

JavaGroups – Collective Behavior in Java

A Bachelor Project by David Erni

2nd Presentation

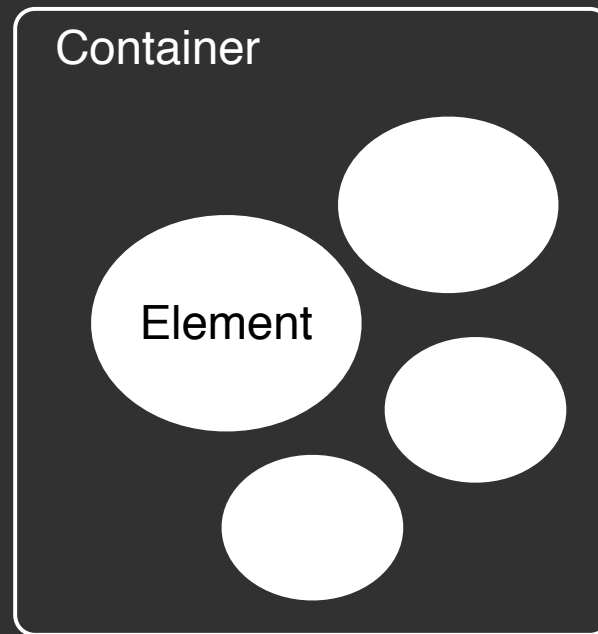
- Collective Behavior
- JavaGroups, a Java Prototype
- Demo
- Lessons Learned

Collective Behavior

extends Collections with behavior specific to
their element's type

Elements — “Objects”

Container — “Collection Framework”



Document

getContent()

clearText()

addText()

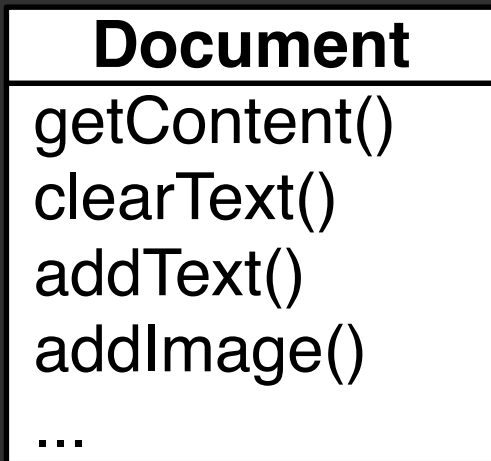
addImage()

...

Document

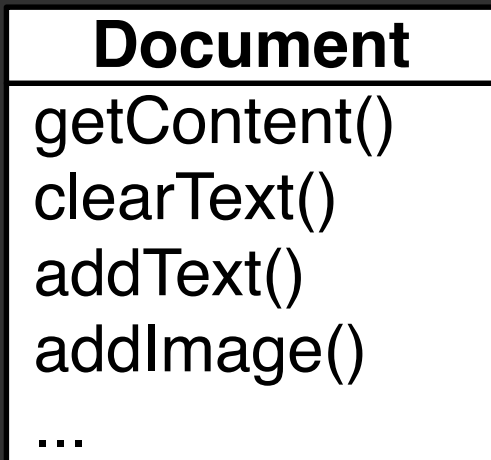
getContent()
clearText()
addText()
addImage()
...

```
Document merge( ... ) {  
    Document a = new Document ();  
    a.frontmatter();  
    for (Document d : ... ) { ... }  
    a.appendix();  
    return a;  
}
```

