Communicating Requirements in Software Engineering

Nicholas Gardella,

HFES at UVA,

Riggs Lab

Bio

- BS, Computer Science, Virginia Tech, 2021
- (soon to be) ME, Systems Engineering, UVA, 2023
- PhD Student, Systems Engineering, UVA
- Member, Riggs Lab (sriggslab.com)
- NSF Cyber-Physical Systems Research Trainee
- Certified Scrum Product Owner, Leidos, 2021
- Webmaster, Human Factors & Ergonomics Society @ UVA (hfes.atuva.ga)

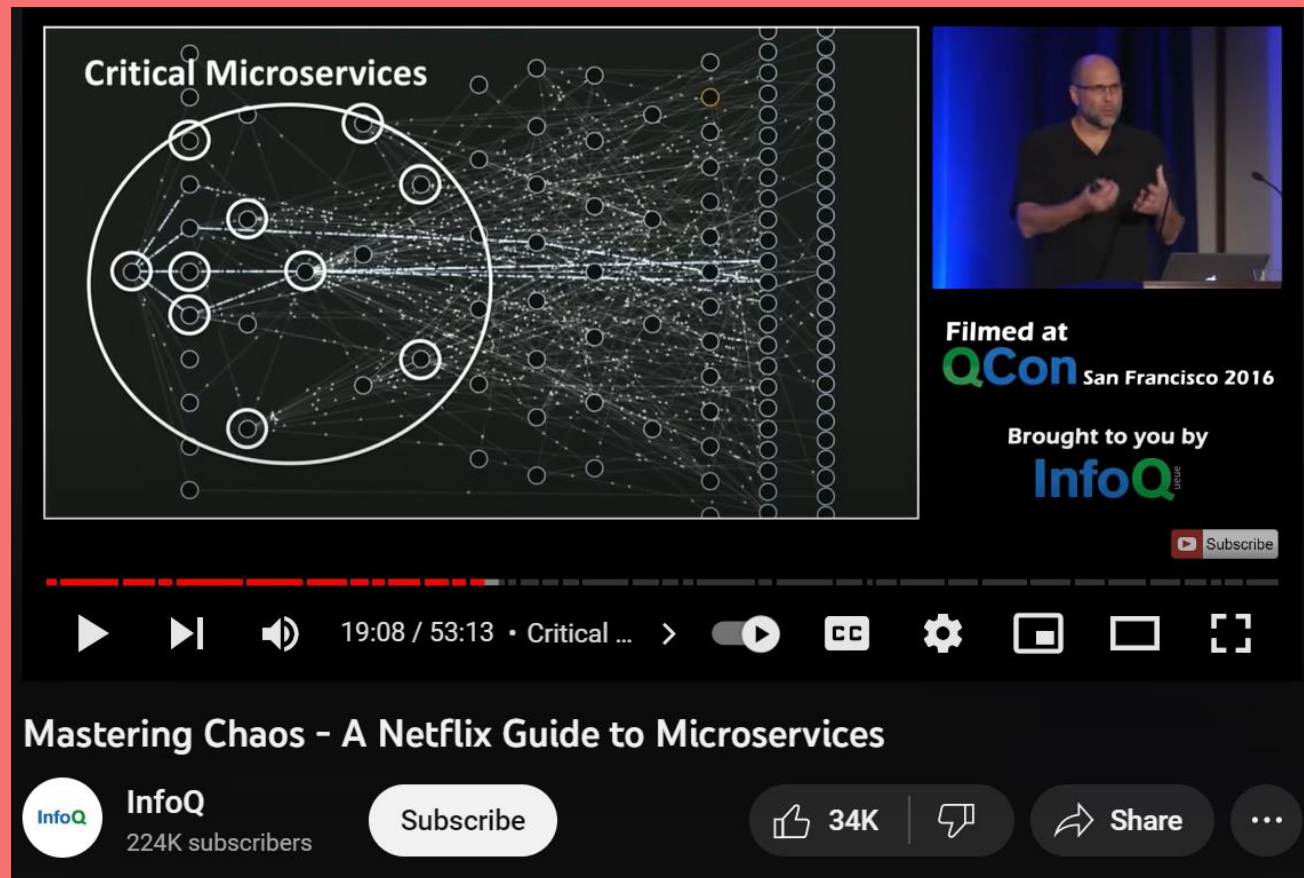# What is
engineering?

What is
software engineering?

What is
systems engineering?

Is it **Operating** Systems?

```c
for (i = 0; i < NUM_THREADS; i++) {
  printf("IN MAIN: Creating thread %d.\n", i);
  thread_args[i] = i;
  result_code = pthread_create(&threads[i], NULL,
  perform_work, &thread_args[i]);
  assert(!result_code);
}
```

Is it **Networking** Systems?

Great Video

Critical Microservices

Filmed at
QCon San Francisco 2016

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InfoQ

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Mastering Chaos – A Netflix Guide to Microservices

InfoQ
224K subscribers

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Share

systems engineering is information engineering

$$(systems\ eng.) \approx (info.\ eng.) \supseteq (SWE)$$

It is **information engineering**.

"I Love Fruit But I Can't Afford It": Using Participatory Action Research to Develop Community-Based Initiatives to Mitigate Challenges to Chronic Disease Management in an African American Community Living in Public Housing

