

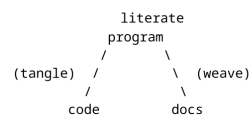


ISSUE 19 - VOL 2

Literate Programming by *~pgadey*

Literate programming is an approach to computer programming invented by Don Knuth. The idea is to simultaneously create both code and documentation as a single unified `_literate program_`. One then `_tangles_` the literate program in to source code, and `_weaves_` it in to documentation.

Here's the idea as an ASCII-tastic diagram.



In this little zine article, I want to show off a little hack-y bit of literate programming that my friend [Dave Gauer](#) put together called [RubyLit](#): "A literate programming system in 35 lines of Ruby".

Dave's system uses markdown as the syntax for the literate program, which can then contain code in arbitrary languages. The process of "weaving" is just compiling the markdown. The process of "tangling" is a bit more subtle.

To keep things simple, I'm going to illustrate with a straight forward "Hello, World!" To make it easier on your eyes, I'll make some of the leading spaces visible using the `_` character. Here is a complete listing of a literate program ``hello-world.md``. There are only three bits of syntax.

This is a very strange program.
The headers come after the main part!

```
#####<<Headers>>
#####<<Hello World>>

## Hello World
```

About ^Z

Ctrl-ZINE (^Z) is a Ctrl-c.club/Smol Web collaborative zine that celebrates tech and the Smol Web. Started in March 2023, Ctrl-ZINE publishes a monthly issue, where anyone can download a PDF version and a pre-folded PDF version for home printing. No digital format of the content is maintained on a Website whatsoever. Some of the topics within these issues range from Smol Web protocols and communities (ActivityPub, Tildeverse), Web-adjacent protocols (Gopher, Gemini), alternative forms of communication (HAM radio, LoRa, finger), snippets of code, artwork, and anything tech-related that is an expression of self.

Those who contribute to ^Z are passionate about what they share. They want what is best for Us, the citizens of the Web. With that, anyone with that same passion is welcome and encouraged to contribute to future issues. Further info can be found in the Editorial section of this issue. May the Smol Web live forever!

Editorial:

Ctrl-ZINE
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[EDITORIAL BACKLOG OF CHANGES: 1.changed the Submissions contact to loghead@ctrl-c.club from previous Fastmail address - 2.changed the "About ^Z" section to include LoRa and finger as examples of alternative forms of communication - 3.fixed grammatical issues in About ^Z section, added clarity]

The Hello World program is an absolute classic. It was made famous by the 1978 book The C Programming Language.

All it does is print "Hello, world!"
Let's put that in a string variable.

```
message = "Hello, world!"

Ruby uses this funny syntax `puts` for printing output.
You get used to it eventually.

puts message

## Headers
```

Headers are the boring part of the program.
Usually, they're called headers because they come at the start.
With literate programming, you can put the boring stuff last.

This line just tells bash to use `ruby` to interpret this file.

```
#!/usr/bin/env ruby
```

What are the three parts of syntax? Anything beginning with `##` creates a new "chunk". This syntax also introduces a sub-section in 'markdown'. A chunk can contain various code blocks which begin with a single space . In the example above, I've started my lines with five spaces because 'markdown' renders them as verbatim code which looks nicer. The code blocks inside chunks do not need to be consecutive; for example the declaration of `message` and `puts message` are in the same chunk. Lastly, the name of a chunk surrounded with `<<...>>` braces reproduces all the code from that chunk. The 'rubylit' program "tangles" the code by printing out all the code blocks and recursively expanding the `<<...>>` tags. The example above would produce the following tangled 'ruby' program:

```
#!/usr/bin/env ruby
message = "Hello, world!"
puts message
```

And so we have a very convoluted way to produce a "Hello, world!" program.

So, while I would love to feel like the Internet could be reclaimed? It's been thirty years since the 'Wild West of the Web.' The digital land has been settled and commodified.

