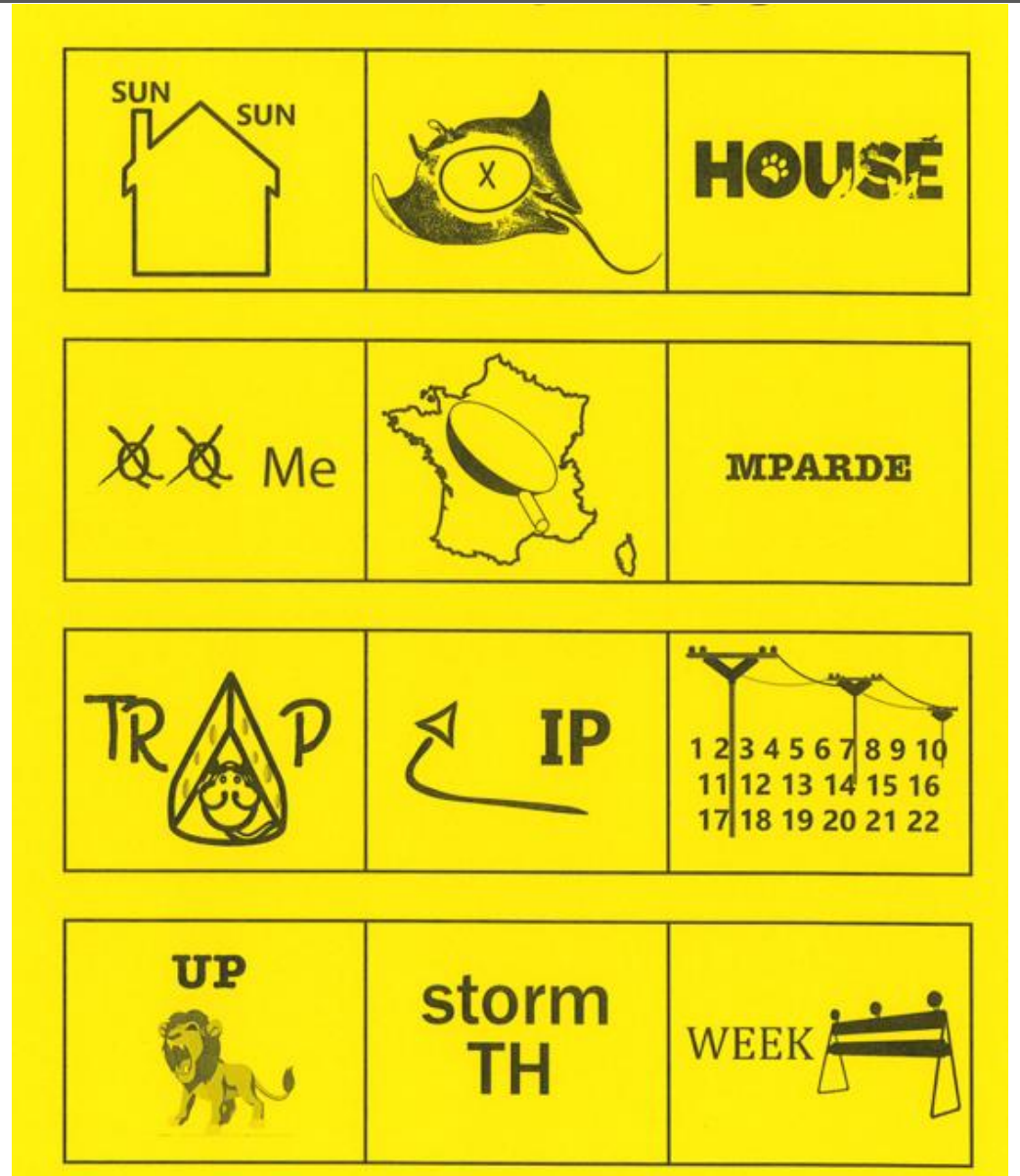


Attendance, Warmup

Attendance link at
ignite.byu.edu/cbe400/lectures



Show and Tell

Max
Toby
Manuela

Next week: Isaak, Zach, Josh A.



Final Project

- Groups of three
- Define and solve a technical creative problem.
- Two parts:
 - **Written:** 5-10 pages. See syllabus
 - **Oral:** final exam period at the university scheduled date and time. Groups have 10-12 minutes to present their projects, and will be evaluated by other students. See syllabus for details



ERASMO

"A transcendent
and powerful piece of filmmaking."



