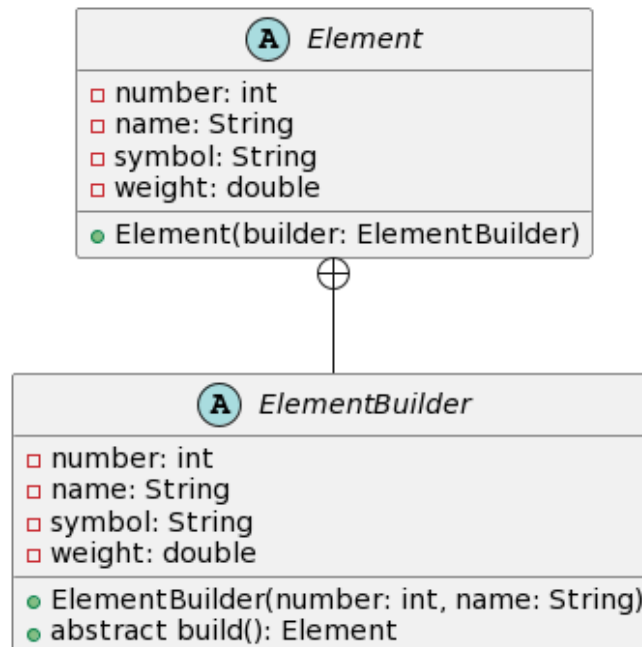
Lab5

- Practice to write a Period Element program using **Factory pattern & Builder pattern**.
 - **abstract class Element** has number, name, symbol, weight.
 - **GasElement, SolidElement, LiquidElement, ArtificialElement** has gas, solid, liq, artificial phase.



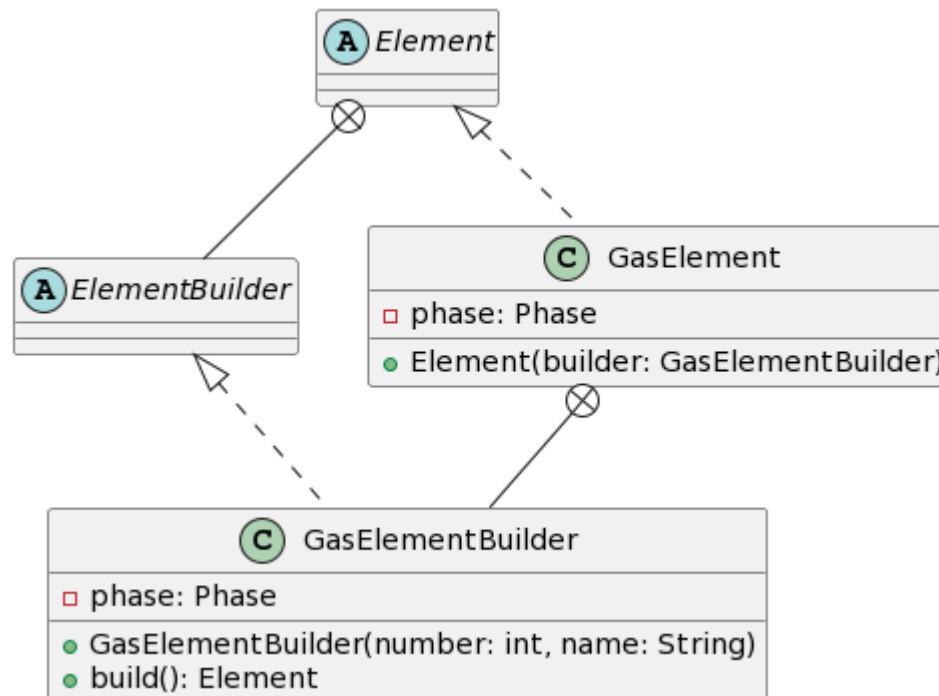
Lab5

- Create the **Element** class using the builder pattern
 - **abstract class Element** has number(required), name(required), symbol(optional), weight(optional) & getter & **Constructor using ElementBuilder**.
 - public abstract static inner class **ElementBuilder** has number, name, symbol, weight & setter & **Constructor using number and name** & **Element build()**.



