

# The Design Cycle

# As We May Think

Bush's prescient vision from 1945

*Your ideas for the future...*

Brain-computer interfaces

Absorb info through touch

Biometrics for implicit input

Seamless flow between reality & digital

A closet that picks & lays out an outfit

# Hall of Fame (👍) or Shame (👎)

The Weather Channel

An IBM Business

Search City or Zip Code

US | °F ▾ GO PREMIUM

☰

29° Austin, TX

Today Hourly 10 Day Weekend Monthly Radar Video More Forecasts ▾

Enjoy elite status from day one.

Join Now

Hertz

A yellow banner with the Hertz logo and the text "Enjoy elite status from day one." is overlaid on the weather forecast for Austin, TX.

### Top Stories

Thousands of Fish Leap From Water

weather.com

A weather map shows a low-pressure system (L) moving across the Eastern United States, with a play button icon indicating a video story. Below it, a video thumbnail shows fish leaping out of water, with the caption "Thousands of Fish Leap From Water".

Advertisement

PURDUE  
UNIVERSITY.<sup>®</sup>  
GLOBAL

Education You Can

The Purdue Global logo is displayed within a black-bordered box, with the text "Education You Can" below it.

9:05 ↗



Austin

-1°

Sunny

H:11° L:-2°

Sunny conditions will continue all day.

	5AM	6AM	7AM	7:26AM	8AM
	🌙	🌙	🌙	☀️	☀️
	-1°	-2°	-2°	Sunrise	-1°

## 10-DAY FORECAST

Today	☀️	-2°	—	11°
Sat	☀️	-2°	—	14°
Sun	☁️	3°	—	16°
Mon	☁️	7°	—	13°
Tue	🌤️	6°	—	16°



9:05 ↗



Seattle

6°

Cloudy

H:9° L:3°

## ⚠️ RIVER FLOOD WARNING

National Weather Service: River Flood Warning in King County.

[See More](#)

## 🕒 HOURLY FORECAST

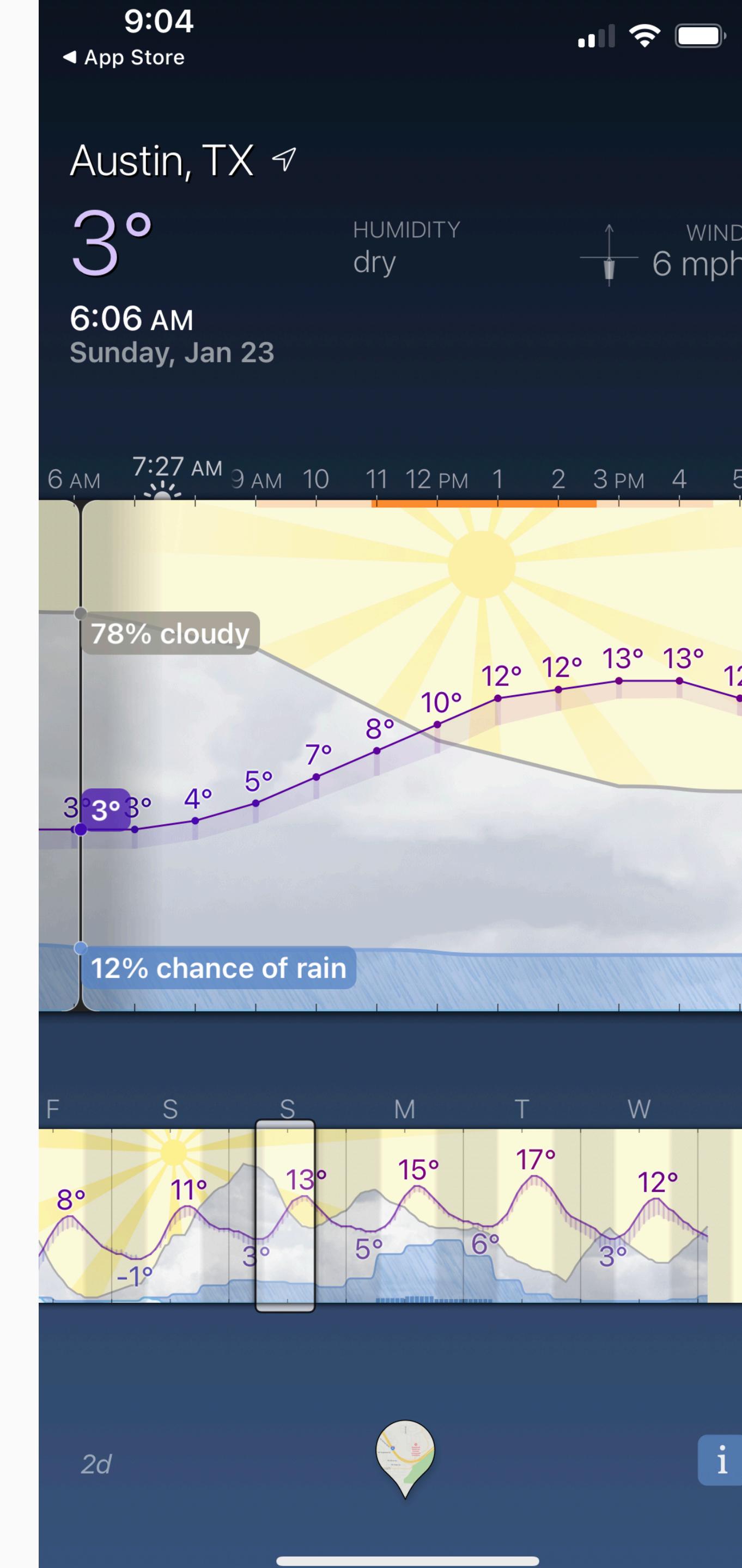
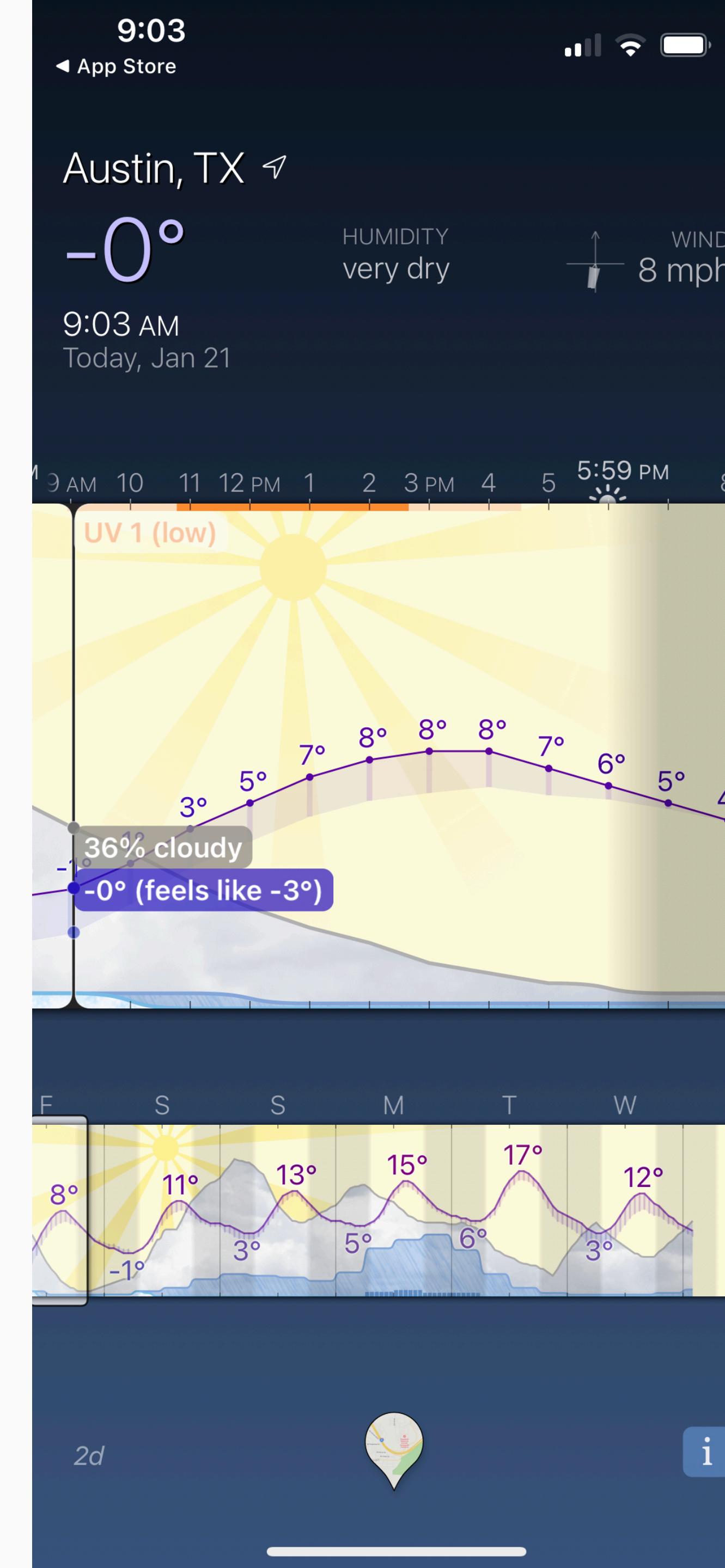
Now	7AM	7:47AM	8AM	9AM
☁️	☁️	☀️	☁️	☁️
6°	6°	Sunrise	6°	7°