I suppose that makes me and my fellows part of the modern digital homesteader movement. It isn't much, but it's been enough

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Individual nodes could and often would pass messages along and sync faster and more often, but that golden hour was one mandated and held as a minimum to allow traffic to flow. It was slow, and it frustrated even a lot of us oldsters that remembered the bad old days, much less the kids that were raised in full HD with everything at their fingertips all of the time. Yet there were plenty of kids getting involved, slowing down, giving us Olds ideas, and help.

Best part about all this? This mesh and the neighborhood nets were not two separate things. Fine, file transfer was very deliberately disallowed if it wasn't raw text, but the neighborhood net allowed, even with fancy interfacing, the local BBS, the wider web of what I thought of as the Cronenberg lovechild of HAM radio, SMS and Usenet.

It isn't perfect, but considering the neighborhood net servers could ingest and hold data from the normal web as well as anything their users uploaded as well as allowing us to push our own data onto the normal web? It was a fun hobbyist experiment that, by and large, self regulated. Bad Stuff did try making its way across, either in deliberate attempts at trafficking in Bad Things, or in the classic 'hey I don't mean any harm but I want to see what happens if I try Doing the Thing' and even with encrypted drive space? You would be amazed and proud of both what people will shrug at and ignore as it passes on, and what people will take the digital equivalent of a shotgun to immediately.

Nobody wants to be the reason this goes away. Even with its imperfections, it gives people a feeling of having a voice in a setting that both feels very local to where they are, and has enough reach to get out into the wider world. Ours aren't the only neighborhood networks either. Sure, can't share data over mesh, but people travel. When everyone has a computer and storage in their pockets via their phones, it was a bit of an ask to get those that run the Neighborhood Net to get people to install apps that dedicated parts of their phone's drive space to ferry data to and from for the sake of allowing things to pass from network to network that were just too much for mesh to handle, but a few brave and insane souls do this.

Why go to all this trouble? I think it's interesting to be able to talk about your code as you write it. Literate programming allows you to lay out your code base in a way that makes literary sense, and tells a story.

Another reason for doing this kind of writing is more Knuth-ian: you can write math about what you are programming. Knuth tends to write very mathematically heavy code. And so, he has a good reason for wanting 'TeX' enabled commentary on his code.

Initially, Knuth developed a literate programming system which was constrained to writing code in 'PASCAL' and outputting documentation in 'TeX'. Later, Silvio Levy developed 'CWEB' which is a literate programming system for 'C'. As of 2024, [CWEB](#) is still under active development; the most recent release was 4.12 on 2024-08-12. Norman Ramsey, a computer scientist at Tufts University, has been maintaining a language agnostic literary programming environment called [noweb](#) since 1989.

Is literate programming for everyone?
No.

Critics point out that the tooling around it is not great. It doesn't scale especially well to huge projects with many authors. (Though, Knuth did write 'TeX' as a literate program. It weaves to a book.) And, there isn't much need. People mostly seem to get by just writing comments. Some freaks get by without comments!

I think that literate program is a lot of fun. After you try it, you start thinking of coding in a different way. Last year, I had a great time re-writing 'soc' as a literate program.

You can read that program here:

<https://ctrl-c.club/~pgadey/notes/computers/#soc>

If you wind up doing anything with literate programming, or you think it's just a nifty idea, please let me know.

An Old Self-Help Memory Book by ~jules

The Roth Memory Course

When I was a kid, I came across "The Roth Memory Course", by David M. Roth, in my local library. It was an old book, possibly published in 1934, however other copies go as far back as 1918. It intrigued me at the time, because it claimed it could help improve the memory and increase mental power. I can't say it did any of those things for me, but I also never committed to it completely. It's gimmick, however, did seem to work. It allowed you to reserve as many slots in your memory as you were willing to dedicate, to enable you to memorize a list of things.

