Syntax Warnings

Language-Integrated Nitpicking

foo.rkt

```
#lang racket/base

(require "util.rkt"
         racket/match
                (for-syntax    "macro-util.rkt")
            "macros.rkt"
                    racket/vector
  (for-syntax           "macro-util-more.rkt")
            (for-template "macro-output.rkt"))
```

Does this look wrong?

foo.rkt

```
#lang racket/base

(require (for-syntax "macro-util.rkt"
                     "macro-util-more.rkt")
         (for-template "macro-output.rkt")
         racket/match
         racket/vector
         "macros.rkt"
         "util.rkt")
```

What about this?

foo.rkt

```
#lang racket/base

(require (for-syntax "macro-util.rkt"
                     "macro-util-more.rkt")
         (for-template "macro-output.rkt")
         racket/match
         racket/vector
         "macros.rkt"
         "util.rkt")
```

Should this be enforced?

Compile errors are pass/fail

But humans use a continuum

foo.rkt

```
#lang racket/base

(require "util.rkt"
         racket/match
               (for-syntax    "macro-util.rkt")
           "macros.rkt"
                  racket/vector
  (for-syntax          "macro-util-more.rkt")
           (for-template "macro-output.rkt"))
```

Plain Racket

foo.rkt

```
#lang racket/base/warn                          WARNING!

(require "util.rkt"
         racket/match
                (for-syntax    "macro-util.rkt")
           "macros.rkt"
                    racket/vector
  (for-syntax             "macro-util-more.rkt")
           (for-template "macro-output.rkt"))
```

Racket with syntax warnings

foo.rkt

```
#lang racket/base/warn                          WARNING!

(require "util.rkt"
         racket/match
                (for-syntax    "macro-util.rkt")
           "macros.rkt"
                    racket/vector
  (for-syntax             "macro-util-more.rkt")
           (for-template "macro-output.rkt"))
```

Racket with syntax warnings

Require clauses annotated with warnings

```
(define warning
  (syntax-warning
   #:message "require clauses not in phase order"
   ...))
```

```
(define warning
  (syntax-warning
   #:message "require clauses not in phase order"
   #:stx require-stx
   ...))
```

```
(define warning
  (syntax-warning
   #:message "require clauses not in phase order"
   #:stx require-stx
   #:kind require:phase-order
   ...))
```

```
(define warning
  (syntax-warning
   #:message "require clauses not in phase order"
   #:stx require-stx
   #:kind require:phase-order
   ...))

(define-warning-kind require:phase-order)
```

```
(define warning
  (syntax-warning
   #:message "require clauses not in phase order"
   #:stx require-stx
   #:kind require:phase-order
   ...))
```

```
(define warning
  (syntax-warning
   #:message "require clauses not in phase order"
   #:stx require-stx
   #:kind require:phase-order
   #:fix fixed-stx))
```

```
(define warning
  (syntax-warning
   #:message "require clauses not in phase order"
   #:stx require-stx
   #:kind require:phase-order
   #:fix fixed-stx))

(define stx/warning (syntax-warn stx warning))
```

```
(define warning
  (syntax-warning
   #:message "require clauses not in phase order"
   #:stx require-stx
   #:kind require:phase-order
   #:fix fixed-stx))

(define stx/warning (syntax-warn stx warning))

(syntax-warnings stx/warnings)
```

```
(define warning
  (syntax-warning
   #:message "require clauses not in phase order"
   #:stx require-stx
   #:kind require:phase-order
   #:fix fixed-stx))

(define stx/warning (syntax-warn stx warning))

(syntax-warnings stx/warnings)
```

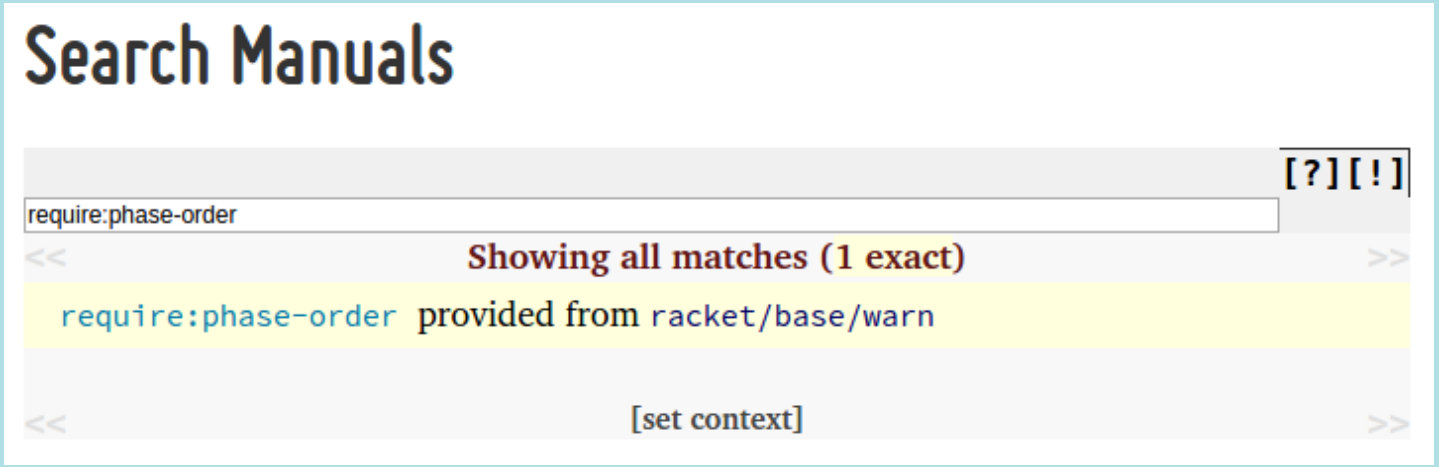
What now?

```
> raco warn foo.rkt
Checking 1 module
raco warn: /path/to/foo.rkt

  [require:phase-order]
  require clauses not in phase order

  2 (require foo
  3          (for-syntax bar)
  4          baz)
```