-Anna Alvarado, DNA Film Review

"Erasmus's story reminds us that it is often the
small tales that pack the biggest punch."



-Jack Burham, Film & Culture

"A great short film...
both spiritual and real."



-Bryan Matheson, Happy Valley Podcast

"Erasmus is capable of sticking in your
mind weeks after your first viewing."



-Tyler Thies, On On Cinema



A
DAVID STAUFFER
FILM

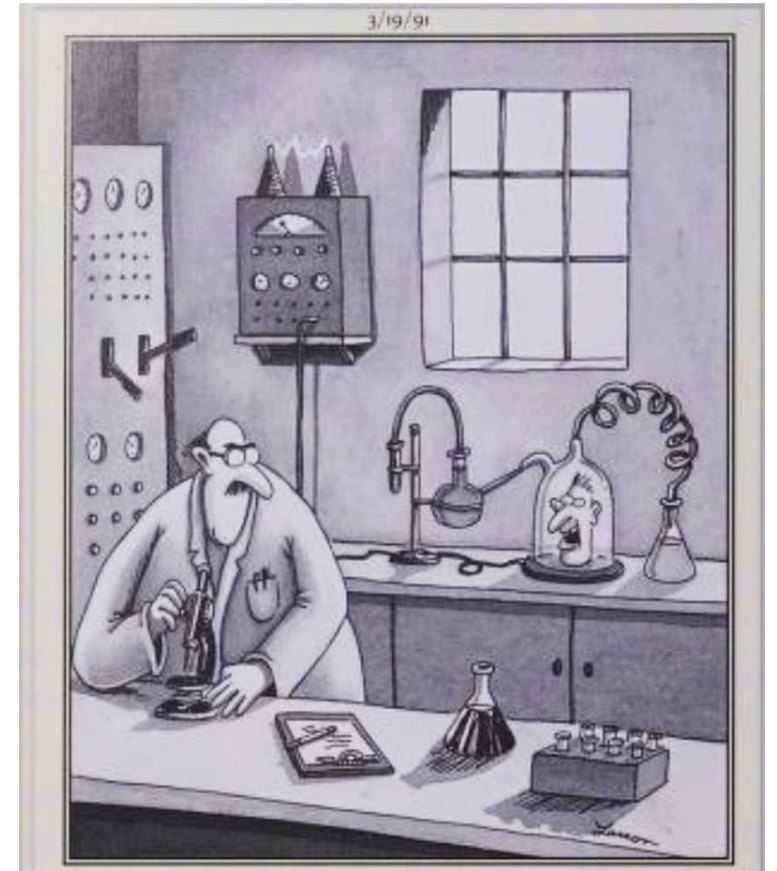
Critical Thinking

Logical fallacies

- An error in reasoning that makes an argument invalid or weak



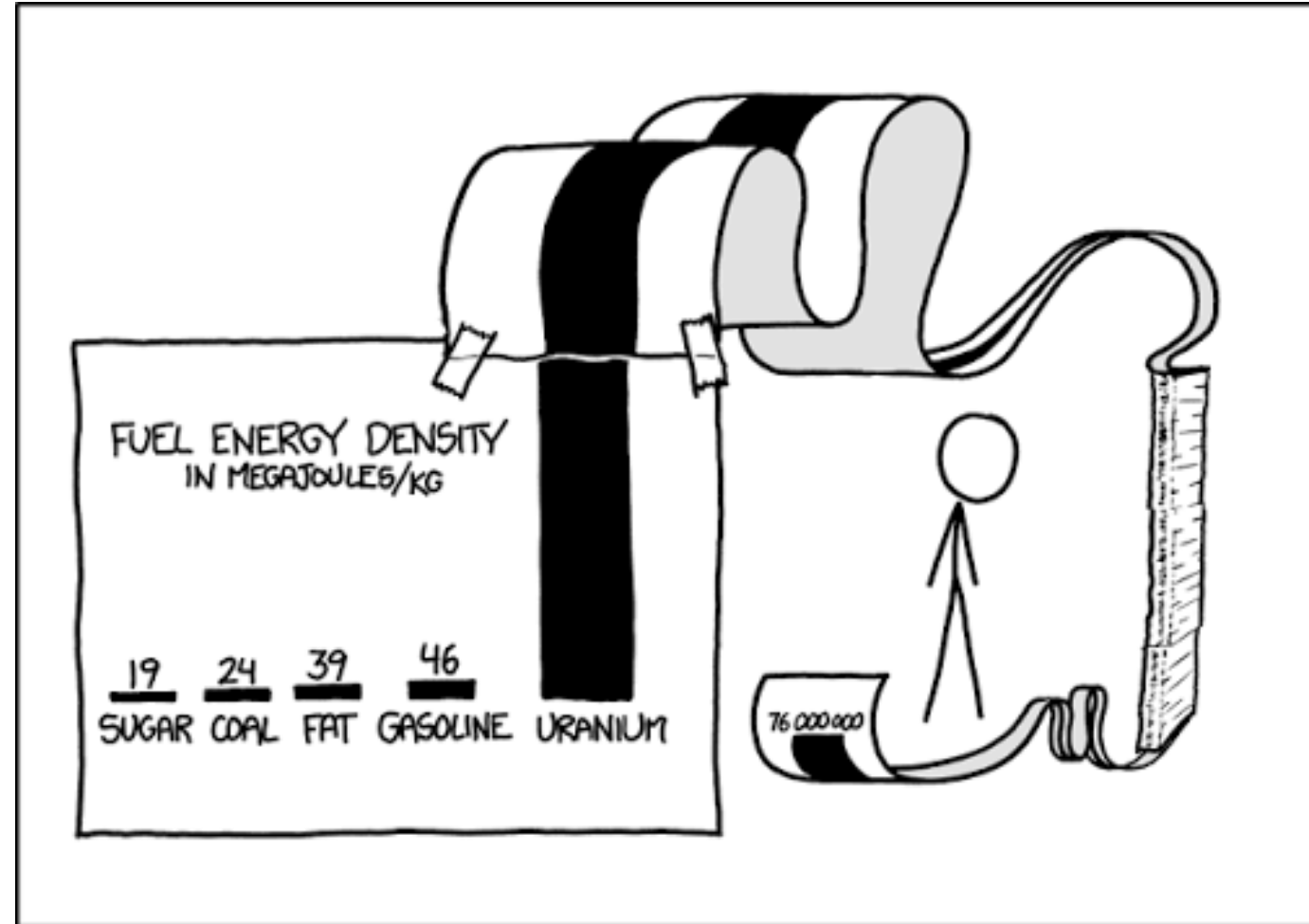
First Four Steps to Attack Problems



Gather and analyze information



- Plot/visualize data
- Fermi problems (no calculators!)
 - Time for a bowling ball to fall off the Central Park Tower (472 m)?
 - How long to heat a hot dog?
 - $\alpha = 2\text{E-}7 \text{ m}^2/\text{s}$
 - (scale the heat equation)
 - How many football fields of pizza will BYU students eat this semester?

