

# Qwalkeko user study - part 2/2

What is your anonymous name? \*

Anonymous Maarten

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Please submit your queries here \*

Select the three queries that you wrote in userstudy.clj, and copy-paste it all into this text box.

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## Exercise 2.1

Please rate the difficulty of this exercise \*

1      2      3      4      5

Easy                        Hard

How much time did you take for this exercise? \*

Time

00 : 09

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

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**Exercise 2.2**

Please rate the difficulty of this exercise \*

1                      2                      3                      4                      5

Easy                                                                                                                                    Hard

How much time did you take for this exercise? \*

Time

00 : 14

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

.....

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## Exercise 2.3

Please rate the difficulty of this exercise \*

1      2      3      4      5

Easy                                    Hard

How much time did you take for this exercise? \*

Time

00 : 25

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

.....



How would you rate the usability of the Qwalkeko language?

	1	2	3	4	5	
Difficult-to-use	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Easy-to-use

How would you rate the expressiveness of the Qwalkeko language?

In other words, to what extent do you think the constructs in the language are sufficient to express a wide range of change patterns?

	1	2	3	4	5	
Limited	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Expressive

How likely is it that you would recommend Qwalkeko to a researcher in Mining Software Repositories? \*

	1	2	3	4	5	
Unlikely	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	Likely

How useful do you think Qwalkeko is for researchers in Mining Software Repositories? \*

	1	2	3	4	5	
Useless	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Useful

How likely is it that you would consider using Qwalkeko yourself?  
(not per se for MSR/research purposes) \*

1            2            3            4            5

Unlikely                        Likely

If you would use Qwalkeko yourself, what would you use it for?

Checking naming conventions that I established at some point but forgot about later.

How did you experience the learning curve of Qwalkeko? \*

- Very smooth, I almost immediately understood most concepts to start writing queries.
- Smooth, it took me a short while to understand most concepts, but I've got the hang of it now.
- In between, I understand the basics, and I'm confident I will become more proficient with some more practice.
- Steep, I think I understand the basics, but it will take a lot of practice to become proficient.
- Very steep, there still are many basic concepts that are unclear or difficult.

Were there specific things that you found difficult or tedious? If so, why?

Declaring all logical variables that you want to use.

It wasn't always clear when two values would be considered the same. For example, I think a SimpleName does not automatically equal the after-change's corresponding SimpleName node, even if the name remained the same (you'd have to actually extract the strings from the nodes and compare those).

Were there any specific things that you like about Qwalkeko? If so, why?

The 'primitive' operations of Qwalkeko (e.g., 'has' and 'ast') make it pretty easy to reason over the AST-relations between nodes.

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Do you have specific feature requests? Is there anything that you wish was available in the language?

It would be very useful to have a construct that combines the 'child+' and 'ast' primitives, so that you can immediately find a child, of a particular AST node class, of a given node.

In general, perhaps it is worthwhile to investigate which Qwalkeko primitives are often invoked right after each other (such as child+ -> ast) and make a construct to combine those.

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What is your overall rating for the Qwalkeko query language? \*

	0	1	2	3	4	5	
Bad	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Excellent

Did your rating change compared to part 1 of the questionnaire? If so, can you comment why?

NA

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Finally, is there anything else you'd like to mention?

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# Qwalkeko user study - part 2/2

What is your anonymous name? \*

Anonymous alpaca

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## Please submit your queries here \*

Select the three queries that you wrote in userstudy.clj, and copy-paste it all into this text box.

; Task 2.1 - Write a query that looks for methods that were private, but they are now changed to public

```
(defn task-2-1 [before after]
  (fresh [?method ?modifiers ?modifier ?keyword ?methodname ?method-after
?modifiers-after ?modifier-after]
```

```
    ; Find private method
    (child+ before ?method)
    (ast :MethodDeclaration ?method)
    (has :modifiers ?method ?modifiers)
    (contains ?modifiers ?modifier)
    (has :keyword ?modifier ?keyword)
    (ast-str-equals ?keyword "private") ; no worky...
    (debug ?keyword)
```

```
    ; Find match and see if public
    (corresponding-method ?method before ?method-after after)
    (has :modifiers ?method ?modifiers-after)
    (contains ?modifiers-after ?modifier-after)
    (has :keyword ?modifier ?keyword)
    (ast-str-equals ?keyword "public") ; This neither
```

```
;; Wasted most time on not seeing (contains ...) and not finding out how to equal
the keyword with private/public
```

```
;; 27m42s, gave up
))
(run-task task-2-1)
```

; Task 2.2 - Write a query that looks for the removal of unused methods (i.e. private methods that are never called)

```
(defn task-2-2 [before after]
  (fresh [?method ?modifiers ?modifier ?keyword ?method-after]
    ; Find private method
```

```
(child+ before ?method)
(ast :MethodDeclaration ?method)
(has :modifiers ?method ?modifiers)
(contains ?modifiers ?modifier)
(has :keyword ?modifier ?keyword)
;(ast-str-equals ?keyword "private"); no worky...
```

```
; Here find out that the method is not actually used anywhere
```

```
(fails
  (fresh [?methodinvocation]
    (child+ before ?methodinvocation)
    (ast :MethodInvocation ?methodinvocation)
    (method-method|same-signature ?methodinvocation ?method)
    (debug ?methodinvocation)
  ))
```

```
; Is the method gone
```

```
(fails (corresponding-method ?method before ?method-after after))
(debug ?method)
```

```
;; Still not sure how to match the private part, copy-pasted from 2.1.
```

```
;; Would possibly review/revise answers to Tasks 1.* where (fails) was involved.
```

```
;; 19m55s, all of it spent how to approach method not being called.
```

```
))
```

```
(run-task task-2-2)
```

```
; Task 2.3 - Write a query that looks for migrations of Junit 3 tests to Junit 4 tests
```

```
;
```

```
; Main changes between Junit 3 and 4:
```

```
; * Test classes no longer need to extend TestCase
```

```
; * setUp method can now have any name, but it should get a @Before annotation
```

```
; * tearDown method can now have any name, but it should get an @After
annotation
```

```
; * test methods no longer need to have a "test" prefix, but should get a @Test
annotation
```

```

(defn task-2-3 [before after]
  (fresh [?class ?super ?setup ?setupname ?teardown ?teardownname
         ?testmethod ?testmethodname ?testmethodstr
         ?class-after ?before ?modifiers ?annotation
         ?after ?modifiers-a ?annotation-a
         ?test ?modifiers-t ?annotation-t]
    (child+ before ?class)

    ; Extends TestCase
    (ast :TypeDeclaration ?class)
    (has :superclassType ?class ?super)
    (ast-str-equals ?super "TestCase")

    ; Has setUp method
    (child+ ?class ?setup)
    (ast :MethodDeclaration ?setup)
    (has :name ?setup ?setupname)
    (ast-str-equals ?setupname "setUp")

    ; Has tearDown method
    (child+ ?class ?teardown)
    (ast :MethodDeclaration ?teardown)
    (has :name ?teardown ?teardownname)
    (ast-str-equals ?teardownname "tearDown")

    ; Has at least one method starting with "test"
    (child+ ?class ?testmethod)
    (ast :MethodDeclaration ?testmethod)
    (has :name ?testmethod ?testmethodname)
    ; TODO: Not sure how to make this work
    ;(ast-str-equals ?testmethodname ?testmethodstr)
    ;(str-starts-with ?testmethodstr "test")
    ;(debug ?testmethodstr)

    (debug ?class)

    ; AFTER
  )

```

```
(child+ after ?class-after)
;(name-equals ?class ?class-after)
;(debug ?class-after)
```

```
; There is a method with @Before
(child+ ?class-after ?before)
(has :modifiers ?before ?modifiers)
(contains ?modifiers ?annotation)
(ast :MarkerAnnotation ?annotation)
(ast-str-equals ?annotation "@Before")
```

```
; There is a method with @After
(child+ ?class-after ?after)
(has :modifiers ?after ?modifiers-a)
(contains ?modifiers-a ?annotation-a)
(ast :MarkerAnnotation ?annotation-a)
(ast-str-equals ?annotation-a "@After")
```

```
; There is a method with @Test
(child+ ?class-after ?test)
(has :modifiers ?test ?modifiers-t)
(contains ?modifiers-t ?annotation-t)
(ast :MarkerAnnotation ?annotation-t)
(ast-str-equals ?annotation-t "@Test")
```

```
;; Lots of copy-pasting
;; 20m23s. Gave up trying to find the intricacies of name-equals as well as
matching strings to match a test method
))
(run-task task-2-3)
```

---

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## Exercise 2.1

Please rate the difficulty of this exercise \*

1      2      3      4      5

Easy                                    Hard

How much time did you take for this exercise? \*

Time

00 : 27

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

I managed to get a hold of the public/private keyword of a method, but was unable to match that to something meaningful (e.g., string compare it to just "private")

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## Exercise 2.2

Please rate the difficulty of this exercise \*

1            2            3            4            5

Easy                                                Hard

How much time did you take for this exercise? \*

Time

00 : 20

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

Same private issue as for Task 2.1. Still unsure if my fails usage would withstand all tests.

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## Exercise 2.3

Please rate the difficulty of this exercise \*

1      2      3      4      5

Easy                                    Hard

How much time did you take for this exercise? \*

Time

00 : 20

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

Got stuck matching string. Both to find out if a method started with test and to find out whether my before and after class had the same name.

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How would you rate the usability of the Qwalkeko language?

1 2 3 4 5

Difficult-to-use      Easy-to-use

How would you rate the expressiveness of the Qwalkeko language?

In other words, to what extent do you think the constructs in the language are sufficient to express a wide range of change patterns?

1 2 3 4 5

Limited      Expressive

How likely is it that you would recommend Qwalkeko to a researcher in Mining Software Repositories? \*

1 2 3 4 5

Unlikely      Likely

How useful do you think Qwalkeko is for researchers in Mining Software Repositories? \*

1 2 3 4 5

Useless      Useful

How likely is it that you would consider using Qwalkeko yourself?  
(not per se for MSR/research purposes) \*

	1	2	3	4	5	
Unlikely	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Likely

If you would use Qwalkeko yourself, what would you use it for?

MSR

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How did you experience the learning curve of Qwalkeko? \*

- Very smooth, I almost immediately understood most concepts to start writing queries.
- Smooth, it took me a short while to understand most concepts, but I've got the hang of it now.
- In between, I understand the basics, and I'm confident I will become more proficient with some more practice.
- Steep, I think I understand the basics, but it will take a lot of practice to become proficient.
- Very steep, there still are many basic concepts that are unclear or difficult.

Were there specific things that you found difficult or tedious? If so, why?