## 10-DAY FORECAST

Today	☁️	3°	—	9°
Sat	☁️	2°	—	8°

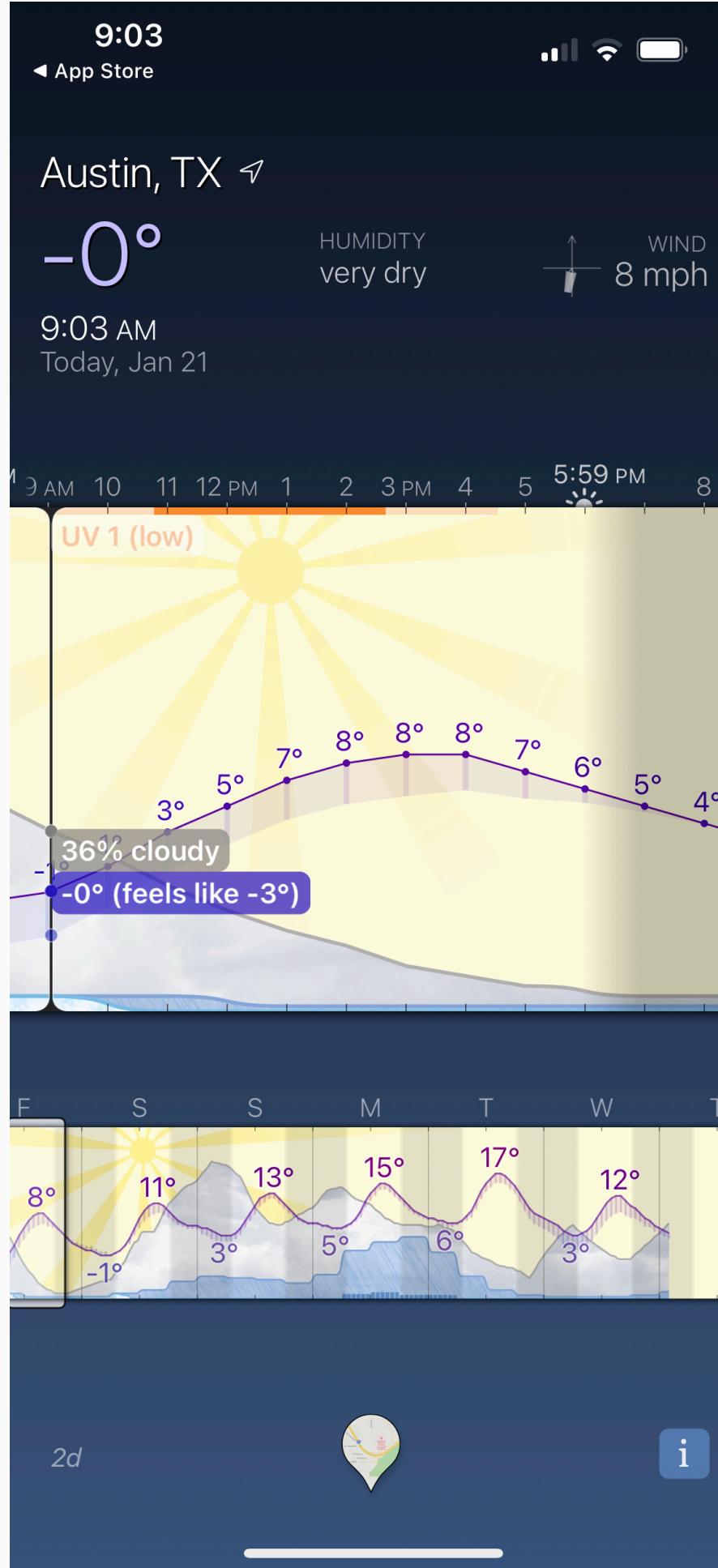


Hall of Fame (👍)  
or Shame (👎)



Hall of Fame (👍)  
or Shame (👎)

# How to choose? STUs!



**S**ituation (or Scenarios)

**T**asks  
**U**sers

**U** Who are you designing for?

**T** What tasks are they trying to accomplish?

**S** In what scenarios will they do the task?

What value can you bring for that STU?

Consider: "Is it real?"

Consider: "Is it already addressed?"

Consider: "It would be game changing if"



