

Extended Abstract: Iteration in ACL2, WITH .. DO

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TALK OVERVIEW

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For more about `DO LOOP$` expressions, see the documentation and supporting materials:

- ▶ `:DOC LOOP$`.
- ▶ `:DOC DO-LOOP$`.
- ▶ books/workshops/2022/kaufmann-moore/, especially:
 - ▶ The input file,
books/workshops/2022/kaufmann-moore/do-loops-input.lsp;
and
 - ▶ The output (log) file,
books/workshops/2022/kaufmann-moore/do-loops-log.txt.

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Evaluation strips out certain keywords and calls Common Lisp `loop`, for guard-verified and `:program-mode` evaluation.

**** DEMO ****

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Note that `OF-TYPE` informs the Common Lisp compiler but `:GUARD` does not, much like types vs. guards for a defun.

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Imperative “keywords” are capitalized for emphasis.

```
(defun next-line-etc (pos str lineno end)
  (LOOP$
    WITH newline-pos WITH start-pos = pos
    WITH next-pos = pos WITH next-lineno = lineno
    WITH line = "" WITH comment-p = nil
    DO
      :VALUES (nil nil nil)
      :MEASURE (nfix (- end next-pos)) ; not needed here
      (cond
        ((= next-pos end)
          (RETURN (mv line nil nil)))
        ((and comment-p
              (not (member (char str next-pos) '(#\+ #\*))))
          (RETURN (mv line next-pos next-lineno)))
        (t
          (PROGN
            (SETQ comment-p (eql (char str next-pos) #\*))
            (SETQ newline-pos
              (search *newline-string* str :start2 next-pos))
            (SETQ start-pos
              (scan-past-whitespace str next-pos
                                    (or newline-pos end))))
```

```

(cond
  (newline-pos
    (PROGN
      (SETQ next-pos (1+ newline-pos))
      (SETQ next-lineno (1+ next-lineno))
      (cond
        (comment-p (PROGN)) ; just keep going
        (t (PROGN
              (SETQ line
                    (let ((s1 (subseq str
                                     start-pos
                                     newline-pos)))
                      (if (equal line "")
                          s1
                          (concatenate 'string line s1))))
              (cond
                (= next-pos end)
                (RETURN (mv line nil nil)))
                ((eql (char str next-pos) #\+)
                 (SETQ next-pos (1+ next-pos)))
                ((eql (char str next-pos) #\*) (PROGN))
                (t (RETURN
                    (mv line next-pos next-lineno))))))))))

```

```
(t (RETURN
  (mv (if comment-p
    line
    (let ((s1 (subseq str start-pos end)))
      (if line
        (concatenate 'string line s1)
        s1)))
    nil
    nil)))))))))
```

Thank you. And we thank ForrestHunt, Inc. for the support.