We will get started at 3:10

Media for Thought

A Samuel Pottinger
Stat 198: IDSV
April 14, 2025

Today

> Intro

Thinkers

Group activity

Wrap up

Final project

Stop drawing dead fish

Today

Intro

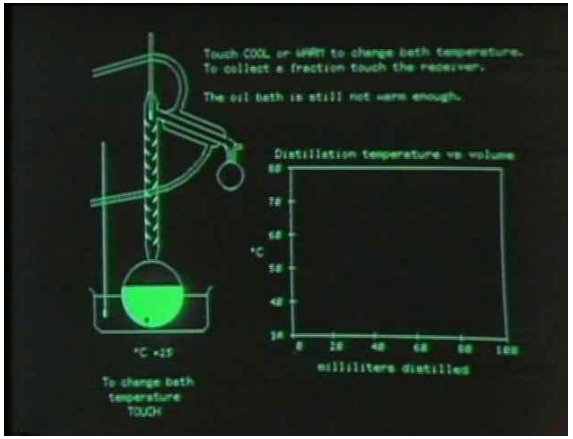
> Thinkers

Group activity

Wrap up

Final project

Some ingredients - Don Blitzer and Kenneth Iverson



Notation as a Tool of Thought

Kenneth E. Iverson
IBM Thomas J. Watson Research Center

Key Words and Phrases: APL, mathematical notation
CR Category: 4.2

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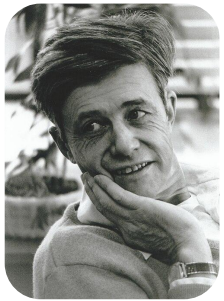
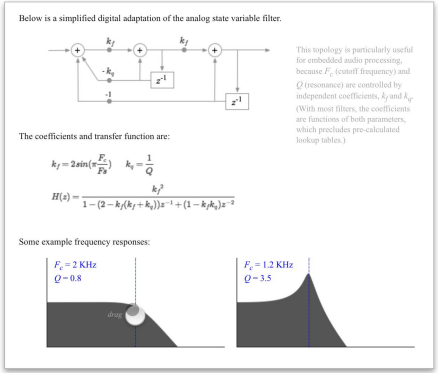
The importance of nomenclature, notation, and language as tools of thought has long been recognized. In chemistry and in botany, for example, the establishment of systems of nomenclature by Lavoisier and Linnaeus did much to stimulate and to channel later investigation. Concerning language, George Boole in his *Laws of Thought* [1, p.24] asserted "That language is an instrument of human reason, and not merely a medium for the expression of thought, is a truth generally admitted."

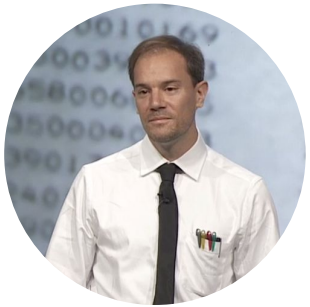
Mathematical notation provides perhaps the best-known and best-developed example of language used consciously as a tool of thought. Recognition of the important role of notation in mathematics is clear from the quotations from mathematicians given in Cajori's *A History of Mathematical Notations* [2, pp.332,331]. They are well worth reading in full, but the following excerpts suggest the tone:

> By relieving the brain of all unnecessary work, a good notation sets it free to concentrate on more advanced problems, and in effect increases the mental power of the race.
>
> A.N. Whitehead



Some ingredients - Bret Victor





Explorable Explanations

Bret Victor / March 10, 2011

postscript, February 2024

What does it mean to be an **active reader**?

An active reader asks questions, considers alternatives, questions assumptions, and even questions the trustworthiness of the author. An active reader tries to generalize specific examples, and devise specific examples for generalities. An active reader doesn't passively sponge up information, but uses the author's argument as a springboard for critical thought and deep understanding.

Do our reading environments encourage active reading? Or do they utterly oppose it? A typical reading tool, such as a book or website, displays the author's argument, and nothing else. The reader's line of thought remains internal and invisible, vague and speculative. We form questions, but can't answer them. We consider alternatives, but can't explore them. We question assumptions, but can't verify them. And so, in the end, we blindly trust, or blindly don't, and we miss the deep understanding that comes from dialogue and exploration.

Some ingredients - Maggie Appleton

The theoretical groundwork for why this kind of dynamic, interactive medium is critical to the future of interfaces has been well-trodden by Bret Victor . In pieces like Learnable Programming and Drawing Dynamic Visualizations Bret outlines a series of principles that make programmatic systems learnable. Such as being able to **read the vocabulary** of a programme, **see the state**, and **create by reacting** to what's on the screen in front of you. Programming portals are one way into these design patterns.

Composing rules with linear syntax is open-ended and flexible in a way that's difficult to recreate in visual interface elements. But that doesn't mean we should use *only* syntax. Intertwining graphical representations with logical syntax gives users the best of both worlds.