Can get stuck on something seemingly super simple that likely can be expressed very simply, but is impossible to find out on your own what exactly is needed. It also suffers the same problem as logic programming, where it looks simple, but you still have to really keep in mind what is happening behind the scenes in order to have it work as you would want to.

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Were there any specific things that you like about Qwalkeko? If so, why?

The expressiveness once it is there.

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Do you have specific feature requests? Is there anything that you wish was available in the language?

Better documentation/ways to go from "I have this problem" to "this solution that works in all your cases"

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What is your overall rating for the Qwalkeko query language? \*

0      1      2      3      4      5

Bad                                          Excellent

Did your rating change compared to part 1 of the questionnaire? If so, can you comment why?

The expressiveness and brevity touted before feels less useful if you take ages to find out the exact right onliner.

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Finally, is there anything else you'd like to mention?

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# Google Forms



# Qwalkeko user study - part 2/2

What is your anonymous name? \*

Anonymous tyrannosaurus

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## Please submit your queries here \*

Select the three queries that you wrote in userstudy.clj, and copy-paste it all into this text box.

; Task 2.1 - Write a query that looks for methods that were private, but they are now changed to public

```
(defn task-2-1 [before after]
  (fresh [?method ?methodmodifiers ?methodmodifier ?after-method ?after-
methodmodifiers ?after-methodmodifier]
    (child+ before ?method)
    (ast :MethodDeclaration ?method)
    (has :modifiers ?method ?methodmodifiers)
    (contains ?methodmodifiers ?methodmodifier)
    (ast-str-equals ?methodmodifier "private")

    (corresponding-method ?method before ?after-method after)
    (has :modifiers ?after-method ?after-methodmodifiers)
    (contains ?after-methodmodifiers ?after-methodmodifier)
    (ast-str-equals ?after-methodmodifier "public")))
```

; TODO Please write your code here (Feel free to remove the above child+ ; it's only there to avoid compilation errors..)

(run-task task-2-1) ; ~10min.

; Task 2.2 - Write a query that looks for the removal of unused methods (i.e. private methods that are never called) ;11 min.

```
(defn task-2-2 [before after]
  (fresh [?method ?methodmodifiers ?methodmodifier ?methodname]
    (child+ before ?method)
    (ast :MethodDeclaration ?method)
    (has :modifiers ?method ?methodmodifiers)
    (contains ?methodmodifiers ?methodmodifier)
    (ast-str-equals ?methodmodifier "private")
    (has :name ?method ?methodname)
    (fails
      (fresh [?invocation ?invocationname]
```

```

(child+ before ?invocation)
(ast|invocation :MethodInvocation ?invocation)
(has :name ?invocation ?invocationname)
(name-equals ?invocationname ?methodname)))

(fails
  (fresh [?altmethod]
    (corresponding-method ?method before ?altmethod after))))
(run-task task-2-2)

```

; Task 2.3 - Write a query that looks for migrations of Junit 3 tests to Junit 4 tests  
;

```

(defn task-2-3 [before after]
  (fresh [?testClass ?testClassName ?annotation ?testClassSuper ?altTestClass
?altTestClassName ?altTestClassSuper]
    ; * Test classes no longer need to extend TestCase
    (child+ before ?testClass)
    (ast :TypeDeclaration ?testClass)
    (has :name ?testClass ?testClassName)
    (has :superclassType ?testClass ?testClassSuper)
    (ast-str-equals ?testClassSuper "TestCase")

    (child+ after ?altTestClass)
    (ast :TypeDeclaration ?altTestClass)
    (has :name ?altTestClass ?altTestClassName)
    (has :superclassType ?altTestClass ?altTestClassSuper)
    (name-equals ?testClassName ?altTestClassName)
    (fails (type-equals ?testClassSuper ?altTestClassSuper)))
    ; * check for any of the new annotations
    ; TODO: should check that method with @Before corresponds to previous method
with name setUp etc, but ran out of time
    (child+ after ?annotation)
    (ast :MarkerAnnotation ?annotation)

```

```
(conde
  (ast-str-equals ?annotation "@Before")
  (ast-str-equals ?annotation "@After")
  (ast-str-equals ?annotation "@Test"))))
```

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## Exercise 2.1

Please rate the difficulty of this exercise \*

1      2      3      4      5

Easy                        Hard

How much time did you take for this exercise? \*

Time

00 : 11

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

.....

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## Exercise 2.2

Please rate the difficulty of this exercise \*

- |      |                       |                                  |                       |                       |                       |      |
|------|-----------------------|----------------------------------|-----------------------|-----------------------|-----------------------|------|
|      | 1                     | 2                                | 3                     | 4                     | 5                     |      |
| Easy | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | Hard |

How much time did you take for this exercise? \*

Time

00 : 11

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

.....

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## Exercise 2.3

Please rate the difficulty of this exercise \*

1                      2                      3                      4                      5

Easy                                                                                                                                    Hard

How much time did you take for this exercise? \*

Time

00 : 30

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

At first I didn't properly understand the requirements for this exercise (i.e. what the predicate was supposed to do exactly). My predicate should work for the given example but could be improved: instead of just checking if any of the new annotations are added, we must also check that they are added to methods that were previously named according to some naming convention. Qwalkeko is not lacking in features to achieve this, I just ran out of time.

---

How would you rate the usability of the Qwalkeko language?

	1	2	3	4	5	
Difficult-to-use	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Easy-to-use

How would you rate the expressiveness of the Qwalkeko language?

In other words, to what extent do you think the constructs in the language are sufficient to express a wide range of change patterns?

	1	2	3	4	5	
Limited	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Expressive

How likely is it that you would recommend Qwalkeko to a researcher in Mining Software Repositories? \*

	1	2	3	4	5	
Unlikely	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Likely

How useful do you think Qwalkeko is for researchers in Mining Software Repositories? \*

	1	2	3	4	5	
Useless	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Useful

How likely is it that you would consider using Qwalkeko yourself?  
(not per se for MSR/research purposes) \*

1            2            3            4            5

Unlikely                        Likely

If you would use Qwalkeko yourself, what would you use it for?

Mining software repositories to query certain change patterns

---

How did you experience the learning curve of Qwalkeko? \*

- Very smooth, I almost immediately understood most concepts to start writing queries.
- Smooth, it took me a short while to understand most concepts, but I've got the hang of it now.
- In between, I understand the basics, and I'm confident I will become more proficient with some more practice.
- Steep, I think I understand the basics, but it will take a lot of practice to become proficient.
- Very steep, there still are many basic concepts that are unclear or difficult.

Were there specific things that you found difficult or tedious? If so, why?

The IDE needs improvement if you ever want to use this in practice; browsing through the combined documentation of JDT and Ekeko is tedious, something like autocompletion would be nice.

---

Were there any specific things that you like about Qwalkeko? If so, why?

Yes, the core of the language is easy to use and expressive

---

Do you have specific feature requests? Is there anything that you wish was available in the language?

Not in the language per se, perhaps more build-in primitive relationships to make certain frequently necessary predicates less tedious

---

What is your overall rating for the Qwalkeko query language? \*

	0	1	2	3	4	5	
Bad	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Excellent

Did your rating change compared to part 1 of the questionnaire? If so, can you comment why?

Yes, hands-on experience always makes things easier to understand

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Finally, is there anything else you'd like to mention?

N/A

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# Google Forms



# Qwalkeko user study - part 2/2

What is your anonymous name? \*

moose

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## Please submit your queries here \*

Select the three queries that you wrote in userstudy.clj, and copy-paste it all into this text box.

```
(ns
  ; ...
  (:use [damp.ekeko.jdt.convenience :as ejdt])
  (:use [damp.ekeko.jdt.aststructure :as east])
  ; ...
)
```

```
; ...
```

; Task 2.1 - Write a query that looks for methods that were private, but they are now changed to public

```
(defn task-2-1 [before after]
  (fresh [?node ?modifiers ?modifier ?node-after ?modifiers-after ?modifier-after]
    (child+ before ?node)
    (ast :MethodDeclaration ?node)
    (has :modifiers ?node ?modifiers)
    (contains ?modifiers ?modifier)
    (modifier|private ?modifier)

    (corresponding-method ?node before ?node-after after)
    (has :modifiers ?node-after ?modifiers-after)
    (contains ?modifiers-after ?modifier-after)
    (modifier|public ?modifier-after)
  ))
(run-task task-2-1)
```

; Task 2.2 - Write a query that looks for the removal of unused methods (i.e. private methods that are never called)

```
(defn task-2-2 [before after]
  (fresh [?method ?modifiers ?modifier ?declaration-name ?method-after]
    (child+ before ?method)
    ; Get the method
    (ast :MethodDeclaration ?method)
```

```
(has :modifiers ?method ?modifiers)
```

```
(contains ?modifiers ?modifier)
```

```
(modifier|private ?modifier)
```

```
; See if there are any usages in before
```

```
(has :name ?method ?declaration-name)
```

```
(fails
```

```
  (fresh [?invocation ?invocation-name]
```

```
    (child+ before ?invocation)
```

```
    (ast :MethodInvocation ?invocation)
```

```
    (has :name ?invocation ?invocation-name)
```

```
    (name-equals ?declaration-name ?invocation-name))))
```

```
; Check whether there is no corresponding method in 'after'
```

```
(fails
```

```
  (corresponding-method ?method before ?method-after after))
```

```
))
```

```
(run-task task-2-2)
```

```
; Task 2.3 - Write a query that looks for migrations of Junit 3 tests to Junit 4 tests
```

```
;
```

```
; Main changes between Junit 3 and 4:
```

```
; * Test classes no longer need to extend TestCase
```

```
; * setUp method can now have any name, but it should get a @Before annotation
```

```
; * tearDown method can now have any name, but it should get an @After  
annotation
```

```
; * test methods no longer need to have a "test" prefix, but should get a @Test  
annotation
```

```
(defn task-2-3 [before after]
```

```
  (fresh [?node ?supertype ?supertype-name ?supertype-name-str ?node-after
```

```
    ?name-before ?name-after ?name-before-str ?name-after-str
```

```
    ?setup ?setup-name ?setup-name-str
```

```
  ]
```

```
  (child+ before ?node)
```

```
; Original class extended TestCase
(ast :TypeDeclaration ?node)
(has :superclassType ?node ?supertype)
(has :name ?supertype ?supertype-name)
(name|simple-string ?supertype-name ?supertype-name-str)
(== ?supertype-name-str "TestCase")
```

```
; Find the same class in the after code
(child+ after ?node-after)
(ast :TypeDeclaration ?node-after)
(has :name ?node ?name-before)
(has :name ?node-after ?name-after)
(name|simple-string ?name-before ?name-before-str)
(name|simple-string ?name-after ?name-after-str)
(== ?name-before-str ?name-after-str)
```

```
; Find @Before
(fresh [?setup ?setup-name ?setup-name-str
       ?after-method ?after-method-mods ?after-method-mod
       ?after-type-name ?annotation-name]
(child+ ?node ?setup)
(ast :MethodDeclaration ?setup)
(has :name ?setup ?setup-name)
(name|simple-string ?setup-name ?setup-name-str)
(== ?setup-name-str "setUp"))
```

```
; Find @Before
(child+ after ?after-method)
(ast :MethodDeclaration ?after-method)
(has :modifiers ?after-method ?after-method-mods)
(contains ?after-method-mods ?after-method-mod)
(ast :MarkerAnnotation ?after-method-mod)
(has :typeName ?after-method-mod ?after-type-name)
(name|simple-string ?after-type-name ?annotation-name)
(== ?annotation-name "Before"))
```

```
; Find @After
```

```

(fresh [?teardown ?teardown-name ?teardown-name-str
      ?after-method ?after-method-mods ?after-method-mod
      ?after-type-name ?annotation-name]
  (child+ ?node ?teardown)
  (ast :MethodDeclaration ?teardown)
  (has :name ?teardown ?teardown-name)
  (name|simple-string ?teardown-name ?teardown-name-str)
  (== ?teardown-name-str "tearDown")

; Find @After
(child+ after ?after-method)
(ast :MethodDeclaration ?after-method)
(has :modifiers ?after-method ?after-method-mods)
(contains ?after-method-mods ?after-method-mod)
(ast :MarkerAnnotation ?after-method-mod)
(has :typeName ?after-method-mod ?after-type-name)
(name|simple-string ?after-type-name ?annotation-name)
(== ?annotation-name "After"))

; Find all methods that start with test
; TODO: Complete me

; Pseudo-code: find all test in before
; Then find all @Test in after
; Check if both have the same size

))
(run-task task-2-3)