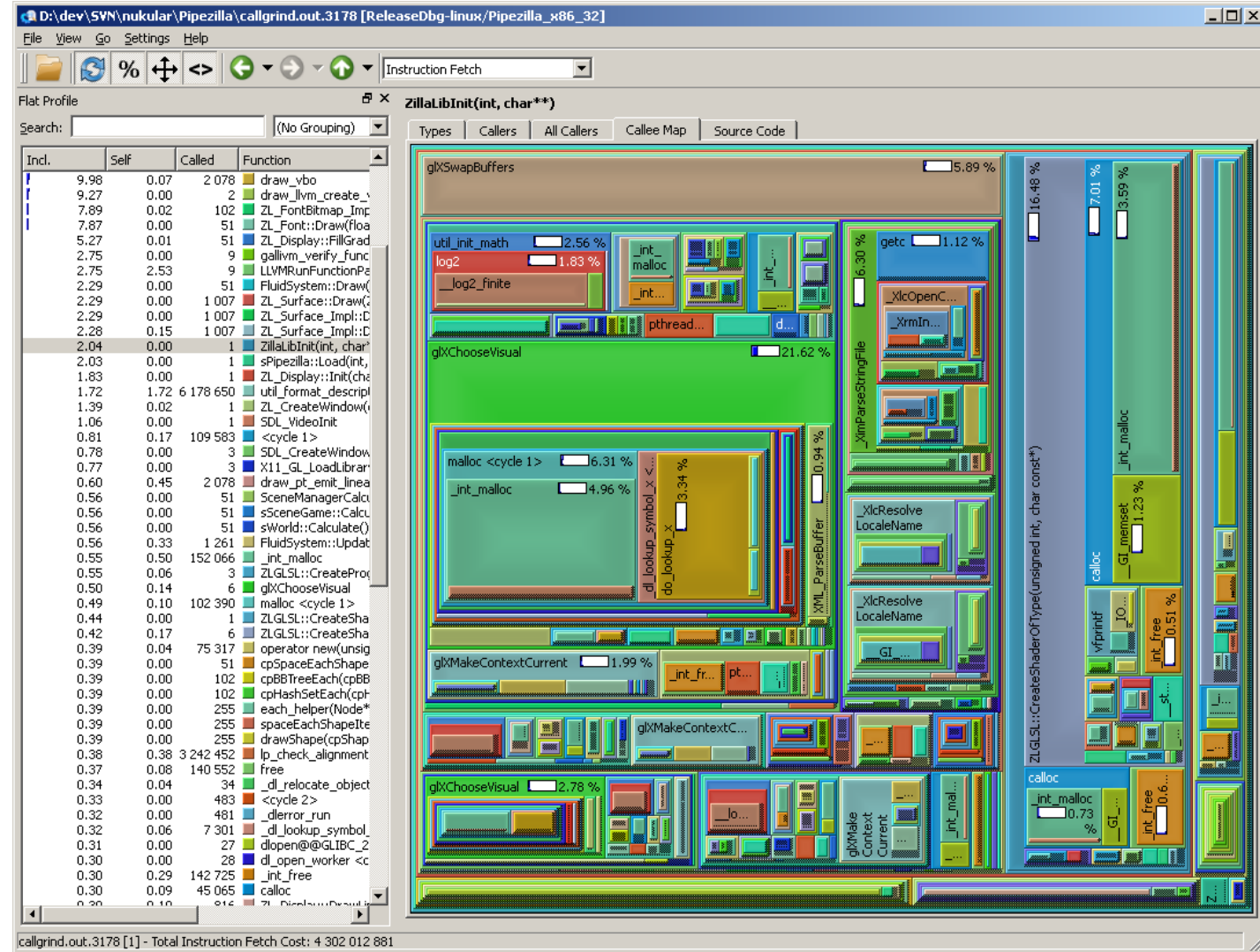


SCIENCE TIP: LOG SCALES ARE FOR QUITTERS WHO CAN'T
FIND ENOUGH PAPER TO MAKE THEIR POINT *PROPERLY*.

Gather and analyze information



- Plot/visualize data