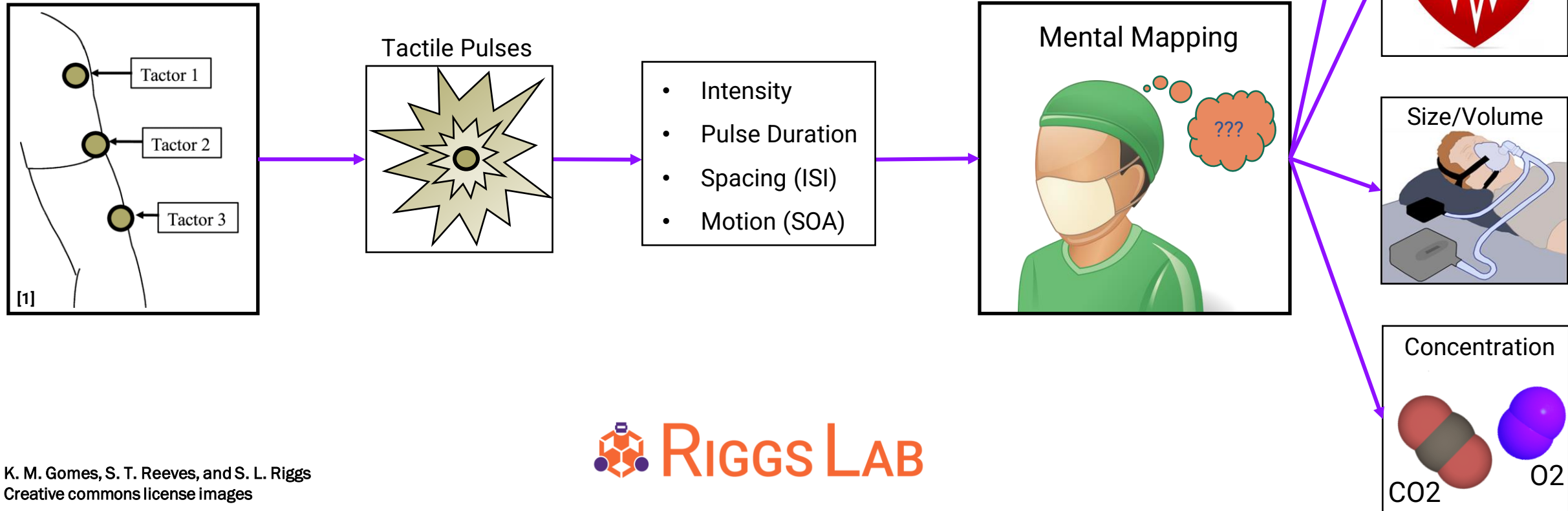Courtney Rogers, Joy Johnson, Brianne Nueslein, David Edmunds & Rupa S. Valdez ✉

transportation). The suggested initiatives are in stark contrast to existing interventions in similar populations that have implemented compensatory interventions designed to transfer knowledge from outside experts. The resu[...] from this study suggest that interventions empowering community members[...]

inductive content analysis. Physical activity, the cost associated with healthy eating, and lack of information were noted as challenges to chronic disease management. Initiatives discussed were the formation of a walking partner's program to promote physical activity, a shopper's club to exchange coupons and learn how to prepare healthy meals, and a natural remedy's book to share information intergenerationally about management tactics. Challenges identified existed predominantly on the individual and the system level, while the initiatives generated target engaging interpersonal and community relationships. These community-envisioned approaches should be explored to facilitate chronic disease management in public housing neighborhoods.
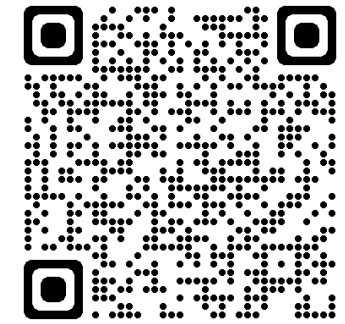
It is **information engineering**.

How can continuous data be naturally encoded in tactile pulses?

Tactile Pulses

- Intensity
- Pulse Duration
- Spacing (ISI)
- Motion (SOA)

Mental Mapping

???

Tactor 1

Tactor 2

Tactor 3

[1]

Pressure
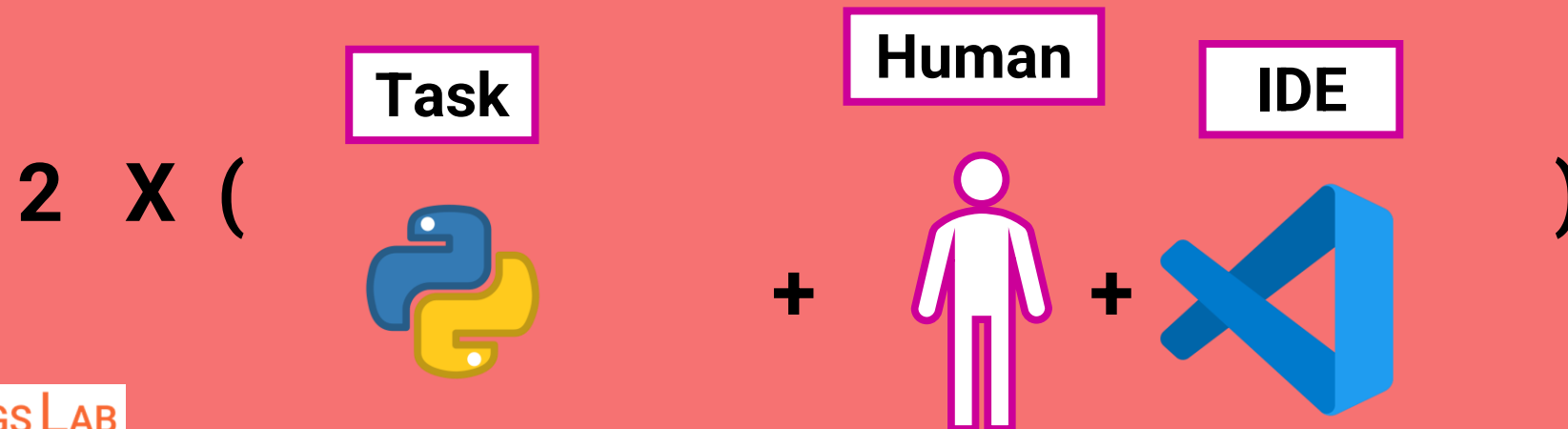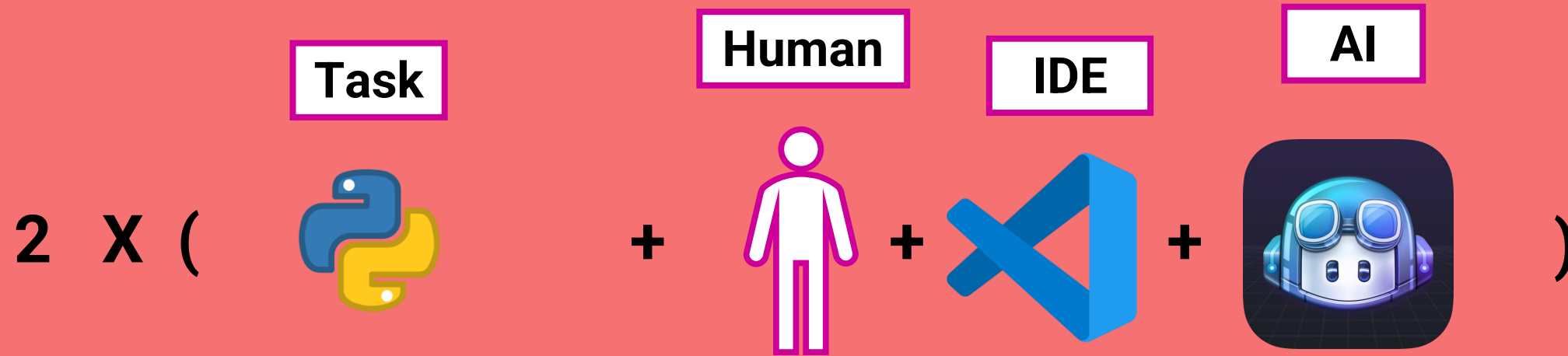
Speed