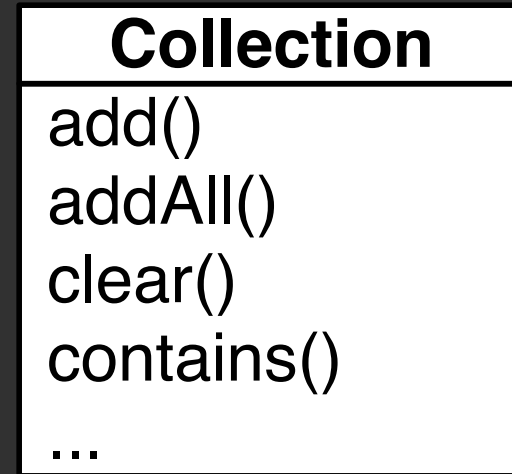


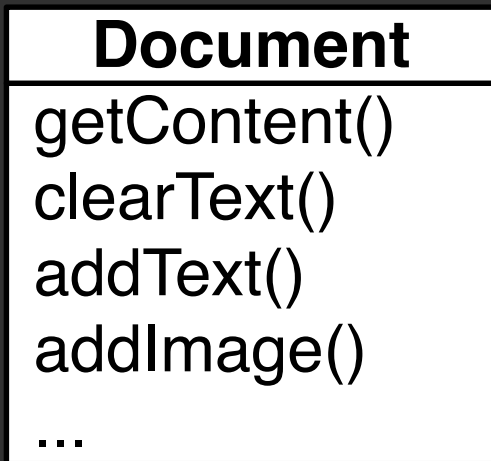
merge()





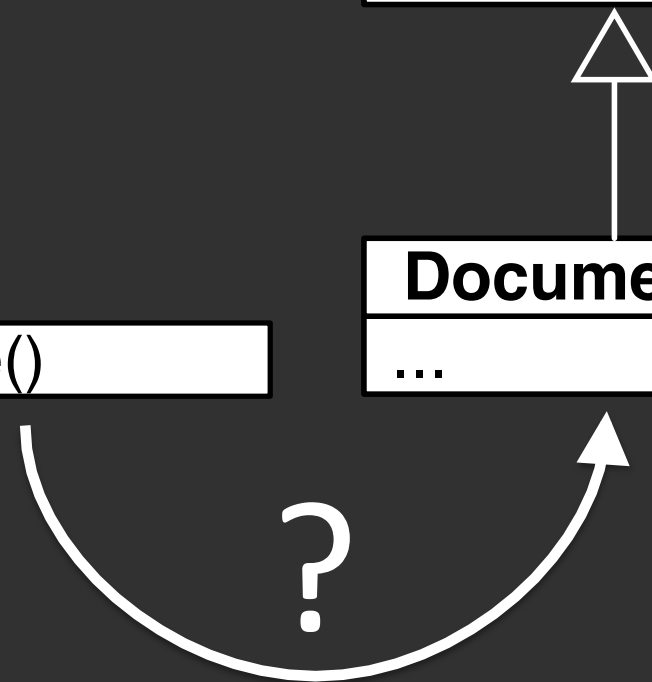
merge()

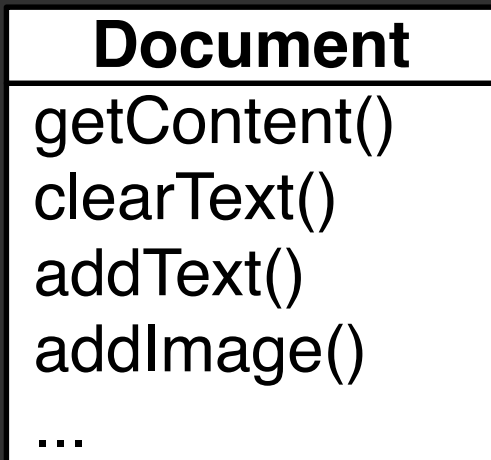




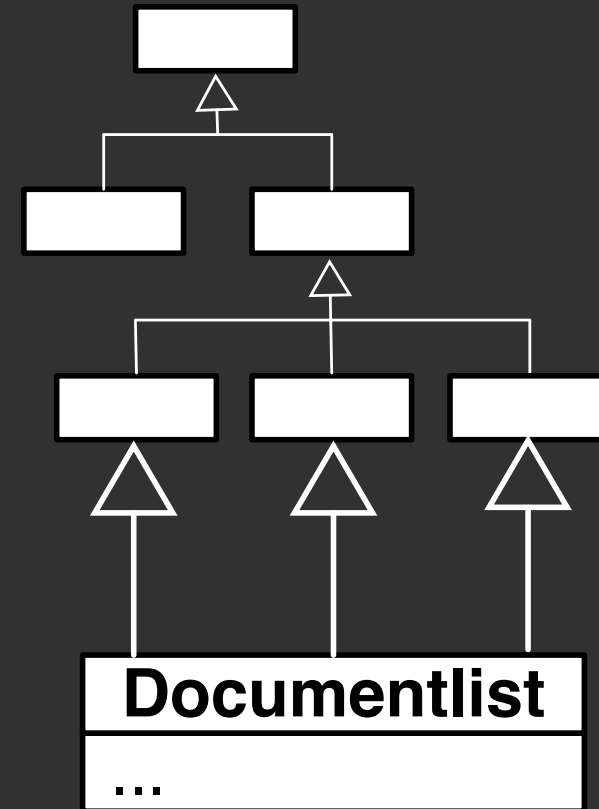
merge()

