



Faculty of Design

2022

The Pattern Atlas of System Vulnerabilities

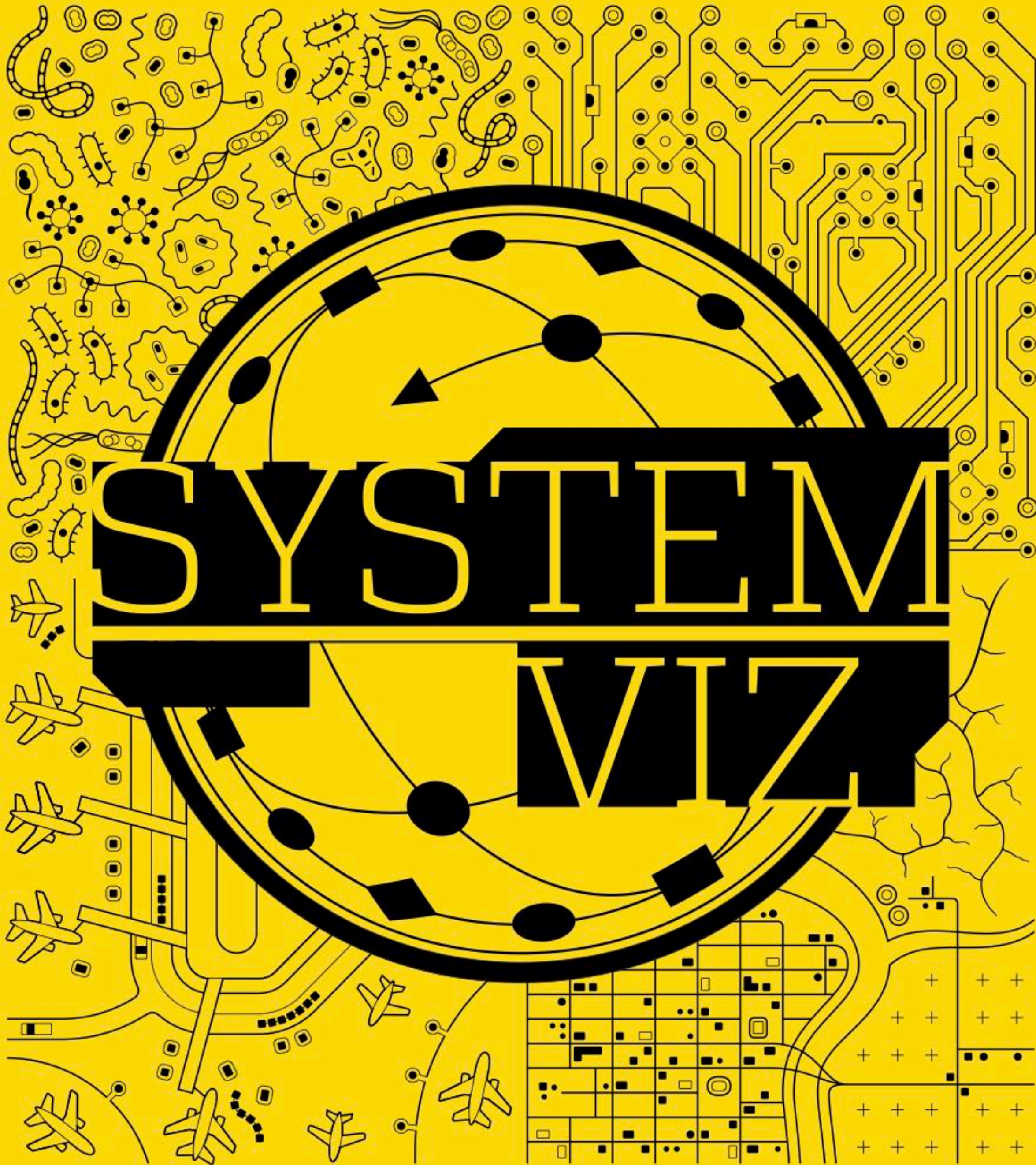
Stoyko, Peter

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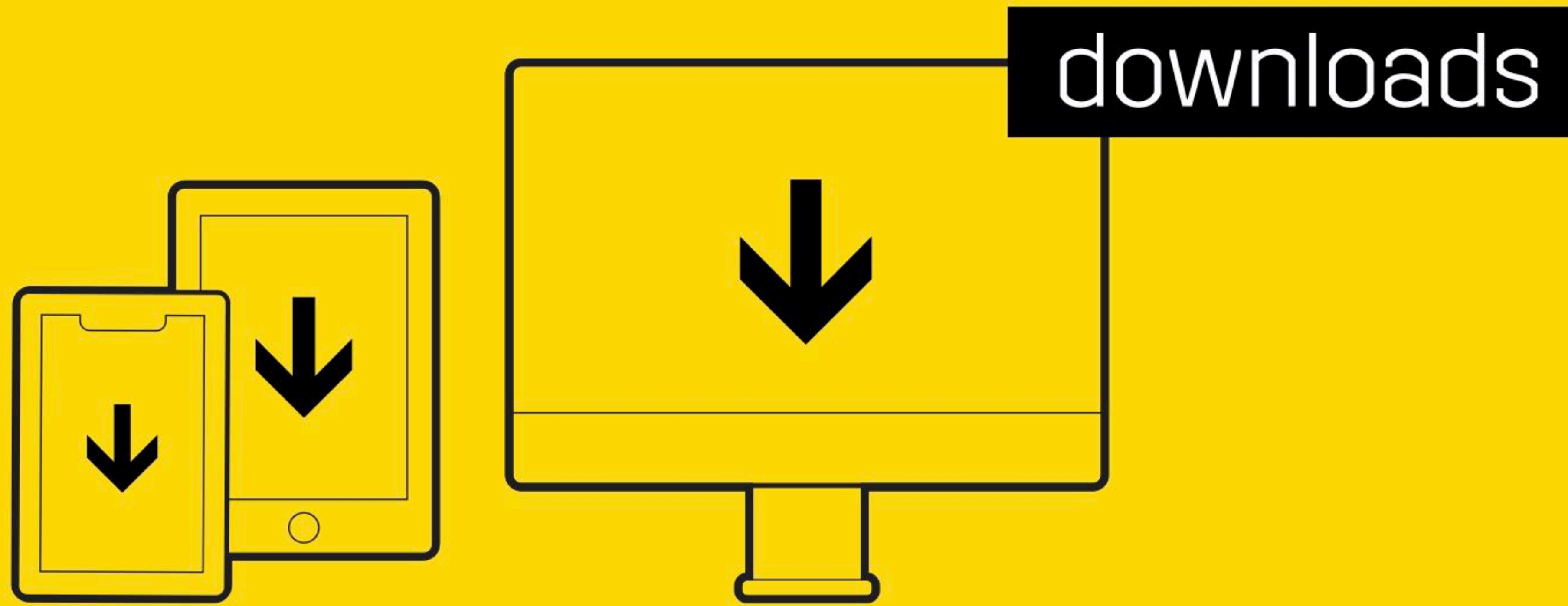
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the pattern atlas of system vulnerabilities

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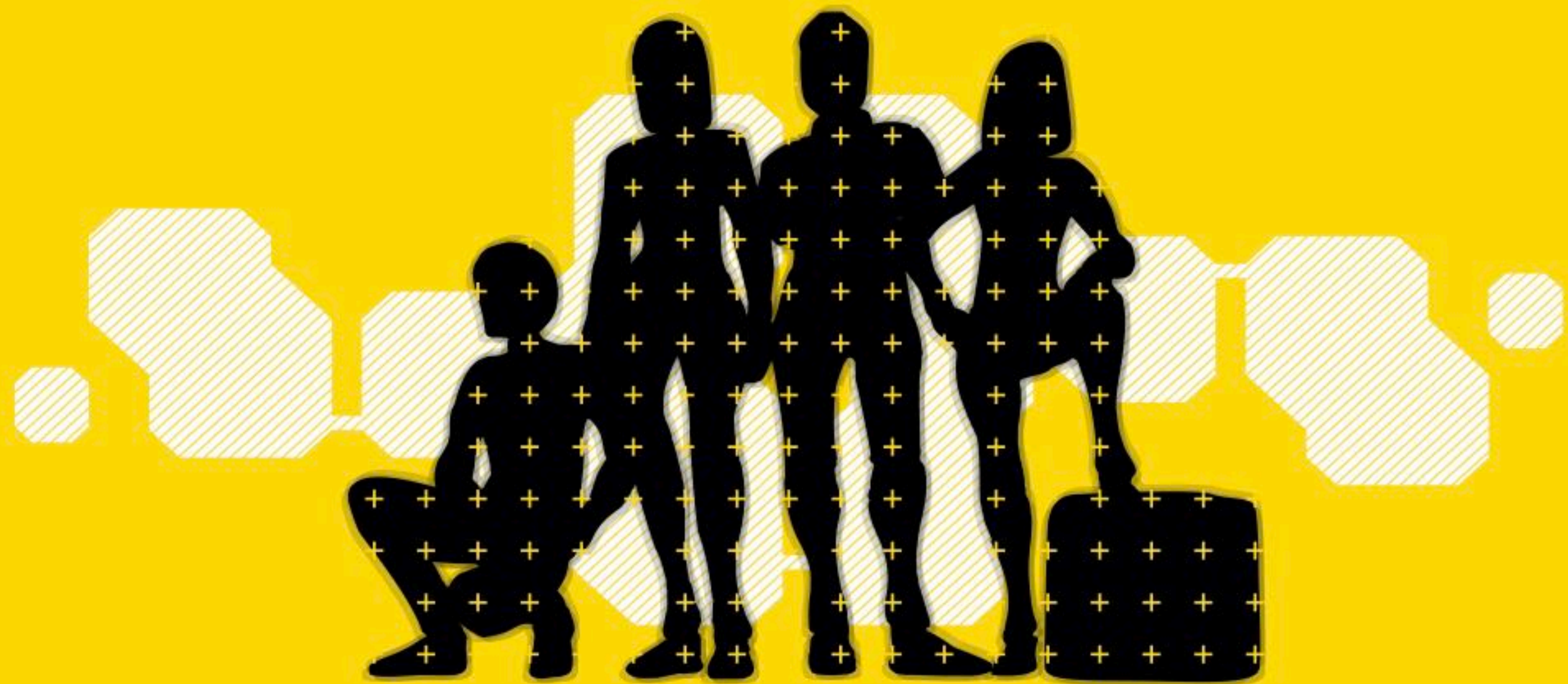
SYSTEM**VIZ**