- Fermi problems (no calculators!)
 - Time for a bowling ball to fall off the Central Park Tower (472 m)?
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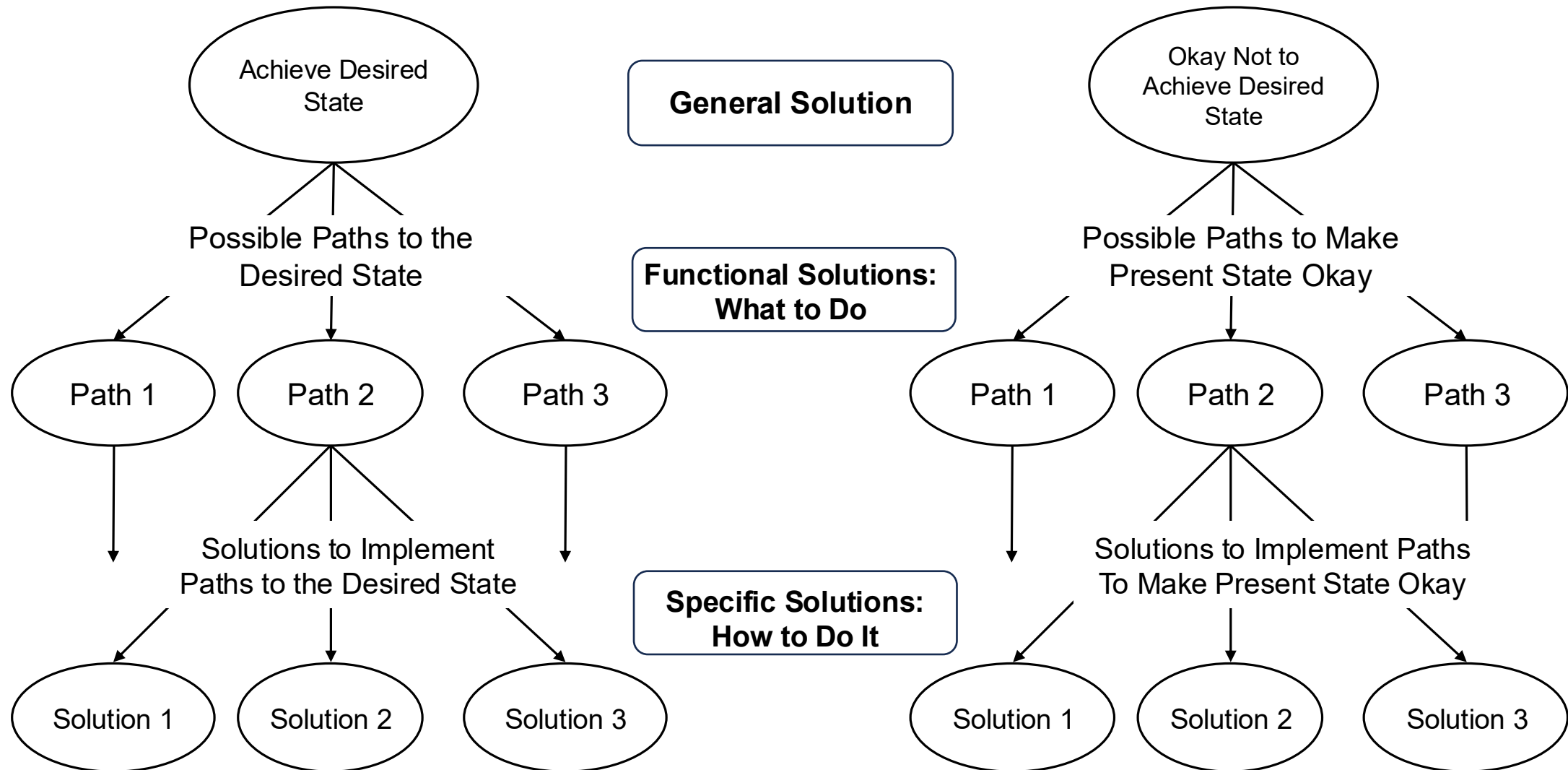