Size/Volume

Concentration

CO2   O2

RIGGS **L**AB

[1] K. M. Gomes, S. T. Reeves, and S. L. Riggs
[2] Creative commons license images

It is **information engineering**.

$$2 \times (\text{Task} + \text{Human} + \text{IDE} + \text{AI})$$

$$\overline{}$$

$$2 \times (\text{Task} + \text{Human} + \text{IDE})$$

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njg4ne@virginia.edu

It is **information engineering**.

Interested?
Get involved

Context

AIDE Trust   Self-Confidence   Workload   Affect   Stress

Team Performance   Rationality

Adaptability

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Universals

Goals **(what to do)**

Metrics — (assessing success)

Tradeoffs — (what matters most)
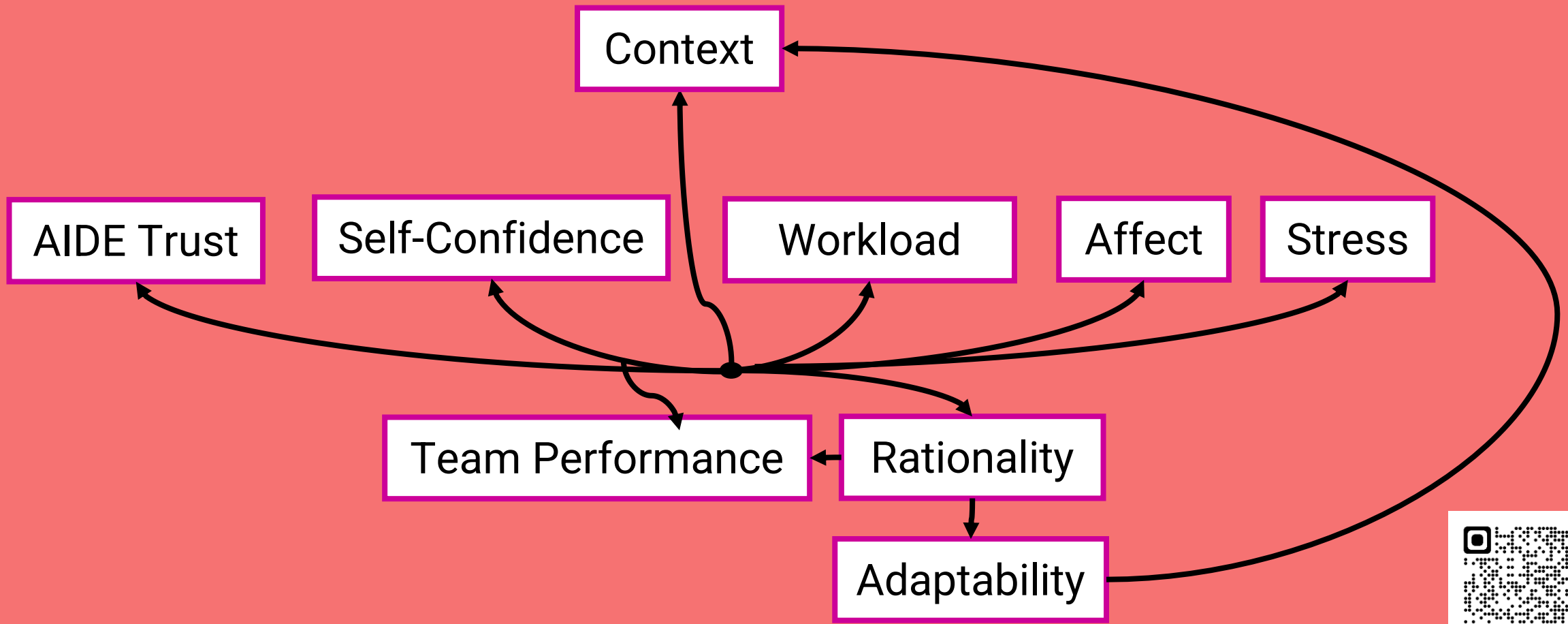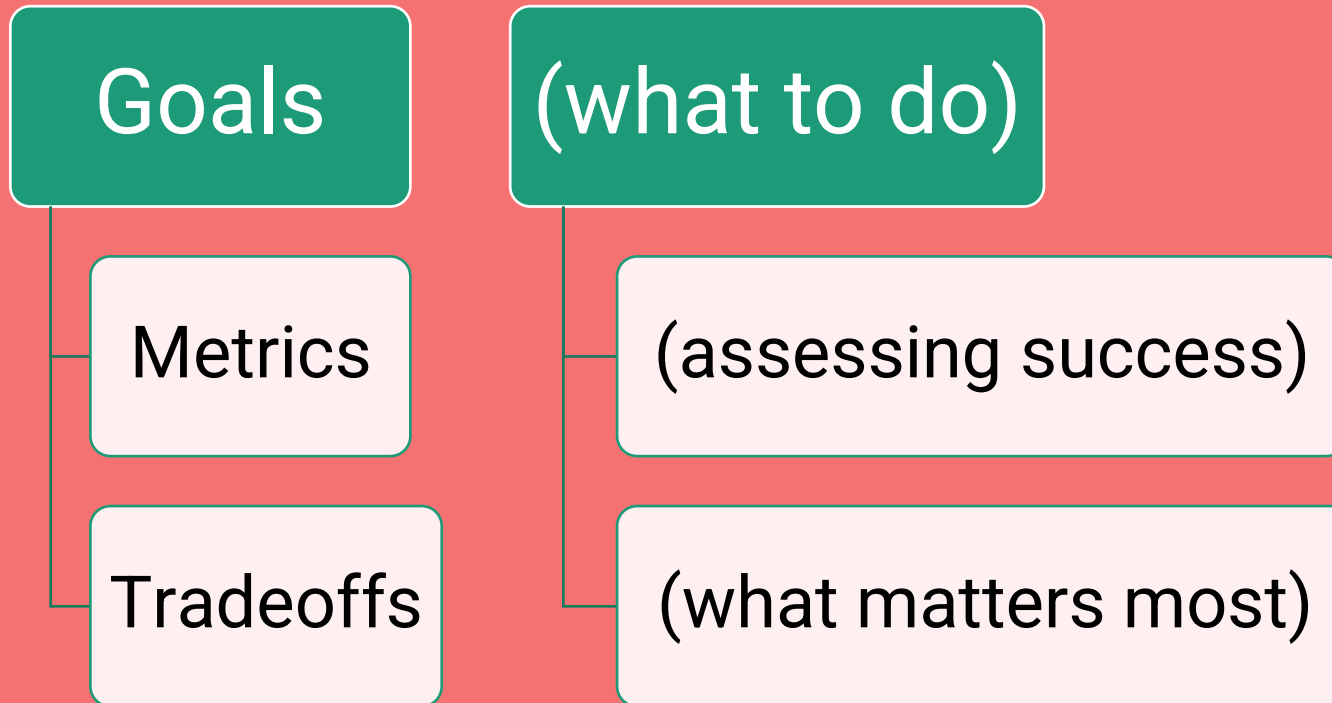
Is it just **common sense?**