www.systemviz.com

in progress

how **SMALL** players change **BIG** systems

SMALL MOVER STRATAGEMS



concept-driven inquiry



**ILLUSTRATIVE
VISUAL ANCHOR**

+

**SENSITIZING
CONCEPTS**

=

**ATTENTIONAL
SENSITIZATION**



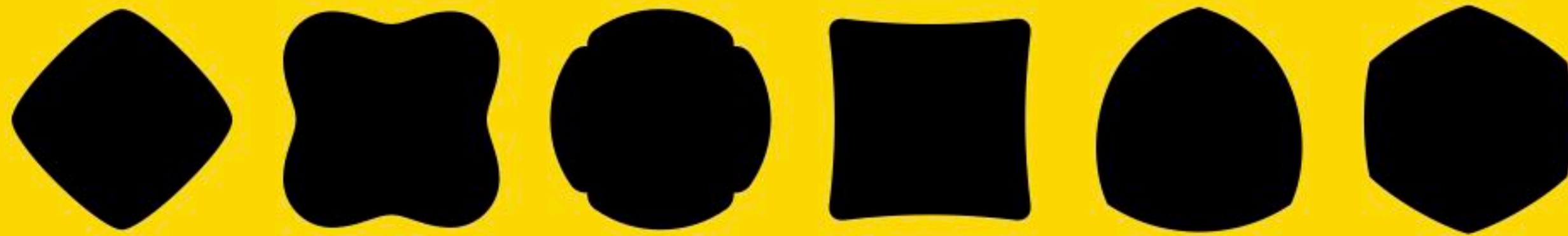
magnets for the mind

system sight





VISUAL
VOCABULARY
OF SYSTEMS



visual vocabulary

SYSTEM TAXONOMY
The visual vocabulary is a structured set of icons that represent the various elements of systems thinking.

01 DRIVER

A DRIVER IS AN ACTIVE FORCE OF CHANGE APPLIED TO THE SYSTEM. IT CAN ALSO BE THOUGHT OF AS A FORCE THAT DRIVES THE SYSTEM TO A NEW STATE.

02 SIGNAL

A SIGNAL IS INFORMATION THAT CAN POTENTIALLY BE USED TO INFLUENCE THE BEHAVIOR OF A SYSTEM. IT IS A MESSAGE THAT TRAVELS THROUGH A CHANNEL TO A RECEIVER.

03 SITUATION

A SITUATION IS A COLLECTION OF FACTS AND CIRCUMSTANCES THAT DEFINE THE CURRENT STATE OF A SYSTEM. IT IS THE CONTEXT IN WHICH A SYSTEM OPERATES.

04 BOUNDARY

A BOUNDARY DEFINES THE LIMITS OF A SYSTEM. IT IS A LINE THAT SEPARATES THE SYSTEM FROM ITS ENVIRONMENT.

05 REFLECTION

A REFLECTION IS A MIRRORING OF A SYSTEM'S BEHAVIOR. IT IS A FEEDBACK LOOP THAT ALLOWS A SYSTEM TO ADJUST TO ITS ENVIRONMENT.

06 DOMAIN

A DOMAIN IS A FIELD OF INTEREST OR A SUBJECT MATTER. IT IS A CONCEPTUAL SPACE THAT ENCOMPASSES A RANGE OF RELATED TOPICS.

SIMPLE

COMPLICATED

COMPLEX

ATTRACTOR

An attractor is a point or set of points that a system's trajectory converges to over time.

PROXIMATE DRIVER

A proximate driver is a force that acts on a system from a very close range.

ENABLER

An enabler is a factor that makes it possible for a system to perform a certain function.

CYCLE

A cycle is a repeating sequence of events that occurs over and over again.

OPPONENT

An opponent is a force that acts against a system, opposing its goals or objectives.

HEALER

A healer is a force that acts to restore a system to its original state after it has been disrupted.

NOTICE

A notice is a signal that draws attention to a specific part of a system.

LAD

LAD stands for Level of Abstraction Design, a framework for designing systems at different levels of detail.

OUTLIER

An outlier is a data point or element that is significantly different from the rest of the system.

BRANCHING

Branching is a process where a single path splits into multiple paths.

DISRUPTION

Disruption is a force that breaks down an existing system or process.

INFLECTION

An inflection is a point where a system's trajectory changes direction.

RECURSION

Recursion is a process where a system repeats a set of actions over and over again.

ENTRAPMENT

Entrapment is a state where a system is stuck in a loop and cannot progress.

DISTAL DRIVER

A distal driver is a force that acts on a system from a very far range.

CASCADE

A cascade is a sequence of events where one event leads to another, creating a chain reaction.

GOAL SHIFT

A goal shift is a change in the objective or purpose of a system.

DIFFUSION

Diffusion is a process where a system's components spread out and mix together.

TENSION

Tension is a state of stress or strain within a system.

REPELLER

A repeller is a point or set of points that a system's trajectory moves away from over time.

FOCAL DESIGN

Focal design is a process where a system's components are arranged around a central point.

AMPLIFIER

An amplifier is a factor that increases the magnitude of a signal or action.

DAMPENER

A dampener is a factor that reduces the magnitude of a signal or action.

CONJUNCTION

A conjunction is a point where two or more paths meet.

NOTICE

A notice is a signal that draws attention to a specific part of a system.

CONTROL POINT

A control point is a location where a system's behavior can be influenced.

LAG

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FEED BACK

Feedback is a process where a system's output is used to influence its input.

TRAIL

A trail is a path or sequence of events that a system follows over time.

TRANSMITTER

A transmitter is a device that sends a signal or message.

STATUS DISPLAY

A status display is a visual representation of a system's current state.

INHIBITION

Inhibition is a process where a system's activity is reduced or stopped.

RECEPTIVE

Receptive is a state where a system is open to receiving information.

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THROUGH-PUTTING

Through-putting is a process where a system's components are arranged in a line.

RECEPTOR

A receptor is a device that receives a signal or message.

STIONS

Stions are points or locations within a system.

DECAY

Decay is a process where a system's components gradually deteriorate.

ASSEMBLY

Assembly is a process where a system's components are put together.

ORDERING

Ordering is a process where a system's components are arranged in a specific sequence.

RESET

Reset is a process where a system's state is returned to its original state.

DISSIPATION

Dissipation is a process where a system's energy is lost.

LOAD BALANCING

Load balancing is a process where a system's workload is distributed evenly.

EROSION

Erosion is a process where a system's components are gradually worn away.

STANDY

Standy is a state where a system is not active or functioning.

FAULT

A fault is a defect or error in a system.

DEVIATION WITHIN

Deviation within is a process where a system's components vary from the expected path.

FAULT RECOVERY

Fault recovery is a process where a system returns to its normal state after a fault.

PHASE SPACE

Phase space is a mathematical representation of a system's state.

DYNAMIC BALANCE

Dynamic balance is a state where a system's components are in a constant state of flux.

ALERT

Alert is a state where a system is ready to respond to a change.

INDICATOR

An indicator is a signal that shows the state of a system.

ECHO

An echo is a reflection of a signal or action.

CO-PROCESSING

Co-processing is a process where a system's components work together.

INSTRUCTION

Instruction is a set of directions or commands.

STANDARD

A standard is a set of criteria or requirements.

(RE)DISTRIBUTION

(Re)distribution is a process where a system's components are rearranged.

(DE)ACTIVATION

(De)activation is a process where a system's components are turned on or off.

ROLE

A role is a function or position within a system.

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STOCK

A stock is a collection of resources or materials.

CAPACITY

Capacity is the maximum amount that a system can hold.

LOAD

A load is a weight or burden placed on a system.

REUNDANCY

Redundancy is a state where a system has more than one of something.

