The Shape of Our Notes

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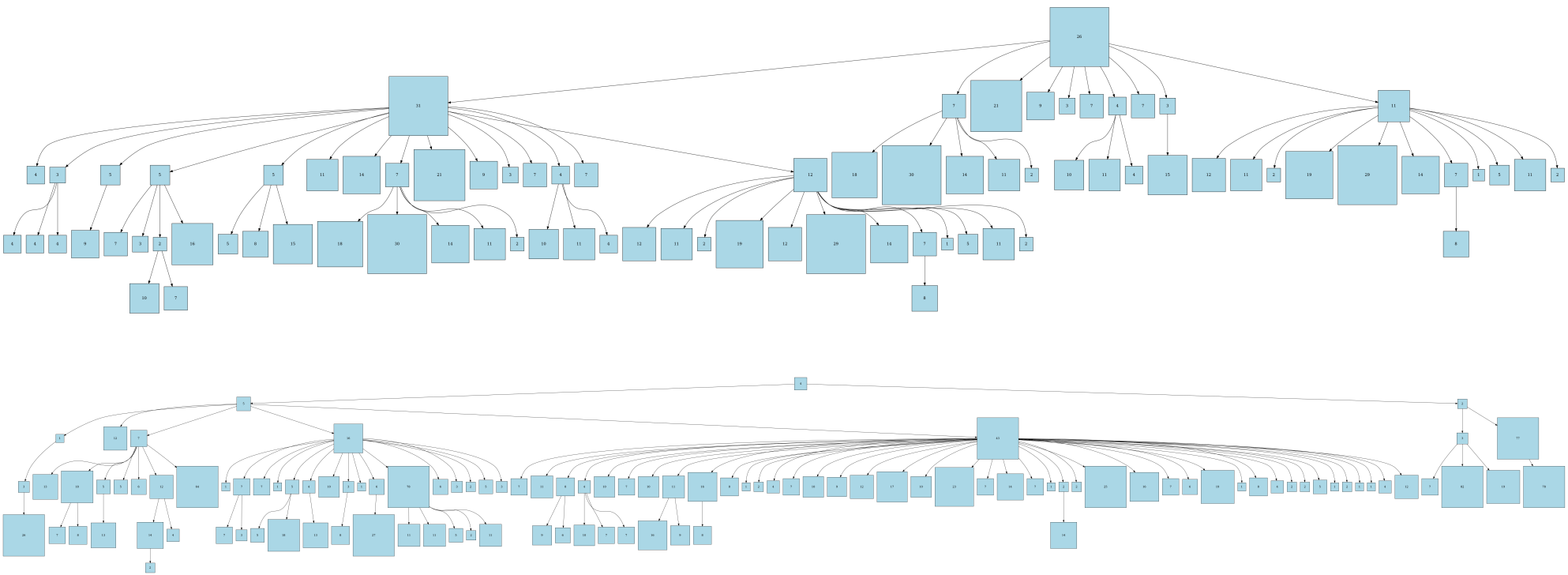
MathsJam 2025

A story

```
Notes
├── 2014
│   ├── Lecture notes 1
│   ├── Lecture notes 2
│   ├── ...
├── 2015
│   ├── Lecture notes 1
│   ├── Lecture notes 2
│   ├── ...
├── ...
```

```
Notes
├── My notes
│   ├── Course 1
│   ├── Course 2
│   ├── ...
├── Textbooks
│   ├── Field 1
│   ├── Field 2
│   ├── ...
├── ...
```

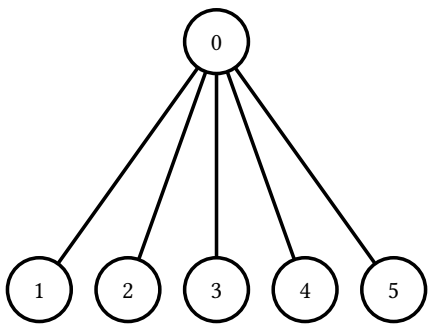
Our actual data

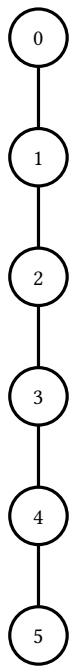


Comparison metrics

Question	Metric
How many clicks to get to a file?	Average Depth
What is the longest “best path” between files?	Diameter
How busy is the busiest folder?	Maximum Degree
How much does the “busyness” vary across the system?	Variance in Degree
What percentage of folders are “dead-ends”?	Proportion of “Leaves”
…	…