```

---

## Exercise 2.1

Please rate the difficulty of this exercise \*

1      2      3      4      5

Easy                                    Hard

How much time did you take for this exercise? \*

Time

20 : 08

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

Answer is yes... But only because I know how to use things from Ekeko... If I only had the documentation of Qwalkeko, I would not have been able to express the query correctly.

---

---

## Exercise 2.2

Please rate the difficulty of this exercise \*

1      2      3      4      5

Easy                                    Hard

How much time did you take for this exercise? \*

Time

09 : 54

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

.....



## Exercise 2.3

Please rate the difficulty of this exercise \*

1      2      3      4      5

Easy                                    Hard

How much time did you take for this exercise? \*

Time

00 : 00

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

I was not able to express "if before had a setUp, then there has to be a method with @Before" (similar for tearDown and @After).

Due to time constraints, I could not finish the last part (checking for methods with a @Test prefix), however, this exercise was not clear on HOW to check it: since other approaches (besides the one that I mentioned as a comment in the code).

---

---

How would you rate the usability of the Qwalkeko language?

	1	2	3	4	5	
Difficult-to-use	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Easy-to-use

How would you rate the expressiveness of the Qwalkeko language?

In other words, to what extent do you think the constructs in the language are sufficient to express a wide range of change patterns?

	1	2	3	4	5	
Limited	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Expressive

How likely is it that you would recommend Qwalkeko to a researcher in Mining Software Repositories? \*

	1	2	3	4	5	
Unlikely	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Likely

How useful do you think Qwalkeko is for researchers in Mining Software Repositories? \*

	1	2	3	4	5	
Useless	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Useful

How likely is it that you would consider using Qwalkeko yourself? (not per se for MSR/research purposes) \*

	1	2	3	4	5	
Unlikely	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Likely

If you would use Qwalkeko yourself, what would you use it for?

---

How did you experience the learning curve of Qwalkeko? \*

- Very smooth, I almost immediately understood most concepts to start writing queries.
- Smooth, it took me a short while to understand most concepts, but I've got the hang of it now.
- In between, I understand the basics, and I'm confident I will become more proficient with some more practice.
- Steep, I think I understand the basics, but it will take a lot of practice to become proficient.
- Very steep, there still are many basic concepts that are unclear or difficult.

Were there specific things that you found difficult or tedious? If so, why?

Expressing the same thing twice in both the "before" and "after" code

---

Were there any specific things that you like about Qwalkeko? If so, why?

---

Do you have specific feature requests? Is there anything that you wish was available in the language?

More corresponding-... then only corresponding-method (think of classes, interfaces, variable declaration...). Although they can already be expressed using existing rules; they make walking over the source code twice a lot easier.

---

What is your overall rating for the Qwalkeko query language? \*

0      1      2      3      4      5

Bad                                          Excellent

Did your rating change compared to part 1 of the questionnaire? If so, can you comment why?

Most of the issues I have are the same issues I have with Ekeko. Comparing versions seems to be working okay.

---

Finally, is there anything else you'd like to mention?

---

---

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---

# Qwalkeko user study - part 2/2

What is your anonymous name? \*

anteater

---

---

## Please submit your queries here \*

Select the three queries that you wrote in userstudy.clj, and copy-paste it all into this text box.

; Task 2.1 - Write a query that looks for methods that were private, but they are now changed to public

(use 'damp.ekeko)

(defn task-2-1 [before after]

(fresh [?before-method ?after-method ?before-mods ?after-mods ?before-public-mod ?after-private-mod]

(child+ before ?before-method)

(ast :MethodDeclaration ?before-method)

(has :modifiers ?before-method ?before-mods)

(contains ?before-mods ?before-public-mod)

(modifier|private ?before-public-mod)

(corresponding-method ?before-method before ?after-method after)

(has :modifiers ?after-method ?after-mods)

(contains ?after-mods ?after-private-mod)

(modifier|public ?after-private-mod)))

(run-task task-2-1)

; Task 2.2 - Write a query that looks for the removal of unused methods (i.e. private methods that are never called)

(defn task-2-2 [before after]

(fresh [?unused-private-method ?modifiers ?private-mod ?method-name]

(child+ before ?unused-private-method)

(ast :MethodDeclaration ?unused-private-method)

(has :modifiers ?unused-private-method ?modifiers)

(contains ?modifiers ?private-mod)

(modifier|private ?private-mod)

(has :name ?unused-private-method ?method-name)

(fails

(fresh [?call-node ?callee-name]

(child+ before ?call-node)

```

    (ast :MethodInvocation ?call-node)
    (has :expression ?call-node ?callee-name)
    (name-equals ?callee-name ?method-name)))
(fails
  (fresh [?after-method]
    (corresponding-method ?unused-private-method before ?after-method after)))

(debug ?unused-private-method)

))
(run-task task-2-2)

```

; Task 2.3 - Write a query that looks for migrations of Junit 3 tests to Junit 4 tests  
;

; Main changes between Junit 3 and 4:

; \* Test classes no longer need to extend TestCase

; \* setUp method can now have any name, but it should get a @Before annotation

; \* tearDown method can now have any name, but it should get an @After  
annotation

; \* test methods no longer need the have a "test" prefix, but should get a @Test  
annotation

```

(defn task-2-3 [before after]
  (fresh [?before-class ?after-class]
    (child+ before ?before-class)
    (child+ after ?after-class)
    ; 1.
    (fresh [ ?before-class-extend ?before-class-name ?super-name ?after-class-name]
      ;(child+ ?before ?before-class)
      (ast :TypeDeclaration ?before-class)
      (has :superclassType ?before-class ?before-class-extend)
      (has :name ?before-class-extend ?super-name)
      (has :identifier ?super-name "TestCase")
      (has :name ?before-class ?before-class-name)

      ;(child+ ?after ?after-class)

```

```
(ast :TypeDeclaration ?after-class)
(has :name ?after-class ?after-class-name)
(name-equals ?before-class-name ?after-class-name)

(fails
  (fresh [?after-class-extend ?after-super-name]
    (has :superclassType ?after-class ?after-class-extend)
    (has :name ?after-class-extend ?after-super-name)
    (has :identifier ?after-super-name "TestCase"))))
))
(run-task task-2-3)
```

---

---

## Exercise 2.1

Please rate the difficulty of this exercise \*

	1	2	3	4	5	
Easy	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Hard

How much time did you take for this exercise? \*

Time

00 : 10

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

.....

---

---

## Exercise 2.2

Please rate the difficulty of this exercise \*

- |      |                       |                       |                                  |                       |                       |      |
|------|-----------------------|-----------------------|----------------------------------|-----------------------|-----------------------|------|
|      | 1                     | 2                     | 3                                | 4                     | 5                     |      |
| Easy | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> | Hard |

How much time did you take for this exercise? \*

Time

00 : 20

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

I did finish the exercise, but an abstraction to get the callers of a specific method would have been useful. I did not find this in the docs.

---

---

## Exercise 2.3

Please rate the difficulty of this exercise \*

1      2      3      4      5

Easy                                    Hard

How much time did you take for this exercise? \*

Time

00 : 30

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

Splitting up a large query with multiple branches into subqueries seemed not to work. Also, combination of `fresh` and `conde` leads to errors. For queries as large as this one, and also to create custom abstractions, creating subqueries as different functions would be useful.

.....

---

---

How would you rate the usability of the Qwalkeko language?

	1	2	3	4	5	
Difficult-to-use	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Easy-to-use

How would you rate the expressiveness of the Qwalkeko language?

In other words, to what extent do you think the constructs in the language are sufficient to express a wide range of change patterns?

	1	2	3	4	5	
Limited	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Expressive

How likely is it that you would recommend Qwalkeko to a researcher in Mining Software Repositories? \*

	1	2	3	4	5	
Unlikely	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	Likely

How useful do you think Qwalkeko is for researchers in Mining Software Repositories? \*

	1	2	3	4	5	
Useless	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Useful

How likely is it that you would consider using Qwalkeko yourself?  
(not per se for MSR/research purposes) \*

1                      2                      3                      4                      5

Unlikely                                                                        Likely

If you would use Qwalkeko yourself, what would you use it for?

---

How did you experience the learning curve of Qwalkeko? \*

- Very smooth, I almost immediately understood most concepts to start writing queries.
- Smooth, it took me a short while to understand most concepts, but I've got the hang of it now.
- In between, I understand the basics, and I'm confident I will become more proficient with some more practice.
- Steep, I think I understand the basics, but it will take a lot of practice to become proficient.
- Very steep, there still are many basic concepts that are unclear or difficult.

Were there specific things that you found difficult or tedious? If so, why?

Sometimes you need to specify a lot of steps to get to what is interesting. Maybe a few abstractions can help. E.g., going from a class declaration to the name of the class it extends.

---

Were there any specific things that you like about Qwalkeko? If so, why?

---

Do you have specific feature requests? Is there anything that you wish was available in the language?

AST diffs would be neat, to allow for easier specification of the queries.

---

What is your overall rating for the Qwalkeko query language? \*

0      1      2      3      4      5

Bad                                          Excellent

Did your rating change compared to part 1 of the questionnaire? If so, can you comment why?

