

GDC March 2001

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Rules

Design

LucasArts
Entertainment
Company LLC





Sketchy

Philosophical

Disclaimer:

- I like to build games that tell stories.
- I've never built an RTS or MMPO game.
- I'm not building one now.



What is Design?

- Planning
- conceiving of something not yet real
 - ...books
 - ...buildings
 - ...bridges
- Forward K instead of Inverse K

Are there any rules?

- Isn't designing just intuition?
- "Intuition" is a name for a process...
 - ...that is unknown
 - ...but that must exist
 - ...remember Phlogiston?

Are there any rules?

- Isn't designing just intuition?
- "Intuition" is a name for a process...
...that is unknown
...but that mu
...remember P

Late 17th Century
J. Becher & G. Stahl
Joseph Priestley
"dephlogisticated air"
Antoine Lavoisier
Combustion!

Are there any rules?

- The wonderful failures of AI research
 - ... War Games
 - ... block worlds
- Brain systems...
 - ... mostly unconscious
 - ... saccades

Are there any rules?

Steven Pinker; *How The Mind Works*; W.W. Norton & Company 1997; ISBN 0-393-04535-8

"I want to convince you that our minds are not animated by some godly vapor or single wonder principle. The mind, like the Apollo spacecraft, is designed to solve many engineering problems, and thus is packed with high-tech systems each contrived to overcome its own obstacles..."

Are there any rules?

"...I believe that the discovery by cognitive science and artificial intelligence of the technical challenges overcome by our mundane mental activity is one of the great revelations of science, an awakening of the imagination comparable to learning that the universe is made up of billions of galaxies or that a drop of pond water teems with microscopic life."

Are there any rules?

- Somehow, we compute our designs...
...unless, of course, what we do is
literally supernatural

Are there any rules?

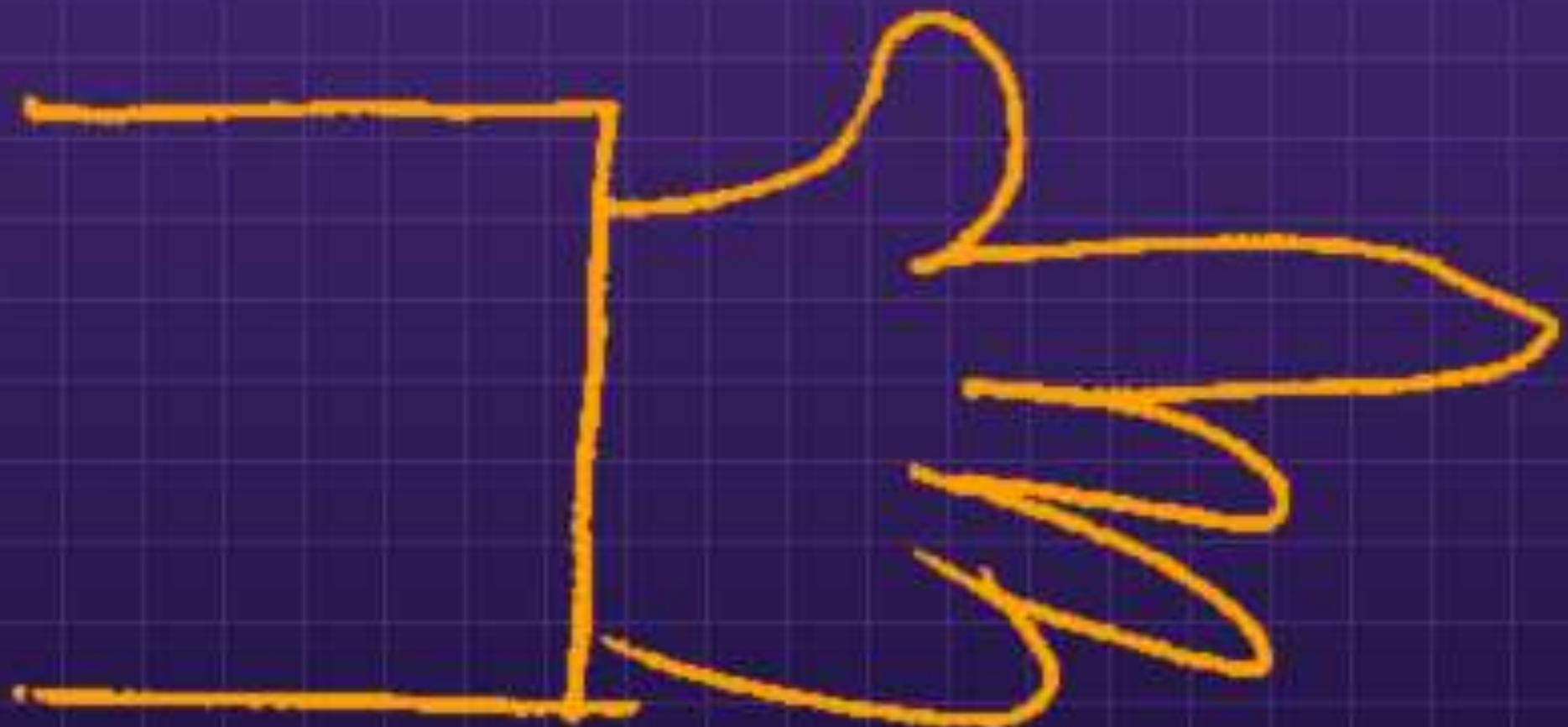
- If rules, where do they come from?
- How do we become aware of them?
- Make use of them?
- Sort them?
- Judge which ones apply?

I'm a believer

- Most of us have a Bag of Tricks...
...feed experience & insight
back into design process
- comforting...
...because it works
- Disturbing...
...because we're not sure why

Unknown Quantity

- How many rules are there?
- Doubt anyone knows...
...a lot.
- For purposes of this session...
...arbitrarily assume exactly 400
- Of that number...
...I propose to discuss just four



Four
of the
Four Hundred

ل ع س

The Chosen

1. Fight Player Fatigue
2. Maximize Expressive Potential
3. Maintain Level of Abstraction
4. Concretize Ideas

The Chosen

- Why pick these...
 - ...not the grandest
 - ...not the most trivial
 - ...not the most important
 - ...not the most precise
 - ...but useful & instructive
- Contrast with a content-free rule...
 - ...make good games

What's the Big Idea?

- I hope to make you comfortable with several notions...
 1. Design is a process of discovery
 2. It's inherently complicated
 3. It's not entirely rational
 4. Nevertheless...
...thoughtful habits pay off

What's the Big Idea?

- What design is not...
 - ...not a formal system
 - ...nor invention of an apparatus
 - ...nor any single algorithm
- Instead design seems to be...
 - ...a mysterious process based on...
 - ...our mental operations
 - ...our knowledge of human beings
 - ...the materials at hand

Real Rules

- Rules like these 4 aren't invented...
 - ...they already exist
 - ...we discover them
- The more we work at our trade...
 - ...the more we turn up
- Movie History analogy...

Real Rules

- D.W. Griffith invented CLOSE-UP...
...or did he?
...discovered fact of psychology

Real Rules

- D.W. Griff
...or did he
...discover

e-up...

ogy

...changing FOV

...not growth



Real Rules

- D.W. Griffith invented CLOSE-UP...
...or did he?
...discovered fact of psychology
...changing FOV
...not growth
- Hinted by painting & sculpture

Real Rules

- There's a vast dark continent of interactivity out there...
...it exists as human potential
- It's our task as designers...
...to discover
...to explore
...to map

Rules Demystified

- What are rules, anyway?
- Loosely speaking...
 - ...imperative procedures
 - ...conceived to reach defined states
 - ...also -- operations we actually use
- Notice their materialistic finitude



Fight Player Fatigue



Fight Player Fatigue

- Games are challenging...
 - ...often difficult
 - ...often repetitive
- Players get tired & give up
- Therefore...
 - ...designers must actively encourage players to continue

Fight Player Fatigue

- How do we do this?
 - ...games are pattern-y
 - ...one way is theme & variation
- Musical analogy...

Fight Player Fatigue

- Pop artists face a similar problem
- People rapidly tire of catchy tunes...
 - ...so elements are added
 - ...verses alternate with choruses
 - ...often there's a hook
 - ...often a bridge is inserted
 - ...sometimes a 2nd chorus

Fight Player Fatigue

- That song you heard as we began...
...Eric Clapton's "Promises"

verse

verse

chorus

verse

2nd chorus

chorus

verse

2nd chorus

chorus

[except, no music is available for this web show]

Fight Player Fatigue

...vary play intensity

Fight Player Fatigue



Fight Player Fatigue



Fight Player Fatigue

- ...vary play intensity
- ...introduce novel situations

Fight Player Fatigue



Fight Player Fatigue

- ...vary play intensity
- ...introduce novel situations
- ...add new types of play

Fight Player Fatigue



Fight Player Fatigue

- ...vary play intensity
- ...introduce novel situations
- ...add new types of play
- ...avoid confinement

Fight Player Fatigue



Fight Player Fatigue

- ...vary play intensity
- ...introduce novel situations
- ...add new types of play
- ...avoid confinement
- ...bestow rewards for success

Fight Player Fatigue



Idle Springs Talisman

Fight Player Fatigue

- ...vary play intensity
- ...introduce novel situations
- ...add new types of play
- ...avoid confinement
- ...bestow rewards for success
- ...advertise progress

Fight Player Fatigue



Fight Player Fatigue



Fight Player Fatigue

- ...vary play intensity
- ...introduce novel situations
- ...add new types of play
- ...avoid confinement
- ...advertise progress
- ...bestow rewards for success
- ...include subgames