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INDICATOR

gateway concepts

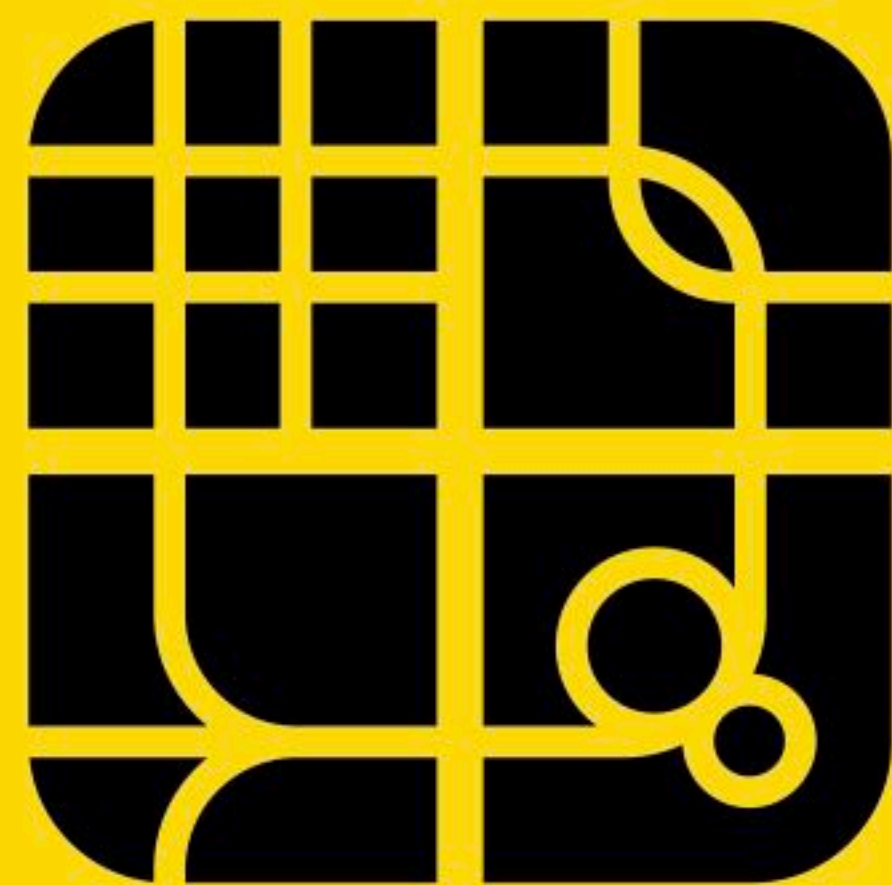


common language



orienting device



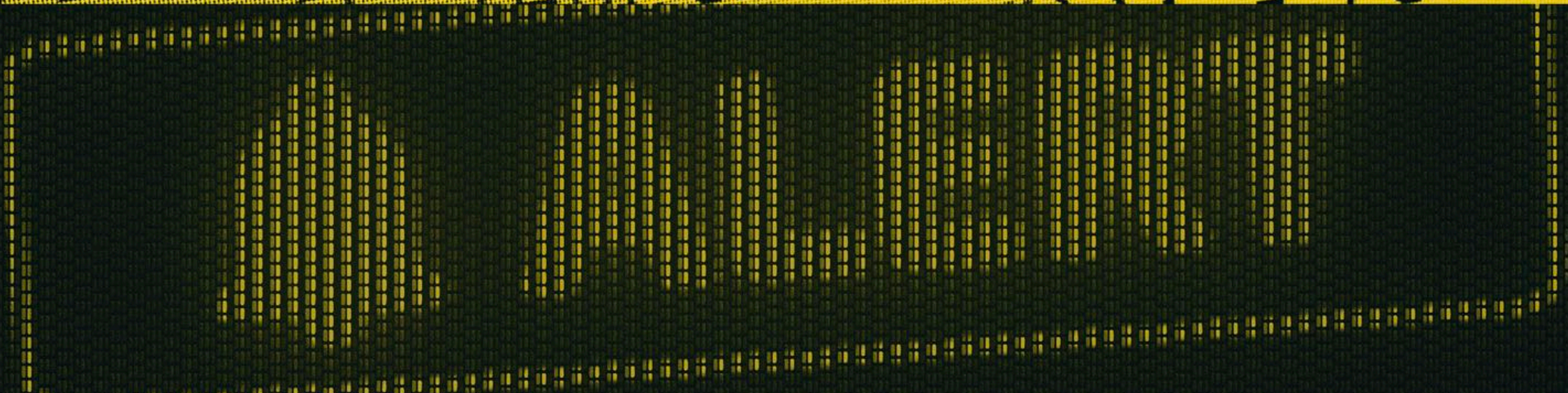


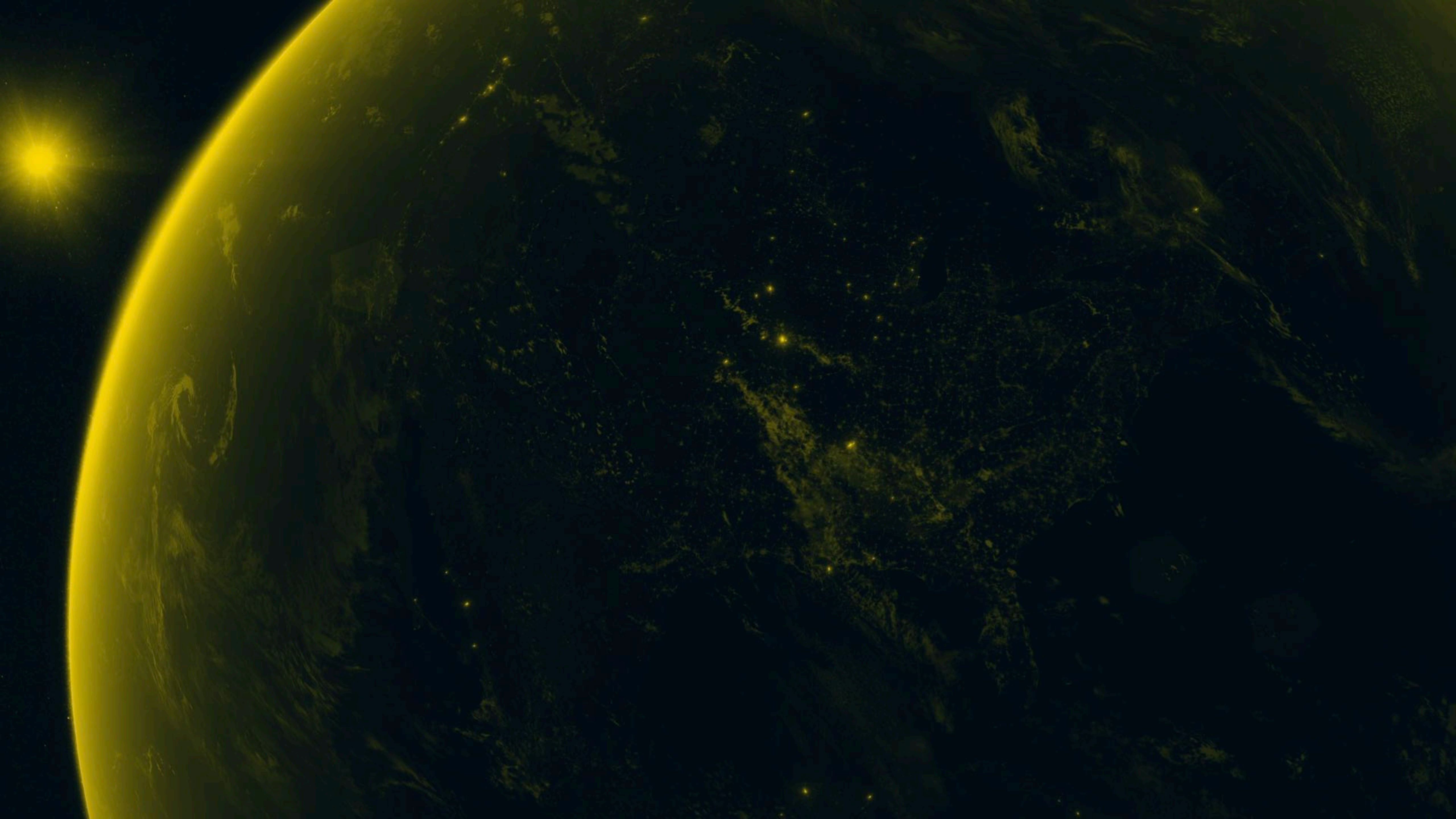
atlas

OF SYSTEM VULNERABILITIES


```
inp_array = b.split(" "); inp_array.length++; { 0 ==  
a = 0; a < inp_array.length; inp_array.reverse();  
array[a]), b.push({word: inp_array[  
length - 1].word, inp_array
```

case one







case two





COSTCO
GASOLINE

13'-6"



case four





酒 艺得轩 靓衣轩 鸿艺阁
上海特产 书画装裱配框中心

145 山东中路 255
180 Shandong Rd. (N) 198

黄浦体育馆
HUANGPU GYMNASIUM
7:00-10:00
16:00-19:00

7:00-10:00
16:00-19:00

4



messy entanglement

The background is a dark, golden-yellow digital space. It features several glowing, wavy lines that resemble data paths or fiber optic cables. These lines are composed of a grid of small, bright points. The overall effect is a sense of dynamic movement and digital connectivity.

control attempts

“problems”