Why **systems engineering**?

Example: running a 5k

Goals
- Metrics
- Tradeoffs
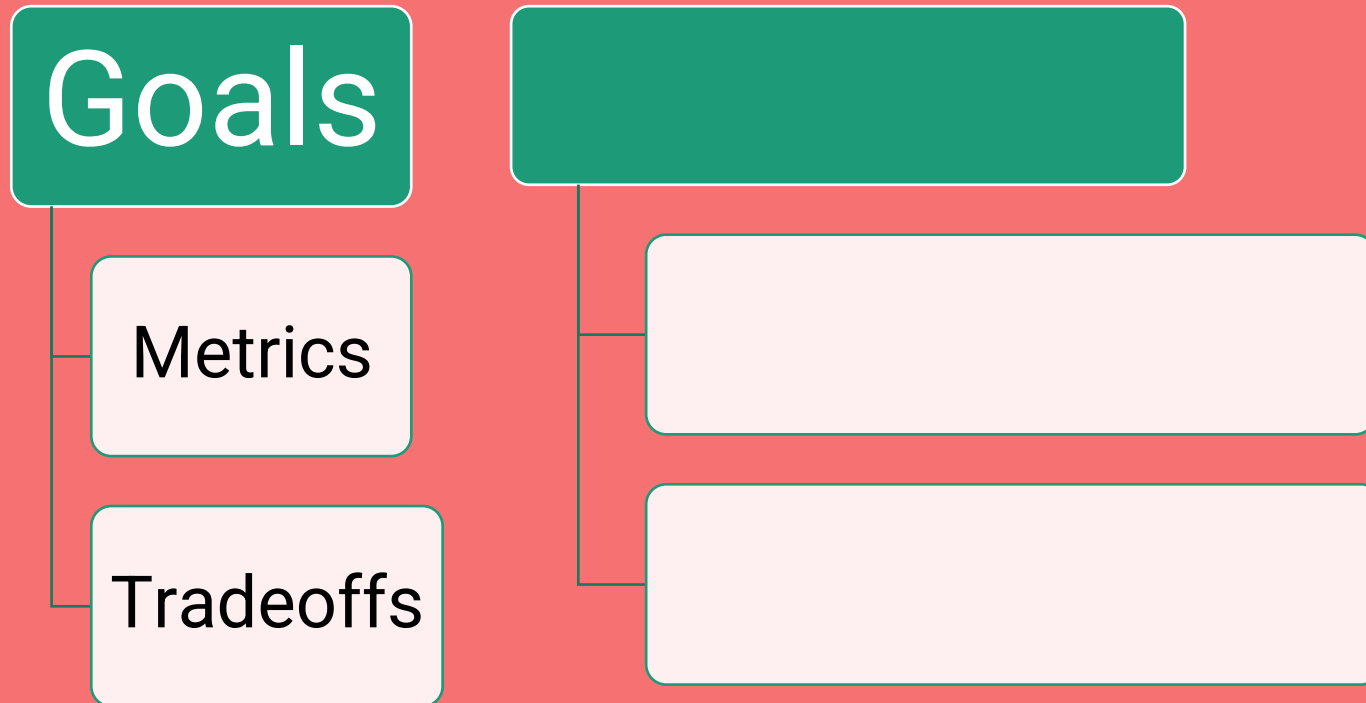
Example: personal project