Collection





merge()



Document

merge()

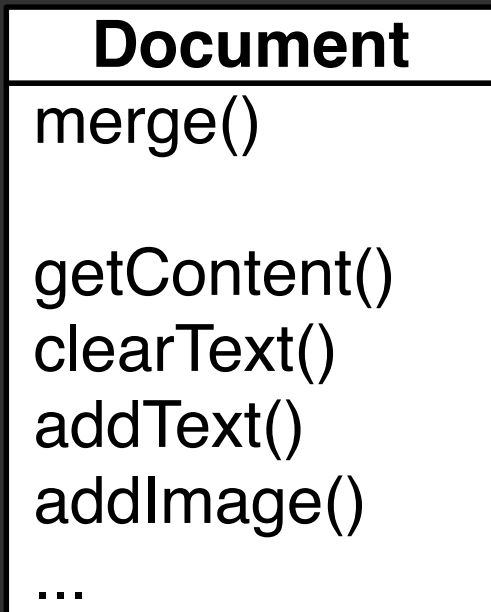
getContent()

clearText()

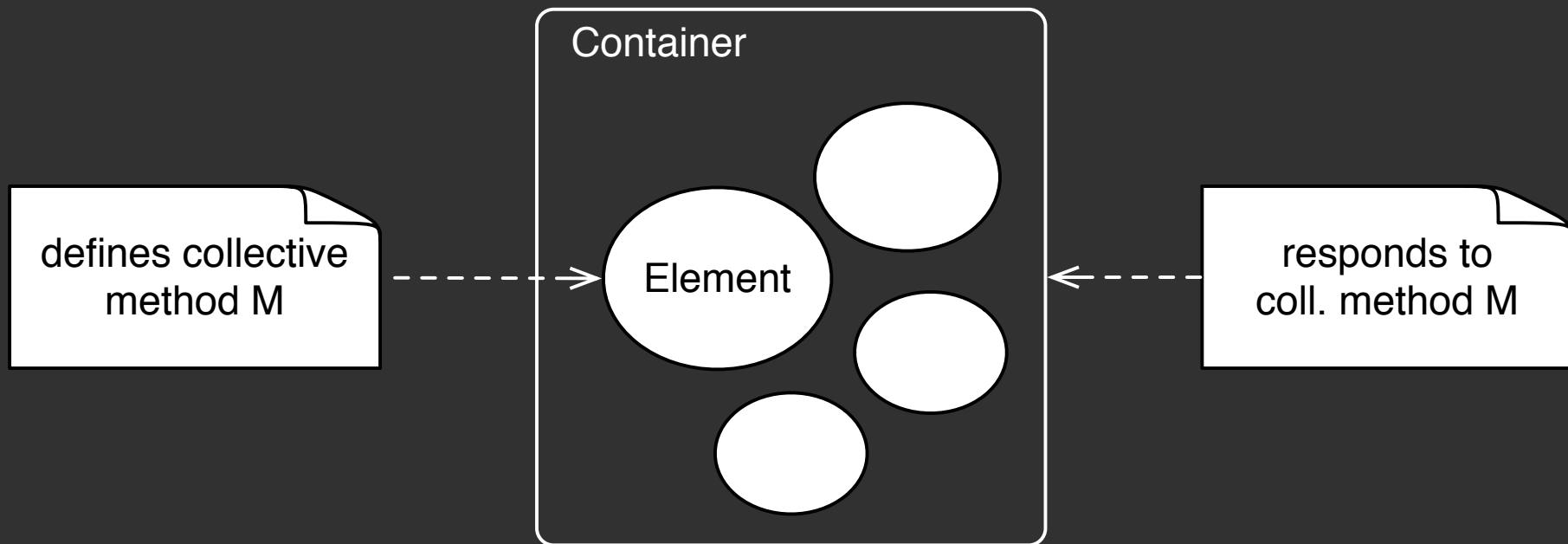
addText()

addImage()

...