Organizing your data to find the *REAL* problem

Present → Desired

Dunker Diagram

“fail” well



Duncker Diagram

I am tired of being a poor college student

What's the real problem?

Have more \$\$

Blessed are the poor

Possible Paths to the
Desired State

Path 1

Path 2

Solutions to Implement
Paths to the Desired State

Solution 1

Solution 2

What to do

Possible Paths to Make
Present State Okay

Path 1

Path 2

Solutions to Implement Paths
To Make Present State Okay

Solution 1

Solution 2

How to Do It



"When you find out you can live without it and go along not thinkin' about it, I'll tell you something true, the bare necessities of life will come to you"

Statement—Restatement

Rephrase the problem statement



Perceived problem

Relax constraints



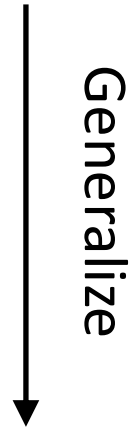
Restatement

Make opposite statement



Restatement

Final Problem



Problem Statement Triggers

- Trigger 1.** Vary the stress pattern-try placing emphasis on different words and phrases.
- Trigger 2.** Choose a term that has an explicit definition and substitute the explicit definition in each place that the term appears.
- Trigger 3.** Make an opposite statement, change positives to negatives, and vice versa.
- Trigger 4.** Change "every" to "some," "always" to "sometimes," "sometimes" to "never," and vice versa.
- Trigger 5.** Replace "persuasive words" in the problem statement such as "obviously," "clearly," and "certainly" with the argument it is supposed to be replacing.
- Trigger 6.** Express words in the form of an equation or picture, and vice versa.

Problem

“I am grumpy every day because my roommate (spouse?) leaves dirty dishes in our bedroom”

Kepner-Tregoe Analysis

The Four K.T. Dimensions of a Problem

		Is	Is Not	Distinction	Cause
What	Identify	What is the problem?	What is not the problem?	What is the distinction between the is and the is not ?	What is a possible cause?
Where	Locate	Where is the problem found?	Where is the problem not found?	What is distinctive about the difference in locations?	What is the possible cause?
When	Timing	When does the problem occur?	When does the problem not occur?	What is distinctive about the difference in the timing?	What is a possible cause?
		When was the problem first observed?	When was the problem last observed?	What is the distinction between these observations?	What is a possible cause?

Kepner-Tregoe Analysis

		Is	Is Not	Distinction	Cause
Extent	Magnitude	How far does the problem extend?	How localized is the problem?	What is the distinction?	What is a possible cause?
		How many units are affected?	How many units are not affected?	What is the distinction?	What is a possible cause?
		How much of any one unit is affected?	How much of any one unit is not affected?	What is the distinction?	What is a possible cause?