Introduction to Clojure

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Agenda

- Hands on: Clojure basic syntax
  - Lists and Sequences
  - Working with Sequences
- BREAK!
- More hands-on exercises
- Q & A

THE WEB

You're doing it wrong

LISt Processing in Clojure

Lists and Sequences

- Here’s a familiar looking list:

```
(+ 1 2 3)
```

- Now experiment with lists and lists within list

Lists and Sequences

- Here's a familiar looking list:

```
(- 5 (* 2 3))
```

- Like this!

Lists and Sequences

- Creating a sequence of values

```
(list 1 2 3 (+ 1 3))
```

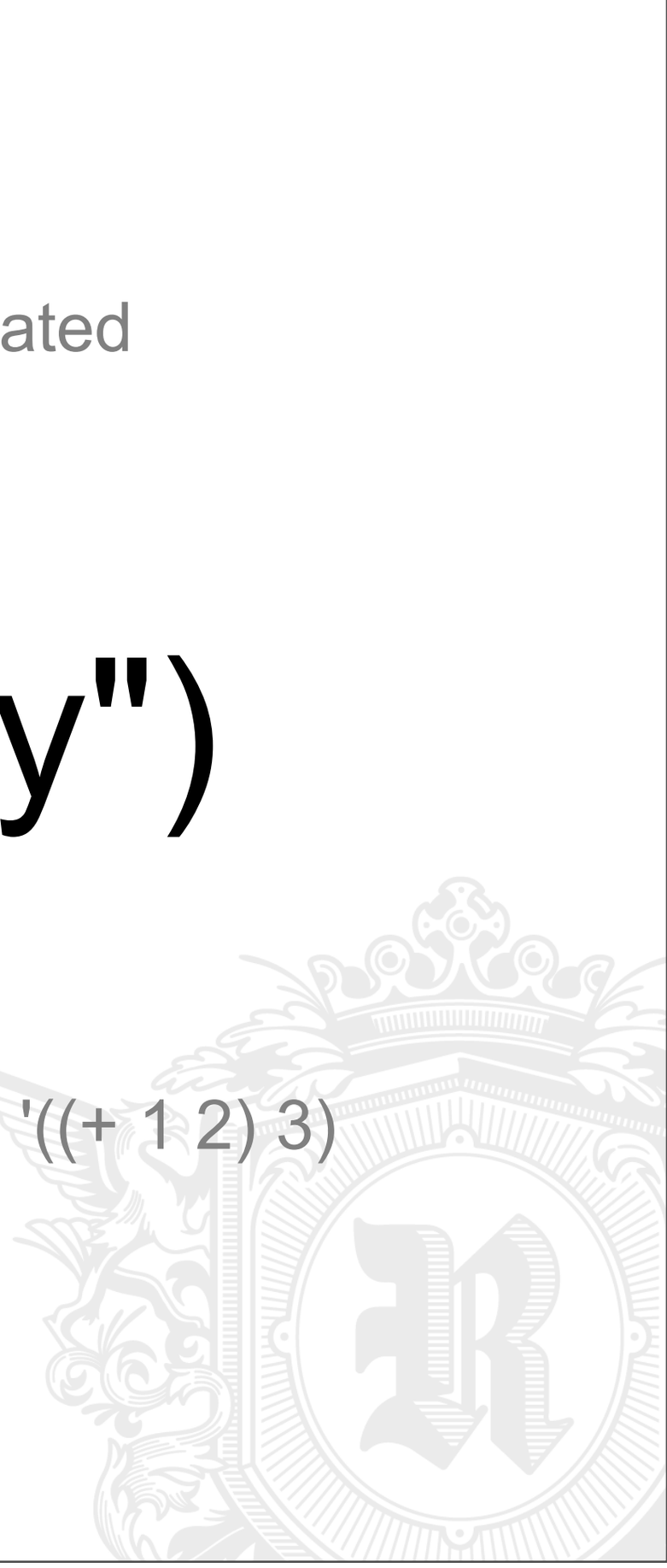
- Try creating some lists of your own

Lists and Sequences

- Lists escaped with single quote are not evaluated

'("hello" "devday")

- Try the difference between (list (+ 1 2) 3) and '((+ 1 2) 3)