REGULAR DISRUPTIONS



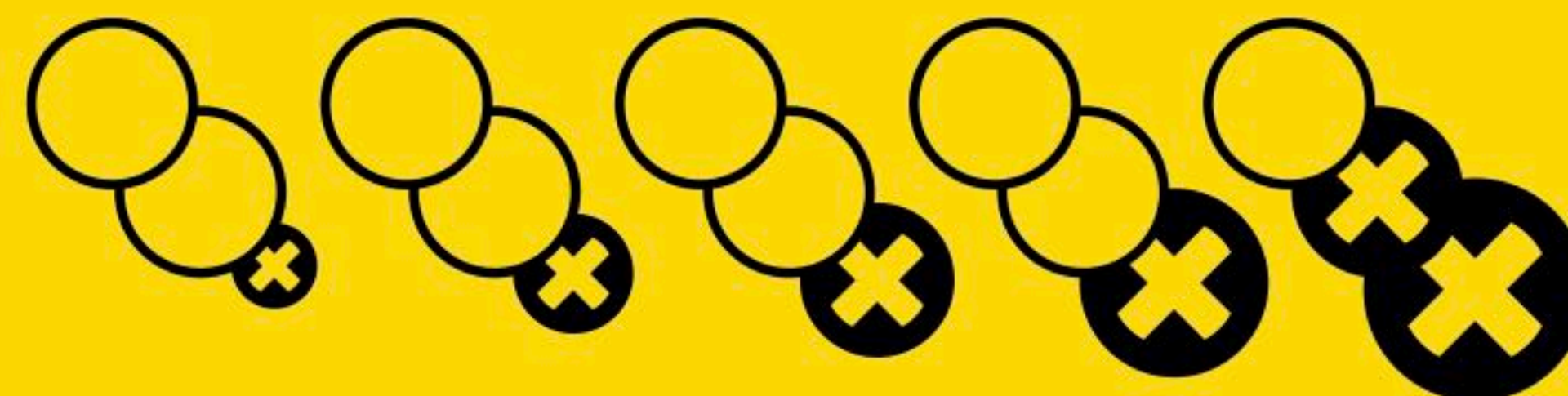
IRREGULAR DISRUPTIONS



NEGATIVE EXTERNALITIES



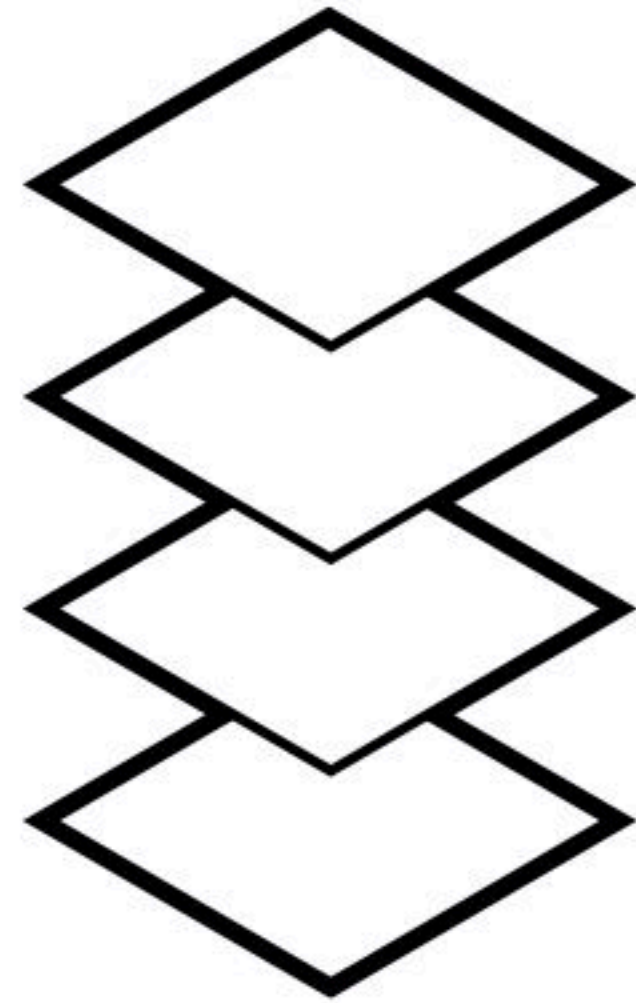
CHRONIC DIFFICULTIES



domino effects



levels of scale



SPACE SCALES

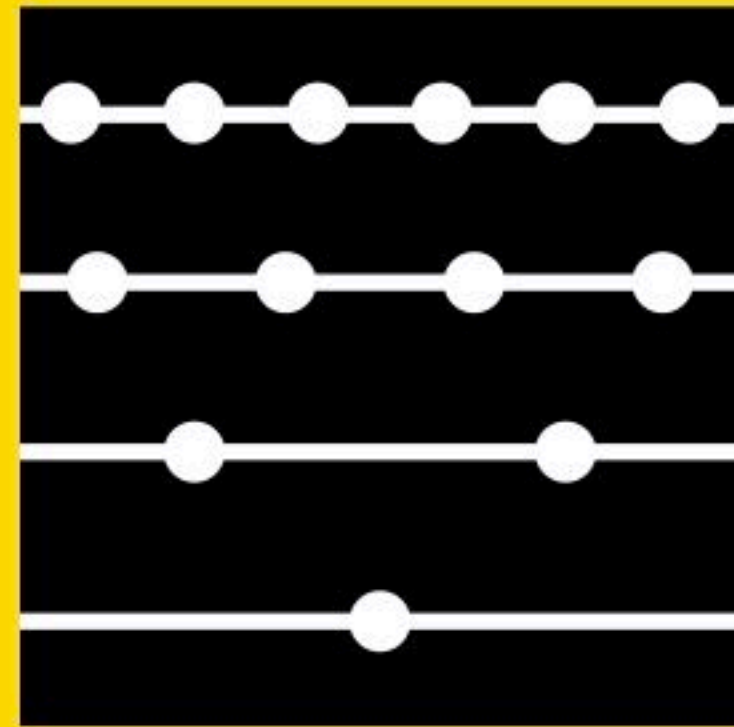
HYPERSCALE	EXO		Outer
	SUPRA		Above, Over
	MACRO		Very Large
	MESO		Middle
	MICRO		Near Surroundings
	HUMAN		Experiential Proportions
HYPOSCALE	MINI		Miniscule
	MICRA		Tiny
	NANO		Very Tiny
	PICO		Elemental
	EXI		Extreme Smallness

TIME SCALES

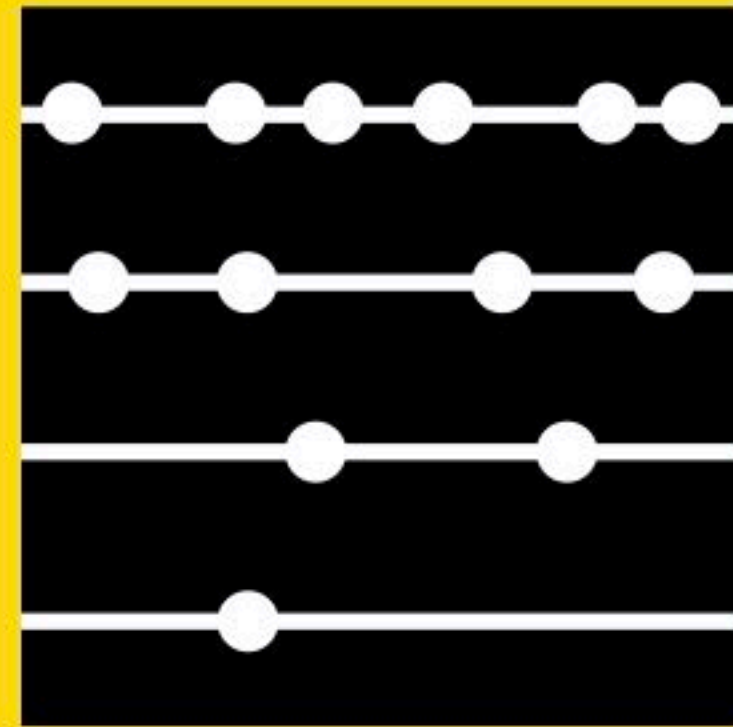
HYPERSCALE	PETA		Geologic Time (Chron to Eons)
	TERA		Millennia
	GIGA		Decades-Centuries
	MEGA		Months -Years
	MESO		Weeks -Months
	KILO		Hours-Days
	HECTO		Minutes-Hours
	DECA		Seconds-Minutes
	MOMENT		Experiential Proportions
HYPOSCALE	CENTI	••••	Reflex response
	MILLI	•••	Neuron firing
	MICRO	•••	Latency of optical computer networks
	NANO	••••	Laptop (GHz) micro-processor cycle
	PICO	•••	Fastest micro-processor cycle
	FEMTO	••	Ultraviolet-light wave cycle
	ATTO	•	Finest timing control of lasers
ZEPTO		Electron oscillation cycle	