Getting a copy

As an adult, I was reminded of that book, and I wanted to look over it again. On eBay, you can probably purchase one for as low as \$13. However, I wasn't heavily invested in getting a physical book. I primarily wanted a specific list out of it. So, I turned to the Internet Archive, and yes, they had copy available (1).

The Book

The book is tailored around a memory pigeon hole system. You're given a list of keywords which you have to commit to memory. Once you have them committed to memory (*these are your memory slots*), you can, through association, memorize a similar number of items. All you would have to do is link the things you're trying to memorize with the keywords. Imagination, exaggeration, and a strong mental image is what you need to link your list with the keywords. Concepts and ideas can also be memorized, but you would have to craft an image that would represent them.

The system works, and one of my daughters still remembers a list she committed years ago. The keywords have been selected carefully to represent a number. So, if you memorize 30 things, you'll be able to name the 27th thing on your list. It can be seen as a parlor trick, but with a creative mind, you can probably apply this system to more practical matters. It's a lot like the Cicero Method.

slown by ~loghead

```
-----
/  . .  \  - hi
|  .    |
{  ---  }
=====
---[X]---
```

...so I arrive as this

```
_____ ~
/         ~\  a quiet one,
/-----[ ]\  safe and sound
|  +      +  |  in a town tucked
|  ---    -  |  into the forest..
|  ==|    ||  |
|  #####  |
```

```
..my city squirrels meld into
rural crickets. fumes of yesterday
give way to the tree-cured crisp air.
coffee in near silence is common, known.
```

```
I keep calm. I try my best. I exceed when I can.
The lights of years past may dimly flicker in
memory, but I can only glance forward to the shine
of tomorrow
```

You see, Mesh has a problem. Same problem Fidonet had in the eighties. Get more than a hundred or two hundred nodes talking and the routing overhead takes up most of your available message space and sending that information takes up most of your messaging time, thus causing the network to grind itself to a halt. Unfortunately Fidonet's region mapping can't be implemented on a one to one basis, as the end users are often people on the move either in a car or with a little node on a backpack, or even on their wrist. So we had to get clever.

I don't know the specifics. I've always been pants at coding, but I can share the dumbed down explanation as it was told to me. There's still that regional system, but the BBS nodes, the mast mounted Repeaters, the node I've got set up at Cat's Diner (little hole in the wall place my folks and a lot of other folk like) act as those regional hubs. They're the static points that act as the constellation all the mobile nodes use to have an awareness of where they are and how many other nodes they actually need to pay attention to. So there is this giant network of LoRa nodes where no single node is aware of everyone else. That'd be like me and you walking into Burning Man, or Defcon and both of us needing to know who everyone there is so we could talk to each other.

This set up allows what is a highly regional setup to hook into a wider national set up. All done by hobbyists for the most part, though I suspect more than a few have sponsorships with hardware manufacturers wanting to use this Othernet as a testbed to improve and iterate for actual commercial purposes. It's slow speed, Gods ... Even by nineties standards it would've been pretty slow dialup, and with the added issue of communication outside of your home region not being instant. So no pulling up AIM like in the old days and having a real time talk with some girl you thought was cute. The Fidonet comparisons have been made by more people than me. We'd kinda collectively agreed on a Messaging Hour just like the days of Old. One hour out of each day where data would propagate across the network. Unlike Ye Olden Days there was still local traffic, but any requests to reach beyond the five or so hops of what was around your mesh node to try getting your local BBS to grab something from a BBS out in ... say ... Minnesota? Delayed until Messaging Hour was up.

The System

Memorizing the keywords is not that difficult. The following is the first five keywords, and it all starts with a hat:

You start by visualizing the first one - a crazy-looking...

Hat

From the hat, you bring in the second keyword -

Hen.

The important thing, here, is to create a mental image that is unusual and memorable. In this instance, you could see out of the tiny hat pops out a huge hen.