I can't remember but I don't think so.

---

Finally, is there anything else you'd like to mention?

Hello!

---

---

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# Qwalkeko user study - part 2/2

What is your anonymous name? \*

spinosaurus

---

---

## Please submit your queries here \*

Select the three queries that you wrote in userstudy.clj, and copy-paste it all into this text box.

; Task 2.1 - Write a query that looks for methods that were private, but they are now changed to public

```
(defn task-2-1 [before after]
  (fresh [?method-decl ?modifiers ?private ?after-method]
    (child+ before ?method-decl)
    (ast :MethodDeclaration ?method-decl)
    (has :modifiers ?method-decl ?modifiers)
    (contains ?modifiers ?private)
    (ast-str-equals ?private "private")

    (corresponding-method ?method-decl before ?after-method after)
    (fails
      (fresh [?modifiers-after ?private-after]
        (has :modifiers ?after-method ?modifiers-after)
        (contains ?modifiers-after ?private-after)
        (ast-str-equals ?private-after "private")))))

(run-task task-2-1)
```

; Task 2.2 - Write a query that looks for the removal of unused methods (i.e. private methods that are never called)

```
(defn task-2-2 [before after]
  (fresh [?method-decl ?modifiers ?private ?name ?after-method]
    (child+ before ?method-decl)
    (ast :MethodDeclaration ?method-decl)
    (has :modifiers ?method-decl ?modifiers)
    (contains ?modifiers ?private)
    (ast-str-equals ?private "private")
    (has :name ?method-decl ?name)

    (fails
      (fresh [?method-inv]
```

```
(child+ before ?method-inv)
(ast :MethodInvocation ?method-inv)
(has :name ?method-inv ?name))) ; MISSING: check for (implicit) this receiver,
this only matches by name
```

```
(fails
(fresh [?method-after]
(child+ after ?method-after)
(ast :MethodDeclaration ?method-decl)
(has :name ?method-after ?name)))
))
```

```
(run-task task-2-2)
```

```
; Task 2.3 - Write a query that looks for migrations of Junit 3 tests to Junit 4 tests
```

```
;
```

```
; Main changes between Junit 3 and 4:
```

```
; * Test classes no longer need to extend TestCase
```

```
; * setUp method can now have any name, but it should get a @Before annotation
```

```
; * tearDown method can now have any name, but it should get an @After
annotation
```

```
; * test methods no longer need to have a "test" prefix, but should get a @Test
annotation
```

```
(defn task-2-3 [before after]
```

```
(fresh [?type-decl ?sct
```

```
    ?setup-method ?setup-name ?setup-method-after ?setup-method-after-
modifiers ?smamb
```

```
    ?tear-method ?tear-name ?tear-method-after ?tear-method-after-modifiers
?tmamb
```

```
    ?test-method ?test-name ?test-name-id ?test-name-str ?test-method-after ?test-
method-after-modifiers ?temamb
```

```
]
```

```
(child+ before ?type-decl)
```

```
(ast :TypeDeclaration ?type-decl)
```

(has :superclassType ?type-decl ?sct)  
(ast-str-equals ?sct "TestCase")

(child+ ?type-decl ?setup-method)  
(ast :MethodDeclaration ?setup-method)  
(has :name ?setup-method ?setup-name)  
(ast-str-equals ?setup-name "setUp")

(corresponding-method ?setup-method before ?setup-method-after after)  
(has :modifiers ?setup-method-after ?setup-method-after-modifiers)  
(contains ?setup-method-after-modifiers ?smamb)  
(ast-str-equals ?smamb "@Before")

(child+ ?type-decl ?tear-method)  
(ast :MethodDeclaration ?tear-method)  
(has :name ?tear-method ?tear-name)  
(ast-str-equals ?tear-name "tearDown")

(corresponding-method ?tear-method before ?tear-method-after after)  
(has :modifiers ?tear-method-after ?tear-method-after-modifiers)  
(contains ?tear-method-after-modifiers ?tmamb)  
(ast-str-equals ?tmamb "@After")

(child+ ?type-decl ?test-method)  
(ast :MethodDeclaration ?test-method)  
(has :name ?test-method ?test-name)  
;(has :identifier ?test-name ?test-name-id)  
(debug ?test-name)  
(literal-value ?test-name ?test-name-str)  
(debug ?test-name-str)  
(str-starts-with ?test-name-str "test")

(corresponding-method ?test-method before ?test-method-after after)  
(has :modifiers ?test-method-after ?test-method-after-modifiers)  
(contains ?test-method-after-modifiers ?temamb)  
(ast-str-equals ?temamb "@Test")

))  
(run-task task-2-3)

---

---

## Exercise 2.1

Please rate the difficulty of this exercise \*

	1	2	3	4	5	
Easy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Hard

How much time did you take for this exercise? \*

Time

20 : 00

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

It is impossible from the .ekt to see that you can access `:modifiers`` of a method decl.

I had to grep this in the doc, and found it by chance.

In other words, tis is totally not clear, and things like the following in the doc do not help either:

"Alternatively, you can also check the list of all types of AST nodes. For a given type of AST node, you'll see several fields that end in `_PROPERTY`. For instance, a `TypeDeclaration` has a `MODIFIERS_PROPERTY` field, i.e. a property called `MODIFIERS`. In Qwalkeko this is reformatted as `:modifiers.`"

==> WTF?

---

---

## Exercise 2.2

Please rate the difficulty of this exercise \*

1      2      3      4      5

Easy                                    Hard

How much time did you take for this exercise? \*

Time

00 : 25

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

.....

---

---

## Exercise 2.3

Please rate the difficulty of this exercise \*

1      2      3      4      5

Easy                                    Hard

How much time did you take for this exercise? \*

Time

00 : 30

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

Go from a SimpleName to a string.  
.....

---

How would you rate the usability of the Qwalkeko language?

	1	2	3	4	5	
Difficult-to-use	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Easy-to-use

How would you rate the expressiveness of the Qwalkeko language?

In other words, to what extent do you think the constructs in the language are sufficient to express a wide range of change patterns?

	1	2	3	4	5	
Limited	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Expressive

How likely is it that you would recommend Qwalkeko to a researcher in Mining Software Repositories? \*

	1	2	3	4	5	
Unlikely	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Likely

How useful do you think Qwalkeko is for researchers in Mining Software Repositories? \*

	1	2	3	4	5	
Useless	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Useful

How likely is it that you would consider using Qwalkeko yourself?  
(not per se for MSR/research purposes) \*

	1	2	3	4	5	
Unlikely	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Likely

If you would use Qwalkeko yourself, what would you use it for?

(i) Check properties of my programs; (ii) find suitable benchmark programs

---

How did you experience the learning curve of Qwalkeko? \*

- Very smooth, I almost immediately understood most concepts to start writing queries.
- Smooth, it took me a short while to understand most concepts, but I've got the hang of it now.
- In between, I understand the basics, and I'm confident I will become more proficient with some more practice.
- Steep, I think I understand the basics, but it will take a lot of practice to become proficient.
- Very steep, there still are many basic concepts that are unclear or difficult.

Were there specific things that you found difficult or tedious? If so, why?

Level of abstraction pretty low.

---

Were there any specific things that you like about Qwalkeko? If so, why?

It looks very complete

---

Do you have specific feature requests? Is there anything that you wish was available in the language?

Interactive query matching, code completion.

---

What is your overall rating for the Qwalkeko query language? \*

0      1      2      3      4      5

Bad                                          Excellent

Did your rating change compared to part 1 of the questionnaire? If so, can you comment why?

Not really.

---

Finally, is there anything else you'd like to mention?

I still found it cool to do these exercises.

---

---

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# Qwalkeko user study - part 2/2

What is your anonymous name? \*

platypus

---

---

## Please submit your queries here \*

Select the three queries that you wrote in userstudy.clj, and copy-paste it all into this text box.

; Task 2.1 - Write a query that looks for methods that were private, but they are now changed to public

```
(defn task-2-1 [before after]
  (fresh [?method-declaration ?modifiers ?modifier ?modifier-public]
    (child+ before ?method-declaration)
    (ast :MethodDeclaration ?method-declaration)
    (has :modifiers ?method-declaration ?modifiers)
    (contains ?modifiers ?modifier)
    (has :keyword ?modifier ?modifier-public)
    (debug ?modifier-public)
    ; Cannot figure out how to test if the modifier == public...
  ))
; (run-task task-2-1)
```

; Task 2.2 - Write a query that looks for the removal of unused methods (i.e. private methods that are never called)

```
(defn task-2-2 [before after]
  (fresh [?method ?method-declaration ?method-name ?method-name-str]
    ; Get all method names
    (child+ before ?method)
    (ast :MethodDeclaration ?method-declaration)
    (has :name ?method-declaration ?method-name)
    (literal-value ?method-name ?method-name-str)
    ; Should test if it is private, but let's not go there again :p

    ; See if the method is used
    (fails
      (fresh [?method-invocation ?method-invocation-name ?method-invocation-name-str]
        (ast :MethodInvocation ?method-invocation)
        (has :name ?method-invocation ?method-invocation-name)
        (literal-value ?method-invocation ?method-invocation-name-str)
        (== ?method-name-str ?method-invocation-name-str)))
  ))
```

```

; See if it is still present in after
(fails
  (fresh [?after-method ?after-method-declaration ?after-method-declaration-name
?after-method-declaration-name-string]
    (child+ after ?after-method)
    (ast :MethodDeclaration ?after-method-declaration)
    (has :name ?after-method-declaration ?after-method-declaration-name)
    (literal-value ?after-method-declaration-name ?after-method-declaration-name-
str)
    (== ?after-method-declaration-str ?method-name-str)))
  ))
(run-task task-2-2)

```

```

; Task 2.3 - Write a query that looks for migrations of Junit 3 tests to Junit 4 tests
;

```

```

; Main changes between Junit 3 and 4:

```

```

; * Test classes no longer need to extend TestCase
; * setUp method can now have any name, but it should get a @Before annotation
; * tearDown method can now have any name, but it should get an @After
annotation
; * test methods no longer need the have a "test" prefix, but should get a @Test
annotation

```

```

(defn task-2-3 [before after]
  (fresh [?node ?class ?super-class ?super-class-name ?super-class-name-str ?after-
node ?after-class]

```

```

; Find all classes which extend TestCase
(child+ before ?node)
(ast :TypeDeclaration ?class)
(has :superclassType ?class ?super-class)
(has :name ?super-class ?super-class-name)
(has :identifier ?super-class-name ?super-class-name-str)
(== ?super-class-name-str "TestCase"); This does not work, why is comparing
names of things so overcomplicated?