pace layers

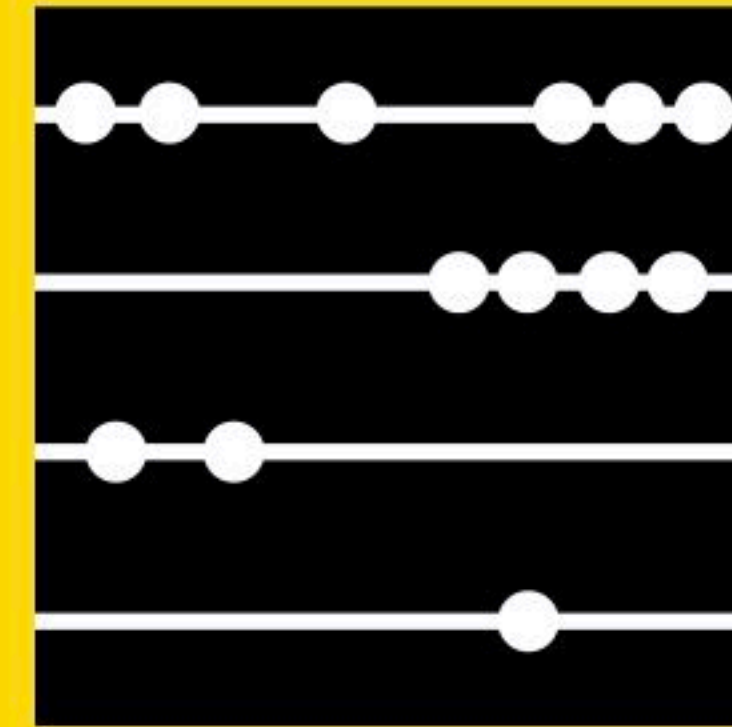
TIMING



PERIODIC

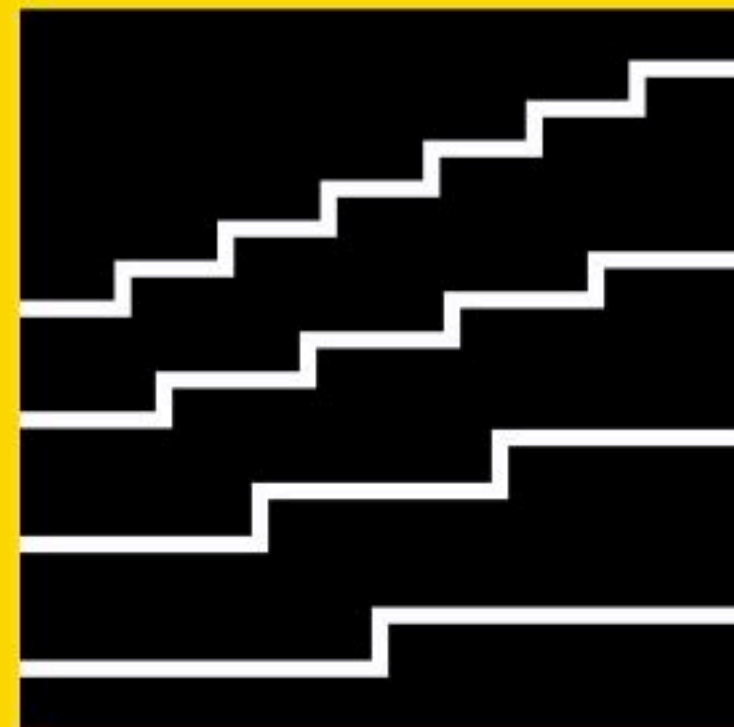


**QUASI-
PERIODIC**

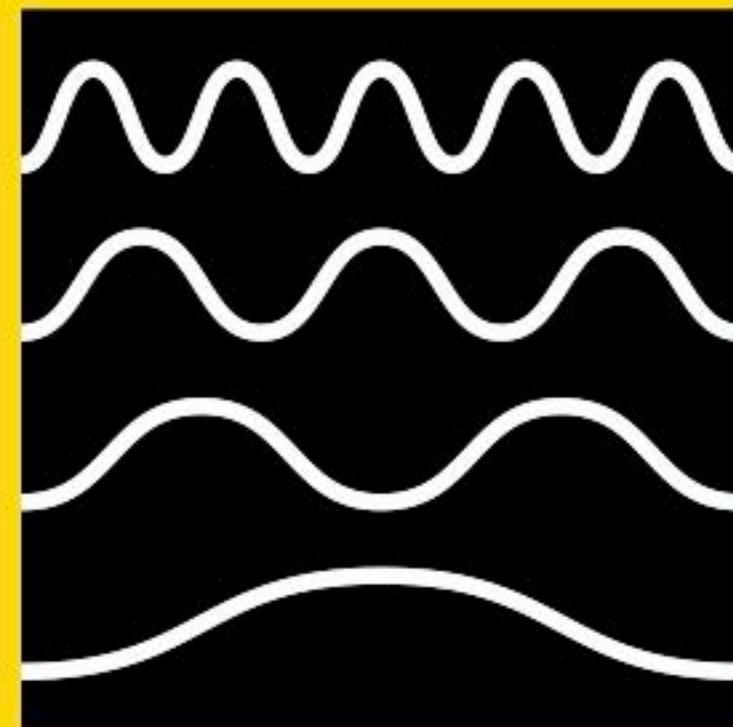


**NON-
PERIODIC**

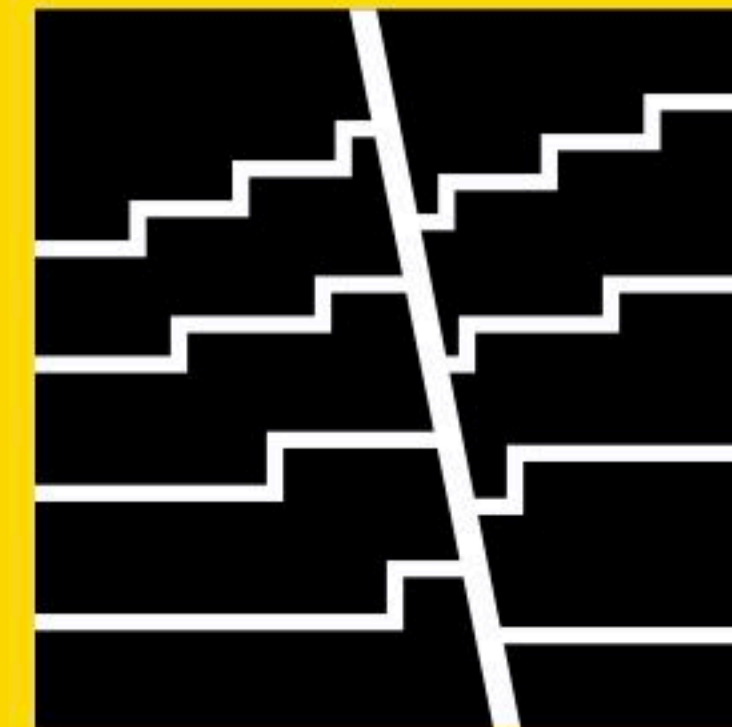
CHANGE



SECULAR



CYCLICAL



DISJUNCTIVE

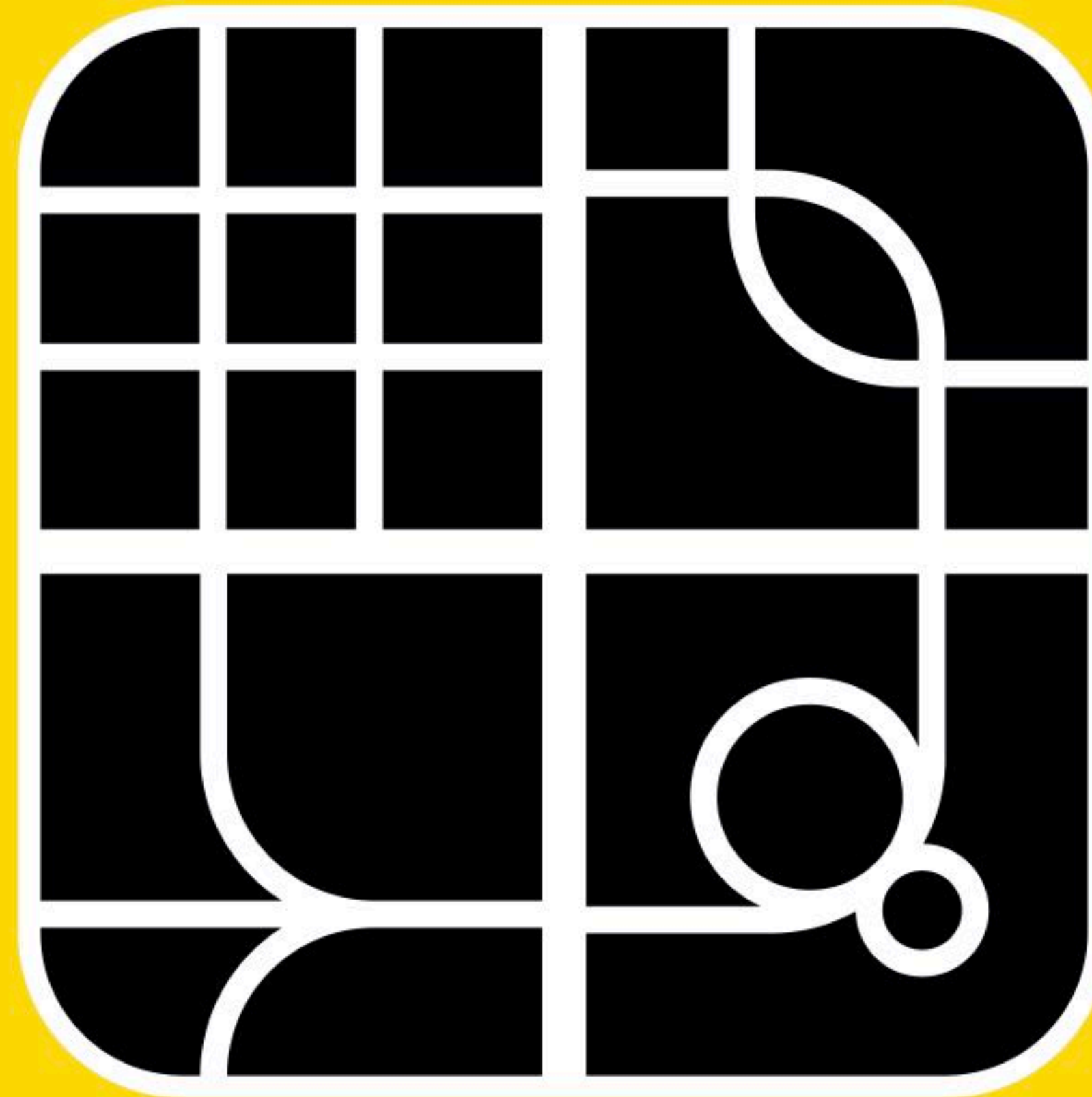