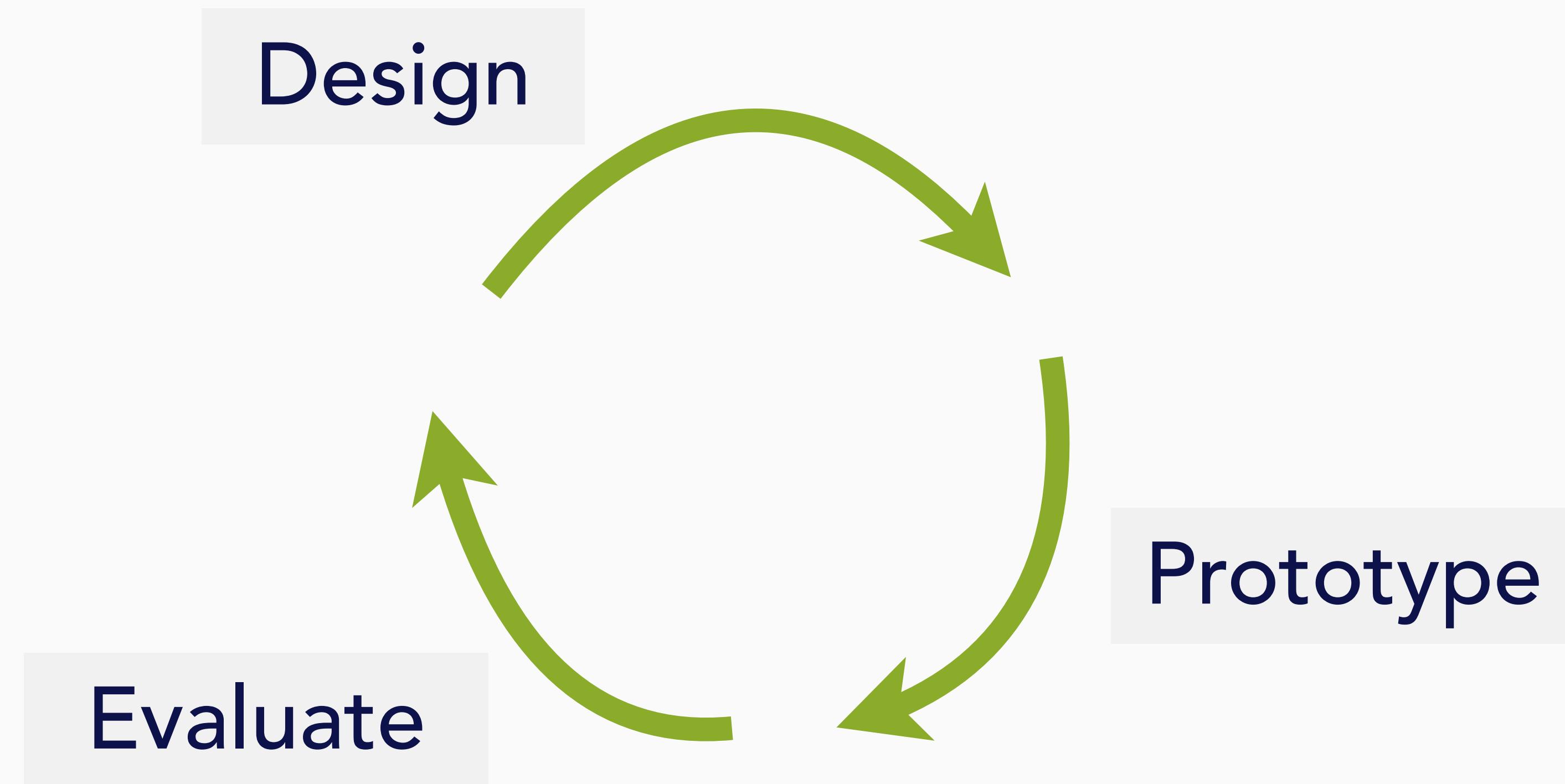
## Activity

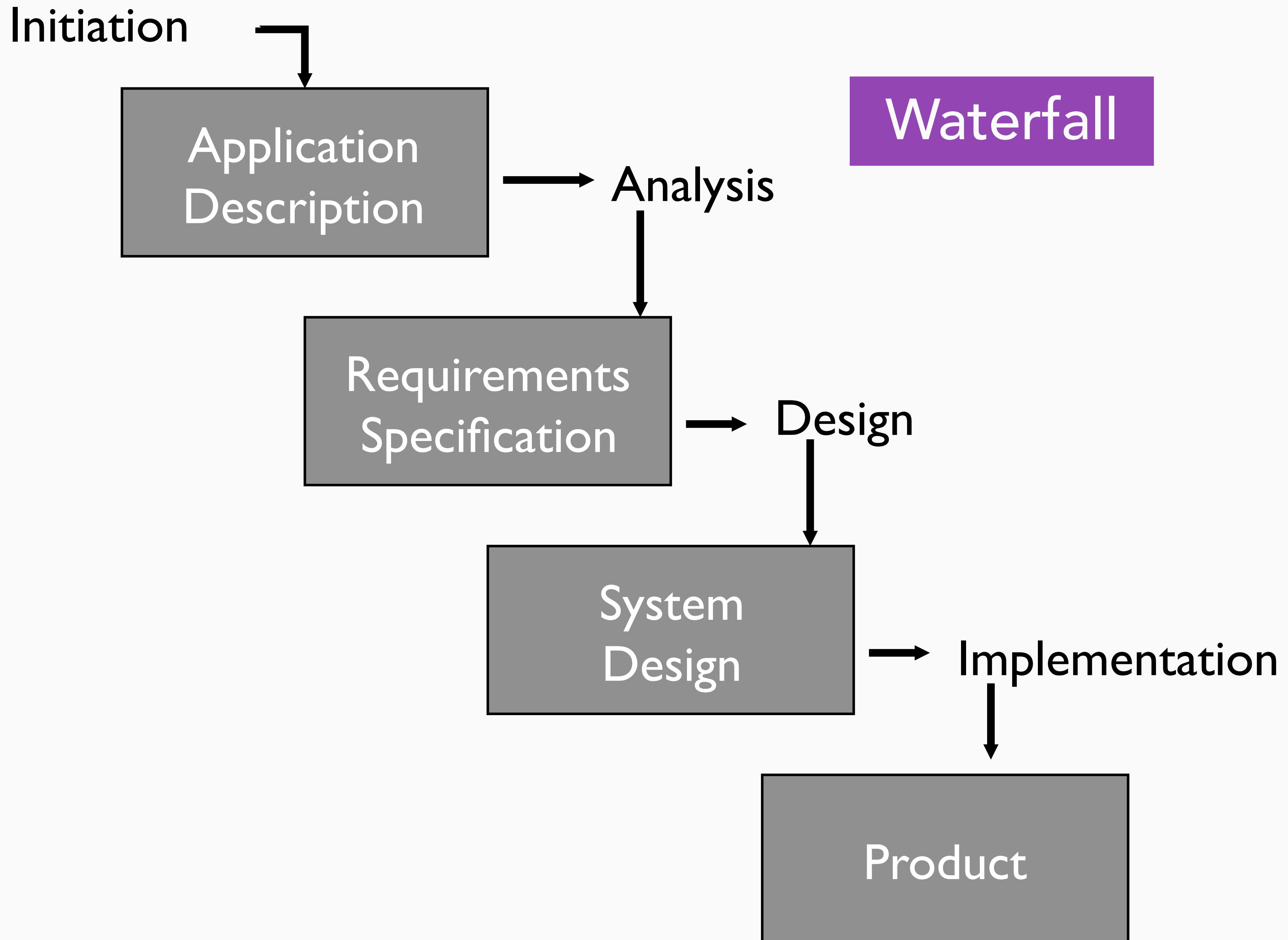
**What STUs does this interface NOT address?**