Some ingredients - Maggie Appleton

Some ingredients - Nicky Case

Parable of the Polygons

Evolution of Trust

Explorable Explanations

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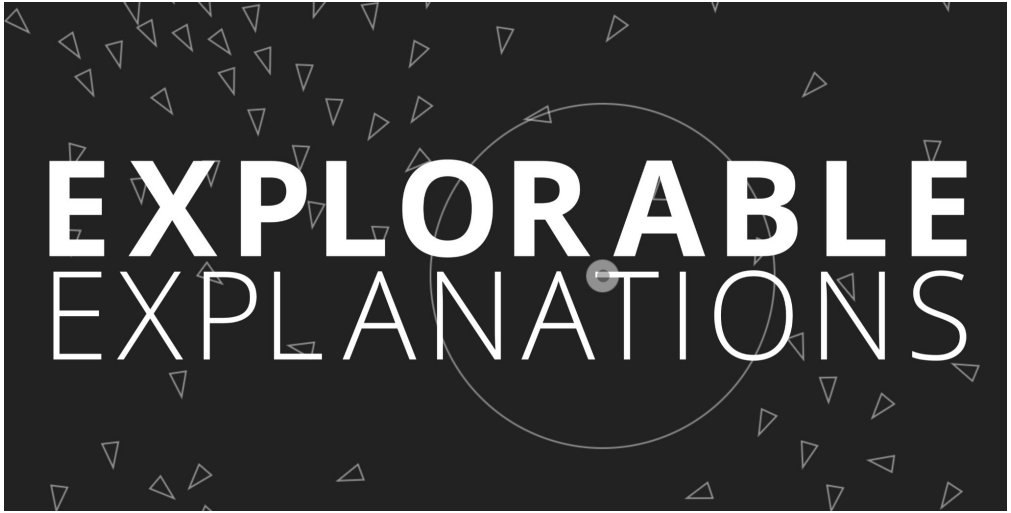
Group activity: explorables



https://explorabl.es

Find an explorable explanation

Identify the user loop

What does that user loop add that a static equivalent would not have?

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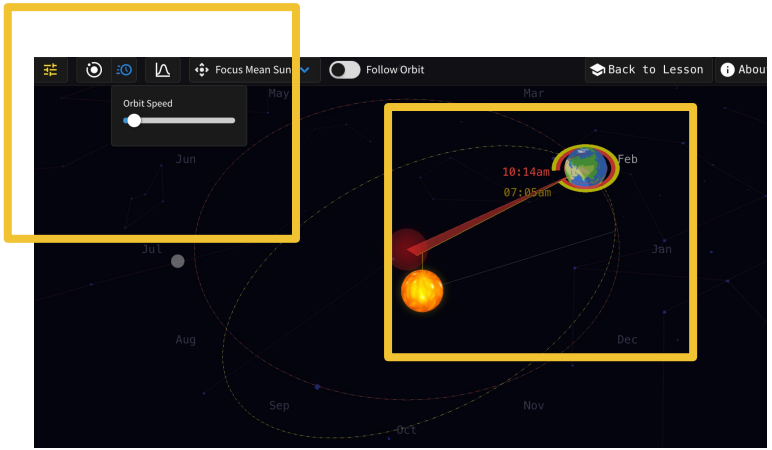
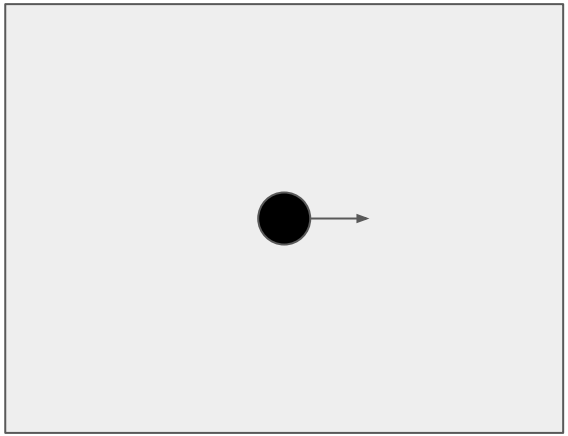
Possibility space and diegetic elements

Diegetic elements



Possibility space



How to think about media for thought

Assume the user to be a co-creator of meaning.

Create space for the user to explore outside of your narrative.

Offer meaningful controls but within a clear possibility space with clear user loops.

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Final project timeline

April 11: Final assigned.

May 1: Last day to get rough draft feedback.

May 2: Accommodations due.

May 14: Final projects due at 7pm on Zulip

May 14: Live presentations

May 16: Zoom presentation alternative

Final project objective

Above all else, this should be an interactive visualization you are proud of. All else is secondary.

Guidelines on Zulip but at least one user action and at least 6 variables though subject to exceptions (May 2 due date).

Pre-approved datasets in the course manual, reach out by April 21 if you have others.

Final project logistics

Live presentations: We will have three groups, one group will present and the other two provide feedback in expo-style. Only feedback that influences grade is from instructor. Friends and family welcome (may have 1 group be for those without preference or opt-out).

Zoom alternative: Direct presentations (not expo) with peer feedback due to Zoom constraints.

Appendix

Works cited

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