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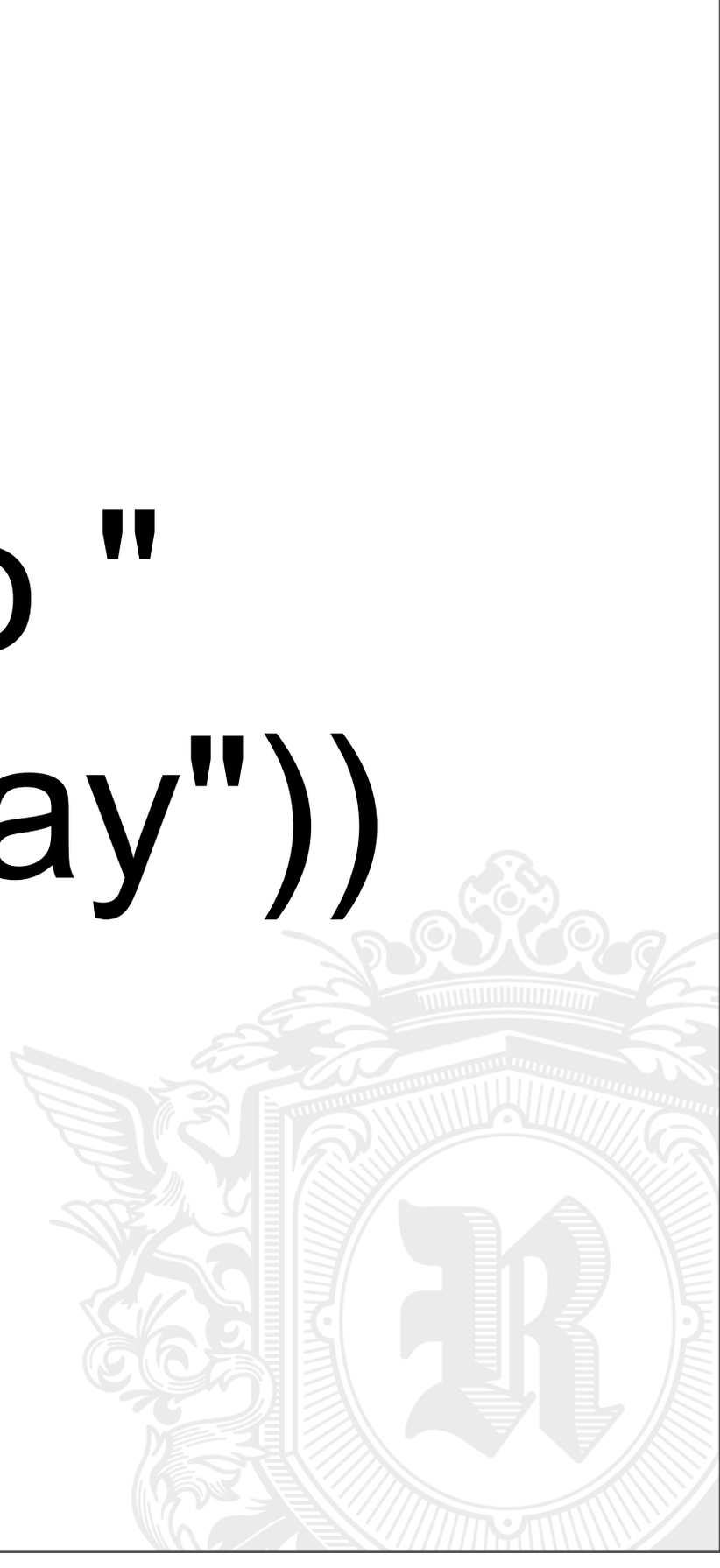
Lists and Sequences

- Creating a vector from a list

```
(vec (list "hello "
           "devday"))
```