Goals

Metrics

Tradeoffs
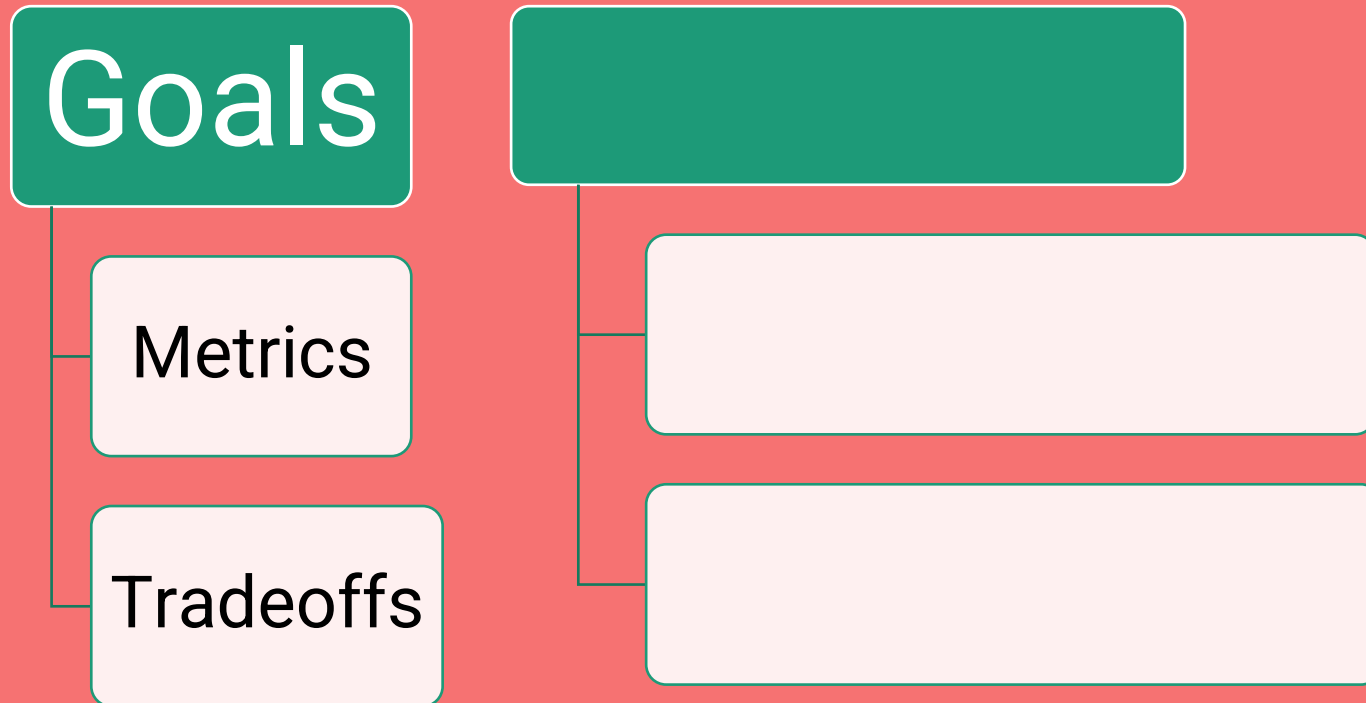
How do you communicate this to a **developer**?

Game:
explain in plain english
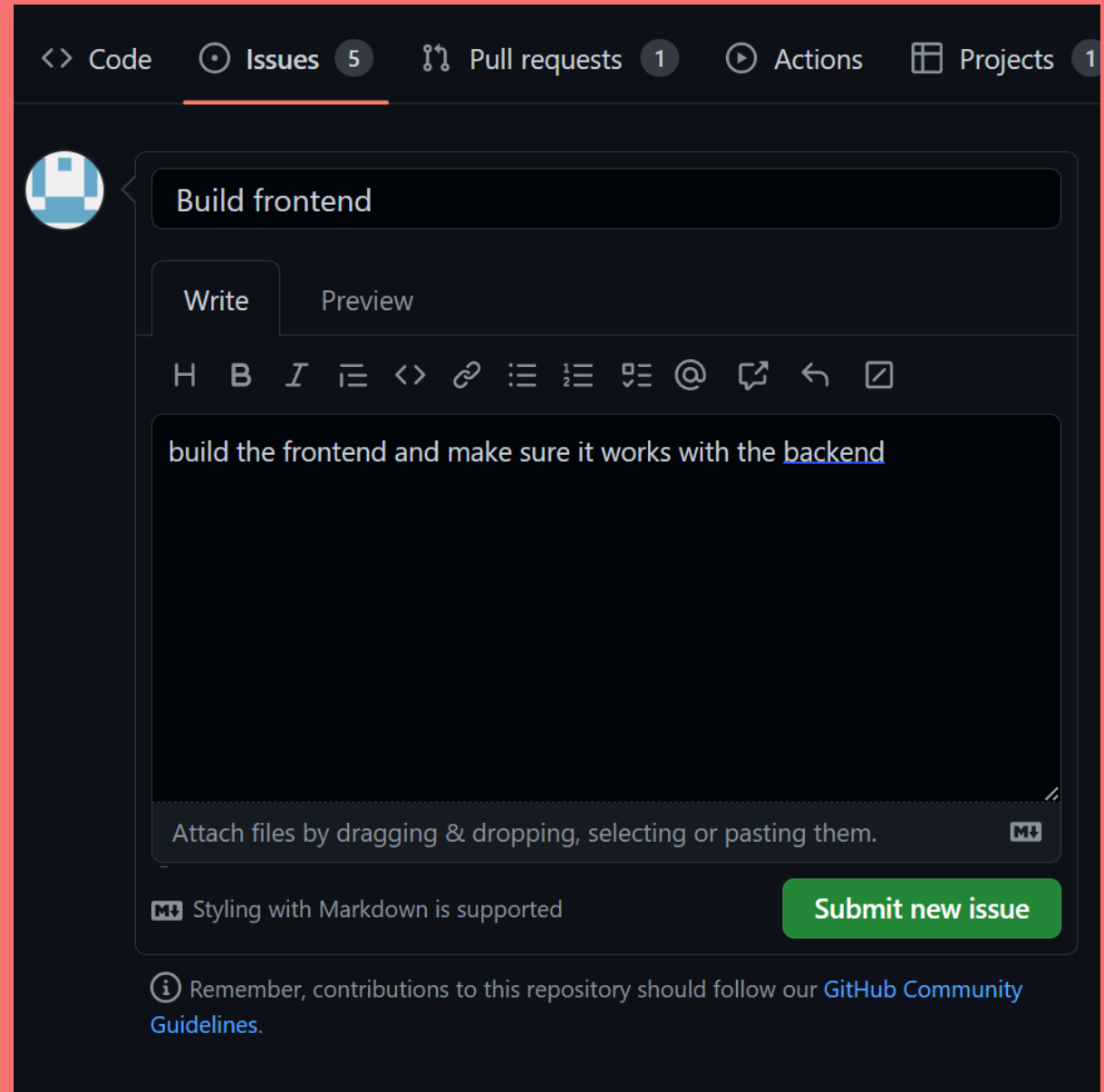
How's this?