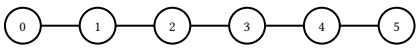
Star and Path





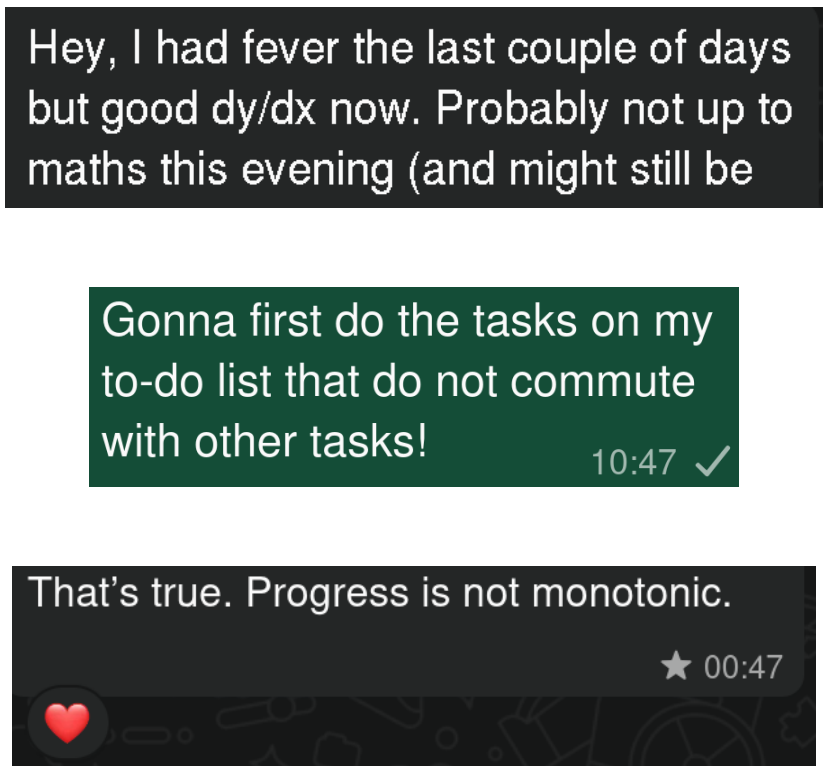
Star and Path

(Say we have N nodes)



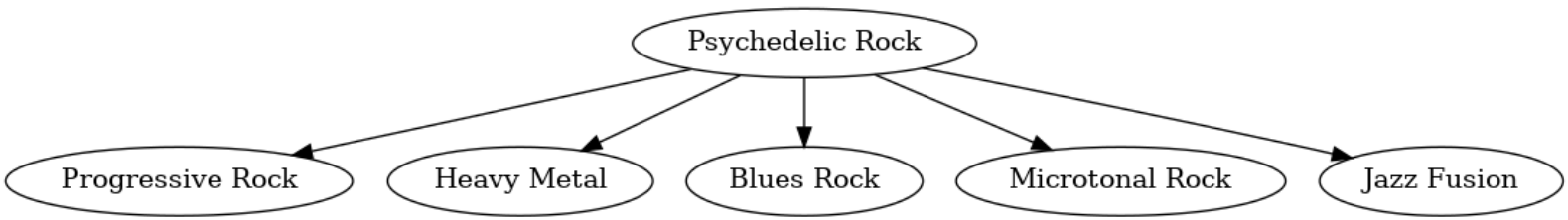
Metric	Star	Path
Average Depth	(lowest) nearly 1	(highest) roughly $\frac{N}{2}$
Diameter	(lowest) 2	(highest) $N - 1$
Maximum Degree	(highest) $N - 1$	(lowest) 2
Variance in Degree	(highest) nearly N	(lowest) nearly 0
Proportion of “Leaves”	(highest) nearly 1	(lowest) nearly 0

