



Universität
Basel

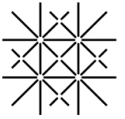
Software Architecture

Exercise – 4+1 View Model (Stack)

BSc

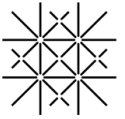


Ingo Arnold



Exercise Opening Overview

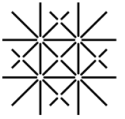
In this exercise you apply Kruchten's 4 + 1 view model to model and then also code an abstract data type Stack in Java.



Exercise Agenda



■ 4+1 View Model of a Stack



4+1 View Model

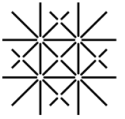
Stack Scenario

You are asked to design a data type Stack by transforming the scenario I provide you below into a logical view of Kruchten's view model.

Next, you will develop a suitable development view. Once you are satisfied with your design, you will also code your Stack design in Java.

Please use this stack scenario as input:

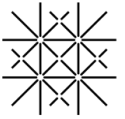
1. You add the element "stack" to an empty stack (push).
2. You add the element "first" to the stack (push).
3. You add the element "My" to the stack (push).
4. As long as the stack is not empty (isEmpty) ...
 1. read the topmost stack element (top)
 2. remove the topmost stack element (pop)



4+1 View Model

Stack – Logical View

How do you transfer the stack scenario into the Logical View of Kruchten's View Model?

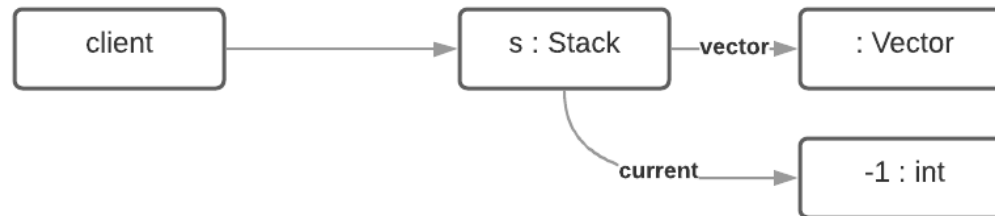


4+1 View Model

Stack – Logical View

How do you transfer the stack scenario into the Logical View of Kruchten's View Model?