Fight Player Fatigue

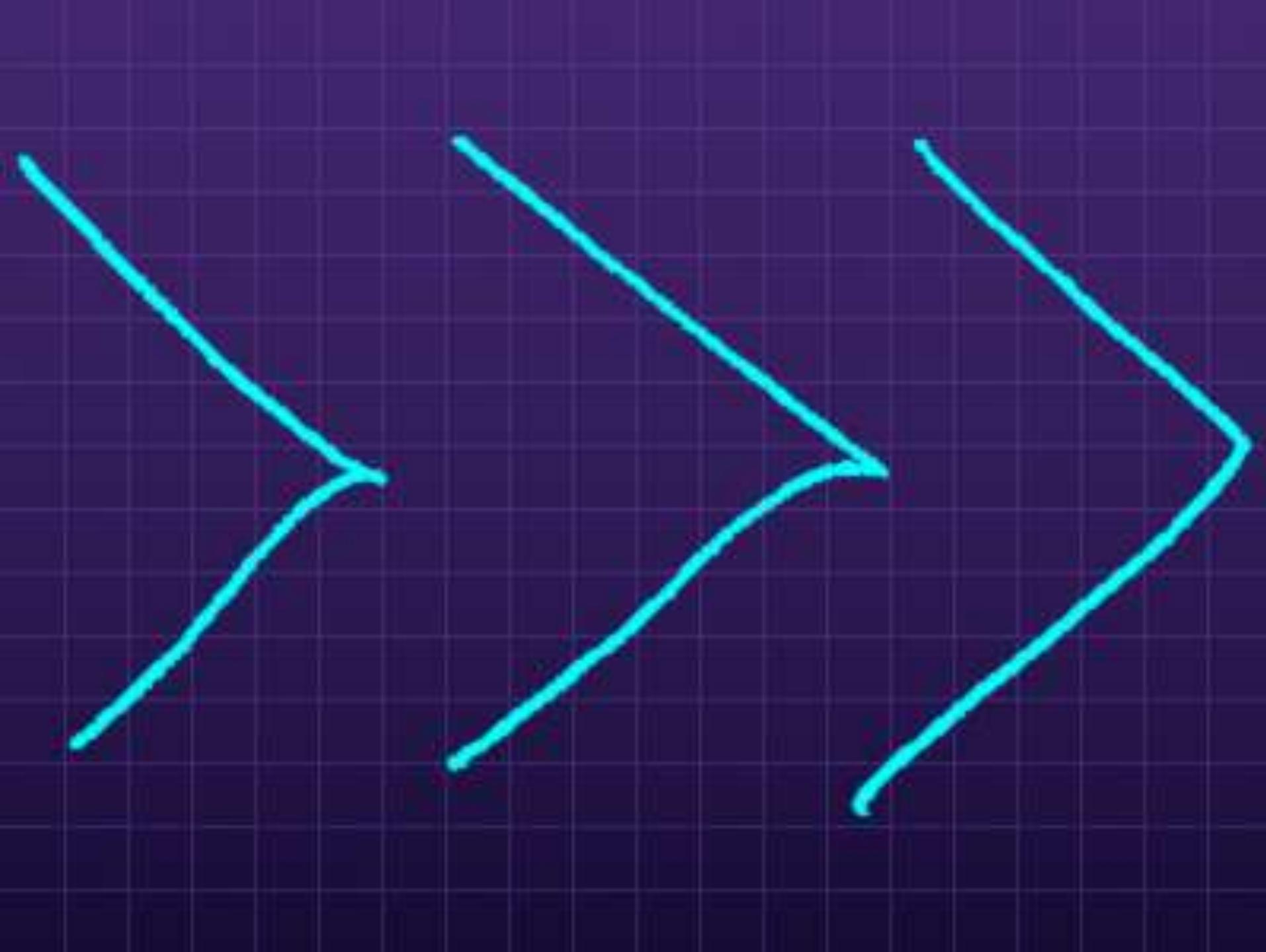


Fight Player Fatigue

- ...vary play intensity
- ...introduce novel situations
- ...add new types of play
- ...avoid confinement
- ...advertise progress
- ...bestow rewards for success
- ...include subgames
- ...foreshadow victory

Fight Player Fatigue



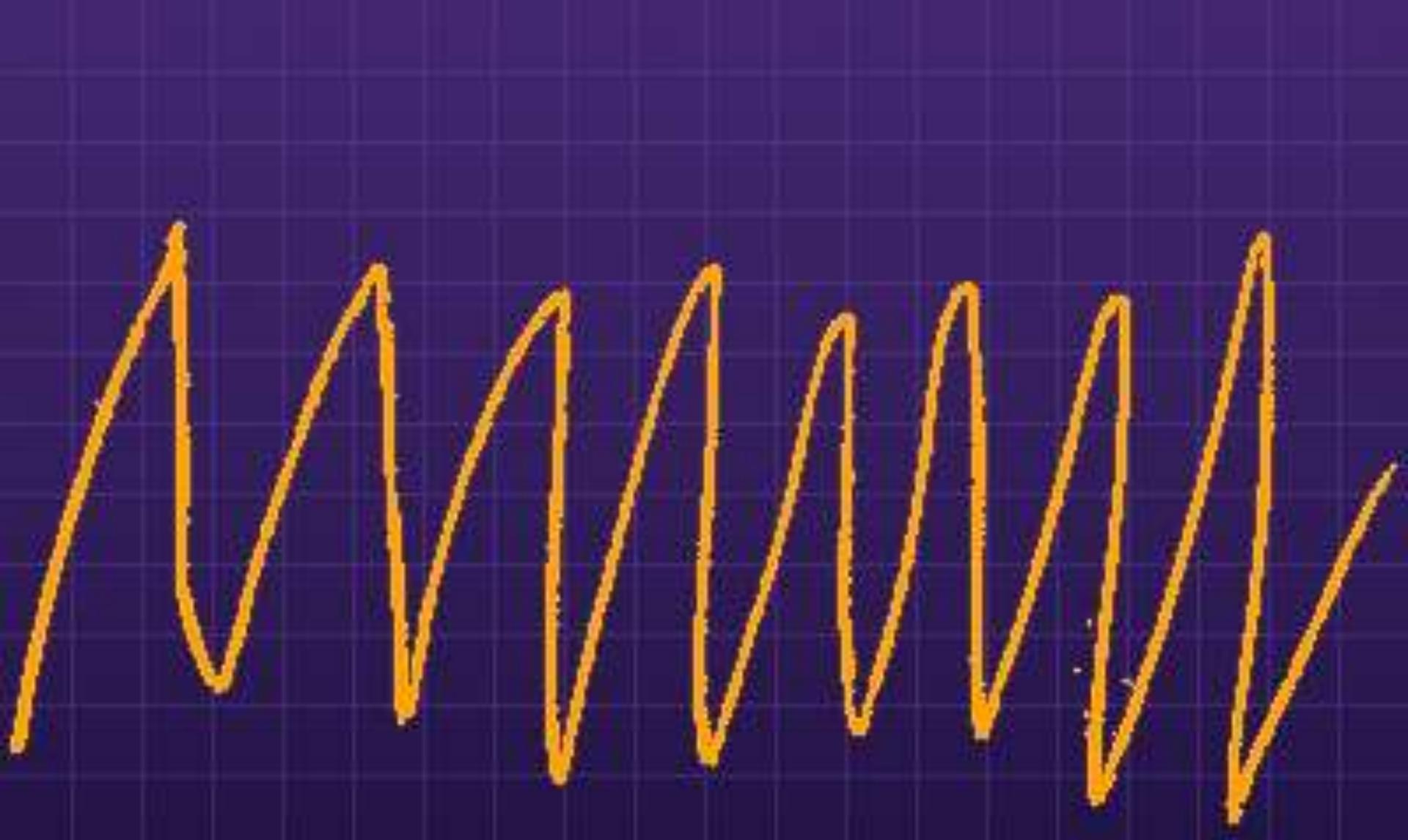


Methods

- Rules are useless without means of application...
 - ...when do you call a procedure?
 - ...we need some methods

Methods

- But wait...
 - ...rules are rules
 - ...methods are other rules
- Whoops...
 - ...let's not recurse to infinity
- Philosophical controversy...
 - ...known processes
 - ...unknown mechanisms



The Design Process

Identify a problem...



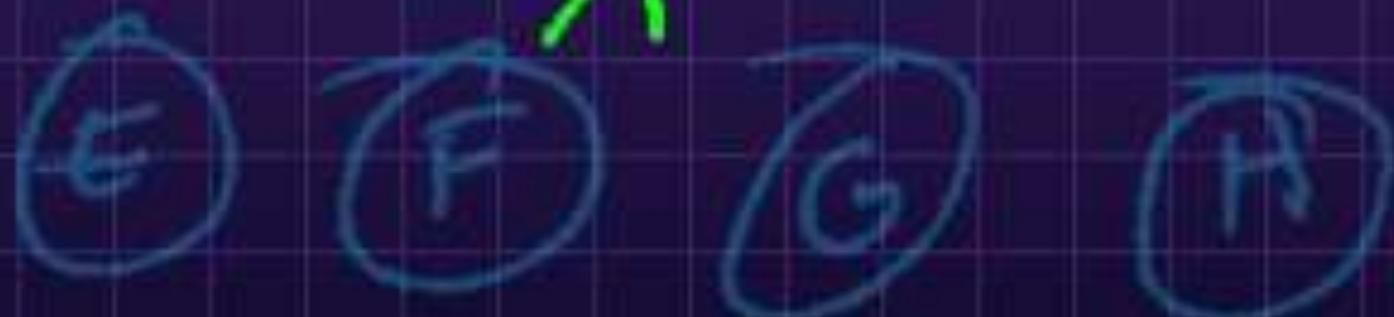
The Design Process

Locate a rule...



The Design Process

Apply the rule...