```

```

; Now find the same class in after
(child+ after ?after-node)

```

```
(ast :TypeDeclaration ?after-class)
; Compare names: nope.jpg
```

```
(debug ?super-class-name-str)
))
(run-task task-2-3)
```

---

---

## Exercise 2.1

Please rate the difficulty of this exercise \*

	1	2	3	4	5	
Easy	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Hard

How much time did you take for this exercise? \*

Time

00 : 30

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

It was fairly easy to figure out how to access the AST node which contained whether or not a method was private. However, after this it seemed impossible to figure out the "value" of this node. I spent 20 minutes of my time trying to figure this out...

---

---

## Exercise 2.2

Please rate the difficulty of this exercise \*

- |      |                       |                       |                                  |                       |                       |      |
|------|-----------------------|-----------------------|----------------------------------|-----------------------|-----------------------|------|
|      | 1                     | 2                     | 3                                | 4                     | 5                     |      |
| Easy | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> | Hard |

How much time did you take for this exercise? \*

Time

00 : 30

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

I think I got the overall structure of the solution right. However, I did not try to figure out whether or not a method was private. Therefore I did not get to test my solution.

---

---

**Exercise 2.3**

Please rate the difficulty of this exercise \*

1      2      3      4      5

Easy                                    Hard

How much time did you take for this exercise? \*

Time

00 : 30

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

I had a hard time figuring out how to find the name of a superclass in qwalkeko. Afterwards, I ran out of time. I have to admit I did not really try here after my experience with the previous exercises.

---

---

How would you rate the usability of the Qwalkeko language?

1      2      3      4      5

Difficult-to-use                  Easy-to-use

How would you rate the expressiveness of the Qwalkeko language?

In other words, to what extent do you think the constructs in the language are sufficient to express a wide range of change patterns?

1      2      3      4      5

Limited                  Expressive

How likely is it that you would recommend Qwalkeko to a researcher in Mining Software Repositories? \*

1      2      3      4      5

Unlikely                  Likely

How useful do you think Qwalkeko is for researchers in Mining Software Repositories? \*

1      2      3      4      5

Useless                  Useful

How likely is it that you would consider using Qwalkeko yourself?  
(not per se for MSR/research purposes) \*

	1	2	3	4	5	
Unlikely	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Likely

If you would use Qwalkeko yourself, what would you use it for?

I do not see much use beyond MSR research.

---

How did you experience the learning curve of Qwalkeko? \*

- Very smooth, I almost immediately understood most concepts to start writing queries.
- Smooth, it took me a short while to understand most concepts, but I've got the hang of it now.
- In between, I understand the basics, and I'm confident I will become more proficient with some more practice.
- Steep, I think I understand the basics, but it will take a lot of practice to become proficient.
- Very steep, there still are many basic concepts that are unclear or difficult.

Were there specific things that you found difficult or tedious? If so, why?

Querying the AST seemed relatively straightforward, however, one often gets stuck in a position where (s)he is missing one primitive to get the identifier that is needed to solve some specific problem. Better documentation could improve this.

Furthermore, code seemed overly verbose, getting the name of a superclass inside a query requires 3 different "calls", while this seems like a fairly common pattern.

---

Were there any specific things that you like about Qwalkeko? If so, why?

A declarative tool seems very well suited to MSR research.

---

Do you have specific feature requests? Is there anything that you wish was available in the language?

A "standard library" which cuts down on the boilerplate (e.g. see if a method is public, find the superclass of a class, ...) would drastically improve the language as it is.

---

What is your overall rating for the Qwalkeko query language? \*

0      1      2      3      4      5

Bad                                          Excellent

Did your rating change compared to part 1 of the questionnaire? If so, can you comment why?

Writing qwalkeko queries was not as smooth as I imagined it would be while reading the queries. Therefore, I am subtracting some points.

---

Finally, is there anything else you'd like to mention?

---

---

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# Qwalkeko user study - part 2/2

What is your anonymous name? \*

stegosaurus

---

---

## Please submit your queries here \*

Select the three queries that you wrote in `userstudy.clj`, and copy-paste it all into this text box.

; Task 2.1 - Write a query that looks for methods that were private, but they are now changed to public

```
(defn task-2-1 [before after]
  (fresh [?method-modifier ?after-method-modifier ?modifier-type ?renamed-type]
    ;(child+ before ?node)
    ; TODO Please write your code here (Feel free to remove the above child+ ; it's only
    there to avoid compilation errors..)
```

```
    (child+ before ?method-modifier)
    (ast :FieldDeclaration ?method-modifier)
    (ast :MethodDeclaration ?method-modifier)
    (has :type ?method-modifier ?modifier-type)
```

```
    (child+ after ?renamed-type)
    (ast :FieldDeclaration ?renamed-type)
    (ast :MethodDeclaration ?renamed-type)
    (has :type ?method-modifier ?renamed-type)
    (type-equals ?modifier-type ?renamed-type)
    (field|introduced after before ?renamed-type)
  ))
```

```
(run-task task-2-1)
```

; Task 2.2 - Write a query that looks for the removal of unused methods (i.e. private methods that are never called)

```
(defn task-2-2 [before after]
  (fresh [?method ?access ?removed ?ftype ?rtype]
    ; TODO Please write your code here
    (child+ before ?method)
    (ast :MethodDeclaration ?method)
    (has :type ?method ?ftype)
    ;(fieldname-accesses ?method ?access)

    (child+ after ?removed)
    (ast :MethodDeclaration ?removed)
```

```
(has :type ?method ?rtype)
(type-equals ?ftype ?rtype)
(field|introduced before after ?removed)
```

```
(fails
(fresh [?caccess]
  (child+ after ?caccess)
  ;(fieldname-accesses ?removed ?caccess)
  ))
))
```

(run-task task-2-2)

---

---

## Exercise 2.1

Please rate the difficulty of this exercise \*

1            2            3            4            5

Easy                                                Hard

How much time did you take for this exercise? \*

Time

01 : 00

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

It was my first time to interact with clojure

---

---

## Exercise 2.2

Please rate the difficulty of this exercise \*

- |      |                       |                       |                       |                       |                                  |      |
|------|-----------------------|-----------------------|-----------------------|-----------------------|----------------------------------|------|
|      | 1                     | 2                     | 3                     | 4                     | 5                                |      |
| Easy | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | Hard |

How much time did you take for this exercise? \*

Time

01 : 00

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

It was my first time to interact with clojure

---

---

## Exercise 2.3

Please rate the difficulty of this exercise \*

1            2            3            4            5

Easy                                                Hard

How much time did you take for this exercise? \*

Time

01 : 00

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

I was not able to complete the first two exercises before this one

---

---

How would you rate the usability of the Qwalkeko language?

	1	2	3	4	5	
Difficult-to-use	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Easy-to-use

How would you rate the expressiveness of the Qwalkeko language?

In other words, to what extent do you think the constructs in the language are sufficient to express a wide range of change patterns?

	1	2	3	4	5	
Limited	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Expressive

How likely is it that you would recommend Qwalkeko to a researcher in Mining Software Repositories? \*

	1	2	3	4	5	
Unlikely	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Likely

How useful do you think Qwalkeko is for researchers in Mining Software Repositories? \*

	1	2	3	4	5	
Useless	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Useful

How likely is it that you would consider using Qwalkeko yourself? (not per se for MSR/research purposes) \*

	1	2	3	4	5	
Unlikely	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Likely

If you would use Qwalkeko yourself, what would you use it for?

Tracking code changes in my projects

---

How did you experience the learning curve of Qwalkeko? \*

- Very smooth, I almost immediately understood most concepts to start writing queries.
- Smooth, it took me a short while to understand most concepts, but I've got the hang of it now.
- In between, I understand the basics, and I'm confident I will become more proficient with some more practice.
- Steep, I think I understand the basics, but it will take a lot of practice to become proficient.
- Very steep, there still are many basic concepts that are unclear or difficult.

Were there specific things that you found difficult or tedious? If so, why?

No

---

Were there any specific things that you like about Qwalkeko? If so, why?

Mining software repositories

---

Do you have specific feature requests? Is there anything that you wish was available in the language?

---

What is your overall rating for the Qwalkeko query language? \*

0      1      2      3      4      5

Bad                                          Excellent

Did your rating change compared to part 1 of the questionnaire? If so, can you comment why?

No

---

Finally, is there anything else you'd like to mention?

No

---

---

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---

# Qwalkeko user study - part 2/2

What is your anonymous name? \*

Anonymous walrus

---

---

## Please submit your queries here \*

Select the three queries that you wrote in userstudy.clj, and copy-paste it all into this text box.

; Task 2.1 - Write a query that looks for methods that were private, but they are now changed to public

```
(defn task-2-1 [before after]
  (fresh [?bmethod ?bmodifiers ?bmodifier ?bkw ?amethod ?amodifiers ?amodifier]
    (child+ before ?bmethod)
    (ast :MethodDeclaration ?bmethod)
    (has :modifiers ?bmethod ?bmodifiers)
    (contains ?bmodifiers ?bmodifier)
    ;(debug ?bmodifier)
    (ast-str-equals ?bmodifier "private")
    ;(debug "this matches")

    (corresponding-method ?bmethod before ?amethod after)
    (has :modifiers ?amethod ?amodifiers)
    (contains ?amodifiers ?amodifier)
    ;(debug ?amodifier)
    (ast-str-equals ?amodifier "public")
    ;(debug "OK")
  ))
(run-task task-2-1)
```

; Task 2.2 - Write a query that looks for the removal of unused methods (i.e. private methods that are never called)

```
(defn task-2-2 [before after]
  (fresh [?bmethod ?bname ?bmodifiers ?bmodifier]
    ; 1. Look for all private methods in before
    (child+ before ?bmethod)
    (ast :MethodDeclaration ?bmethod)
    (has :modifiers ?bmethod ?bmodifiers)
    (contains ?bmodifiers ?bmodifier)
```

```
(ast-str-equals ?bmodifier "private")
(debug "Found private method" ?bmethod)
(has :name ?bmethod ?bname)
```

```
; 2. Filter out those that were removed
```

```
(fails
  (fresh [?amethod]
    (corresponding-method ?bmethod before ?amethod after)))
```

```
; 3. Check that they were never called in before
```

```
; Do this by failing if we can find any invocation
```

```
(fails
  (fresh [?node ?name]
    (child+ before ?node)
    (ast :MethodInvocation ?node)
    ;(debug ?node)
    (has :name ?node ?name)
    ;(debug "bname" ?bname)
    ;(debug "name" ?name)
    (name-equals ?name ?bname)
  ))
))
```

```
(run-task task-2-2)
```

```
; Task 2.3 - Write a query that looks for migrations of Junit 3 tests to Junit 4 tests
```

```
;
```

```
; Main changes between Junit 3 and 4:
```

```
; * Test classes no longer need to extend TestCase
```

```
; * setUp method can now have any name, but it should get a @Before annotation
```

```
; * tearDown method can now have any name, but it should get an @After
annotation
```

```
; * test methods no longer need to have a "test" prefix, but should get a @Test
annotation
```

```
(defn task-2-3 [before after]
```

```
  (fresh []
```