Handle /settings/birthday changes in express

Write | Preview

- Handle post on /settings/birthday
- Persist the setting to the database
- Reply appropriately

Styling with Markdown is supported

Submit new issue

ⓘ Remember, contributions to this repository should follow our GitHub Community Guidelines.

Who checks the checkboxes?

Is it worth it?

More & better information is powerful.
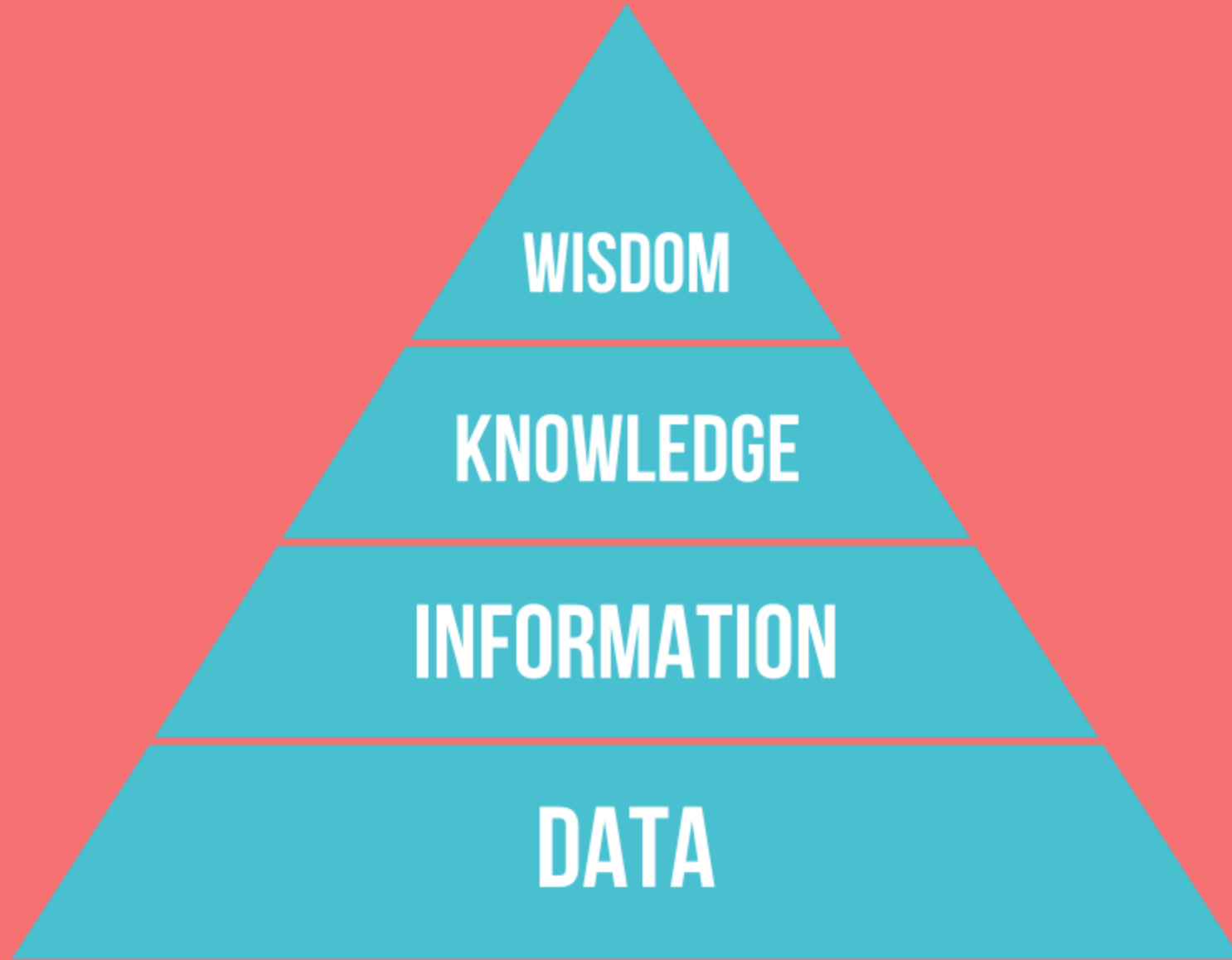
2006 --- $40.9

All figures are in billions of US dollars

Added security | https://www.dni.gov/index.php/what-we-do/ic-budget

getattool - Google... | Slide 1 | field | Digest of Education... | c | arm assembly separ...

captured here.