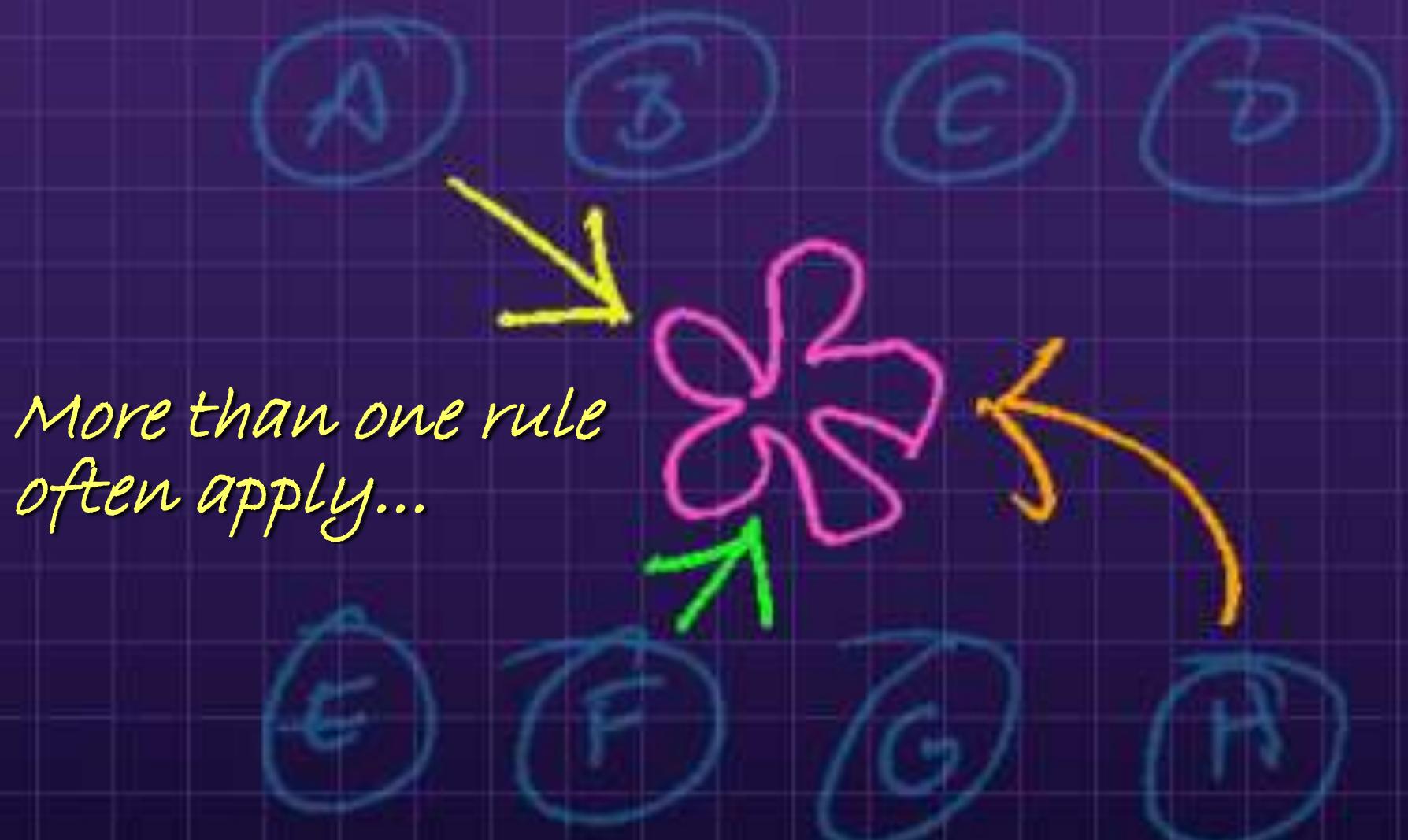
The Design Process



If it were only
this easy!



The Design PROCESS



The Design Process

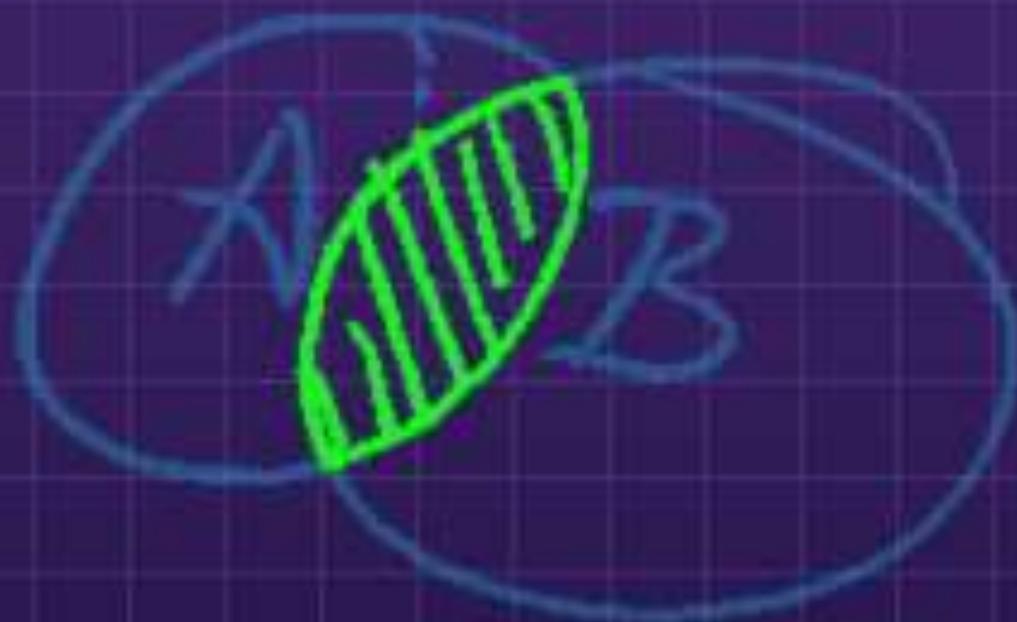
worse...



The Design PROCESS

worse...

...rules overlap

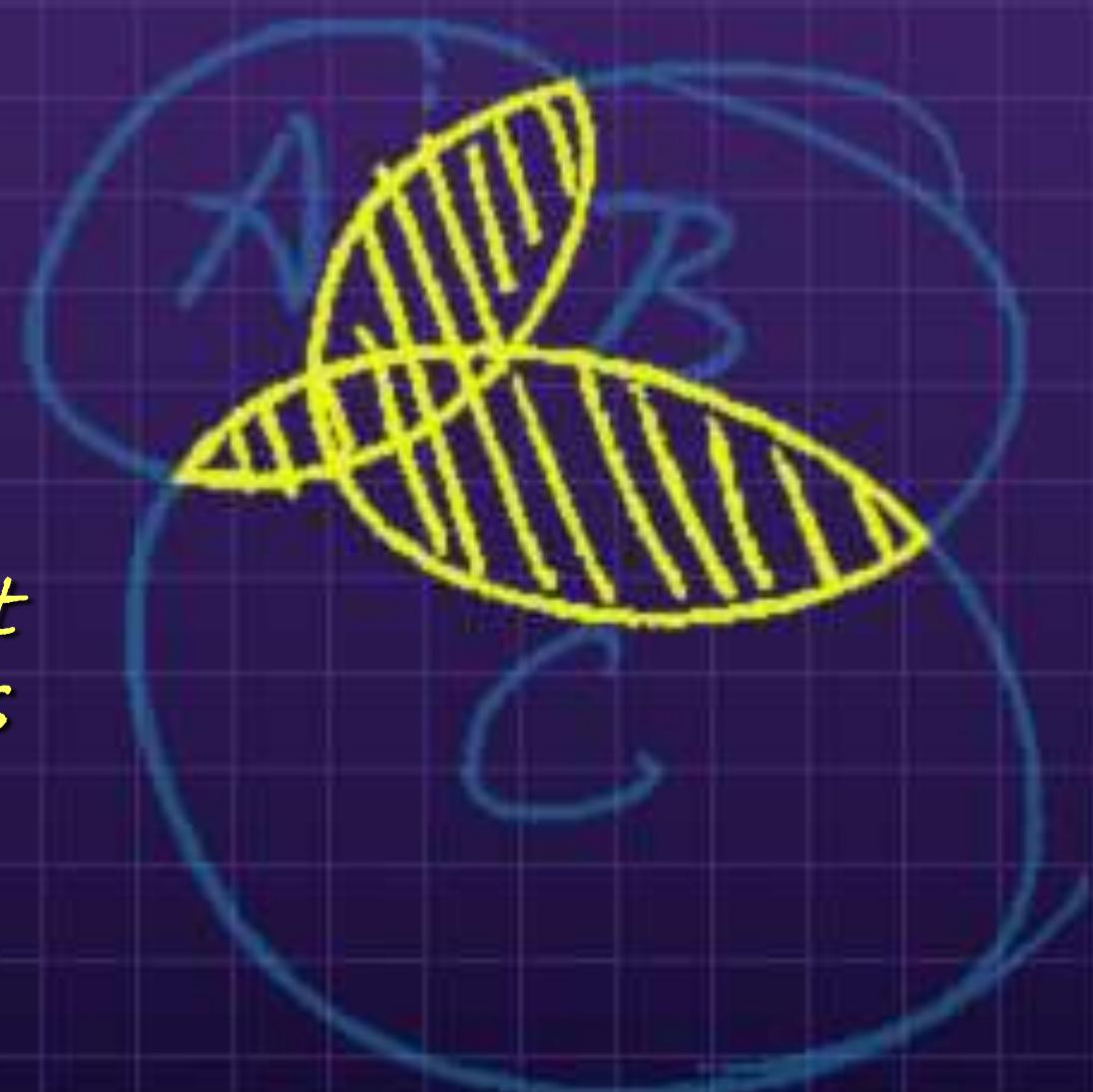


The Design PROCESS

worse...