Define on the Element Invoke on the Container!



JavaGroups, a Java Prototype

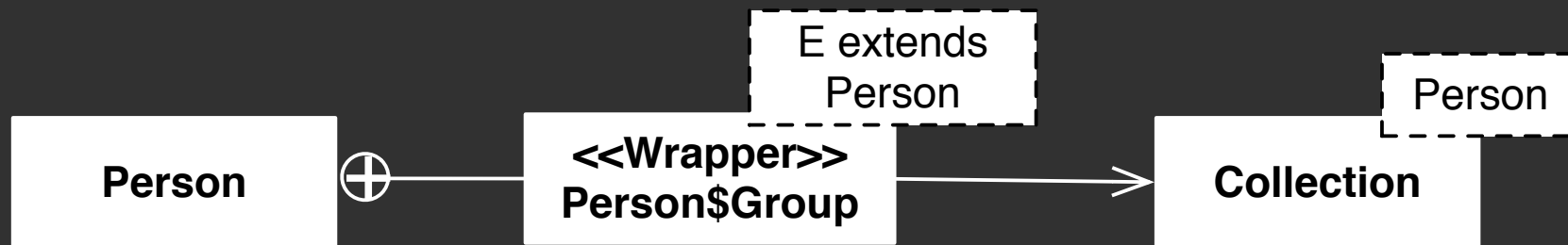
Implementing Collective Behavior for Java by
extending the OpenJDK compiler

```
public class Person {  
  
    @Group  
    public int averageIncome() {  
        for ( Person p : this )  
            { ... }  
    }  
  
}
```

```
Collection<Person> p  
    = new ArrayList<Person>;
```

```
...
```

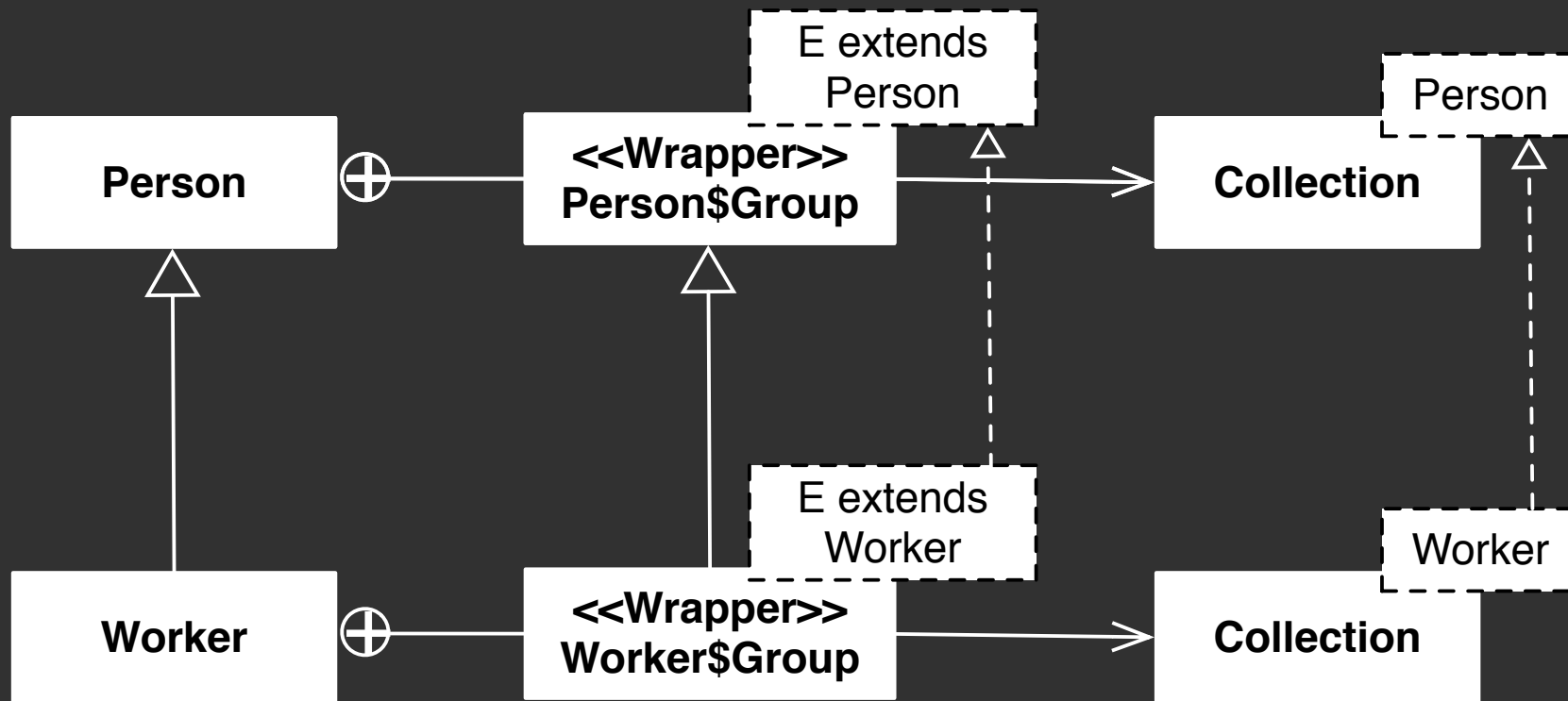
```
int r = p.avgInc();
```



```
Collection<Person> p  
    = new ArrayList<Person>;
```