(conde ; I will check for anything that matches any of these conditions (or), as any of these indicates a switch to Junit 4

```
[(fresh [?bclass ?bsuper ?aclass ?asuper]
; 1. Look for class that extends TestCase
(child+ before ?bclass)
(ast :TypeDeclaration ?bclass) ; I assume a type declaration is always a class?
(has :superclassType ?bclass ?bsuper)
;(debug ?bsuper)
(ast-str-equals ?bsuper "TestCase")
;(debug "This class extends TestCase:" ?bclass)
```

```
; 2. Check if it no longer extends TestCase
```

```
(child+ after ?aclass)
```

(ast :TypeDeclaration ?aclass) ; I assume this is the same class as in 1. Maybe I should check its name?

```
(fails
(fresh []
(has :superclassType ?aclass ?asuper)
(ast-str-equals ?asuper "TestCase")))
])
```

```
[(fresh [?bmethod ?bmethodname ?asetupmethod]
```

```
; 1. Look for setUp method in before
```

```
(child+ before ?bmethod)
```

```
(ast :MethodDeclaration ?bmethod)
```

```
;(debug ?bmethod)
```

```
(has :name ?bmethod ?bmethodname)
```

```
(ast-str-equals ?bmethodname "setUp")
```

```
(debug "Method setUp found:" ?bmethod)
```

```
; - Check that it's no longer present in after
```

```
;(fails
```

```
;(corresponding-method ?bmethod before ?asetupmethod after))
```

```
;(debug "setUp has been removed")
```

```
; -> doesn't work, but also not necessary?
```

```
; 2. Look for method with @Before in after
```

```
(fresh [?anewmethod ?modifiers ?modifier]
```

```
(child+ after ?anewmethod)
(ast :MethodDeclaration ?anewmethod)
(debug ?anewmethod)
(has :modifiers ?anewmethod ?modifiers)
(contains ?modifiers ?modifier)
(ast-str-equals ?modifier "@Before")
(debug "found method with @Before:" ?anewmethod)

; 3. Check that they have the same body?
(fresh [?bbody ?abody]
  (has :body ?bmethod ?bbody)
  (has :body ?anewmethod ?abody)
  ;(debug ?bbody)
  ;(debug ?abody)
  ;(ast-equals ?bbody ?abody) -- this doesn't work and I don't know why
  (debug "they have the same body"))
)]
)
))
(run-task task-2-3)
```

---

---

## Exercise 2.1

Please rate the difficulty of this exercise \*

	1	2	3	4	5	
Easy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Hard

How much time did you take for this exercise? \*

Time

00 : 18

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

.....

---

---

**Exercise 2.2**

Please rate the difficulty of this exercise \*

1      2      3      4      5

Easy                                    Hard

How much time did you take for this exercise? \*

Time

00 : 10

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

I'm not sure it works though. I simply compare names to check whether the method is not invoked, but it might be another method with the same name.

---

---

## Exercise 2.3

Please rate the difficulty of this exercise \*

1      2      3      4      5

Easy                                    Hard

How much time did you take for this exercise? \*

Time

00 : 30

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

I think it would be more do-able if there were more helper functions for common scenarios (e.g. to get the method with name "setUp" in one line).

---

How would you rate the usability of the Qwalkeko language?

	1	2	3	4	5	
Difficult-to-use	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Easy-to-use

How would you rate the expressiveness of the Qwalkeko language?

In other words, to what extent do you think the constructs in the language are sufficient to express a wide range of change patterns?

	1	2	3	4	5	
Limited	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	Expressive

How likely is it that you would recommend Qwalkeko to a researcher in Mining Software Repositories? \*

	1	2	3	4	5	
Unlikely	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	Likely

How useful do you think Qwalkeko is for researchers in Mining Software Repositories? \*

	1	2	3	4	5	
Useless	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Useful

How likely is it that you would consider using Qwalkeko yourself?  
(not per se for MSR/research purposes) \*

1                  2                  3                  4                  5

Unlikely                                                            Likely

If you would use Qwalkeko yourself, what would you use it for?

\* In research, to check the use of specific libraries (although I don't think you need to compare changes for that, just one version would suffice).

\* If there was a library of common "code smells" (e.g. use of null), I could check my code against that.

---

How did you experience the learning curve of Qwalkeko? \*

- Very smooth, I almost immediately understood most concepts to start writing queries.
- Smooth, it took me a short while to understand most concepts, but I've got the hang of it now.
- In between, I understand the basics, and I'm confident I will become more proficient with some more practice.
- Steep, I think I understand the basics, but it will take a lot of practice to become proficient.
- Very steep, there still are many basic concepts that are unclear or difficult.

Were there specific things that you found difficult or tedious? If so, why?

- \* The environment is difficult (two Eclipse instances)
  - \* It's difficult to know how the different kinds of nodes that can appear in ASTs.
  - \* You often have to write a lot for something simple. E.g. to get names, modifiers...
- 

Were there any specific things that you like about Qwalkeko? If so, why?

- \* It seems very flexible: you can probably detect many patterns with it.
  - \* If you know about logic programming, it isn't difficult to get used to the language.
- 

Do you have specific feature requests? Is there anything that you wish was available in the language?

A larger "standard library" with commonly used functions, e.g. (method-public? ?amethod)

---

What is your overall rating for the Qwalkeko query language? \*

0      1      2      3      4      5

Bad                                          Excellent

Did your rating change compared to part 1 of the questionnaire? If so, can you comment why?

It stayed the same, but I think queries are easier to write than to understand :)

---

Finally, is there anything else you'd like to mention?

.....

---

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---

# Qwalkeko user study - part 2/2

What is your anonymous name? \*

Anonymous antilope

---

---

## Please submit your queries here \*

Select the three queries that you wrote in `userstudy.clj`, and copy-paste it all into this text box.

```
(defn task-2-1 [before after]
  (fresh [?method-decl ?after-method ?modifiers ?child ?str ?modifiers2 ?child2]
    (child+ before ?method-decl)
    (ast :MethodDeclaration ?method-decl)
    (has :modifiers ?method-decl ?modifiers)
    (contains ?modifiers ?child)
    (ast :Modifier ?child)
    (ast-str-equals ?child "private")

    (corresponding-method ?method-decl before ?after-method after)
    (ast :MethodDeclaration ?after-method)
    (has :modifiers ?after-method ?modifiers2)
    (contains ?modifiers2 ?child2)
    (ast :Modifier ?child2)
    (ast-str-equals ?child2 "public")
  ))
(run-task task-2-1)
```

---

## Exercise 2.1

Please rate the difficulty of this exercise \*

	1	2	3	4	5	
Easy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Hard

How much time did you take for this exercise? \*

Time

00 : 30

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

.....

---

---

**Exercise 2.2**

Please rate the difficulty of this exercise \*

1      2      3      4      5

Easy                                    Hard

How much time did you take for this exercise? \*

Time

00 : 00

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

I didn't finish the other exercises because the first exercise took a lot of time. Mainly due to figure out which properties an instance has + no support for debugging in anyway except using "(debug ...)". Might be handy to show in eclipse until which statement there are matches (and which ones)

---

---

## Exercise 2.3

Please rate the difficulty of this exercise \*

1      2      3      4      5

Easy                                    Hard

How much time did you take for this exercise? \*

Time

00 : 00

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

Didn't had the chance to even look at this exercise

---

How would you rate the usability of the Qwalkeko language?

1      2      3      4      5

Difficult-to-use                  Easy-to-use

How would you rate the expressiveness of the Qwalkeko language?

In other words, to what extent do you think the constructs in the language are sufficient to express a wide range of change patterns?

1      2      3      4      5

Limited                  Expressive

How likely is it that you would recommend Qwalkeko to a researcher in Mining Software Repositories? \*

1      2      3      4      5

Unlikely                  Likely

How useful do you think Qwalkeko is for researchers in Mining Software Repositories? \*

1      2      3      4      5

Useless                  Useful

How likely is it that you would consider using Qwalkeko yourself?  
(not per se for MSR/research purposes) \*

	1	2	3	4	5	
Unlikely	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Likely

If you would use Qwalkeko yourself, what would you use it for?

Refactorings

---

How did you experience the learning curve of Qwalkeko? \*

- Very smooth, I almost immediately understood most concepts to start writing queries.
- Smooth, it took me a short while to understand most concepts, but I've got the hang of it now.
- In between, I understand the basics, and I'm confident I will become more proficient with some more practice.
- Steep, I think I understand the basics, but it will take a lot of practice to become proficient.
- Very steep, there still are many basic concepts that are unclear or difficult.

Were there specific things that you found difficult or tedious? If so, why?

Going through the eclipse documentation to find the right properties to call etc.

---

Were there any specific things that you like about Qwalkeko? If so, why?

Its expressiveness

---

Do you have specific feature requests? Is there anything that you wish was available in the language?

debugger + autocomplete for properties

---

What is your overall rating for the Qwalkeko query language? \*

0      1      2      3      4      5

Bad                                          Excellent

Did your rating change compared to part 1 of the questionnaire? If so, can you comment why?

Not really, but it is harder to writing the queries (i.e. easier to understand what a query does by looking at it, rather than writing one by yourself)

---

Finally, is there anything else you'd like to mention?

---

# Google Forms



# Qwalkeko user study - part 2/2

What is your anonymous name? \*

Anonymous allosaurus

---

---

## Please submit your queries here \*

Select the three queries that you wrote in userstudy.clj, and copy-paste it all into this text box.