- First item of a vector is not a function

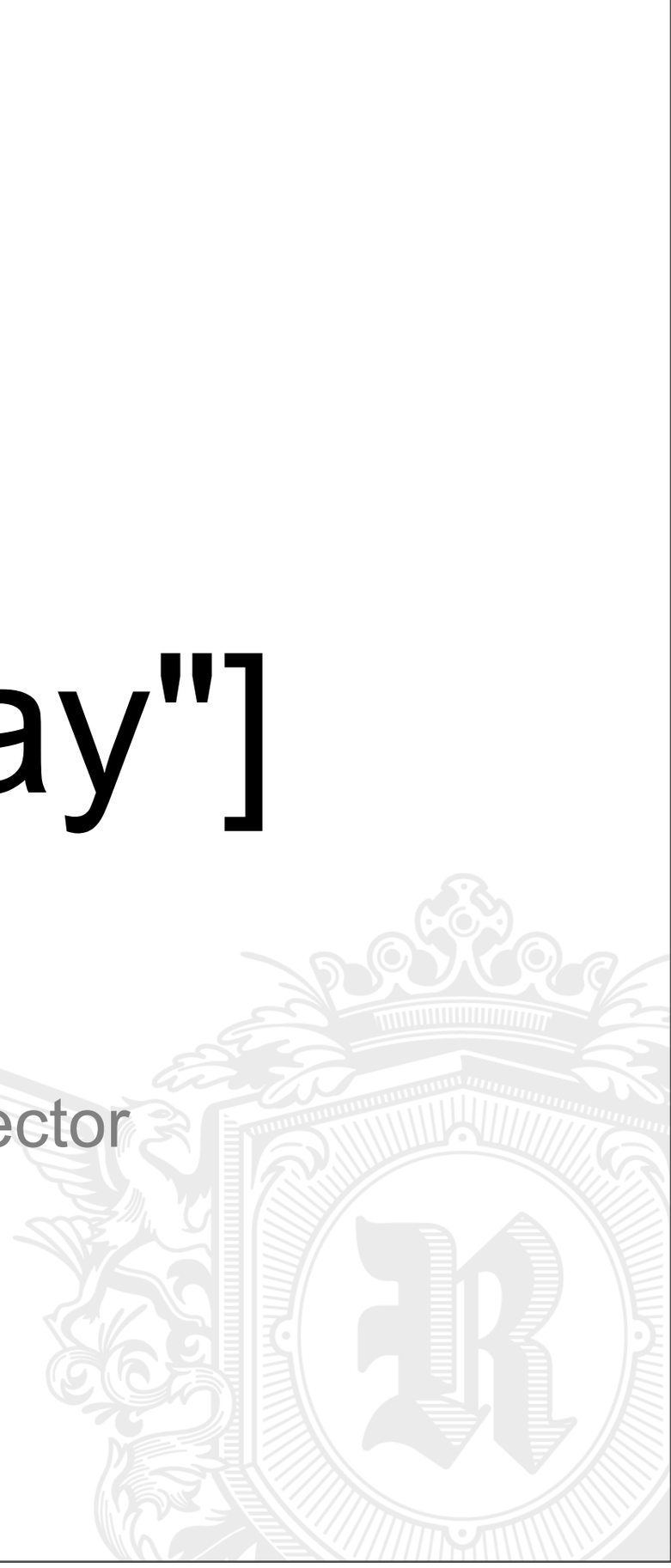


Lists and Sequences

- Easier syntax

```
["hello " "devday"]
```

- *vec* should be used when converting list to vector



Lists and Sequences

- Set is a sequence where one value may occur only once

```
(hash-set 1 2 3 1)
```

- Evaluates to **#{1 2 3}** which is shorthand for hash set

Lists and Sequences

- Map is an associative sequence

```
(hash-map
                    "a" 2 "b" 3)
```

- Evaluates to **{“a” 2 “b” 3}** which is shorthand for map

Lists and Sequences

- Accessing values from map

```
(def m {"a" 1 "b" 2})
(m "a")
```

- Map is also a function that takes key as a parameter and returns associated value

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Lists and Sequences

- Keywords can be used for easier access

```
(def m {:a 1 :b 2})
(:a m)
```

- Keyword is also a function that retrieves corresponding value from a map given as argument