...rules overlap

...and the result
can be a mess





*MAXIMIZE EXPRESSIVE
POTENTIAL:*



MAXIMIZE EXPRESSIVE POTENTIAL:

- Flip side of Rule #1
- Overlaps with it
- Complementary...
 - ...instead of urging us to stay out of trouble
 - ...urges us to find & seize opportunities

MAXIMIZE EXPRESSIVE POTENTIAL:

- POSSIBILITIES are limited...
 - ...run, jump & shoot
 - ...build a character
 - ...SOLVE PUZZLES
 - ...and hey, there's a budget
- Therefore...
 - ...find lots of ways to play

MAXIMIZE EXPRESSIVE POTENTIAL:

- You want the best return on design investment...
...as measured in units of play
- An equivalent rule in drama is...
...write a scene for each pair of characters $(n! / [r! (n-r)!])$
- Variety pays!

MAXIMIZE EXPRESSIVE POTENTIAL:

- Look for unusual environments...
 - ...natural versus man-made
 - ...open space versus confined
 - ...earth, air, water, fire

*MAXIMIZE EXPRESSIVE
POTENTIAL:*



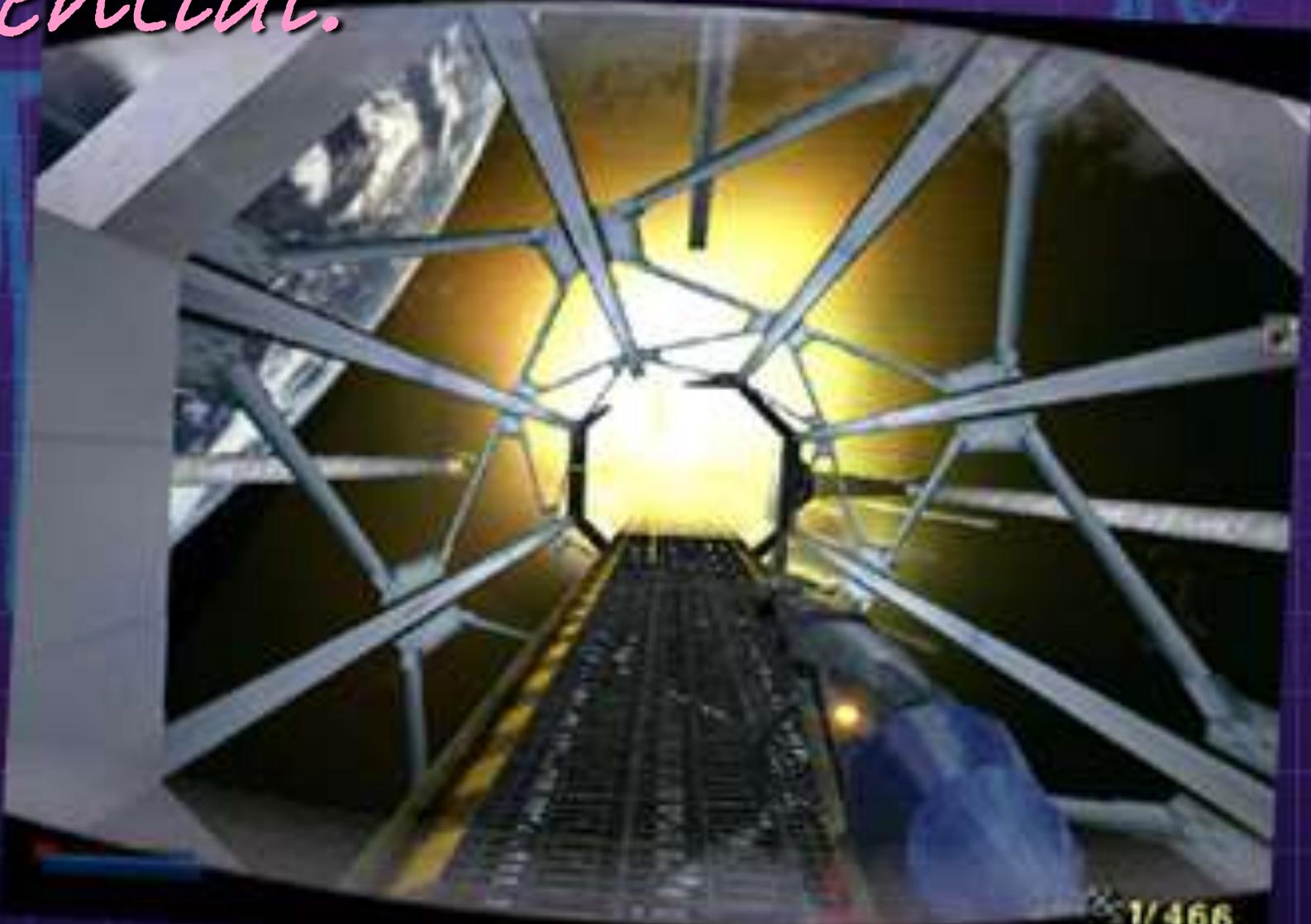
*MAXIMIZE EXPRESSIVE
POTENTIAL:*



*MAXIMIZE EXPRESSIVE
POTENTIAL:*



*MAXIMIZE EXPRESSIVE
POTENTIAL:*



MAXIMIZE EXPRESSIVE POTENTIAL:

- Look for unusual activities...
 - ...exploration (means mazes)
 - ...combat (means arenas)
 - ...puzzles (means gates)
 - ...stunts (means platforms)

*MAXIMIZE EXPRESSIVE
POTENTIAL:*



*MAXIMIZE EXPRESSIVE
POTENTIAL:*



MAXIMIZE EXPRESSIVE POTENTIAL:



*MAXIMIZE EXPRESSIVE
POTENTIAL:*



MAXIMIZE EXPRESSIVE
POTENTIAL:



MAXIMIZE EXPRESSIVE
POTENTIAL:



MAXIMIZE EXPRESSIVE
POTENTIAL:



MAXIMIZE EXPRESSIVE POTENTIAL:

- Look for new powers...
...if your character can jump
...maybe he should also fly

*MAXIMIZE EXPRESSIVE
POTENTIAL:*

1.86



*MAXIMIZE EXPRESSIVE
POTENTIAL:*



MAXIMIZE EXPRESSIVE
POTENTIAL:



MAXIMIZE EXPRESSIVE
POTENTIAL:





The Design Process

The Design PROCESS

More trouble...

...rules fight with
each other





Maintain Level of
Abstraction:



Maintain Level of Abstraction:

- Games may imitate the world...
 - ...but they're only fragments
 - ...full of artificial features
 - ...players are easily confused
- Therefore...
 - ...don't force players to recalibrate suspension of disbelief

Maintain Level of Abstraction:

- If you use interface graphics to highlight activities...

Maintain Level of Abstraction:



Maintain Level of Abstraction:

- If you use inside-the-world interface graphics to highlight activities...
 - ...it's okay to have transparent ceilings
 - ...and swing from the sky

Maintain Level of Abstraction:



Maintain Level of Abstraction:



Maintain Level of Abstraction:

- If your combat is realistic...
...probably want restarts on death

Maintain Level of Abstraction:



Maintain Level of Abstraction:



Maintain Level of Abstraction:

- This rule is like the "unities" rule in drama...
 - ...time, place, action
 - ...tightly bound
- Helps design parts hang together

Maintain Level of Abstraction:

- conflicts with Player Fatigue Rule...
...guns that don't need ammo

Maintain Level of Abstraction:



Maintain Level of Abstraction:

- conflicts with Player Fatigue Rule...
...Omniscient character to help navigate a fantasy world

Maintain Level of Abstraction:



Maintain Level of Abstraction:

- conflicts with Player Fatigue Rule...
...tiled RPG with video cutscenes

Maintain Level of
Abstraction:

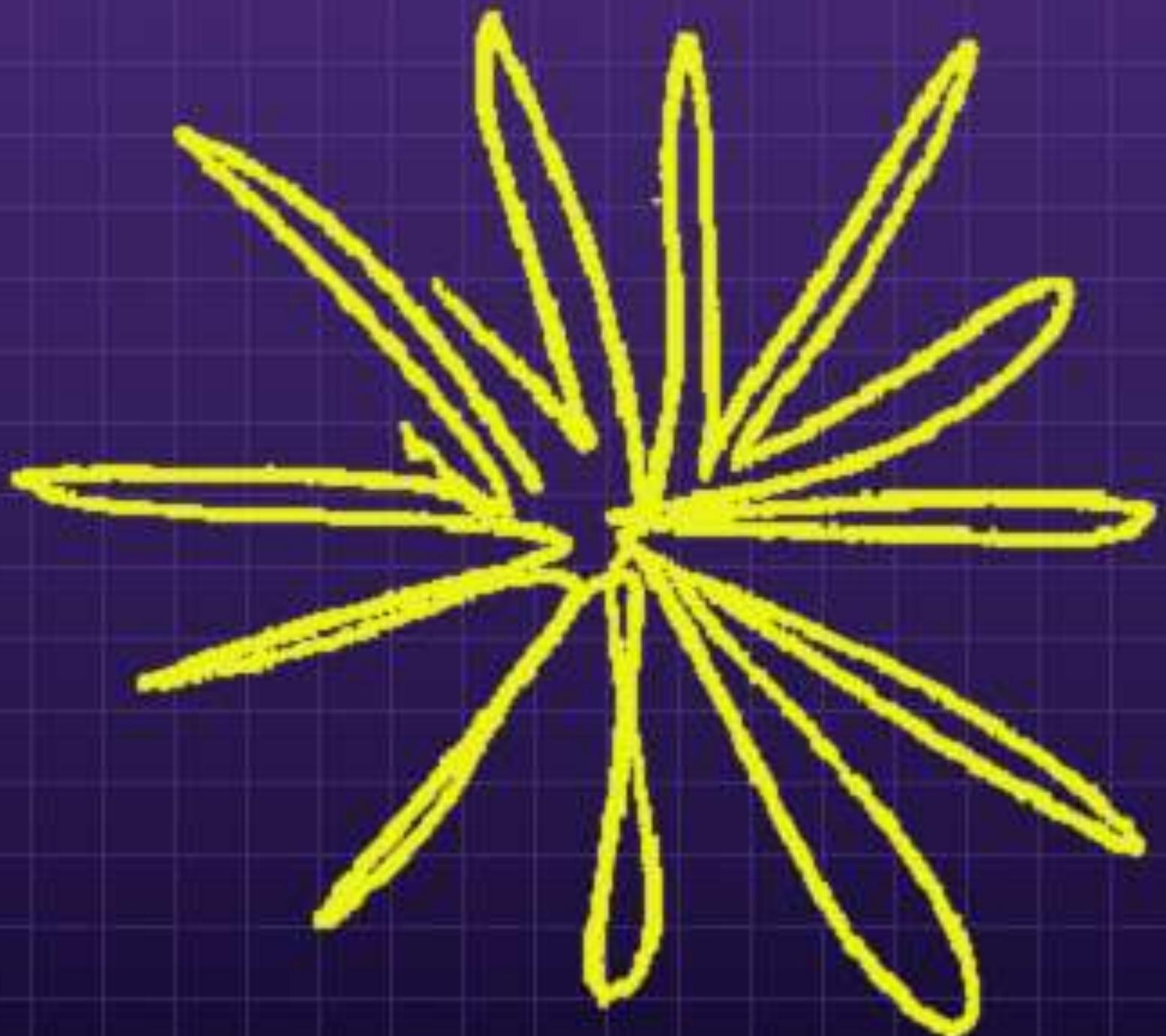


Maintain Level of Abstraction:



Maintain Level of Abstraction:

- It seems that fighting fatigue...
...trumps the Abstraction Rule!



Trying to Think

- Neo-Kantians...

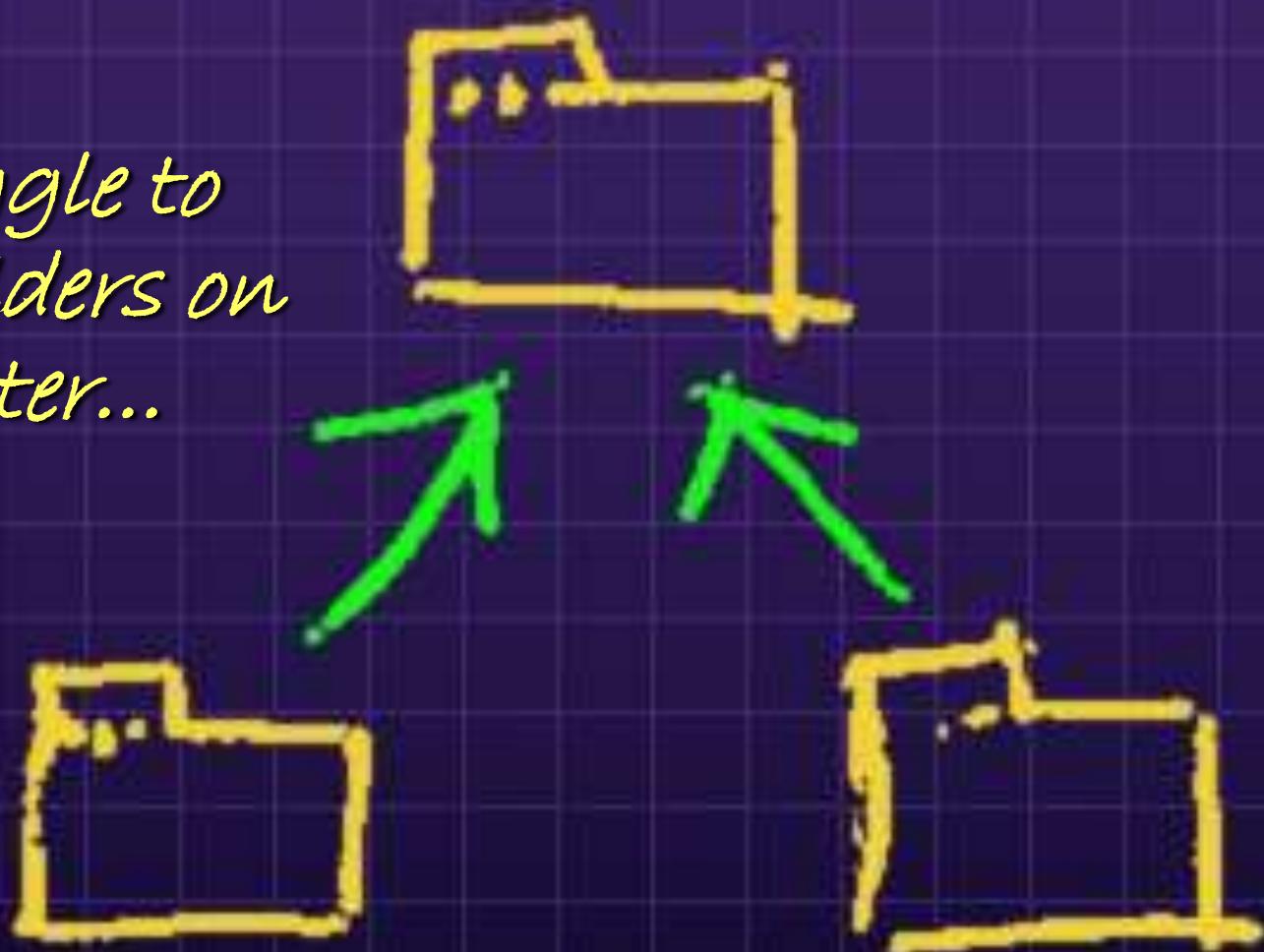
...no guarantee
clear categories
of thought

Trying to Think

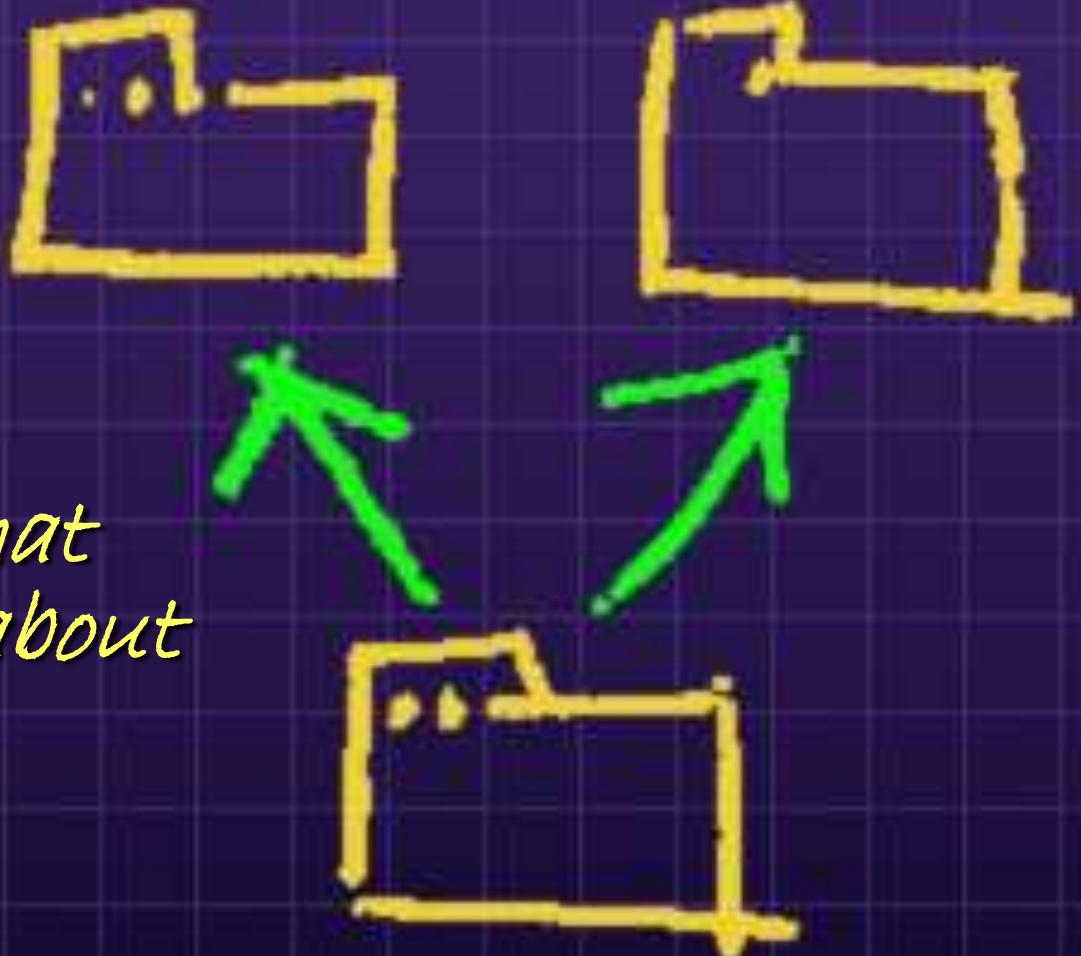
- Russell's Barber
- Gödel's Theorem

Trying to Think

If you struggle to
organize folders on
your computer...



Trying to Think



...you know what
I'm talking about

Trying to Think

Ludwig Wittgenstein; *Philosophical Investigations*
1951; quoted in Steven Pinker; *Words and Rules*;
Basic Books 1999; ISBN 0-393-04535-8

66. Consider for examples the proceedings we call "games." I mean board-games, card-games, ball-games, Olympic games, and so on. What is common to them all?--Don't say: "There must be something common, or they would not be called "games" "--but look and see whether there is anything common to all.--For if you look at them you will not see something that is common to all, but similarities, relationships, and a whole series of them at that...