Then the 3rd keyword,

Ham, comes into view, and you stop seeing the Hat. You only think of that huge hen landing on a whole ham and then starts dancing with it.

From there, you go on to -

Hare.

The hen is forgotten. The Hare lifts up the ham like a gymnast above its head. After that, (no more ham) the hare trips and starts tumbling, like a tiny little rock, down an enormous green -
Hill.

So now you have: hat, hen, ham, hare, hill. Once you have them firmly in place you can associate almost anything to them.

For example: milk, bread, apple, hot dogs, computer.

- a top HAT overflowing with milk;
- a HEN using a loaf of french bread as a sword;
- a slab of HAM being used to pulverize an apple;
- a HARE with hot dogs for ears;
- a HILL with keyboard keys littering it's landscape, and a monitor sticking out of the top.

When you call up your keywords, the corresponding associated word will pop up.

media like as a sort of hybrid between Facebook and Twitter. Local events, memes, and the like. It gives them a community feel they have long wanted, though they complain about how slow and/or limited it can be when there are networking hiccups because of whatever, or because a guy three hops down had to reboot. Still, it's very modern looking. There's even video sharing. What they only recently found out when our local ISP had outages is that the whole thing is completely independent of whether the Internet at large exists or not.

However, for me, the best part isn't even being Internet independant. The high bandwidth video and meme sharing neighborhood servers? That's just to get the normies on board enough to let me take on my more bold experiments.

It started with Meshtastic, but it is so much more than that base firmware. Over half a decade to grow and evolve within the constrained limits of what can be seen as slow dialup speeds at best is unattractive to normies. Admittedly there are a few instances where my step dad does appreciate that I'm trying to think of the wider community (a neighbor about a mile down the road is over a hundred. Insists on living on his own. So the man has a panic button that isn't tied to the Internet, or his cellphone. Something akin to those medical bracelets that can ping not just us but anyone else within five or so hops that are set up to re-transmit the alert gives everyone a little piece of mind that people aren't completely cut off from eachother in worst case situations.)

I'd set up four BBS nodes through the local cluster. Each of those nodes existing in weatherproof boxes connected to solar panels, large batteries, and a series of antenna. The setup isn't as cheap as getting a rak board to talk to one's phone, but the purpose is so much grander. There are three antennas for each of these nodes. One is an omni directional antenna. The other two are directional. Each of those are aimed at very specific nodes along the chain. Each of those targets are nodes set up by people with similar ideas to me but we only vaguely know rather than make any plans in the strictest sense.

2030 by ~Singletona082

Preamble

This is something I have gone over time and again. First as speculative fiction, then at me simply explaining what I want as an unrestrained end goal, and on with several other permutations and barely started but now discarded drafts. The advantage of zines, I suppose, is that people don't expect to be professional and polished. So I will simply do as I can and let the cards fall as they may.

I was technically there near the start of the home 8 bit micro era. I became computer aware at the height of the BBS era and saw The Net (what is now thought of as Web 1.0) take off and balloon. I have seen the rise of social media and its expansion into essentially becoming what 'online' represents for large swathes of people. This is a longhand way of saying I have Seen Things. There are people far wiser than me that were actively in the trenches, such as xwindows, as example. I am not claiming a privileged position of technical knowledge, just a position of having seen the shape of the past and arrogant enough to believe I have some notion of what might be.

The Short Version; Things Change yet for normies there won't be any explosive shakeups. For those in the niche hobbies, there are potentially interesting developments.

The Normal People and Normal Web

For normal people who only care about Facebook, Reddit, birdsite, and YouTube? It hasn't really changed. Fine, sure. Names have changed. Bluesky instead of Twitter (I refuse to call it X, even now) and whatever Facebook has rebranded itself to, and Google's third attempt at a Facebook-like platform. To me it just feels like more of the same.