Empty Stack state



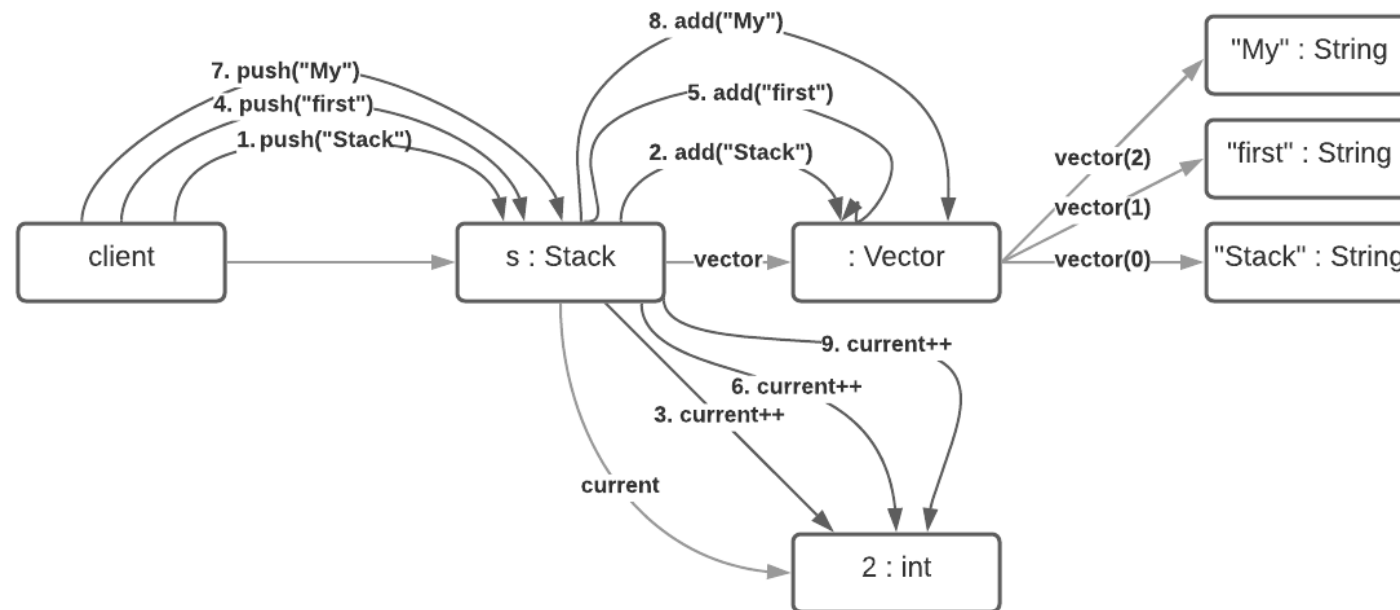


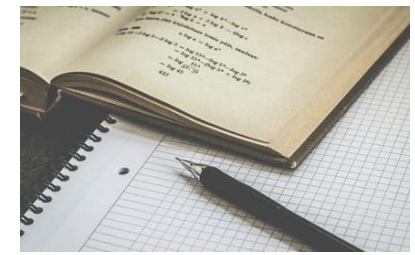
4+1 View Model

Stack – Logical View

How do you transfer the stack scenario into the Logical View of Kruchten's View Model?

Loading the Stack with elements



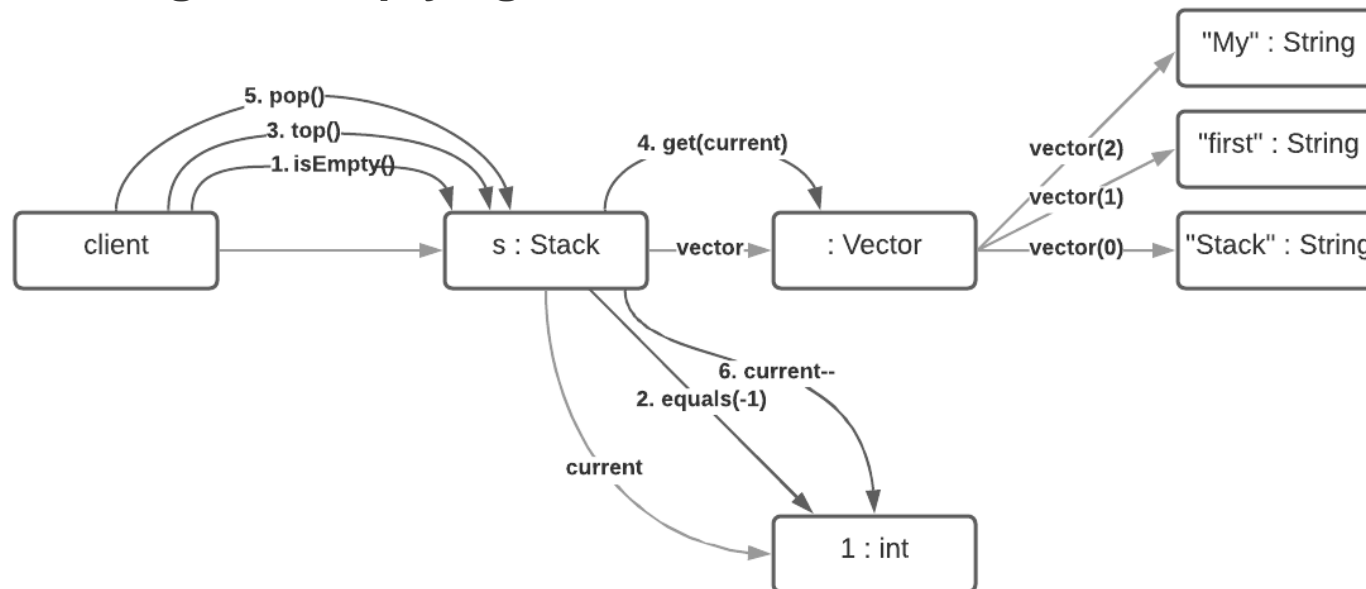


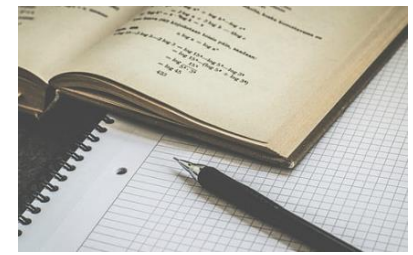
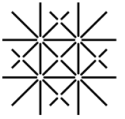
4+1 View Model

Stack – Logical View

How do you transfer the stack scenario into the Logical View of Kruchten's View Model?