	U.S. INTELLIGENCE COMMUNITY BUDGET				
Fiscal Year	NIP Budget Requested	NIP Budget Appropriated	MIP Budget Requested	MIP Budget Appropriated	Total Appropriated
2024	$72.4		$29.3		
2023	$67.1		$26.6		
2022	$62.3	$65.7	$23.3	$24.1	$89.8

Game:
what's the best way

Help a sociologist clean this

	A	B	C	D	E	F	G	H	I	J	K
1	Label (Grouping)	SEX AND AGE	SEX AND AGE!!Tota	SEX AND AGE!!Tota	SEX AND AGE!!Tota	SEX AND AGE!!Tota	SEX AND AGE!!Tota	SEX AND AGE!!Tota	SEX AND AGE!!Tota	SEX AND AGE!!Tota	SEX AND AGE
2	Albemarle County, Virginia										
3	Estimate		113,535	54,126	59,409	91.1	4,750	5,924	7,336	12,929	4
4	Percent	4	113,535	47.70%	52.30%	(X)	4.20%	5.20%	6.50%	11.40%	4
5	Arlington County, Virginia										
6	Estimate		232,965	117,490	115,475	101.7	11,890	12,388	11,559	8,344	17
7	Percent		232,965	50.40%	49.60%	(X)	5.10%	5.30%	5.00%	3.60%	7
8	Augusta County, Virginia										
9	Estimate		77,563	39,115	38,448	101.7	3,424	4,799	3,901	5,039	4
10	Percent		77,563	50.40%	49.60%	(X)	4.40%	6.20%	5.00%	6.50%	5
11	Bedford County, Virginia										
12	Estimate		80,131	39,894	40,237	99.1	3,478	4,819	4,240	4,905	4
13	Percent		80,131	49.80%	50.20%	(X)	4.30%	6.00%	5.30%	6.10%	5
14	Chesterfield County, Virginia										
15	Estimate		370,688	178,687	192,001	93.1	21,345	24,395	26,345	25,225	22
16	Percent		370,688	48.20%	51.80%	(X)	5.80%	6.60%	7.10%	6.80%	6
17	Fairfax County, Virginia										
18	Estimate		1,139,720	569,443	570,277	99.9	67,480	70,444	78,960	73,948	67
19	Percent		1,139,720	50.00%	50.00%	(X)	5.90%	6.20%	6.90%	6.50%	6

Buy a sensor to measure **Heart Rate Variability** in a non-medical setting

R-R Interval   973ms   1102ms

Get **Heart Rate Variability** data from this device for research use

Polar H10

Heart Rate Sensor

When it comes to accuracy and connectivity, Polar H10 heart rate sensor is the go-to choice. Monitor your heart rate with maximum precision and connect your heart rate to a great variety of training devices with Bluetooth® and ANT+.
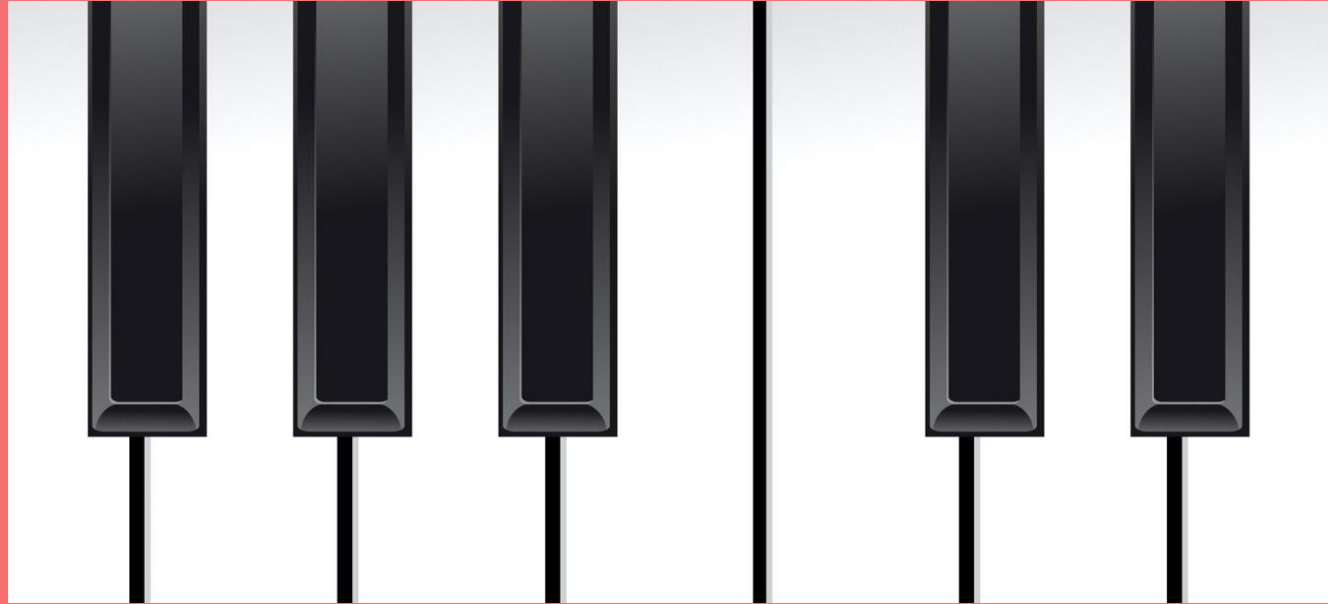
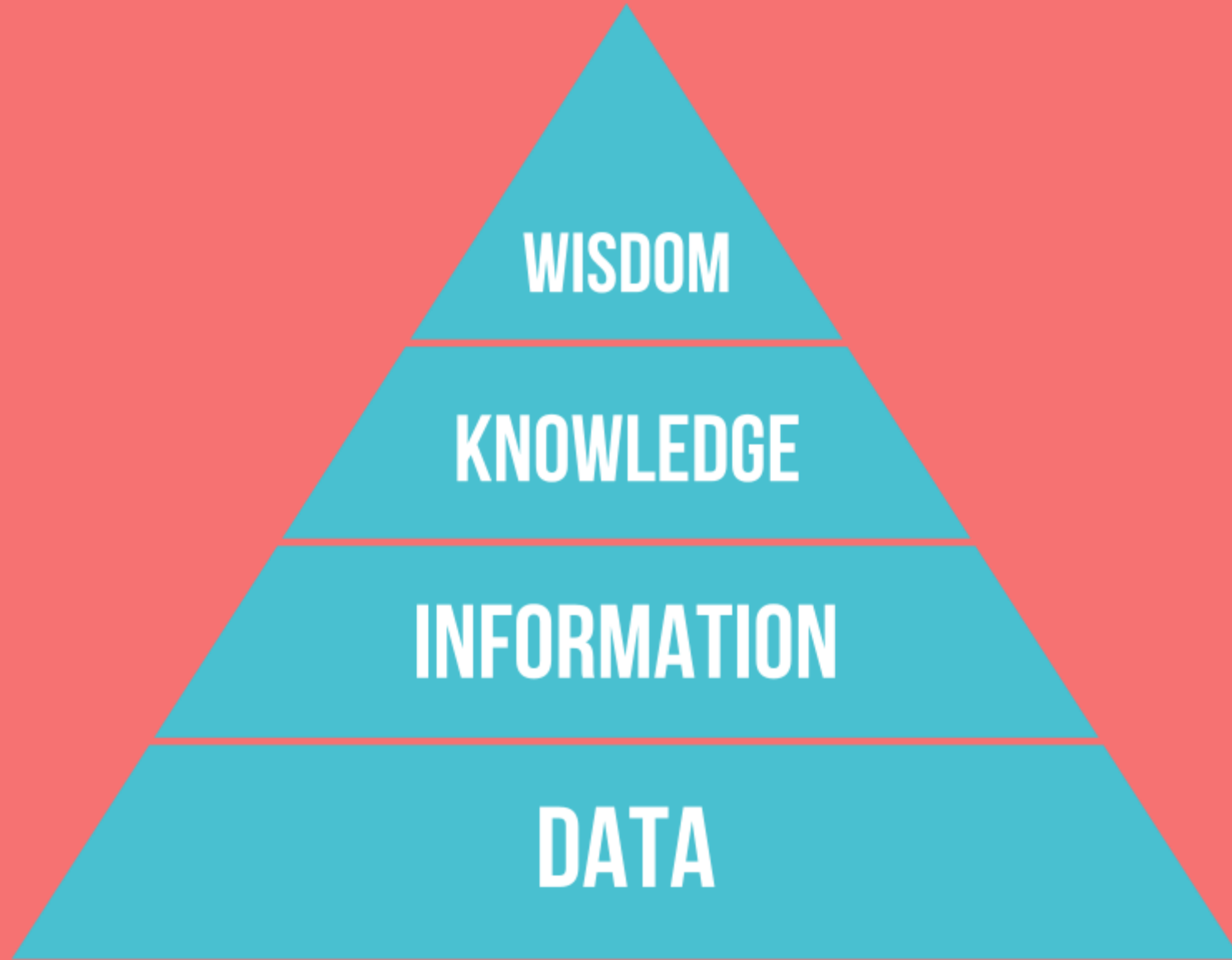|	
Polar H10	**$89.95**
10-kit	$829.95