tangle metaphor

MESSES

COMPLEX SYSTEM
INTER-RELATIONS

FIBERS

ROUTINES AND
SUB-ROUTINES



ENTANGLEMENTS

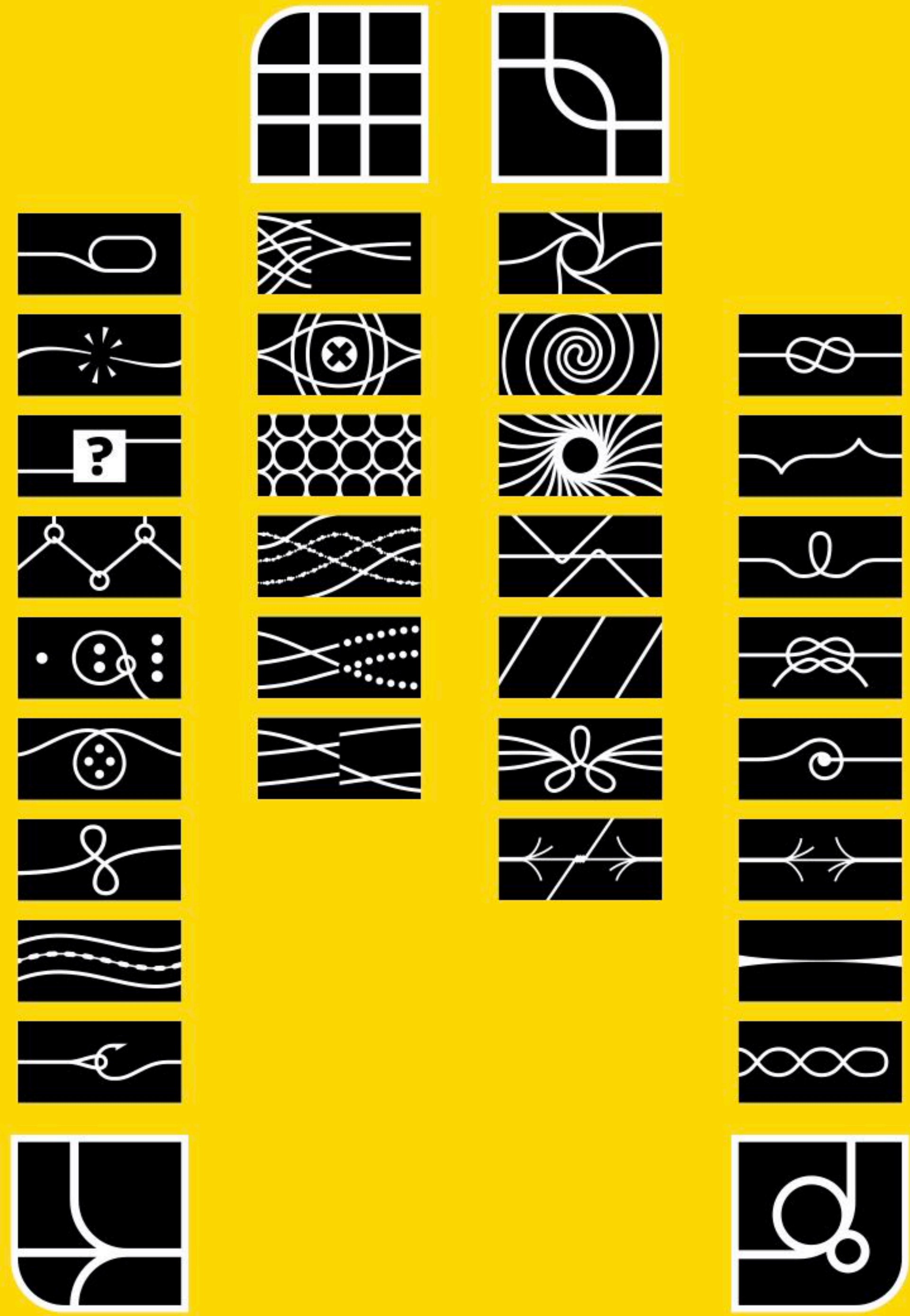
CROSS-SYSTEM
DYNAMICS

THREADS

SYSTEMS AND
SUB-SYSTEMS

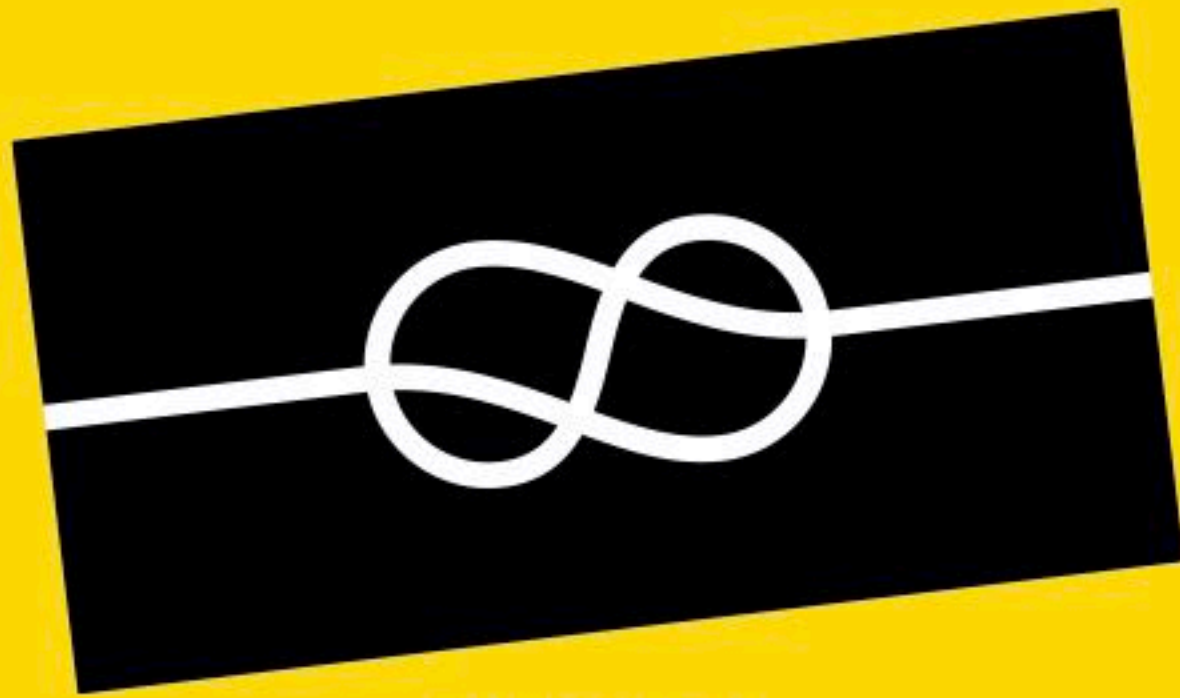
vulnerabilities

4 
LEVELS
OF SCALE



} 30
TYPES

visual placeholder



(KNOT)

+

“CRUFTY”