That isn't to say there won't be changes. It's just, these are things normal people will at best grumble at. The further fragmentation of streaming services, some streaming services combining, other services playing ads even for paid accounts. AI is going to go the way of

hat => milk
hen => bread
ham => apple
hare => hot dogs
hill => computer

The list, by the way, goes up to 100.

Further Reading

If you find this system interesting, you can get access, and even a PDF download, at the link provided below. The book explains how to associate the keywords to numbers and why memorizing a new list is not a problem. It also goes on about memorizing other sorts of information, however I never delved too deeply into the other areas of the book. The link provided is not the only copy the Internet Archive has for the book. Like a lot of other books on their site, there are multiple publications of either the same print or other printings. Sometimes it's worth the time comparing what's available.

Notes:

(1) The Roth Memory Course
<https://archive.org/details/rothmemorycourse1918roth/page/n55/mode/2up>

block-chain. That is to say it may exist in a few niche applications, but the rampant speculation is going to... not die in a spectacular ball of fire, it's going to largely just be a case of most of the grifters moving on with a few smaller communities still going and forming a niche of long term users.

The current trends of bending knee to Oligarchs and Overlords will continue. There will be pushback. The companies at the heart of things will make token statements or act as if the pushback did something, then quietly ramp up with kissing the ring after the initial outrage dies. People have a limited ability to sustain outrage before fatigue sets in and most normal people didn't care to begin with, so wouldn't care after the initial incident if they aren't directly affected.

As I am _Not_ one of these normal people? I view this as a negative and I have ideas. This is not a true solution, nor do I feel it will widely be attempted. I acknowledge I am going through a fairly major pessimistic phase in life, so I may be discounting what those that do not like the Normal Way of Things are willing to do.

Let's Play a Game

So, will you join me in a game of 'What If?' It will be from the perspective of a hypothetical Me. A man in his mid forties unable to drive due to disability and living in a semi rural part of the South-East United States. I have picked this as our starting point because as I see it, politically and culturally this is one of the more hostile to non-normal locations in the United States.

Life goes on. The last six years have largely been a case of staying above water. Family has helped, much to the continued death of my pride, and I've tried to remain helpful to them in return. Yet in that time I've noticed for me the internet has largely become something I interact with sparingly rather than whole heartedly and enthusiastically embrace as I had in years and decades past. I am not the only one that has had this falling out of love, or at least feeling the internet has lost its usefulness.

So while the family checks their latest Facebook anger pit messages (Hey! What's this 'Federated' business they're doing with Twitter? Are they like business partners now?) I do my own electronic rounds. There are services that can be provided through the Internet, but aren't some new social media site, or even Mastodon (Bluesky has Federated with a lot of Mastodon sites, though their relative market share is still only around twenty percent.)

Tildes have been a part of my daily rotation for years, and I've finally gotten most of my friends to try Tilde-based services even if they don't personally use the command line aspects. This has helped not just in the abstract giving us weird-folk a home that has flown below mainstream attention that it's generally ignored, but given those in marginalized communities a series of communities and services that aren't getting crowded out by the types that want them to stop existing.

Hard to stamp out what one does not know exists. Is this ideal? No. Then again neither was turning the Internet into a giant siphon that keeps people angry and screaming. So we do what we can rather than try dismantling a system built by more money than God has ever seen? Tunnel around the problem.

That's the heart of the Internet after all; treat these things as network obstructions and route around so the information we want can flow.

For years, however, my attention hasn't been on the Internet properly. It's taken years, but I'd gotten local groups to start essentially connecting their home servers up to each other as a local net. Where I'm at isn't the kind of rural one sees in the Midwest with thousand acre farms, or as far in the back woods as deep Appalachia, but there's enough space between a lot of these shared servers that maybe one or two can connect to each other directly and even then it takes using the kind of directional antenna setup that generally isn't seen outside of ham radio.

My home is part of a relay of several of these servers. My folks access it by browser bookmarks i'd made that point them to a neighborhood landing page that's themed to be very modern social