**Situation (or Scenarios)**  
**Tasks**  
**Users**

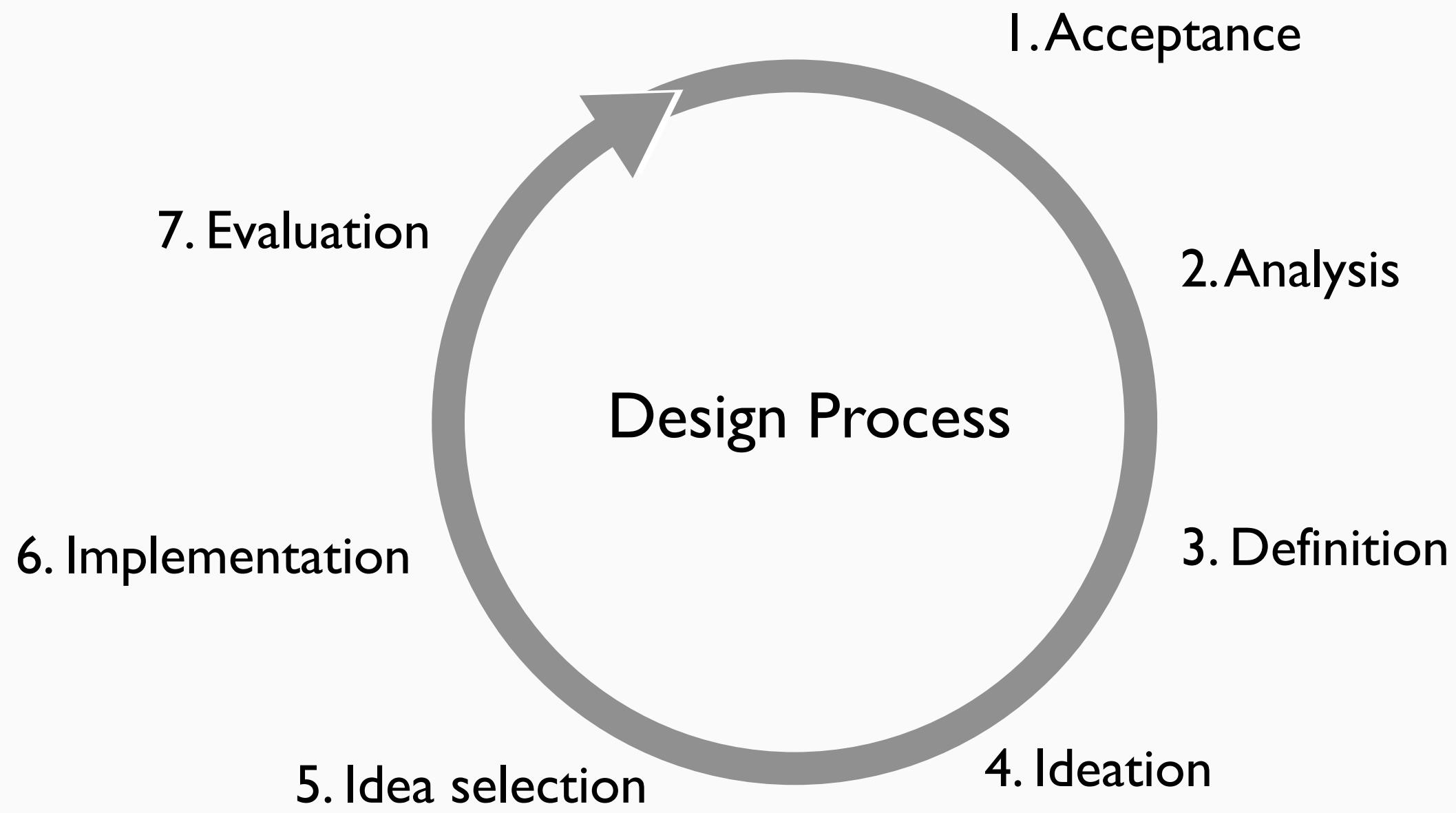
# Design Cycle

# Yesterday

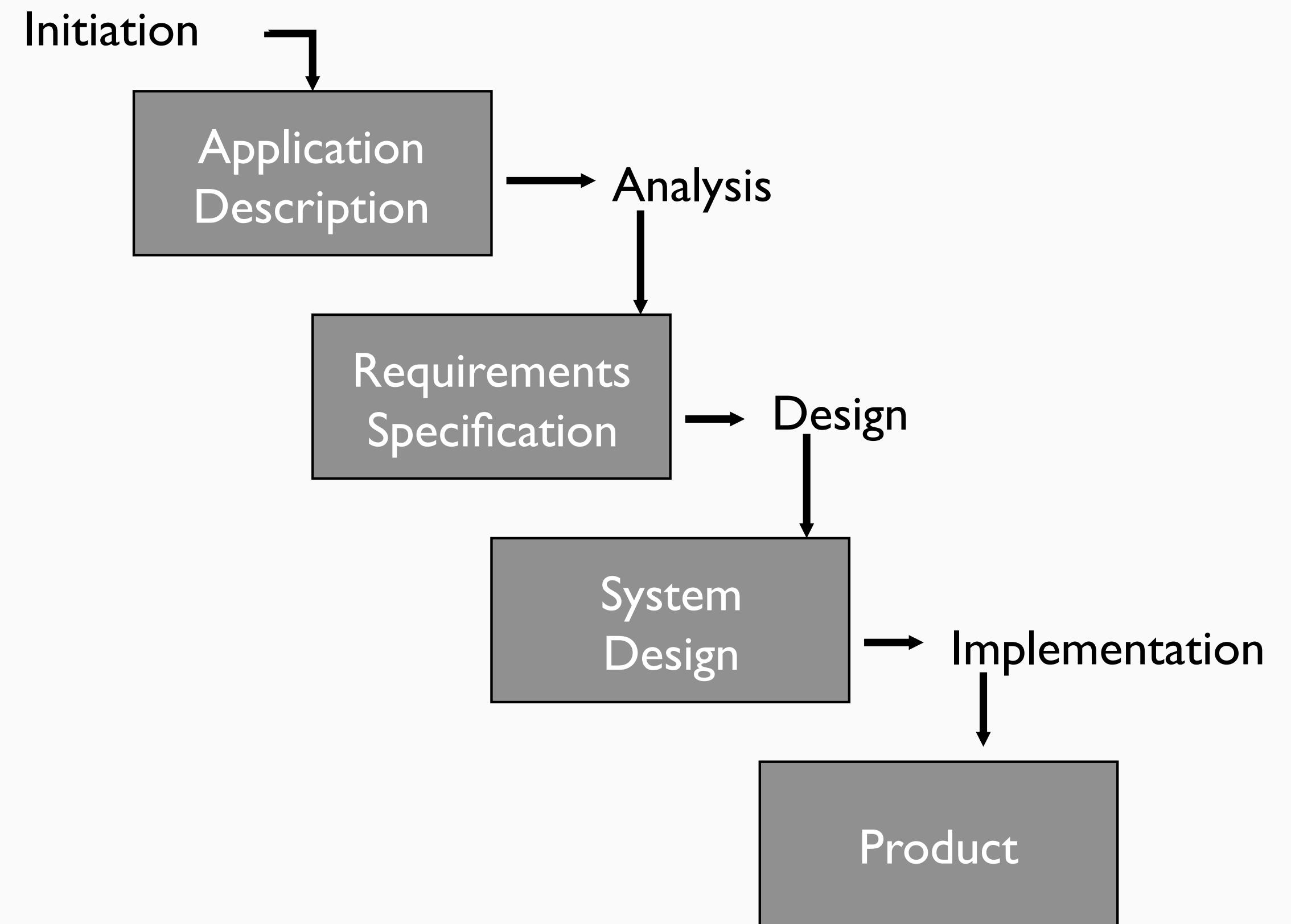




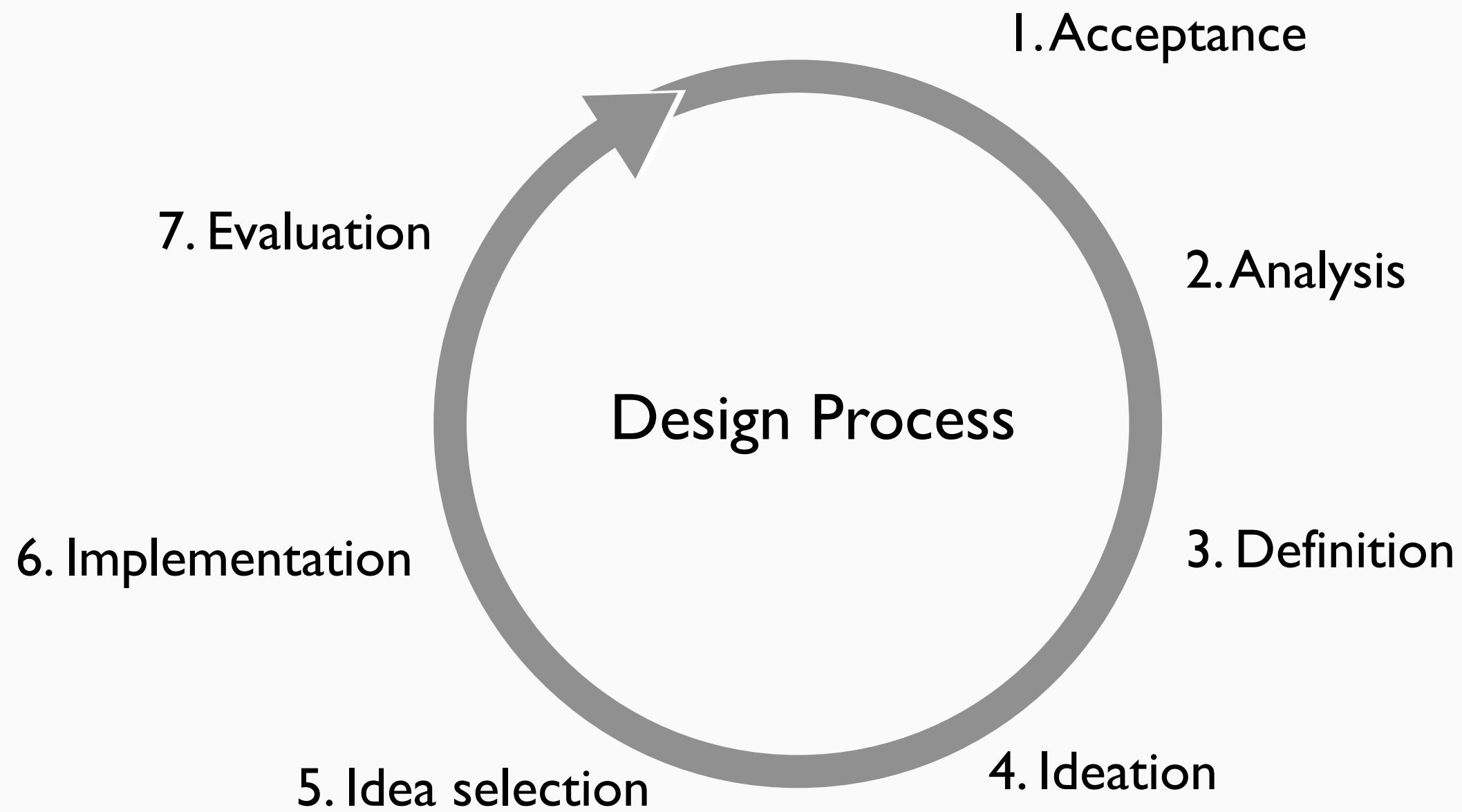