Reading and emptying the Stack

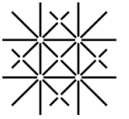




4+1 View Model

View Model Applied

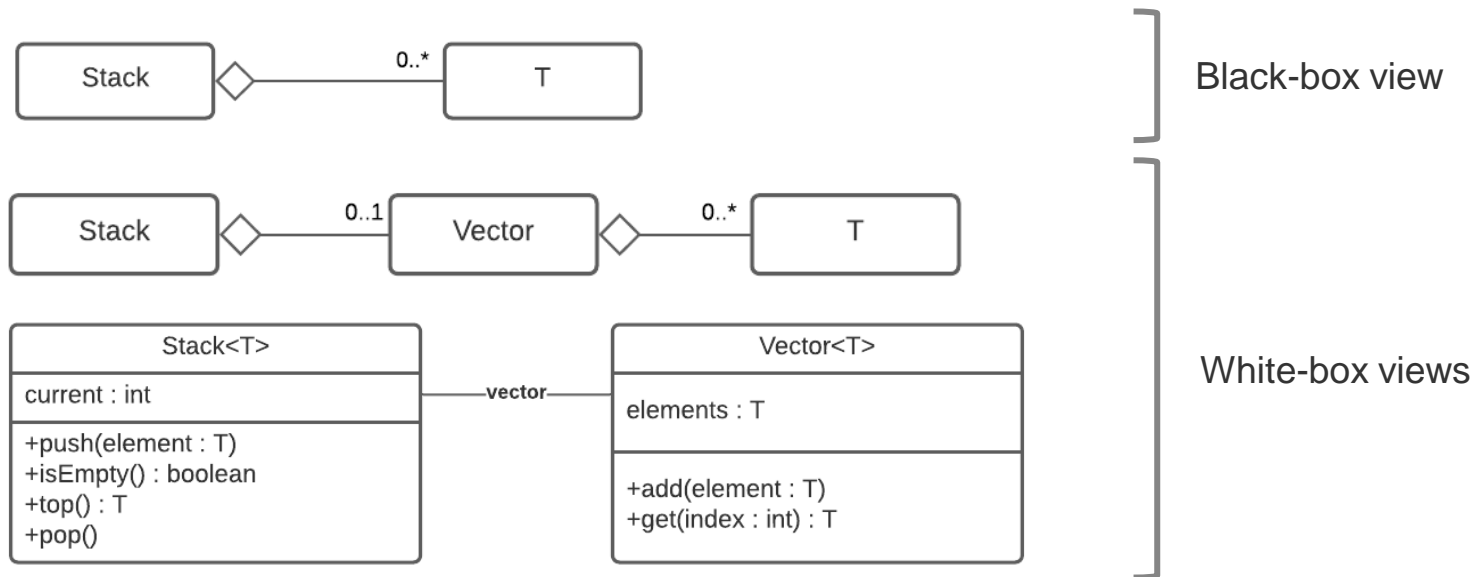
How do you represent the Stack in the development view?

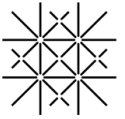


4+1 View Model

View Model Applied

How do you represent the Stack in the development view?



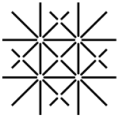


4+1 View Model

View Model Applied



Finally, how do you code your Stack model in Java?



4+1 View Model

View Model Applied

Finally, how do you code your Stack model in Java?

```
public class Stack<T> {  
    private List<T> vector = new Vector<T>();  
    private int current = -1;  
  
    public void push(T element) {  
        vector.add(element);  
        current++;  
    }  
    public boolean isEmpty() {  
        return current == -1;  
    }  
    public T top() {  
        T result = null;  
        if(!isEmpty()) {  
            result = vector.get(current);  
        }  
        return result;  
    }  
    public void pop() {  
        current--;  
    }  
}
```

```
public class Client {  
    public static void main(String[] args) {  
        Stack<String> s = new Stack<String>();  
  
        s.push("Stack");  
        s.push("first");  
        s.push("My");  
  
        while(!s.isEmpty()) {  
            String top = s.top();  
            System.out.println(top + " ");  
            s.pop();  
        }  
    }  
}
```

Questions