Trying to Think

To repeat: don't think, but look!--Look for example at board-games, with their multifarious relationships. Now pass to card-games; here you will find many correspondences with the first group, but many common features drop out, and others appear. When we pass next to ball-games, much that is common is retained, but much is lost.--Are they all "amusing"? Compare chess with [tic-tac-toe]. Or is there always winning and losing, or competition between players? Think of [solitaire]. In ball games there is winning and losing; but when a child throws his ball at the wall and catches it again, this feature has disappeared. Look at the parts played by skill and luck; and at the difference between skill in chess and skill in tennis...

Trying to Think

Think now of games like ring-a-ring-a-roses; here is the element of amusement, but how many other characteristic features have disappeared! And we can go through the many, many other groups of games in the same way; can see how similarities crop up and disappear.

67. I can think of no better expression to characterize these similarities than "family resemblances"; for the various resemblances between members of a family: build, features, colour of eyes, gait, temperament, etc. etc. overlap and criss-cross in the same way.--And I shall say: "games" form a family.

Trying to Think



- How should we cope with...
 - ...multiple rules
 - ...that overlap & conflict?
- Is there a way forward?

Trying to Think



- Gilles Fauconnier, (et al.)
- THEORY OF BLENDS

Trying to Think



- TWO mental spaces...
...share some features
...not others

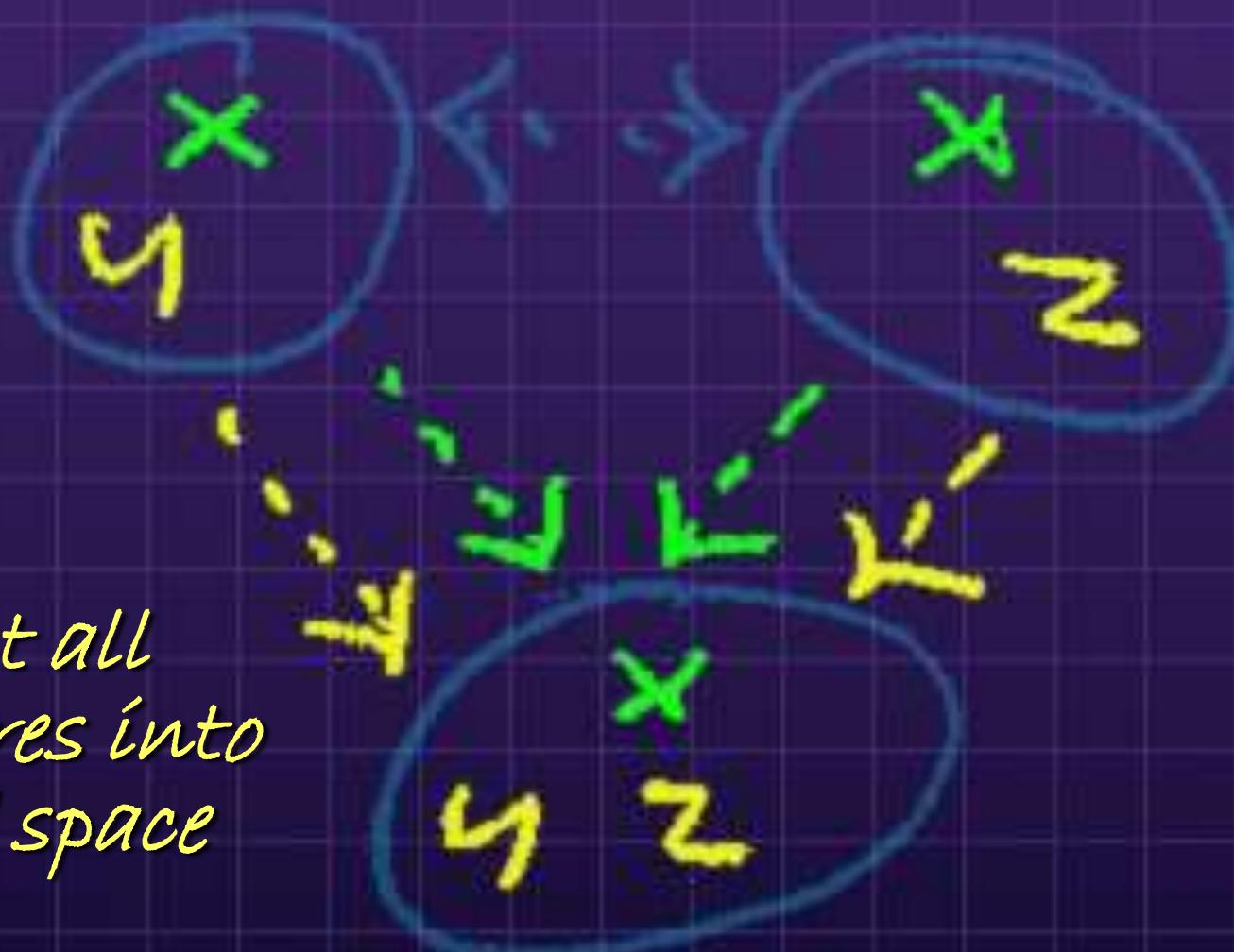
Trying to Think



- Common features map...
...showing a relationship

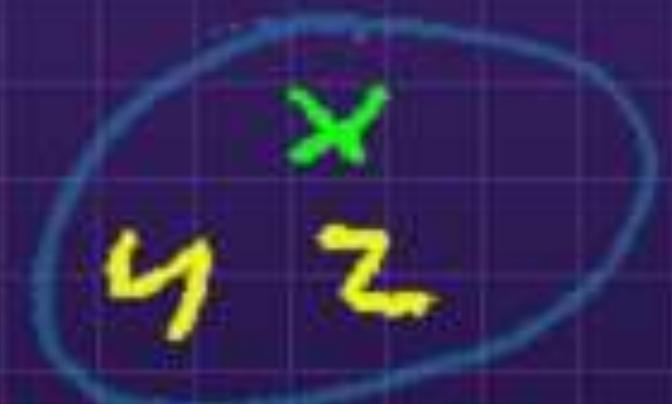
Trying to Think

- Project all features into blend space



Trying to Think

- Blend space has new properties...
 - ...emergent structure
 - ...like salt



Trying to Think

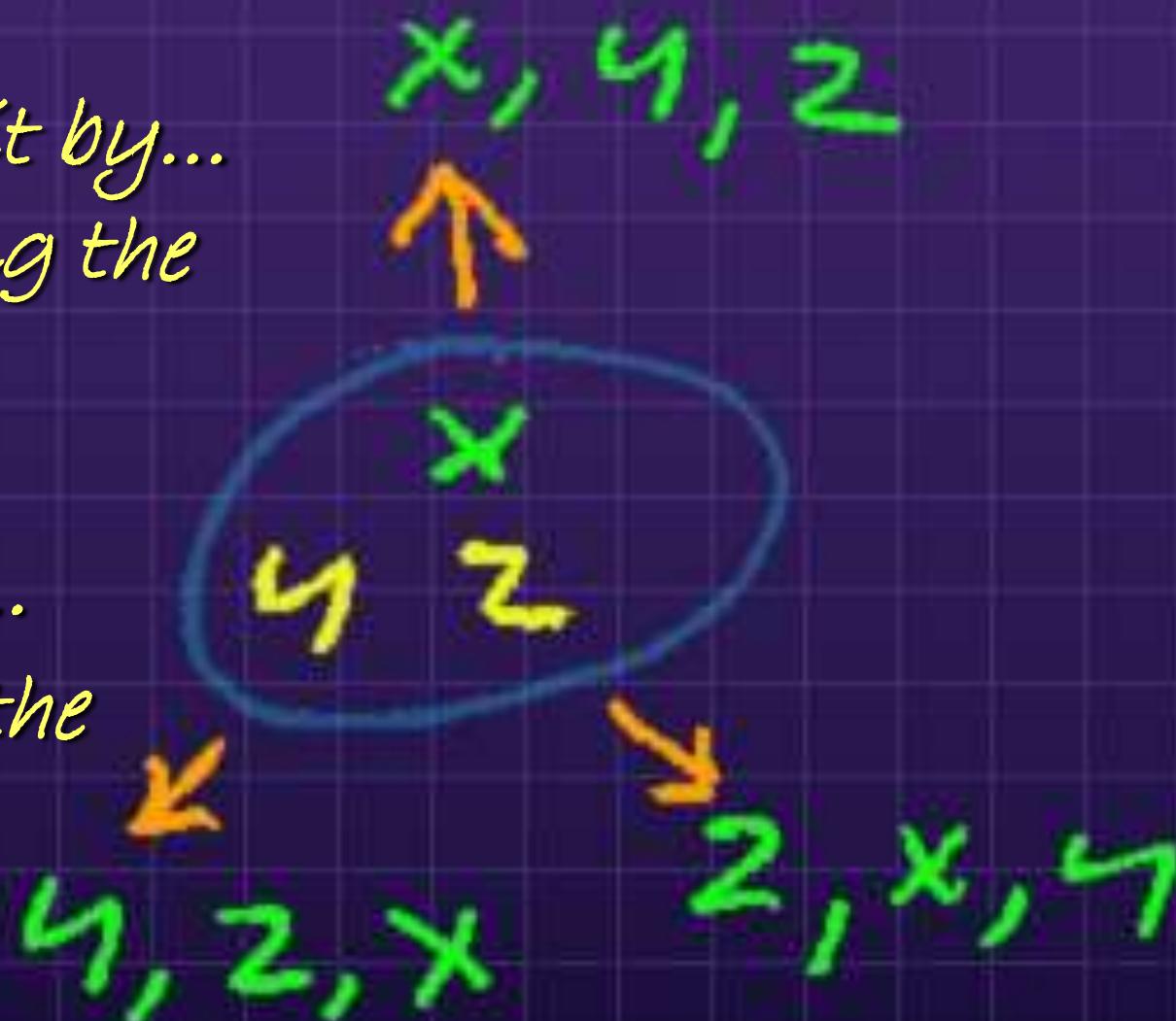
- Elaborate it by...