Shaping Language

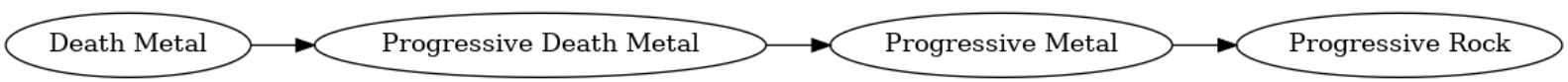


Shaping Language

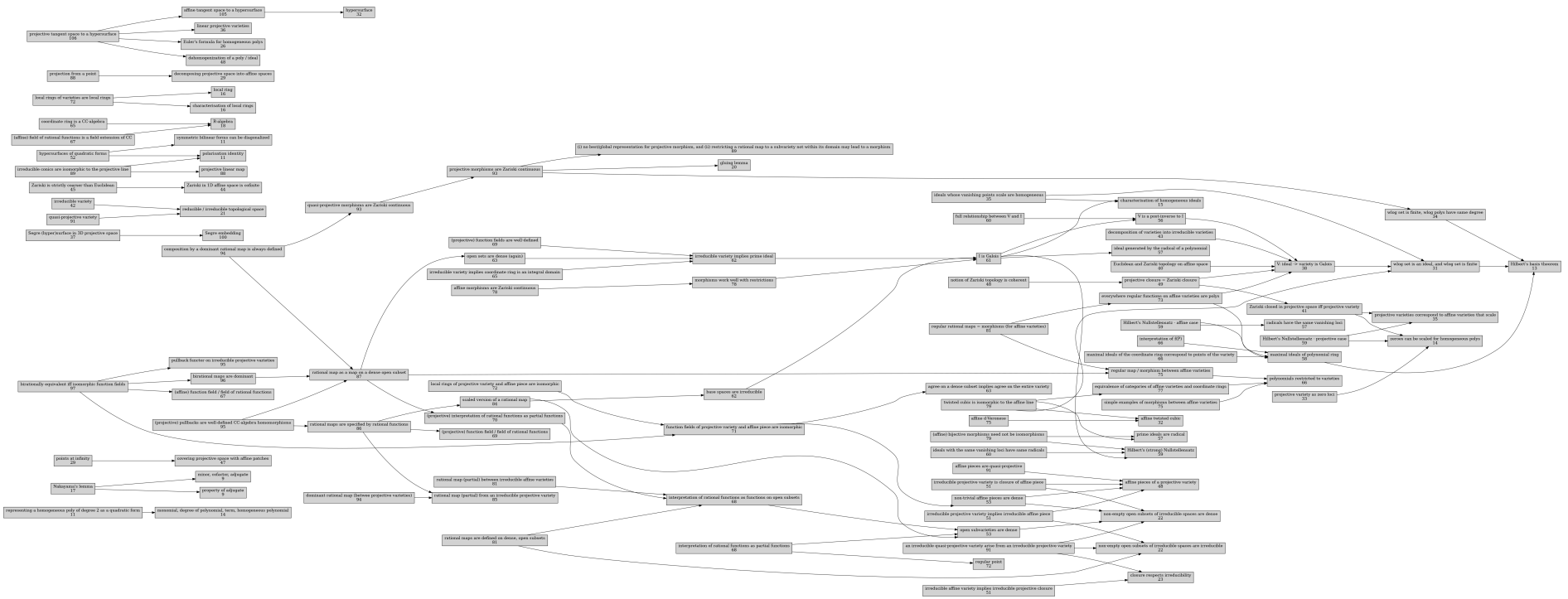
King Gizzard & the Lizard Wizard



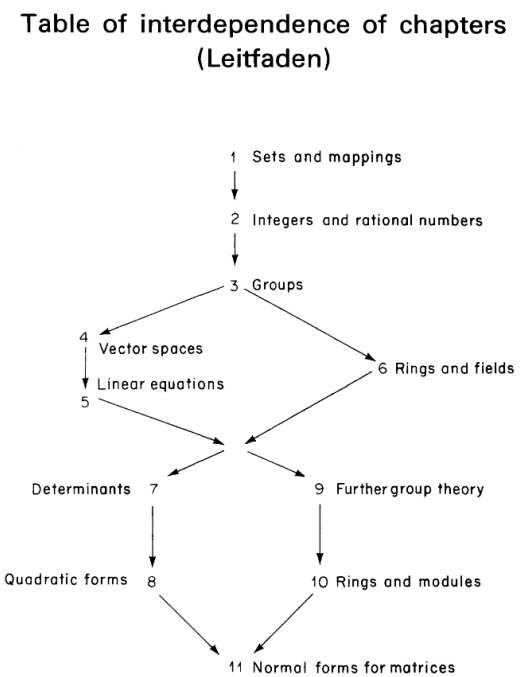
Opeth



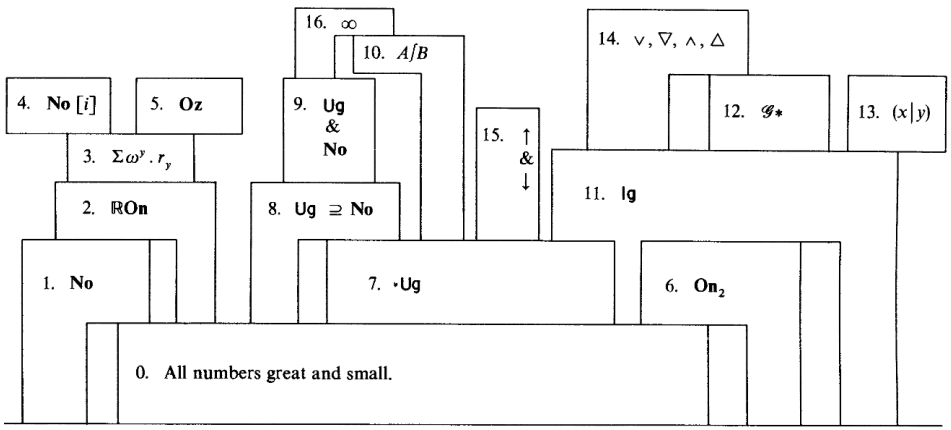
Proofs within a course



Leitfaden



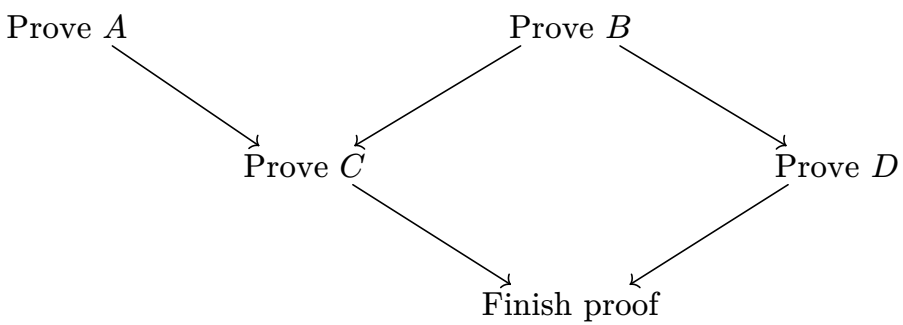
Algebra (Vol 1) - P.M. Cohn



Dependence of Chapters. (Not on oath!)

On Numbers and Games - J.H. Conway

Whilst doing maths



"Am I thinking too much like a path?"

"This proof is star-shaped, can I come back to the part I'm stuck on later?"

Thank you

I'm `@thricery` on `mathstodon.xyz`.

Speak to me about trying to assess the 'stariness' and 'pathicity' of

- maths courses across time,
- dependencies in formal proofs,
- anything else!