# Design Cycle



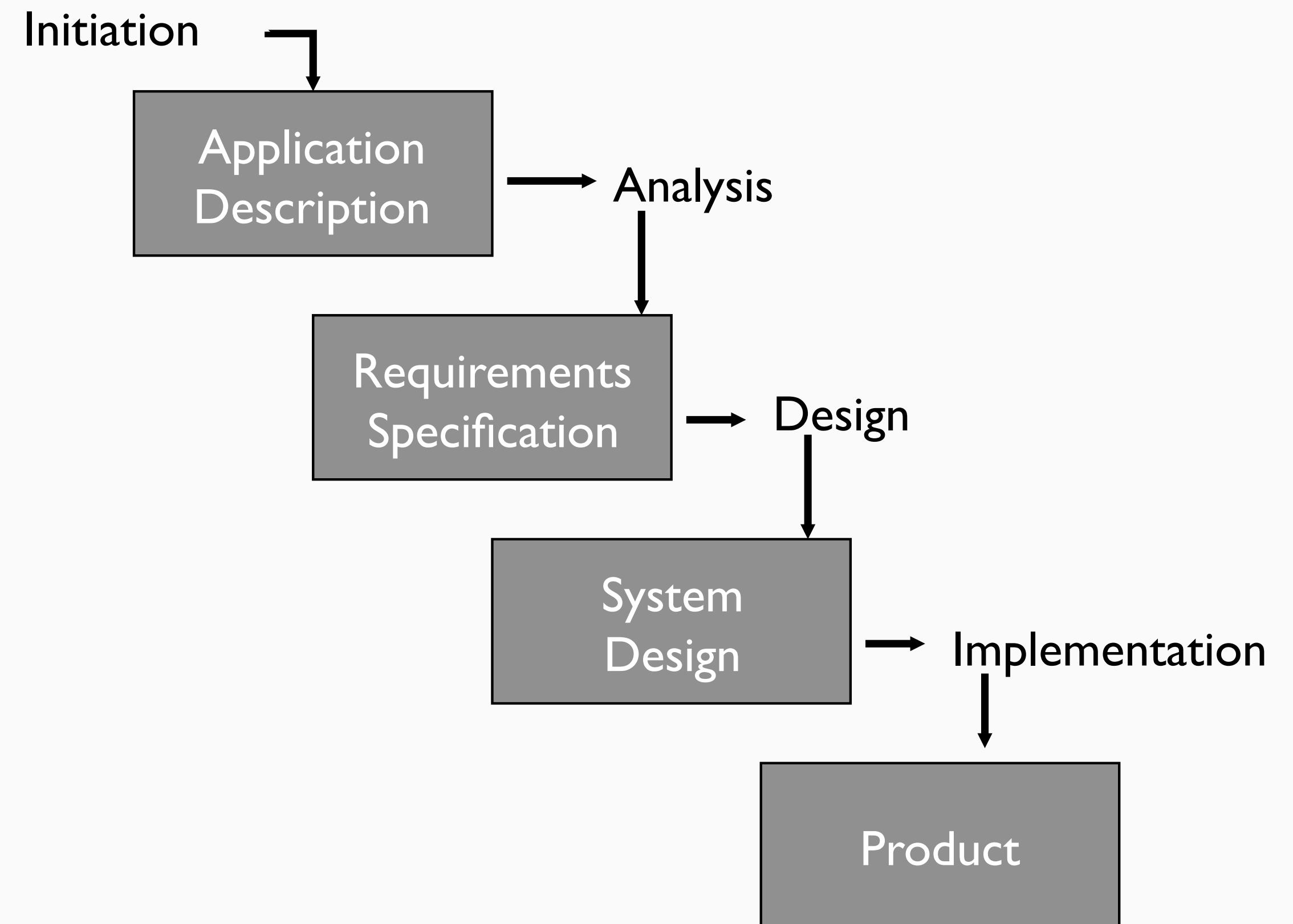
# Waterfall



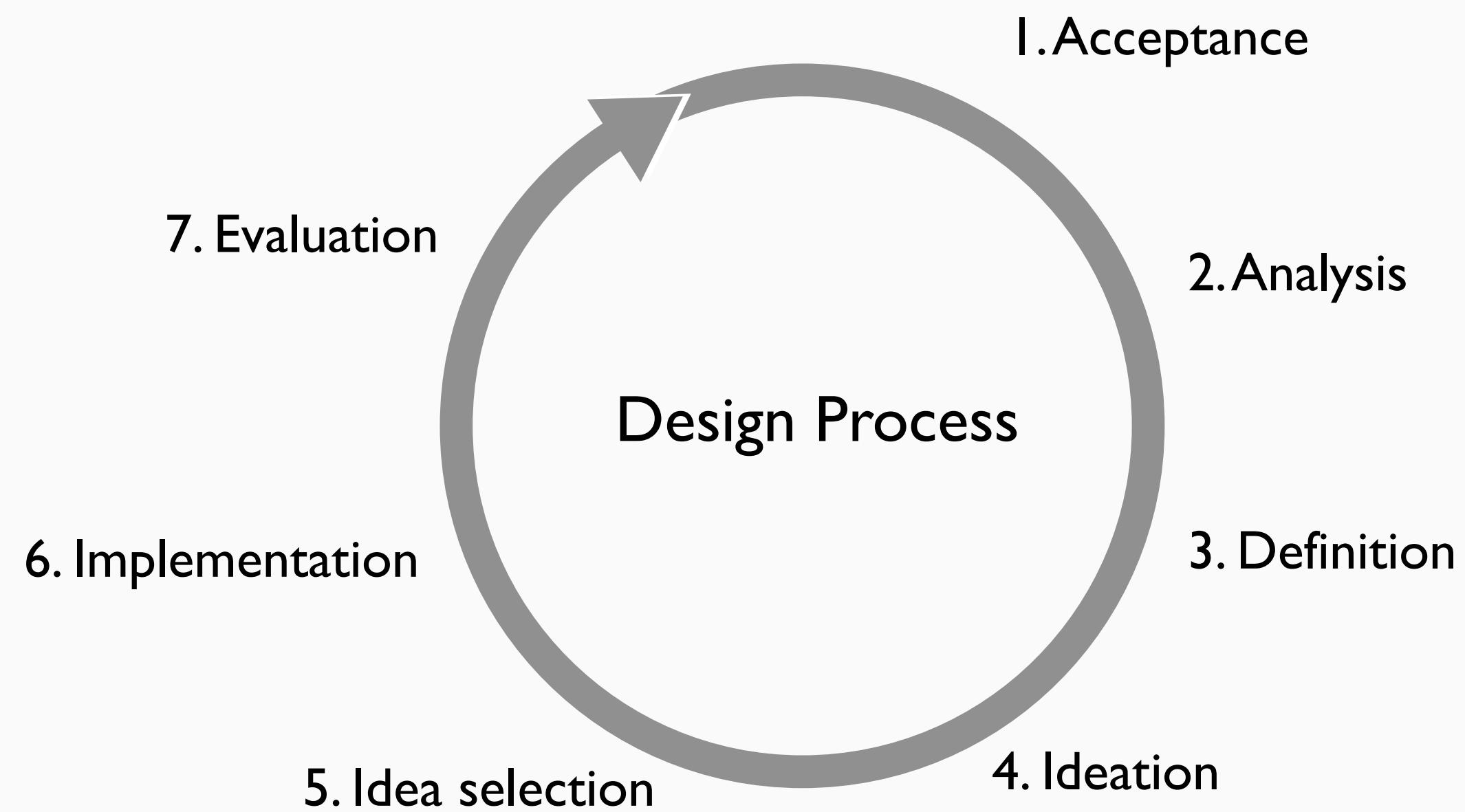
# Design Cycle



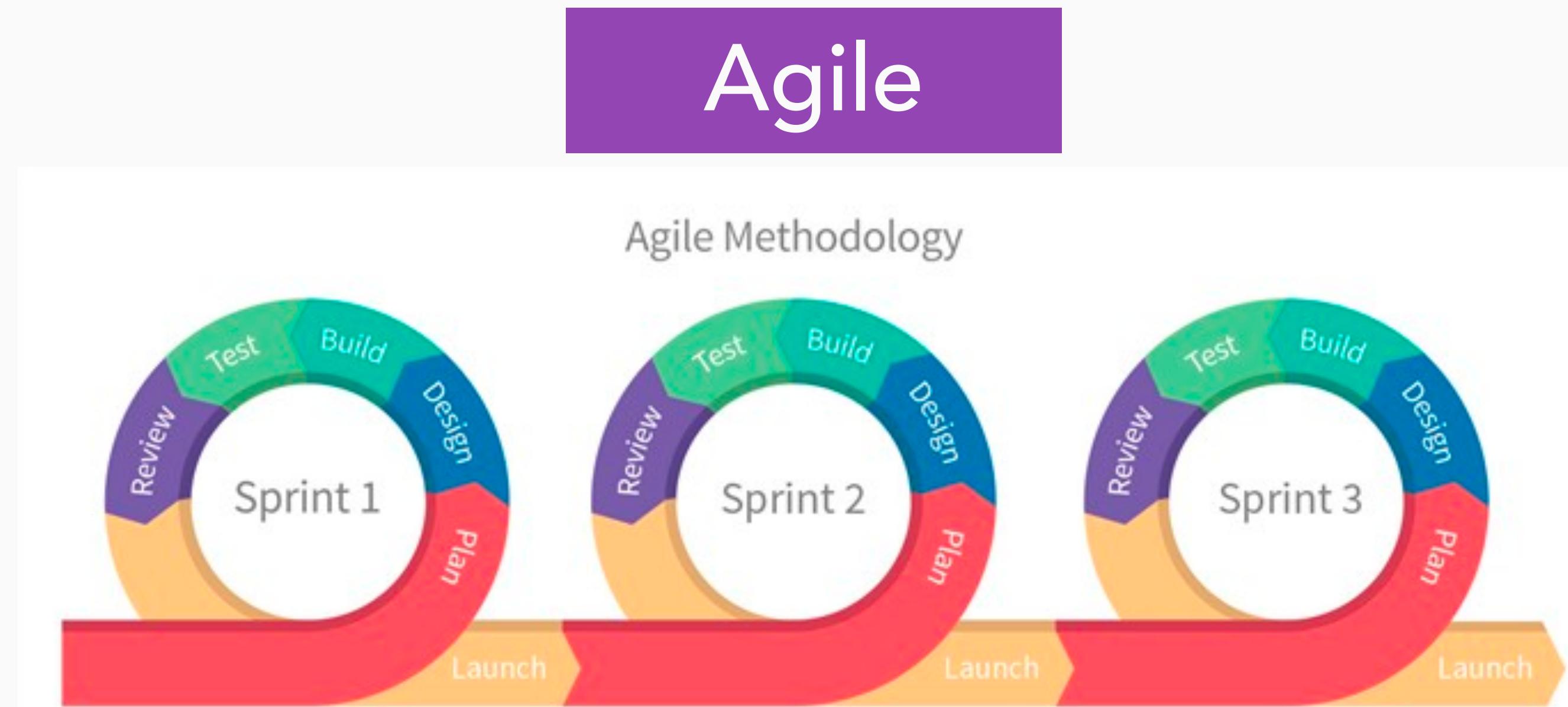