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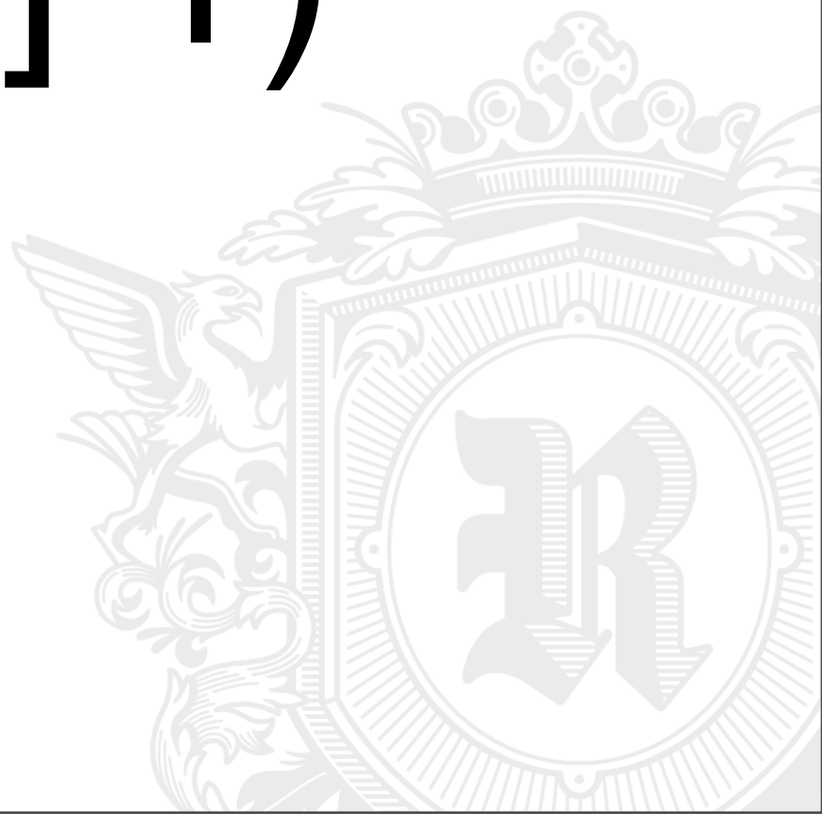
Lists and Sequences

- Accessing first or n’th item of a sequence

```
(first [1 2 3 4])
(nth ["a" "b" "c"] 1)
```

- Try also **second**, **last**, **rest** and **reverse**



Lists and Sequences

- Retrieve all the map keys as a sequence

```
(keys {:who "pete"
       :greet "hello"})
```

- **vals** does the same for values

Write an expression that returns the last item from a sequence without using ***last***

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Write an expression that returns the next to last item from a sequence

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Working with Sequences

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Working with Sequences

- Defining anonymous functions

```
(fn [x] (* x x))
```

- Doesn't really do much?
  - Try it as a first value to a list with one number

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Working with Sequences

- Defining anonymous functions

```
((fn [x] (* x x)) 4)
```

- Can be used wherever a function is required

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Working with Sequences

- Defining named functions

```
(def sqr
  (fn [x] (* x x)))
```

- Now you can use it like this: **(sqr 2)**

Working with Sequences

- Shorter syntax for defining functions

```
(defn sqr [x] (* x x))
```

- You can still call it like this: **(sqr 2)**

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Working with Sequences

- Map applies function to every value in the sequence

```
(map sqr [1 2 3 4])
```

- Map returns a new sequence, in this case **(1 4 9 16)**

Working with Sequences

- Filter returns sequence that satisfies the condition

```
(filter even?
        [1 2 3 4])
```

- Functions used as test conditions usually end with ? like **even?** or **odd?**
- **remove** is the opposite of **filter**

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Working with Sequences

- Reduce a value from function applied over sequence

```
(reduce min 3
        [1 2 5 4])
```

- second parameter is ***memo***
- Function takes two parameters, ***memo*** and item from list, producing the next ***memo***

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Lists and Sequences

- Applying a function to a sequence

```
(apply min
       [1 4 3 2 5])
```

- Apply evaluates the function with list of parameters like **(str "hello " "devday")**

Working with Sequences

- Conditional processing

```
(if (even? 2)
    "even"
    "that's odd")
```

- Experiment with different values for test. How **false** and **nil** work differently to everything else?
- **when** omits the else branch

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Working with Sequences

- Testing for multiple conditions

```
(defn pos-or-neg[x]
(cond (> 0 x) "positive"
      (< 0 x) "negative"
      :else "neither"))
```

Working with Sequences

- Create a sequence of integers

```
(range 10)
```

- Without arguments it will create an endless sequence

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Working with Sequences

- Grouping and slicing lists

```
(partition 5 3
           (range 10))
```

- Test also partitioning without second parameter

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When given 500 character length string of digits, find the maximum value when multiplying five consecutive digits

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Questions?