... "running the
blend"

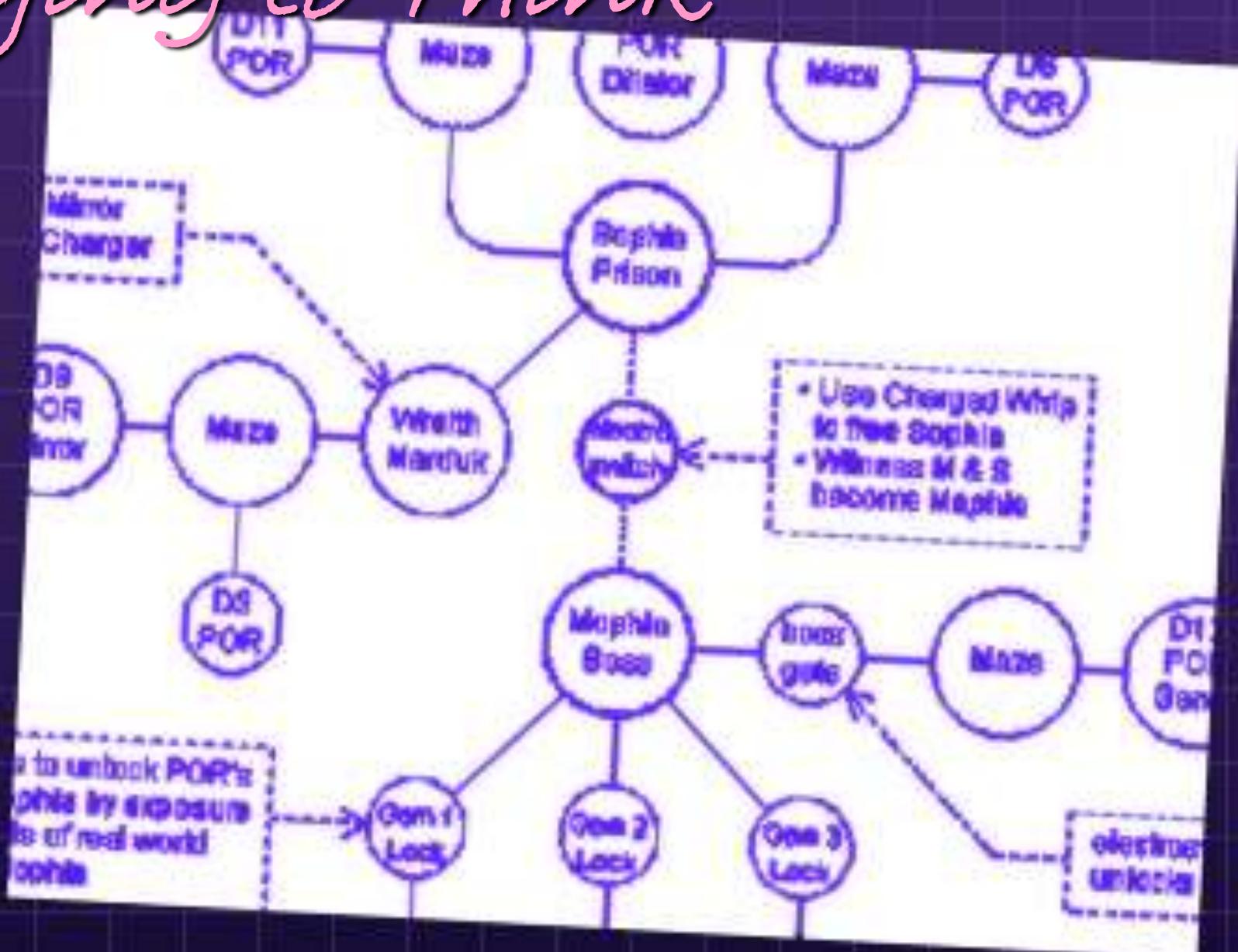
- Monk...

- Sailboats...

- Walking the
Bubbles...



Trying to Think



TRYING TO THINK

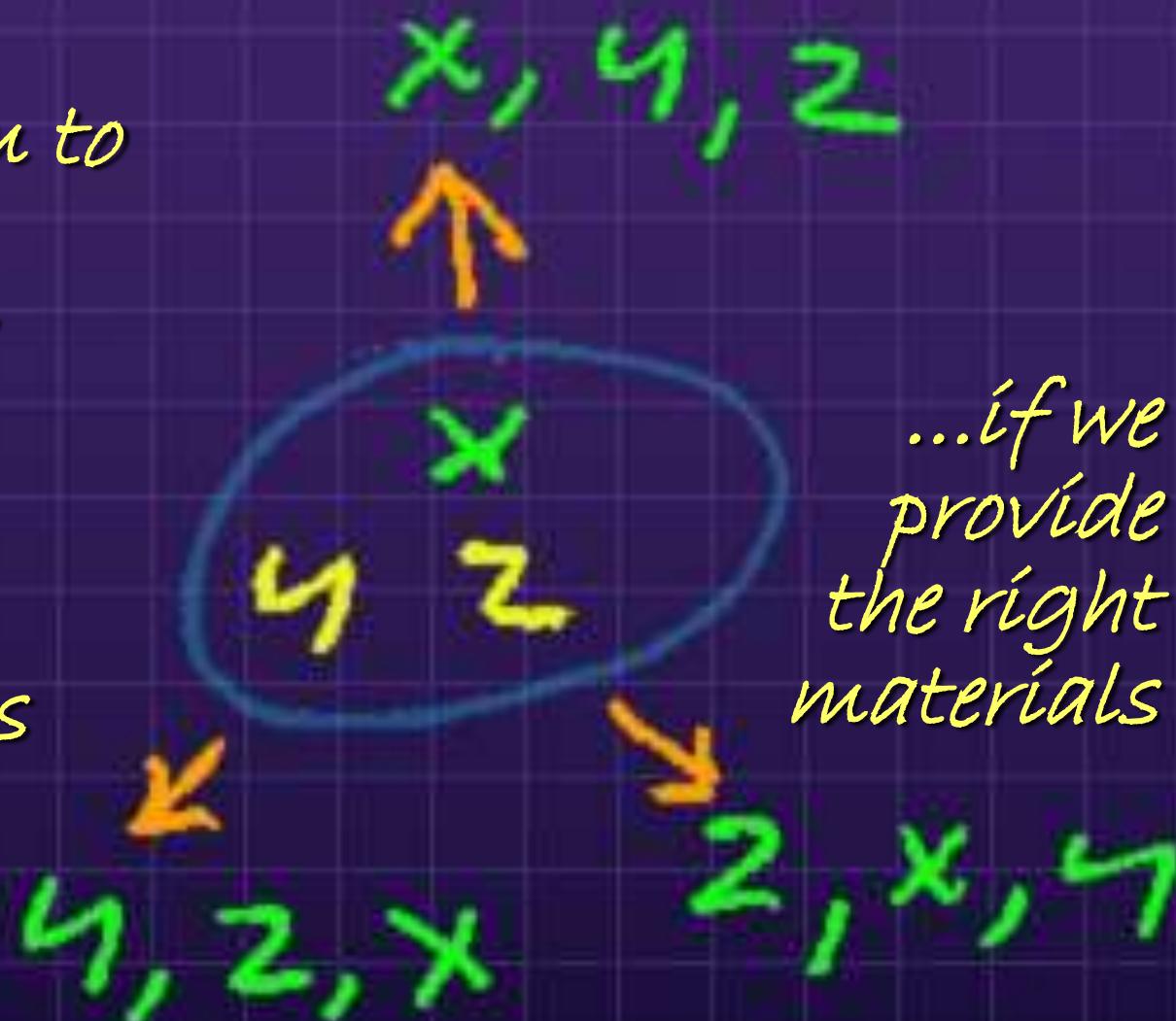
* T4 IMPERSONALIZING YOUR ATTITUDE:

- The red line slices across the map, crosses the Red Sea. Dissolve to Indy, back where he started, standing outside the dig site. He ducks into the interior.
- * Work your way through the previously-explored, if still unvisited, Room of the Tablets, where a panel on one wall has moved from its original position. Someone has been here already.
- Touch the secret switch in the alcove.
- * Another wall panel that seemed like decoration the last time you visited. It sags open.
- * Move into the passageway. A stairwell leads downward. Hand railings are missing.
- * Jump the gaps. Avoid the traps.
- * As you descend, the decor changes. Metal replaces rock and stone walls. The metal panels are...

TRYING TO THINK

- People seem to possess a generative reasoning faculty...