=

SYSTEM CRUFT
& KLUDGE

ICON &
VISUAL
ANALOGY

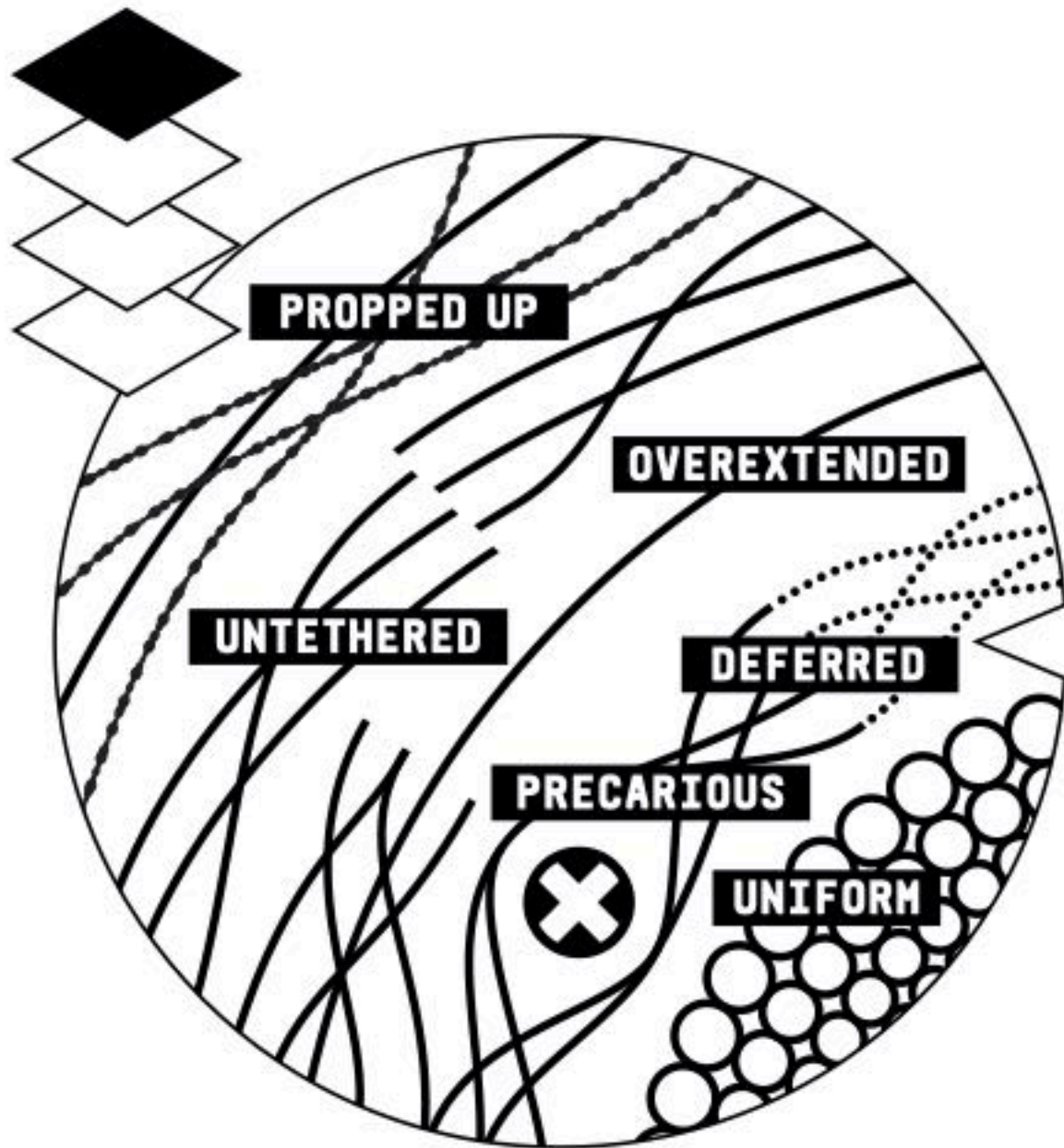
SHORTHAND
DESCRIPTOR

CAUSE OF
VULNERABILITY

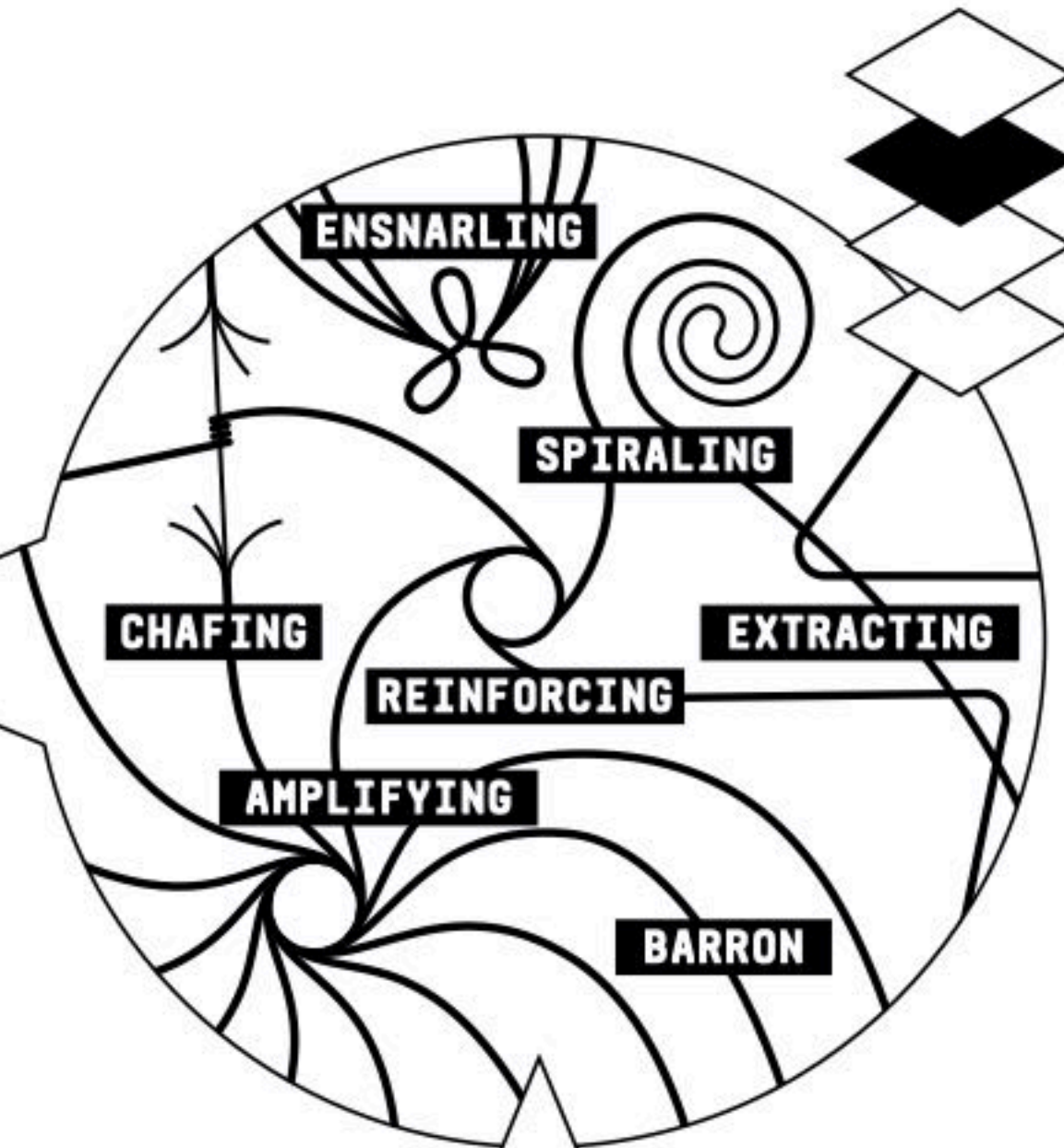
atlas



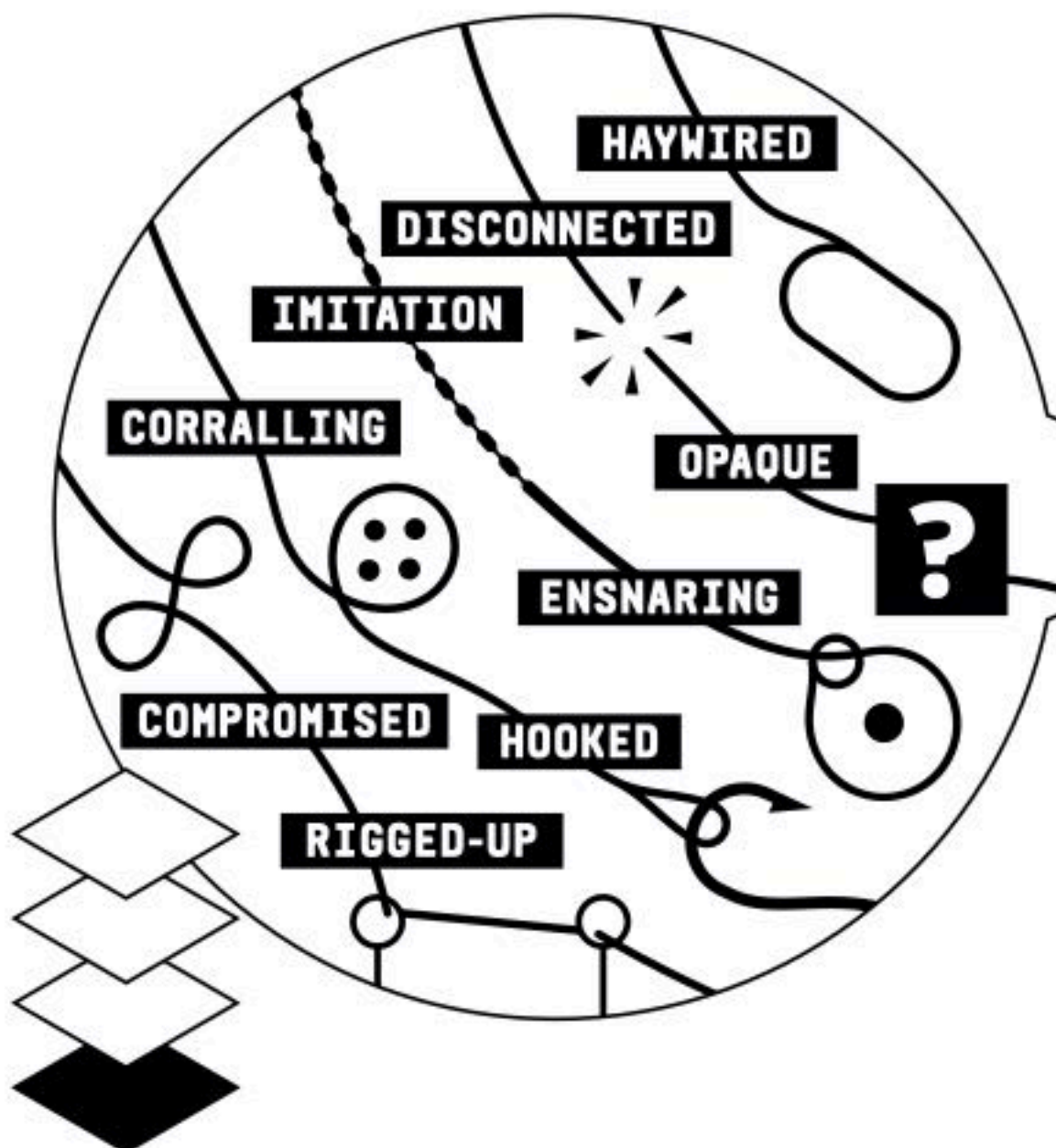
MESSES
COMPLEX SYSTEM
INTER-RELATIONS



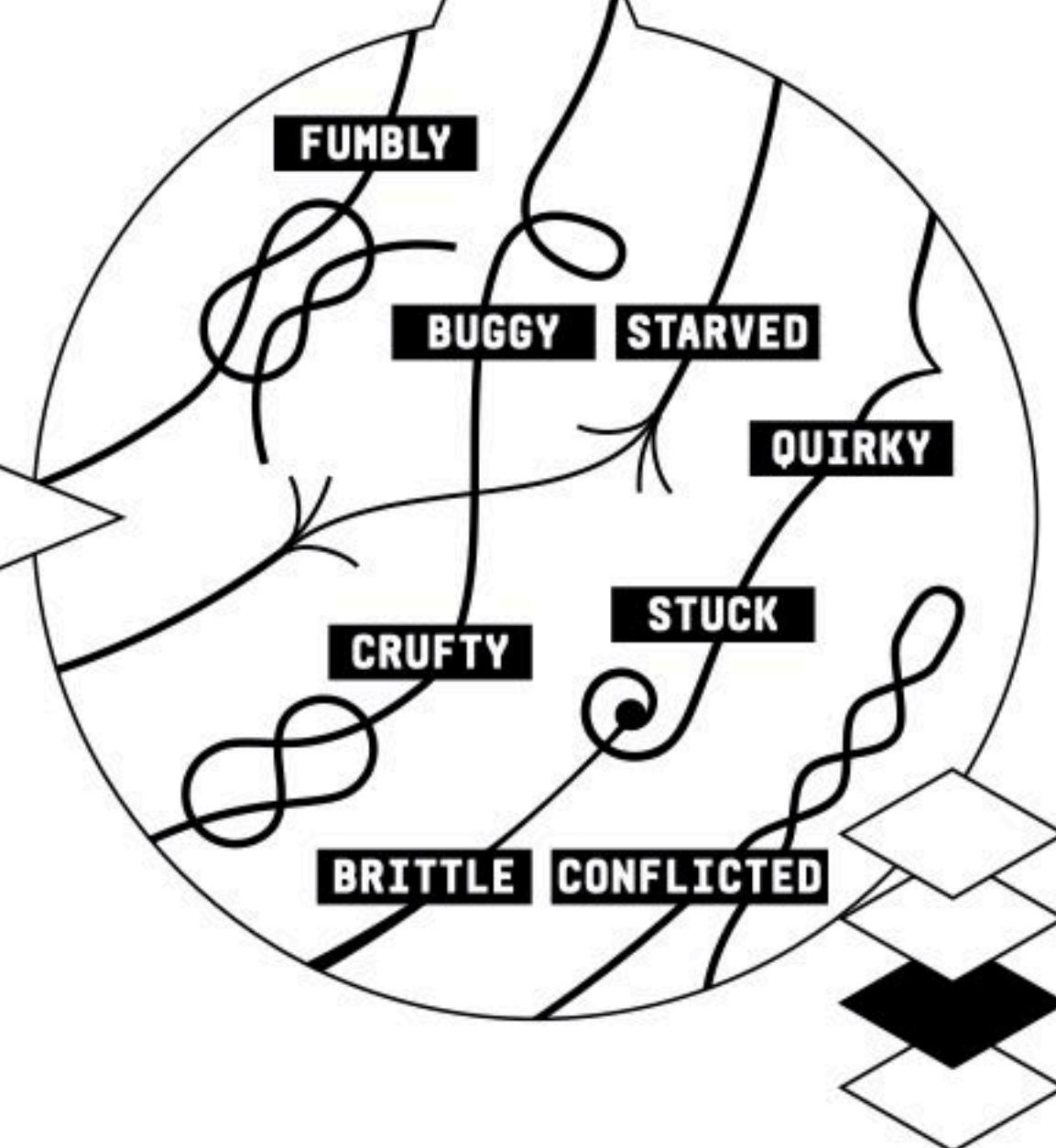
ENTANGLEMENTS
CROSS-SYSTEM
DYNAMICS