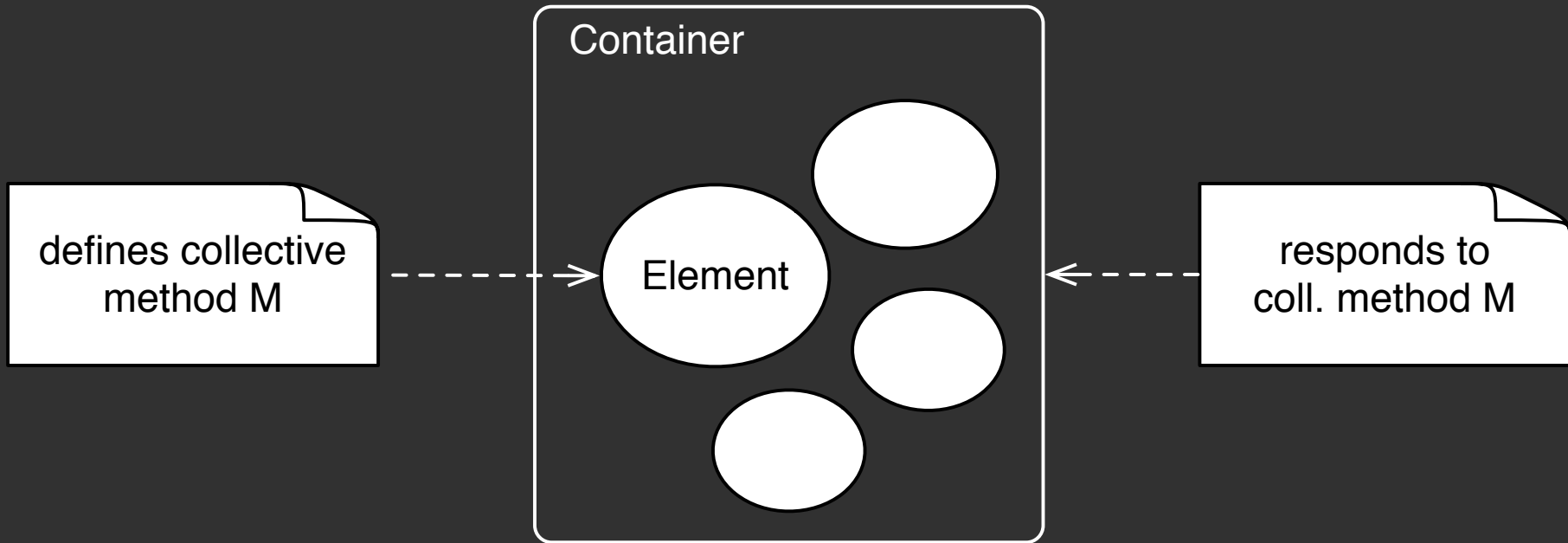
```
...
```

```
int r =  
    new Person.Person  
    $Group(p).avgInc();
```



Lessons learned ...

- Compiler internals
- Static Languages
- Writing a thesis



**Define on the Element
Invoke on the Container!**