...that makes new stuff



...if we provide the right materials

Trying to Think

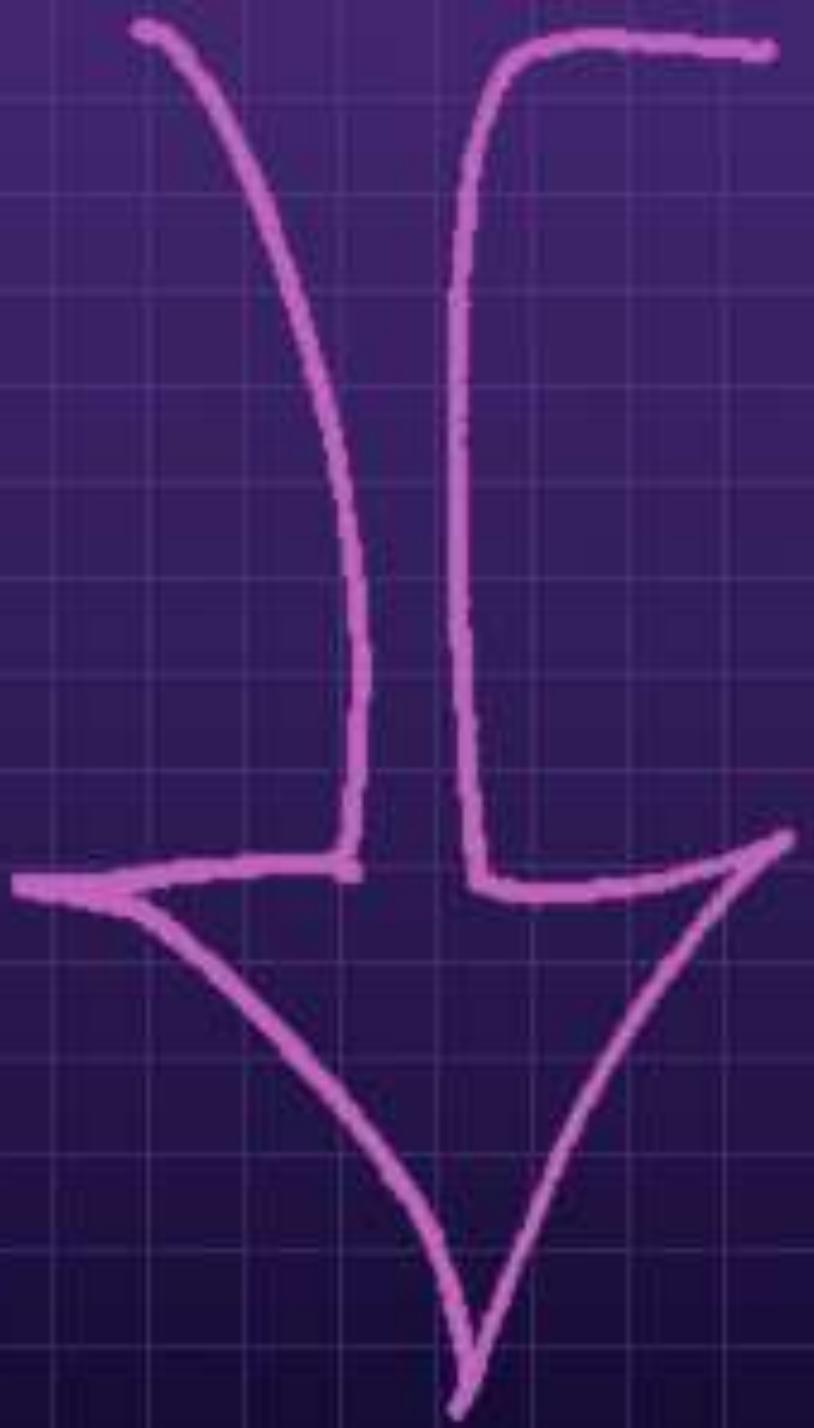
Robert Louis Stevenson; on writing *Treasure Island*;
quoted by Miles Harvey; *The Island of Lost Maps*;
Random House; 2000; ISBN 0-375-50151-7

"The map was the chief part of my plot."

"As I pored over my map of Treasure Island, the future characters of the book began to appear there visibly among the imaginary woods; and their brown faces and bright weapons peeped out upon me from unexpected quarters, as they passed to and fro, fighting and hunting treasure, on these few square inches of a flat projection. The next thing I knew, I had some paper before me and was writing out a list of chapters.

Trying to Think

"It is my contention--my superstition, if you like--that he who is faithful to his map, and consults it, and draws from it his inspiration, daily and hourly, gains positive support.....The tale has a root there: it grows in that soil; it has a spine of its own behind the words.....As he studies [the map], relations will appear that he had not thought upon."



concretize ideas:

4

concretize ideas:

- Numbers numb...
...examples excite!
- Therefore...
...objectify everything

concretize ideas:



[abstractions made into objects – like a contract]

concretize ideas:

- Numbers numb...
...examples excite!
- Therefore...
...objectify everything
...including character
...Indy's whip

concretize ideas:



concretize ideas:

- Numbers numb...
...examples excite!
- Therefore...
...objectify everything
...including character
...Indy's whip
...Rayman's helicopter ears

concretize ideas:



concretize ideas:



concretize ideas:

- This rule is a way of thinking that forces ideas to take shape...
...like Link's famous hearts

concretize ideas:



concretize ideas:



concretize ideas:

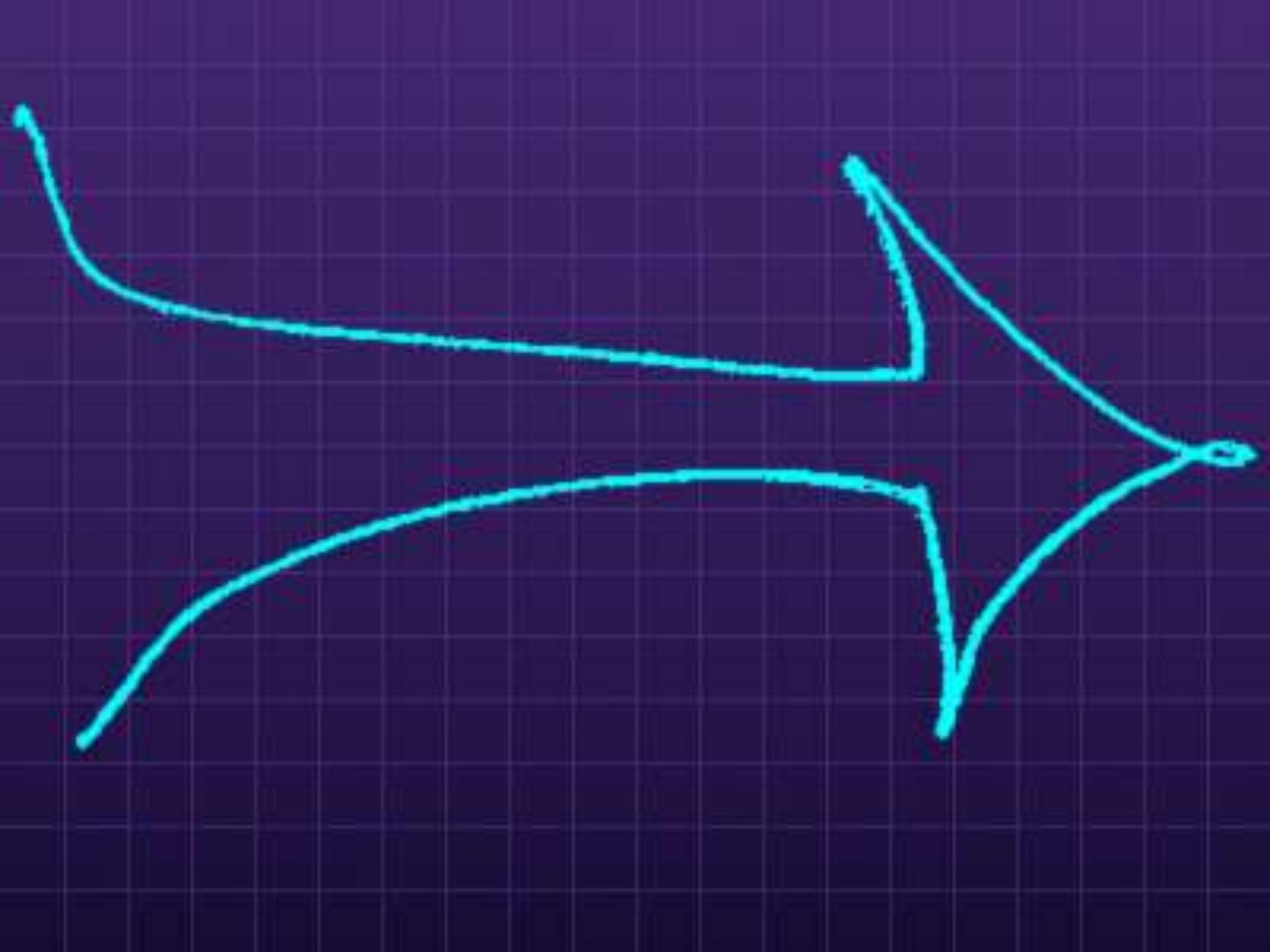
- Don't dispense information...
...send a telegram!
- Don't pursue justice...
...recover a stolen H-bomb
- Don't portray heavenly splendor...
...show an angel in Eden

concretize ideas:

William Shakespeare; *A Midsummer-Night's Dream;*
Act 5, Scene 1; 1596

THESEUS:

"...The poet's eye, in a fine frenzy rolling,
Doth glance from heaven to earth, from earth to
heaven;
And, as imagination bodies forth
The forms of things unknown, the poet's pen
Turns them to shapes, and gives to airy nothing
A local habitation and a name."



How to spot problems:

- How do you see trouble coming?
- Learn how to feel confused...
 - ...restlessness
 - ...urge for coffee
 - ...urge to mow lawn
- You need a rule!
- Underlying philosophy has a simple surface

How to Locate rules:

- Scan Rule Space...
 - ...explicit > tacit knowledge
 - ...what's on my list?
 - ...what can I use to attack?
- When rules collide...
 - ...good things
 - ...likely novel things
 - ...happen

How to apply rules:

- Change design until problem disappears
- Sometimes the best blend...
...emerges from chaos

How to apply rules:



How to apply rules:



How to apply rules:



How to apply rules:

Jasper Johns; notebook entry;

quoted by Michael Crichton in his catalogue to the Whitney Museum of American Art's retrospective exhibit of Johns' work; 1977-1978

Take an object

Do something to it

Do something else to it

"

"

"

"

"

QUESTIONS & DISCUSSION

- A list of references...
...is available here
- Finally...
...a Golden Oldie with
...3 major elements
...and a hooky structure...

[except, no music is available for this web show]

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Some References...

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ISBN 0-87427-024-3