; Task 2.1 - Write a query that looks for methods that were private, but they are now changed to public

```
(defn task-2-1 [before after]
```

```
  ; TODO Please write your code here (Feel free to remove the above child+ ; it's only there to avoid compilation errors..)
```

```
  (fresh [?method-decl ?fparam ?fparam-name ?fparam-name-str ?after-method  
?modifier ?!left-after ?!left]
```

```
    (child+ before ?method-decl)
```

```
    (ast :MethodDeclaration ?method-decl)
```

```
    (child+ ?method-decl ?fparam)
```

```
    (has :modifiers ?method-decl ?modifier)
```

```
    ;(debug "2-1 modifier" ?modifier)
```

```
    (== ?modifier "private")
```

```
    (corresponding-method ?method-decl before ?after-method after)
```

```
    (child+ ?after-method ?!left-after)
```

```
    (ast/ast-ast|same ?!left ?!left-after)
```

```
    (has :modifiers ?after-method ?modifier)
```

```
    (== ?modifier "public"))
```

```
)
```

; Task 2.2 - Write a query that looks for the removal of unused methods (i.e. private methods that are never called)

```
(defn task-2-2 [before after]
```

```
  (fresh [?method-decl ?fparam ?fparam-name ?fparam-name-str ?after-method  
?modifier ?!left-after ?!left]
```

```
    (child+ before ?method-decl)
```

```
    (ast :MethodDeclaration ?method-decl)
```

```
    (child+ ?method-decl ?fparam)
```

```
    (has :modifiers ?method-decl ?modifier)
```

```
    (== ?modifier "private")
```

```
    (corresponding-method ?method-decl before ?after-method after)
```

```
(fails (fresh[]
  (child+ ?after-method ?left-after)
  (ast/ast-ast|same ?left ?left-after)
  (ast|invocation ?left-after)
))
))
```

```
(defn task-2-3 [before after]
  (fresh [?class-decl ?type-name ?method-decl ?fparam ?fparam-name ?fparam-
name-str ?after-method]
    (child+ before ?class-decl)
    (ast :TypeDeclaration ?class-decl)
    (has :SimpleType ?class-decl ?type-name)
    (literal-value ?type-name ?type-name-str)
    (== ?type-name-str "TestCase")
```

```
(corresponding-method ?class-decl before ?after-method after)
(fails
  (fresh [?type2-name ?type2-name-str]
    (ast/ast-ast|same ?class-decl after)
    (ast :TypeDeclaration ?after)
    (has :SimpleType ?after ?type2-name)
    (literal-value ?type2-name ?type2-name-str)
    (== ?type2-name-str "TestCase")
  ))
; part 2..
```

```
)
)
```

---

---

## Exercise 2.1

Please rate the difficulty of this exercise \*

1      2      3      4      5

Easy                                    Hard

How much time did you take for this exercise? \*

Time

00 : 24

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

.....



## Exercise 2.2

Please rate the difficulty of this exercise \*

1      2      3      4      5

Easy                                    Hard

How much time did you take for this exercise? \*

Time

00 : 27

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

.....



## Exercise 2.3

Please rate the difficulty of this exercise \*

1      2      3      4      5

Easy                                    Hard

How much time did you take for this exercise? \*

Time

00 : 30

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

The navigation to capture some of the more advanced concepts in order to create a query was a problem, so I spent time looking up how to capture an extend, for example. In the end all I had to capture was a SimpleType in the declaration, for part 1.

---

How would you rate the usability of the Qwalkeko language?

	1	2	3	4	5	
Difficult-to-use	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Easy-to-use

How would you rate the expressiveness of the Qwalkeko language?

In other words, to what extent do you think the constructs in the language are sufficient to express a wide range of change patterns?

	1	2	3	4	5	
Limited	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	Expressive

How likely is it that you would recommend Qwalkeko to a researcher in Mining Software Repositories? \*

	1	2	3	4	5	
Unlikely	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Likely

How useful do you think Qwalkeko is for researchers in Mining Software Repositories? \*

	1	2	3	4	5	
Useless	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Useful

How likely is it that you would consider using Qwalkeko yourself? (not per se for MSR/research purposes) \*

	1	2	3	4	5	
Unlikely	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Likely

If you would use Qwalkeko yourself, what would you use it for?

Essentially for querying source code.. cannot think of other reasons

How did you experience the learning curve of Qwalkeko? \*

- Very smooth, I almost immediately understood most concepts to start writing queries.
- Smooth, it took me a short while to understand most concepts, but I've got the hang of it now.
- In between, I understand the basics, and I'm confident I will become more proficient with some more practice.
- Steep, I think I understand the basics, but it will take a lot of practice to become proficient.
- Very steep, there still are many basic concepts that are unclear or difficult.

Were there specific things that you found difficult or tedious? If so, why?

Debugging specifically is a problem, only with print statements currently.

---

Were there any specific things that you like about Qwalkeko? If so, why?

Integration with the IDE. Makes the learning curve much less.

---

Do you have specific feature requests? Is there anything that you wish was available in the language?

Debugging, Graphic visualisation of the AST as a tree, rather than the current limited tree structure.

---

What is your overall rating for the Qwalkeko query language? \*

0      1      2      3      4      5

Bad                                          Excellent

Did your rating change compared to part 1 of the questionnaire? If so, can you comment why?

No

---

Finally, is there anything else you'd like to mention?

I have not seen such a similar tool before, so as a first impression this was pretty good.

---

---

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---

# Qwalkeko user study - part 2/2

What is your anonymous name? \*

anaconda

---

---

## Please submit your queries here \*

Select the three queries that you wrote in userstudy.clj, and copy-paste it all into this text box.

```
(defn task-2-1 [before after]
  (fresh [?node ?method-decl ?modifiers-before ?ident-before ?modifier ?node-after
?modifier-str]
    (child+ before ?node)
    (ast :MethodDeclaration ?node)
    (has :modifiers ?node ?ident-before)
    (contains ?ident-before ?modifier)

    (corresponding-method ?node before ?node-after after)
    (fresh [?modifiers-after ?modifier-after]
      (has :modifiers ?node-after ?modifiers-after)
      (contains ?modifiers-after ?modifier-after)
      (debug ?modifier-after)
    )

    (debug ?modifier )

    ; TODO Please write your code here (Feel free to remove the above child+ ; it's only
there to avoid compilation errors..)
  ))
(run-task task-2-1)
```

---

---

## Exercise 2.1

Please rate the difficulty of this exercise \*

1      2      3      4      5

Easy                                    Hard

How much time did you take for this exercise? \*

Time

00 : 40

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

.....

---

---

## Exercise 2.2

Please rate the difficulty of this exercise \*

1      2      3      4      5

Easy                                    Hard

How much time did you take for this exercise? \*

Time

00 : 20

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

.....



## Exercise 2.3

Please rate the difficulty of this exercise \*

1      2      3      4      5

Easy                                    Hard

How much time did you take for this exercise? \*

Time

00 : 00

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

.....



How would you rate the usability of the Qwalkeko language?

	1	2	3	4	5	
Difficult-to-use	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Easy-to-use

How would you rate the expressiveness of the Qwalkeko language?

In other words, to what extent do you think the constructs in the language are sufficient to express a wide range of change patterns?

	1	2	3	4	5	
Limited	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Expressive

How likely is it that you would recommend Qwalkeko to a researcher in Mining Software Repositories? \*

	1	2	3	4	5	
Unlikely	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Likely

How useful do you think Qwalkeko is for researchers in Mining Software Repositories? \*

	1	2	3	4	5	
Useless	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Useful

How likely is it that you would consider using Qwalkeko yourself?  
(not per se for MSR/research purposes) \*

1                  2                  3                  4                  5

Unlikely                                                            Likely

If you would use Qwalkeko yourself, what would you use it for?

In looking for patterns in source code on github projects for example.

---

How did you experience the learning curve of Qwalkeko? \*

- Very smooth, I almost immediately understood most concepts to start writing queries.
- Smooth, it took me a short while to understand most concepts, but I've got the hang of it now.
- In between, I understand the basics, and I'm confident I will become more proficient with some more practice.
- Steep, I think I understand the basics, but it will take a lot of practice to become proficient.
- Very steep, there still are many basic concepts that are unclear or difficult.

Were there specific things that you found difficult or tedious? If so, why?

The syntax of the language

---

Were there any specific things that you like about Qwalkeko? If so, why?

---

Do you have specific feature requests? Is there anything that you wish was available in the language?

---

What is your overall rating for the Qwalkeko query language? \*

	0	1	2	3	4	5	
Bad	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Excellent

Did your rating change compared to part 1 of the questionnaire? If so, can you comment why?

---

Finally, is there anything else you'd like to mention?

---

---

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# Qwalkeko user study - part 2/2

What is your anonymous name? \*

Anonymous hippopotamus

---

---

## Please submit your queries here \*

Select the three queries that you wrote in userstudy.clj, and copy-paste it all into this text box.

```
; *****  
; ** Qwalkeko user study - tasks 2.1, 2.2 and 2.3  
; *****
```

; Task 2.1 - Write a query that looks for methods that were private, but they are now changed to public

```
(defn task-2-1 [before after]
```

```
  (fresh [?before-method ?modifiers ?modifier ?after-method ?modifiers-after  
?modifier-after]
```

```
    (child+ before ?before-method)
```

```
    (ast :MethodDeclaration ?before-method)
```

```
    (has :modifiers ?before-method ?modifiers)
```

```
    (contains ?modifiers ?modifier)
```

```
    (ast-str-equals ?modifier "private")
```

```
    (corresponding-method ?before-method before ?after-method after)
```

```
    (has :modifiers ?after-method ?modifiers-after)
```

```
    (contains ?modifiers-after ?modifier-after)
```

```
    (ast-str-equals ?modifier-after "public")
```

```
  ))
```

```
; (run-task task-2-1)
```

```
; 20 minuten
```

; Task 2.2 - Write a query that looks for the removal of unused methods (i.e. private methods that are never called)

```
(defn task-2-2 [before after]
```

```
  (fresh [?before-method ?modifiers ?modifier ?before-method-name ?after-method]
```

```
    (child+ before ?before-method)
```

```
    (ast :MethodDeclaration ?before-method)
```

```
    (has :modifiers ?before-method ?modifiers)
```

```
    (contains ?modifiers ?modifier)
```

```

(ast-str-equals ?modifier "private")
(has :name ?before-method ?before-method-name)
(fails
  (fresh [?method ?access]
    (child+ before ?method)
    (fails
      (ast-equals ?method ?before-method)
    )
    (ast :MethodDeclaration ?method)
    (child+ ?method ?access)
    (ast :SimpleName ?access)
    (name-equals ?before-method-name ?access)
  )
)
(fails
  (corresponding-method ?before-method before ?after-method after)
)
(debug ?before-method-name)
))
;(run-task task-2-2)

```

; 14 minuten

; Task 2.3 - Write a query that looks for migrations of Junit 3 tests to Junit 4 tests

;

; Main changes between Junit 3 and 4:

; \* Test classes no longer need to extend TestCase

; \* setUp method can now have any name, but it should get a @Before annotation

; \* tearDown method can now have any name, but it should get an @After annotation

; \* test methods no longer need to have a "test" prefix, but should get a @Test annotation

```
(defn task-2-3 [before after]
```

```
  (fresh []
```

```
    ; check the use of 'extend TestCase' in before
```

```
    (fresh [?test-class ?super-class]
```

```
      (child+ before ?test-class)
```

```
(ast :TypeDeclaration ?test-class)
(has :superclassType ?test-class ?super-class)
(ast-str-equals ?super-class "TestCase")
)
```

; check that before does not use annotations Before, After en Test

```
(fails
(fresh [?annotation]
(child+ before ?annotation)
(ast :MarkerAnnotation ?annotation)
(conde
  (ast-str-equals ?annotation "@Test")
  (ast-str-equals ?annotation "@Before")
  (ast-str-equals ?annotation "@After")
)
)
)
)
```

; check that after does not use 'extend TestCase'

```
(fails
(fresh [?test-class ?super-class]
(child+ after ?test-class)
(ast :TypeDeclaration ?test-class)
(has :superclassType ?test-class ?super-class)
(ast-str-equals ?super-class "TestCase")
)
)
```

; check that after does not use annotations Before, After en Test

```
(fresh [?annotation]
(child+ after ?annotation)
(ast :MarkerAnnotation ?annotation)
(conde
  [(ast-str-equals ?annotation "@Test")]
  [(ast-str-equals ?annotation "@Before")]
  [(ast-str-equals ?annotation "@After")]
)
)
```

)

)

)

(run-task task-2-3)

; 23 minuten

---

---

## Exercise 2.1

Please rate the difficulty of this exercise \*

	1	2	3	4	5	
Easy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Hard

How much time did you take for this exercise? \*

Time

20 : 00

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

.....