# Waterfall



# Design Cycle



# Agile





## define

# analyse

# TRAVEL MAP For The Universal Traveler

# **accept situation**

## Start



## evaluate

Finish

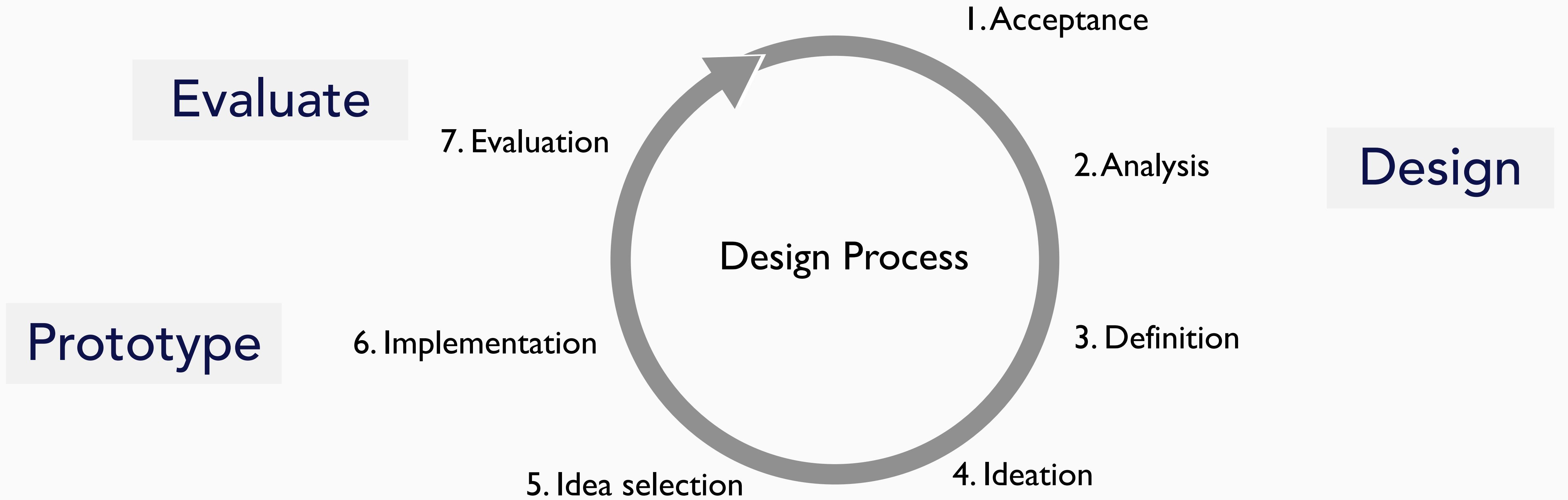