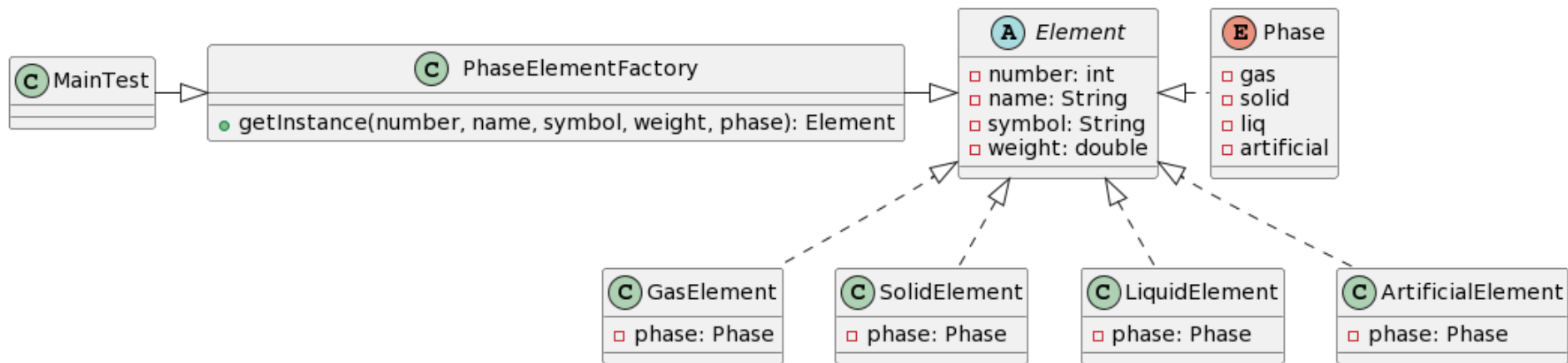
Lab5

- Create the **GasElement/SolidElement/LiquidElement/ArtificialElement** class using the builder pattern
 - **class GasElement** extends Element and has phase & getter & **Constructor using GasElementBuilder**.
 - public static inner class **GasElementBuilder** has phase & setter & **Constructor using number and name** & override **Element build()**.



Lab5

- PhaseElementFactory getInstance(number, name, symbol, weight, phase) creates **GasElement**, **SolidElement**, **LiquidElement**, **ArtificialElement** by **Phase**.



Lab5

```
public class PhaseElementFactory {  
    // getInstance by phase -> Element  
    public static Element getInstance(int number,  
String name, String symbol, double weight, Phase  
phase) {  
        switch (phase) {  
            case gas:  
                // create Element using builder  
                return new  
GasElement.GasElementBuilder(number,  
name).setPhase(Phase.gas).setSymbol(symbol).setWeig  
ht(weight).build();  
            case solid:  
...  
            default:  
                return null;  
            }  
        }  
    }  
}
```

Lab5

```
public class MainTest {  
    public static Class<?> getClass(Phase phase) { // phase -> Class  
        switch (phase) {  
            case gas:  
                return GasElement.class;  
            case liq:  
                return LiquidElement.class;  
            case solid:  
                return SolidElement.class;  
            case artificial:  
                return ArtificialElement.class;  
            default:  
                return Object.class;  
        }  
    }  
}
```

Lab5

```
public static void main(String[] args[]) {
    List<PeriodicElement> list =
PeriodicElementImporter.loadCSV("PeriodicElements.csv");
    list.forEach(System.out::println);
    // create list of Element using PhaseElementFactory
    List<Element> elements = new ArrayList<>();
    for (PeriodicElement element: list) {
        elements.add( /* .....using PhaseElementFactory */ );
    }
    Phase phase = Phase.valueOf(UserInput.getString());
    Element[] found = elements.stream().filter(e -> e.
getClass().equals(getClass(phase))).toArray(Element[]::new);
    }
}
```


Submit to e-learning

- ❑ Add your code (e.g., `Period1Element`, `Period2Element`,... class etc) in the Lab5 assignment.
- ❑ Submit the Lab5 assignment (`JAVA23-2-Lab5-YourID-YourName.zip` including the report) to e-learning (due by 10/23).