Choose your size

Create a **web presence** for your 88 year-old piano teacher neighbor

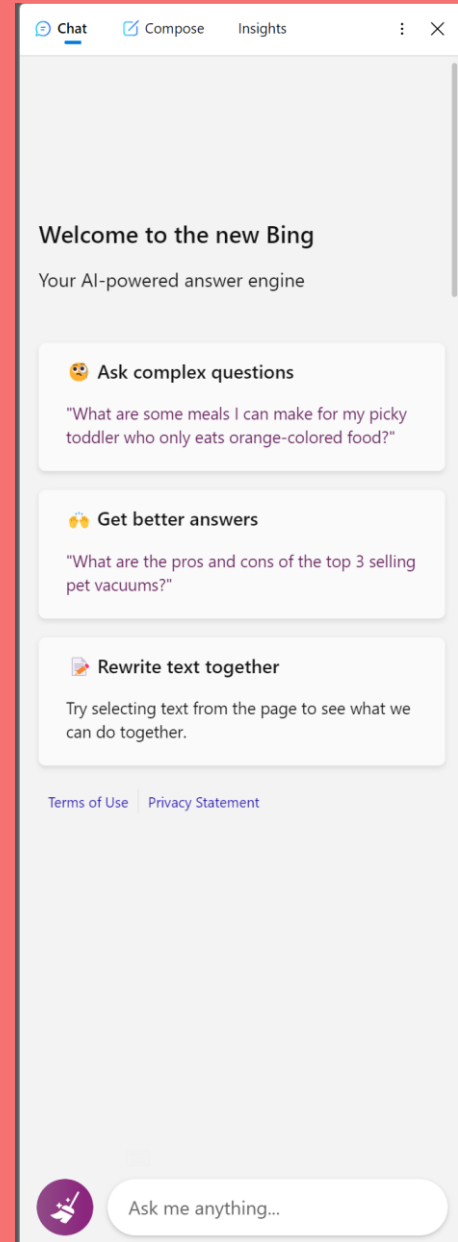**systems engineering** is information engineering

More & better information is powerful.

You know who else likes information?

Chat   Compose   Insights

Welcome to the new Bing
Your AI-powered answer engine

🤔 Ask complex questions

"What are some meals I can make for my picky toddler who only eats orange-colored food?"

🙌 Get better answers

"What are the pros and cons of the top 3 selling pet vacuums?"

📝 Rewrite text together

Try selecting text from the page to see what we can do together.

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Ask me anything...

Nicholas Gardella
Computer Scientist & Human Systems Engineer

Contact- njg4ne@virginia.edu
Website- https://njg.engineering.virginia.edu
Primary Services- teaching, consulting, research
Secondary Services- software development, tutoring
Free Services- 1-to-1 mentorship, public speaking

hfesuva@gmail.com
https://hfes.atuva.ga/

HFES
Systems That Work for **Humans**

sriggs@virginia.edu
https://sriggslab.com/

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