## ideate

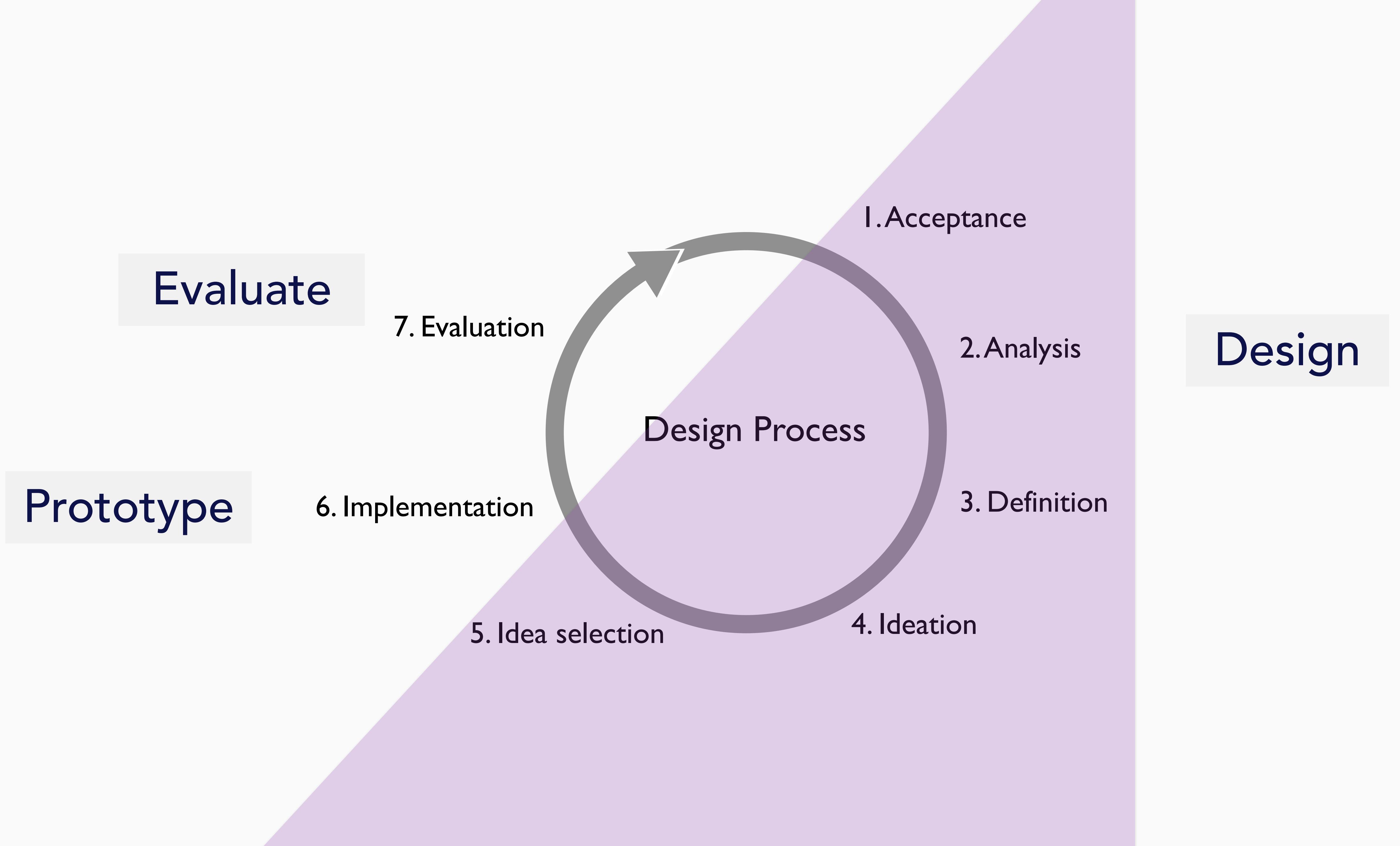
**select**

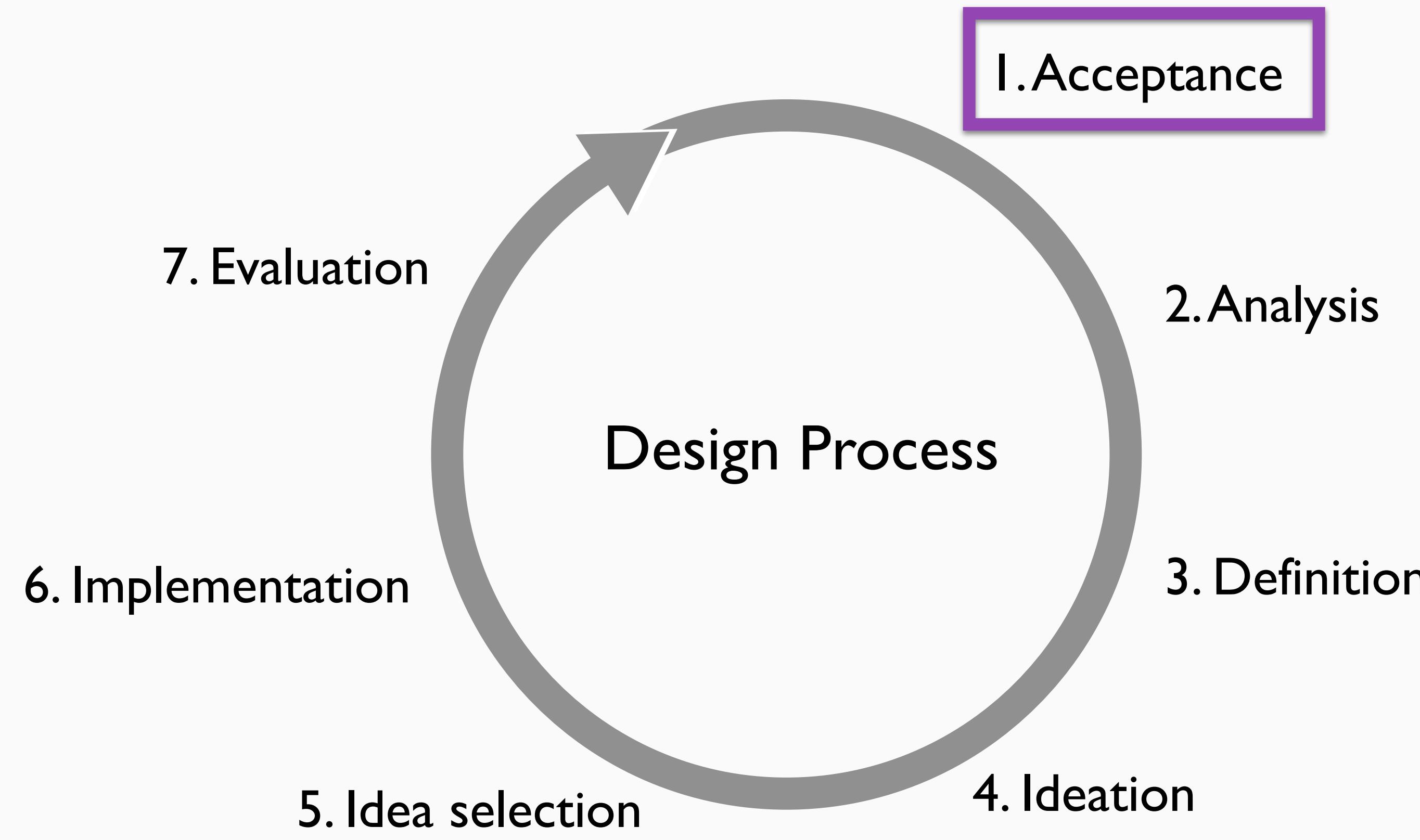
The Creative Process  
of Problem-  
Solving or  
is like Design  
taking an excursion  
or JOURNEY!