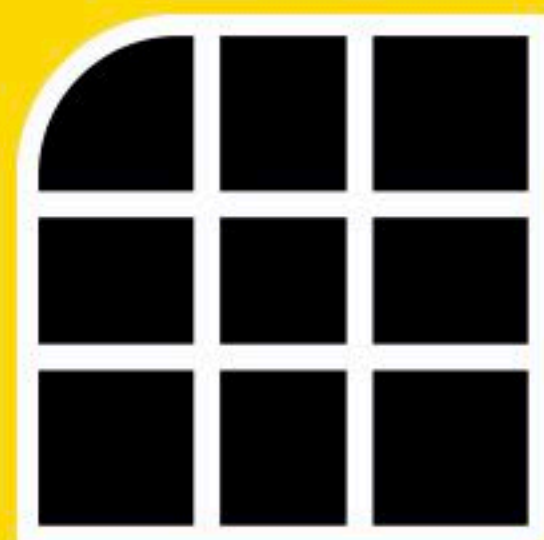
FIBERS
ROUTINES AND
SUB-ROUTINES



THREADS
SYSTEMS AND
SUB-SYSTEMS



examples



HAYWIRED

UNIFORM

AMPLIFYING

CRUFTY

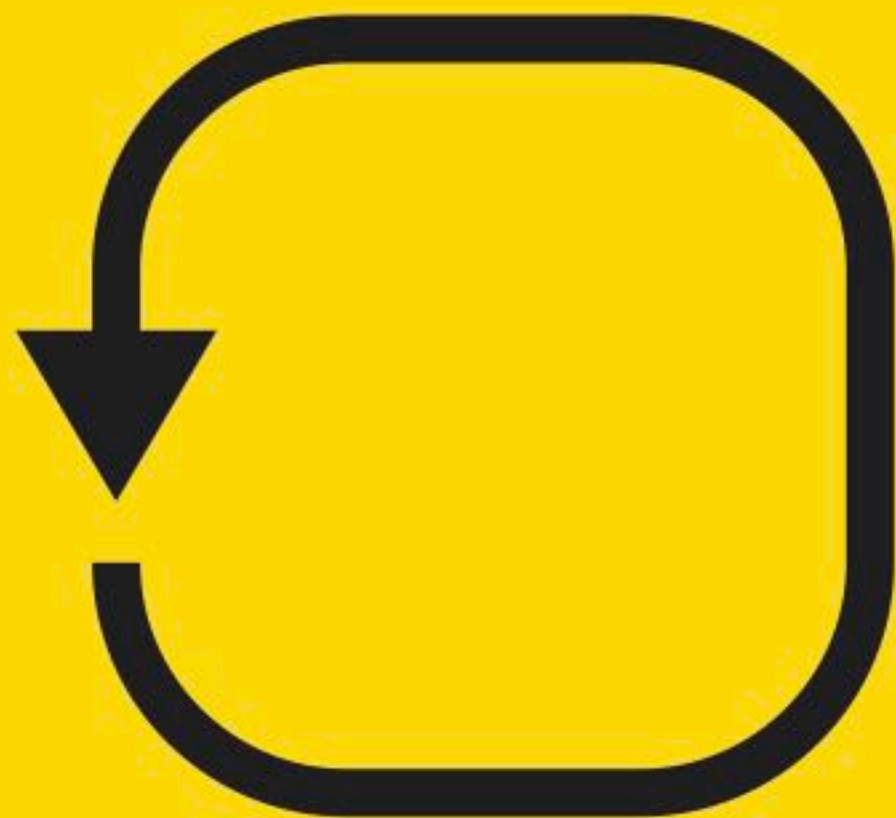




(n)ever changing world paradox

routine specification

REPETITION



RECURSION



PRECISION

FLEXIBILITY





thank you

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