Tip 42: Don't bother with `union`

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level: textbook reader
purpose: reduce cognitive load

I've read a lot of old computing manuals—I've even got a PL/I book on my shelf that I've spent many minutes flipping through. [On the language family tree, PL/I is in some ways the parent of a lot of languages, including ALGOL, FORTRAN, SAS, C, and other languages from the era when every language name was capitalized.]

These manuals cared a lot about *alignment*. Computer memory had certain preferred sizes, like eight-byte chunks, and those chunks were requisite for processing. If a variable began halfway through a chunk, you were screwed. I've had to deal with this here in my lifetime, when writing C code to interface with FORTRAN code; alignment bugs ensued.

R is a statistics-oriented scripting language that, under the hood, is a kind of LISP, implemented via *S expressions*, which can be of any type: integer, floating point, text, vector, list of other S expressions, function, something like two dozen options total. Also, roughly everything is an S expression—if you had 100,000 of them in memory at one time, it wouldn't be all that surprising, and at this point having a fraction of the memory footprint that one would have via a fixed-size struct would be noticeable. It's a somewhat clever setup, marred only by its lack of documentation [not that I'm bitter].

To summarize the use cases for using unions:

- Interfacing with FORTRAN '77, because unions solve the alignment problem we don't have anymore.

- Reimplementing LISP: you want to fight against C and pretend that it is an untyped language and wrap every data element in a container.

Are you doing either of those? If not, then don't bother—alignment is irrelevant on a modern machine, and any memory savings is near to it. Meanwhile, there are lots of problems with unions that can easily be avoided by just using structs instead.

[PS for those of you who got here by searching for *unions are useless*: I am a member of my local labor union. They've done good things.]