Why Clojure (and not Scala)?

- Clojure maps are perfect match for RESTFUL web services (e.g. JSON APIs)
- Easier to write decent functional programs
- Doesn’t try to make things easy to Java developers
- Maintains Java interoperability

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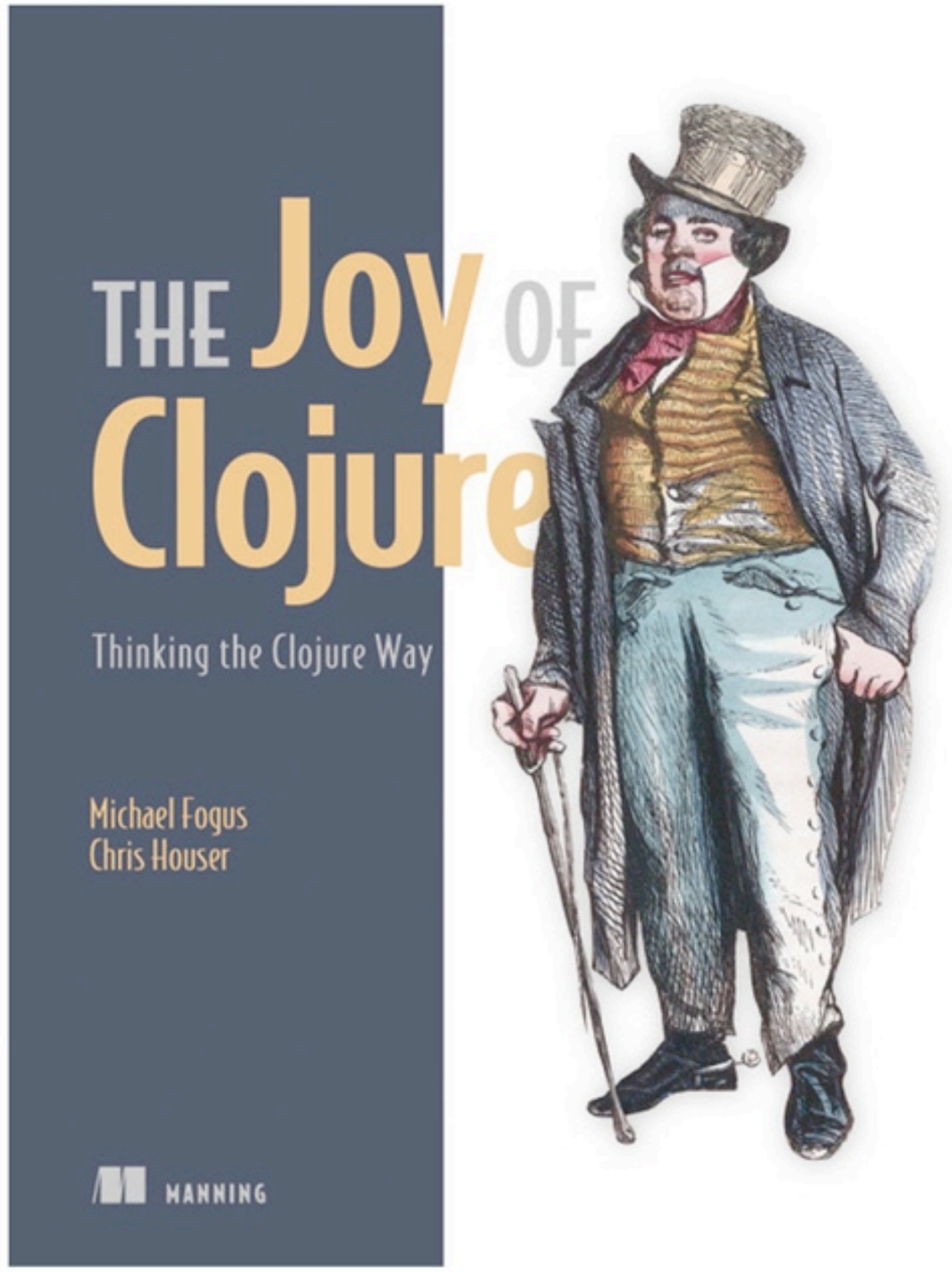
Further reading



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Thank

You!

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