View warnings with **`raco warn`**



Warning kinds provide a documentation hook

```
> raco warn foo.rkt
Checking 1 module
raco warn: /path/to/foo.rkt

  [require:phase-order]
  require clauses not in phase order
    ...
  suggested fix:

  2 (require (for-syntax bar)
  3          baz
  4          foo)
```

Warning output includes suggested fix

```
> raco fix foo.rkt
Checking 1 module
raco fix: /path/to/foo.rkt: 1 warning, fixing
```

`raco fix` applies suggestions automatically

```
> raco fix --dry foo.rkt
Checking 1 module
raco fix: /path/to/foo.rkt: 1 warning, would fix
```

`--dry` option makes no changes

```
18  install:
19    - raco pkg install --auto
20        $TRAVIS_BUILD_DIR/mock
21        $TRAVIS_BUILD_DIR/mock-rackunit
22
23  script:
24    - raco warn --package mock
25    - raco test --package mock
```

Options for checking entire packages

Use in CI to enforce warnings

What if a warning is wrong?

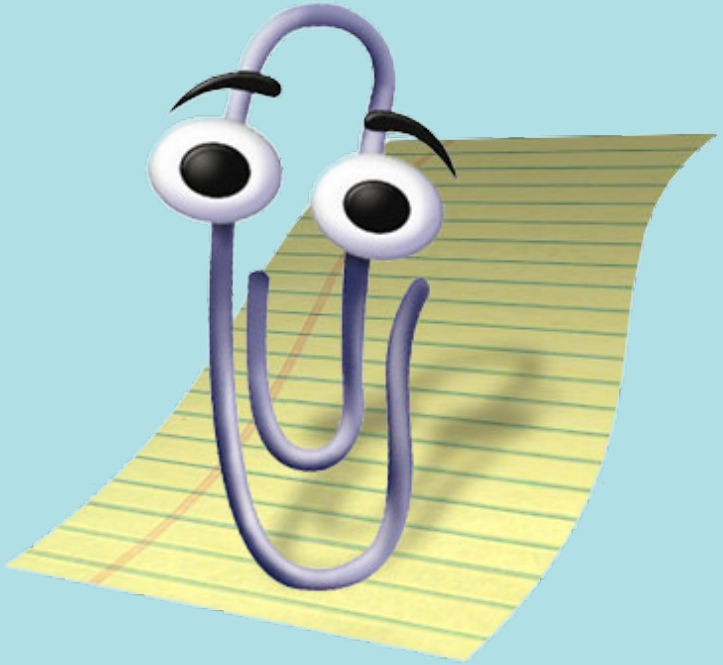
Or unhelpful?

Or just not your style?

What if a warning is wrong?

Or unhelpful?

Or just not your style?



foo.rkt

```
#lang racket/base/warn

(module warning-config racket/base/warn
  (define config (suppress require:phase-order))
  (provide config))

(require foo
         (for-syntax bar)
         baz)
```

We can configure warnings with submodules

What if I don't want to use a new language?

awesome.rkt

```
#lang racket/base

(require awesome-library)

;; deprecated! use (thing ...) instead
(make-thing ...)
```

We don't need a language to add warnings

awesome.rkt

```
#lang racket/base

(require awesome-library)

;; deprecated! use (thing ...) instead
(make-thing ...)
```

awesome-library can attach syntax warnings to uses of **make-thing**

```
> raco warn awesome.rkt

  [make-thing:deprecated]
  make-thing is deprecated, use thing instead

  6 (make-thing ...)

  suggested fix:

  6 (thing ...)
```

raco warn and **raco fix** just work!

With syntax warnings, packages can gradually improve client code over time

Future Work

awesome-library.rkt

```
#lang racket/base

(provide (deprecate-out make-thing)
         thing)

(define thing ...)
(define make-thing ...)
```

Automated deprecation warnings

```
> raco warn --watch --package my-package
raco warn: watching for changes...
```

More complex tooling

at-exp.rkt

```
#lang at-exp racket/base/warn


@require{foo.rkt}
```

Better support for custom readers

Built-in warnings for everything!

Built-in warnings for everything!

- Whitespace formatting
- Unused imports
- Unused variables
- Let where define would do

Built-in warnings for everything!

- Whitespace formatting
- Unused imports
- Unused variables
- Let where define would do
- Whatever you want!

Package system features

Package system features

- Package-wide configuration
- Catalog build system integration
- Automatically fixing client packages
- Using warnings for streamlined upgrades

Open problems

Suggested-fix construction is hard

Source locations need to be consistent

Macros can hide syntax warnings

If a macro produces bad code, who's to blame?

Configurable warnings?

People have different preferences for max line length

How should this information be specified?

GUI integration

What's a good way to show warnings in DrRacket? What about emacs?

Questions?

```
raco pkg install syntax-warn
```