---

---

## Exercise 2.2

Please rate the difficulty of this exercise \*

- |      |                       |                       |                                  |                       |                       |      |
|------|-----------------------|-----------------------|----------------------------------|-----------------------|-----------------------|------|
|      | 1                     | 2                     | 3                                | 4                     | 5                     |      |
| Easy | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> | Hard |

How much time did you take for this exercise? \*

Time

14 : 00

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

.....

---

---

**Exercise 2.3**

Please rate the difficulty of this exercise \*

1            2            3            4            5

Easy                                                                        Hard

How much time did you take for this exercise? \*

Time

23 : 00

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

.....

---

---

How would you rate the usability of the Qwalkeko language?

	1	2	3	4	5	
Difficult-to-use	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Easy-to-use

How would you rate the expressiveness of the Qwalkeko language?

In other words, to what extent do you think the constructs in the language are sufficient to express a wide range of change patterns?

	1	2	3	4	5	
Limited	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	Expressive

How likely is it that you would recommend Qwalkeko to a researcher in Mining Software Repositories? \*

	1	2	3	4	5	
Unlikely	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Likely

How useful do you think Qwalkeko is for researchers in Mining Software Repositories? \*

	1	2	3	4	5	
Useless	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	Useful

How likely is it that you would consider using Qwalkeko yourself? (not per se for MSR/research purposes) \*

	1	2	3	4	5	
Unlikely	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Likely

If you would use Qwalkeko yourself, what would you use it for?

MSR research

---

How did you experience the learning curve of Qwalkeko? \*

- Very smooth, I almost immediately understood most concepts to start writing queries.
- Smooth, it took me a short while to understand most concepts, but I've got the hang of it now.
- In between, I understand the basics, and I'm confident I will become more proficient with some more practice.
- Steep, I think I understand the basics, but it will take a lot of practice to become proficient.
- Very steep, there still are many basic concepts that are unclear or difficult.

Were there specific things that you found difficult or tedious? If so, why?

Learning the correct names of the AST nodes and connections was tedious (we would have to look up an example in the ekt file). It would be useful to have an overview of some sort in the documentation.

---

Were there any specific things that you like about Qwalkeko? If so, why?

I think the Qwalkeko language can be very powerful once mastered.

---

Do you have specific feature requests? Is there anything that you wish was available in the language?

I encountered some 'bugs' in the writing of task 2-3. I needed to add an empty scope at the start of the task, and I had to add square brackets around the conde options.

---

What is your overall rating for the Qwalkeko query language? \*

0      1      2      3      4      5

Bad                                          Excellent

Did your rating change compared to part 1 of the questionnaire? If so, can you comment why?

Yes, it improved: trying to understand a script written in a language you have never used can be difficult and confusing. Now, after having written scripts in the Qwalkeko language, I have a much better understanding of (a) how it works, and (b) the possibilities.

---

Finally, is there anything else you'd like to mention?

---

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# Qwalkeko user study - part 2/2

What is your anonymous name? \*

Anonymous alligator

---

---

## Please submit your queries here \*

Select the three queries that you wrote in userstudy.clj, and copy-paste it all into this text box.

; Task 2.1 - Write a query that looks for methods that were private, but they are now changed to public

```
(defn task-2-1 [before after]
  (fresh [?method-decl ?before-name ?modifier ?after-method ?after-name ?after-modifier]
    (child+ before ?method-decl)
    (ast :MethodDeclaration ?method-decl)
    (has :name ?method-decl ?before-name)
    (child+ ?method-decl ?modifier)
    (ast :Modifier ?modifier)
    (ast-str-equals ?modifier "private")

    (child+ after ?after-method)
    (ast :MethodDeclaration ?after-method)
    (has :name ?method-decl ?after-name)
    (== ?before-name ?after-name)
    (child+ ?after-method ?after-modifier)
    (ast :Modifier ?after-modifier)
    (ast-str-equals ?after-modifier "public")
  ))
(run-task task-2-1)
```

; Task 2.2 - Write a query that looks for the removal of unused methods (i.e. private methods that are never called)

```
(defn task-2-2 [before after]
  (fresh [?method-decl ?method-name ?method-name-str ?method-invocation
?modifier]
    (child+ before ?method-decl)
    (ast :MethodDeclaration ?method-decl)
    (child+ ?method-decl ?modifier)
    (ast :Modifier ?modifier)
    (ast-str-equals ?modifier "private")
```

```

(has :name ?method-decl ?method-name)
(fails
  (fresh [?method-invocation ?method-invocation-name ?method-invocation-
name-str]
    (child+ before ?method-invocation)
    (ast :MethodInvocation ?method-invocation)
    (has :name ?method-invocation ?method-invocation-name)
    (== ?method-invocation-name ?method-name)
  )
)
)
)
(run-task task-2-2)

```

; Task 2.3 - Write a query that looks for migrations of Junit 3 tests to Junit 4 tests

;

; Main changes between Junit 3 and 4:

; \* Test classes no longer need to extend TestCase

; \* setUp method can now have any name, but it should get a @Before annotation

; \* tearDown method can now have any name, but it should get an @After annotation

; \* test methods no longer need the have a "test" prefix, but should get a @Test annotation

```
(defn task-2-3 [before after]
```

```

  (fresh [?testclass ?testclass-name ?superclass ?superclass-name ?testclass-after
?testclass-after-name ?method ?method-name ?method-body ?method-after
?method-after-name ?method-after-body]

```

```

    (child+ before ?testclass)

```

```

    (ast :TypeDeclaration ?testclass)

```

```

    (has :name ?testclass ?testclass-name)

```

```

    (has :superclassType ?testclass ?superclass)

```

```

    (has :name ?superclass ?superclass-name)

```

```

    (ast-str-equals ?superclass-name "TestCase")

```

```

    (child+ after ?testclass-after)

```

```
(ast :TypeDeclaration ?testclass-after)
(has :name ?testclass-after ?testclass-after-name)
(ast-equals ?testclass-name ?testclass-after-name)
(fails
  (fresh [?superclass-after ?superclass-after-name]
    (has :superclassType ?testclass-after ?superclass-after)
    (has :name ?superclass-after ?superclass-after-name)
  )
)
```

```
(child+ before ?method)
(ast :MethodDeclaration ?method)
(has :name ?method ?method-name)
(ast-str-equals ?method-name "setUp")
(has :body ?method ?method-body)
```

```
(child+ after ?method-after)
(ast :MethodDeclaration ?method-after)
(has :name ?method-after ?method-after-name)
(has :body ?method-after ?method-after-body)
(ast-equals ?method-body ?method-after-body)
(debug ?method-after-name)
```

```
))
```

```
(run-task task-2-3)
```

---

---

## Exercise 2.1

Please rate the difficulty of this exercise \*

1      2      3      4      5

Easy                                    Hard

How much time did you take for this exercise? \*

Time

00 : 16

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

.....

---

---

## Exercise 2.2

Please rate the difficulty of this exercise \*

1      2      3      4      5

Easy                                    Hard

How much time did you take for this exercise? \*

Time

00 : 21

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

.....



## Exercise 2.3

Please rate the difficulty of this exercise \*

1      2      3      4      5

Easy                                    Hard

How much time did you take for this exercise? \*

Time

00 : 30

Could you finish this exercise? \*

- Yes
- Almost, I just needed more time.
- No, I got stuck because I needed to express something that Qwalkeko does not seem to have.
- No, I got stuck because I was not sure how to solve the exercise.
- No, for another reason.

If your answer was no, can you give some more details? (e.g. Which feature is missing? Was something unclear?)

.....

---

How would you rate the usability of the Qwalkeko language?

	1	2	3	4	5	
Difficult-to-use	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Easy-to-use

How would you rate the expressiveness of the Qwalkeko language?

In other words, to what extent do you think the constructs in the language are sufficient to express a wide range of change patterns?

	1	2	3	4	5	
Limited	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Expressive

How likely is it that you would recommend Qwalkeko to a researcher in Mining Software Repositories? \*

	1	2	3	4	5	
Unlikely	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Likely

How useful do you think Qwalkeko is for researchers in Mining Software Repositories? \*

	1	2	3	4	5	
Useless	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Useful

How likely is it that you would consider using Qwalkeko yourself?  
(not per se for MSR/research purposes) \*

1                  2                  3                  4                  5

Unlikely                                                            Likely

If you would use Qwalkeko yourself, what would you use it for?

Teaching

---

How did you experience the learning curve of Qwalkeko? \*

- Very smooth, I almost immediately understood most concepts to start writing queries.
- Smooth, it took me a short while to understand most concepts, but I've got the hang of it now.
- In between, I understand the basics, and I'm confident I will become more proficient with some more practice.
- Steep, I think I understand the basics, but it will take a lot of practice to become proficient.
- Very steep, there still are many basic concepts that are unclear or difficult.

Were there specific things that you found difficult or tedious? If so, why?

I found the semantics of certain construct sometimes confusing. For example, the ast-str-equals construct can only compare to a literate string, it cannot compare the string value of two ast nodes, although that was what I wanted to do.

---

Were there any specific things that you like about Qwalkeko? If so, why?

It is pretty easy to start writing queries and experimenting, the debug feature is very useful to see what is going on.

---

Do you have specific feature requests? Is there anything that you wish was available in the language?

---

What is your overall rating for the Qwalkeko query language? \*

0      1      2      3      4      5

Bad                                          Excellent

Did your rating change compared to part 1 of the questionnaire? If so, can you comment why?

Yes, it seems being able to write your own queries helps you appreciate the language, instead of trying to figure out what existing queries do. Also, I think it has to do with the questions that were asked: in the writing exercise, the questions were more applied and made sense, while the reading questions seemed more "arcane".

---

Finally, is there anything else you'd like to mention?

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