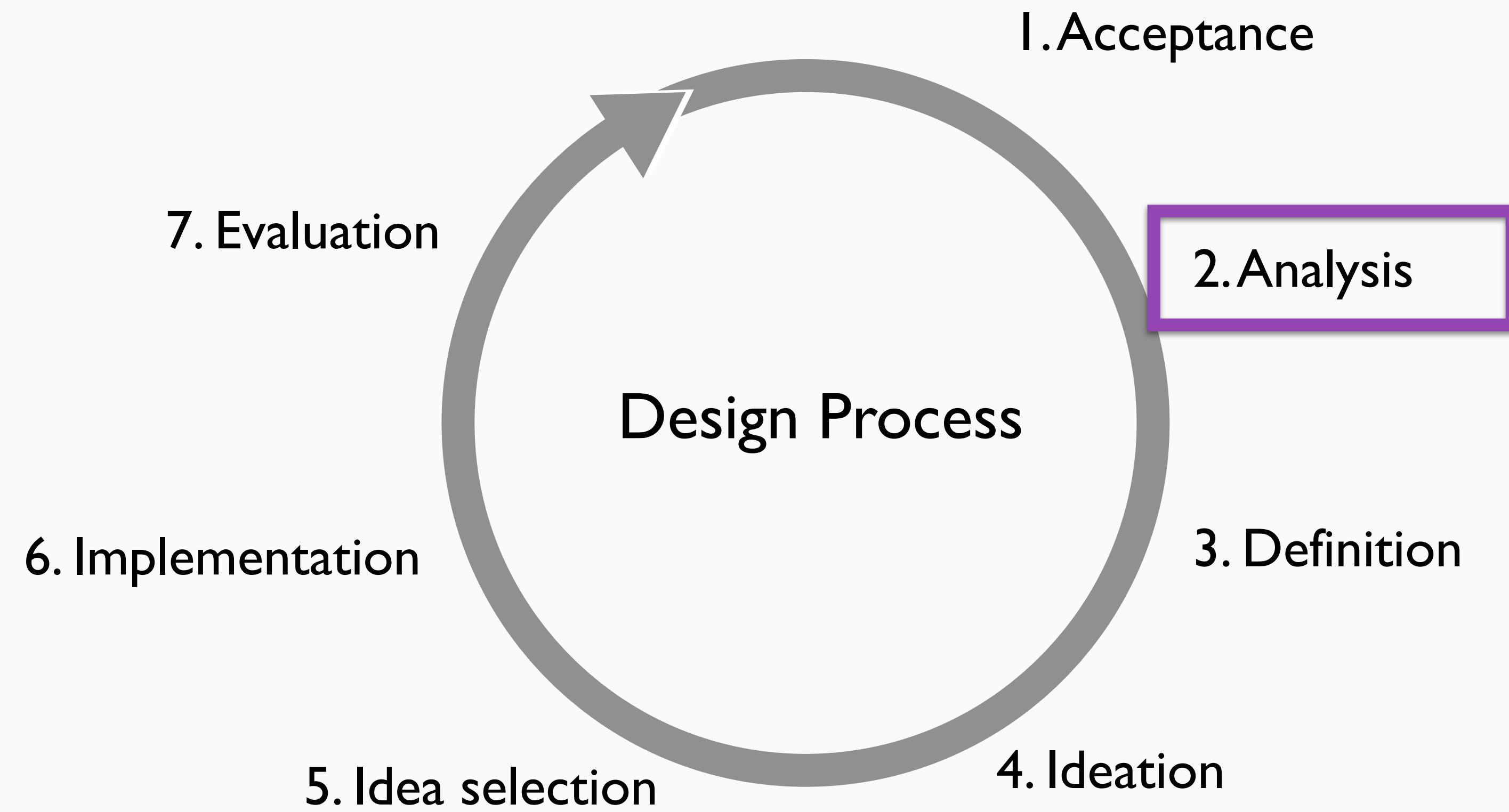
# implement

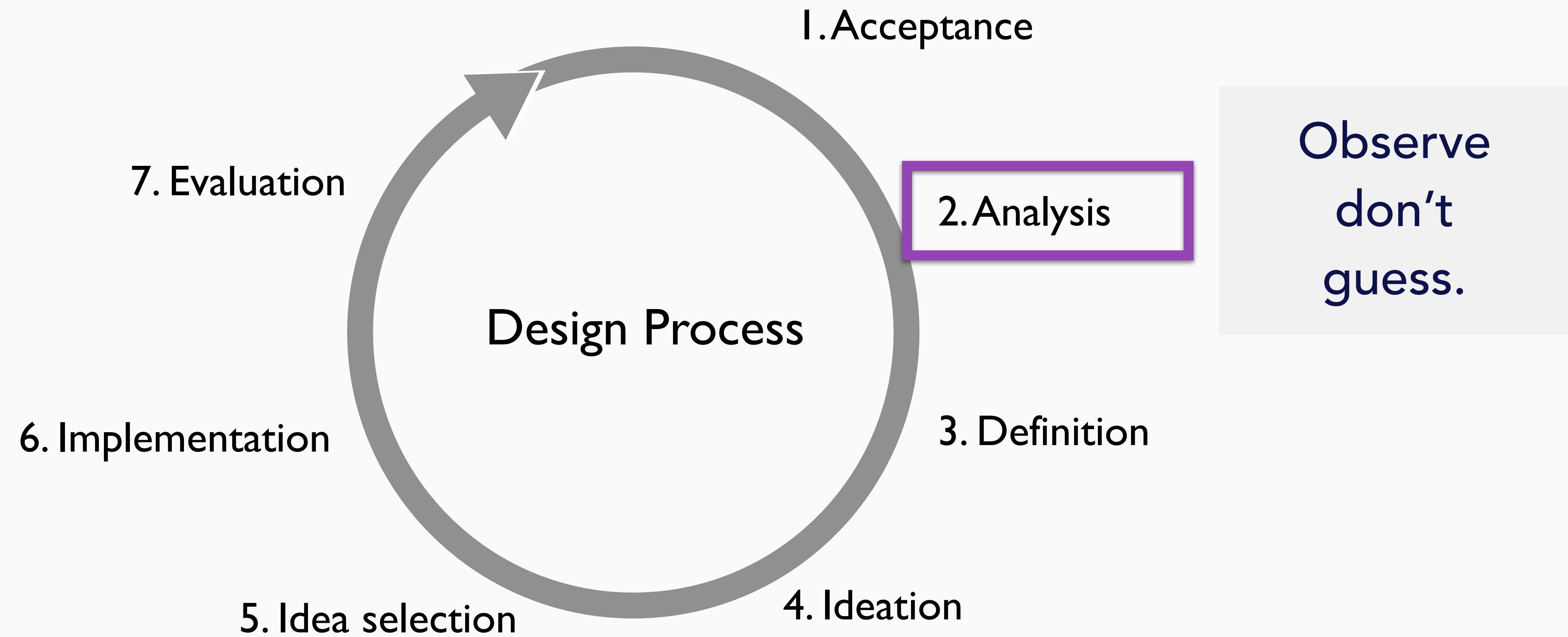
三

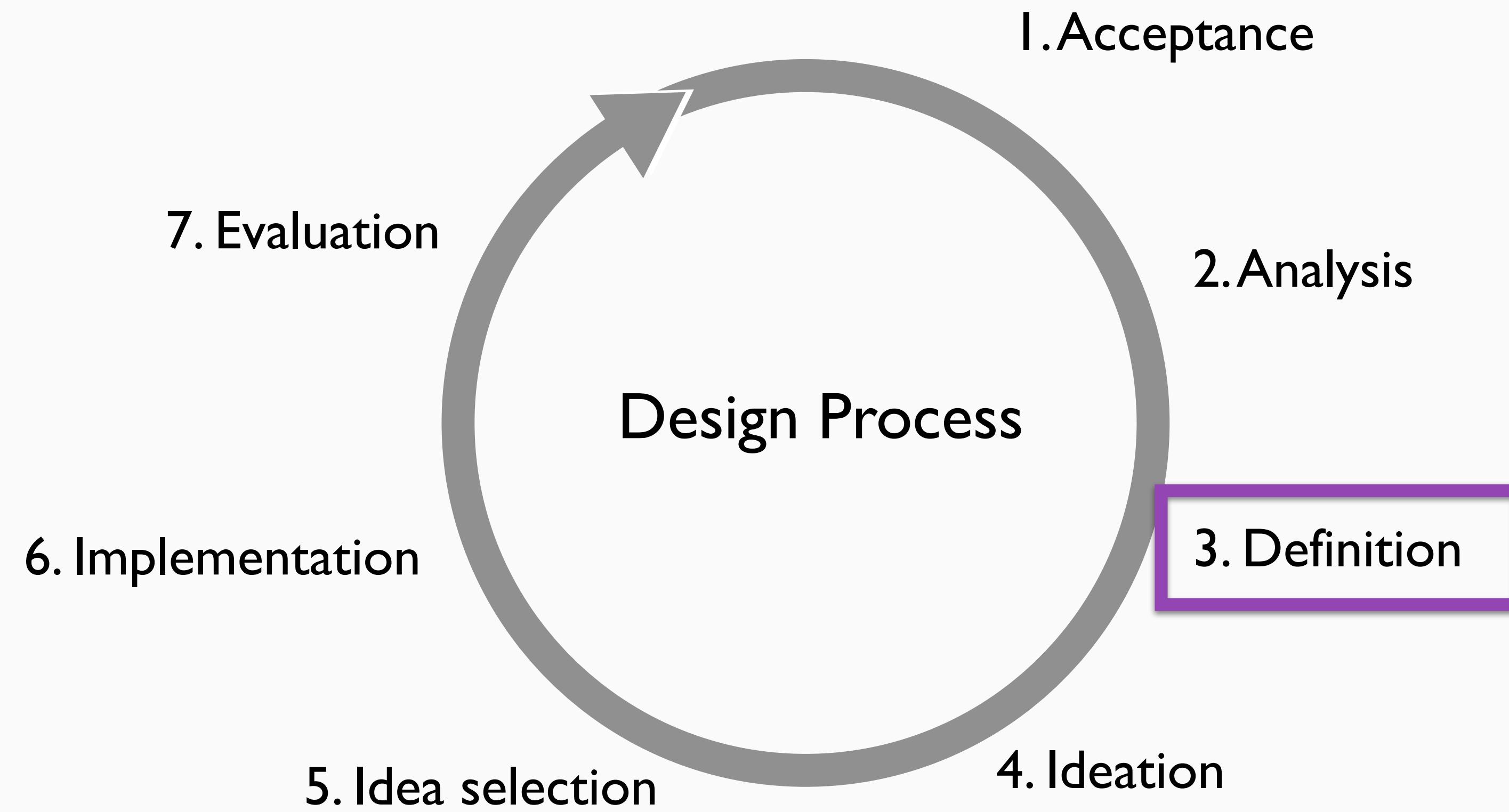


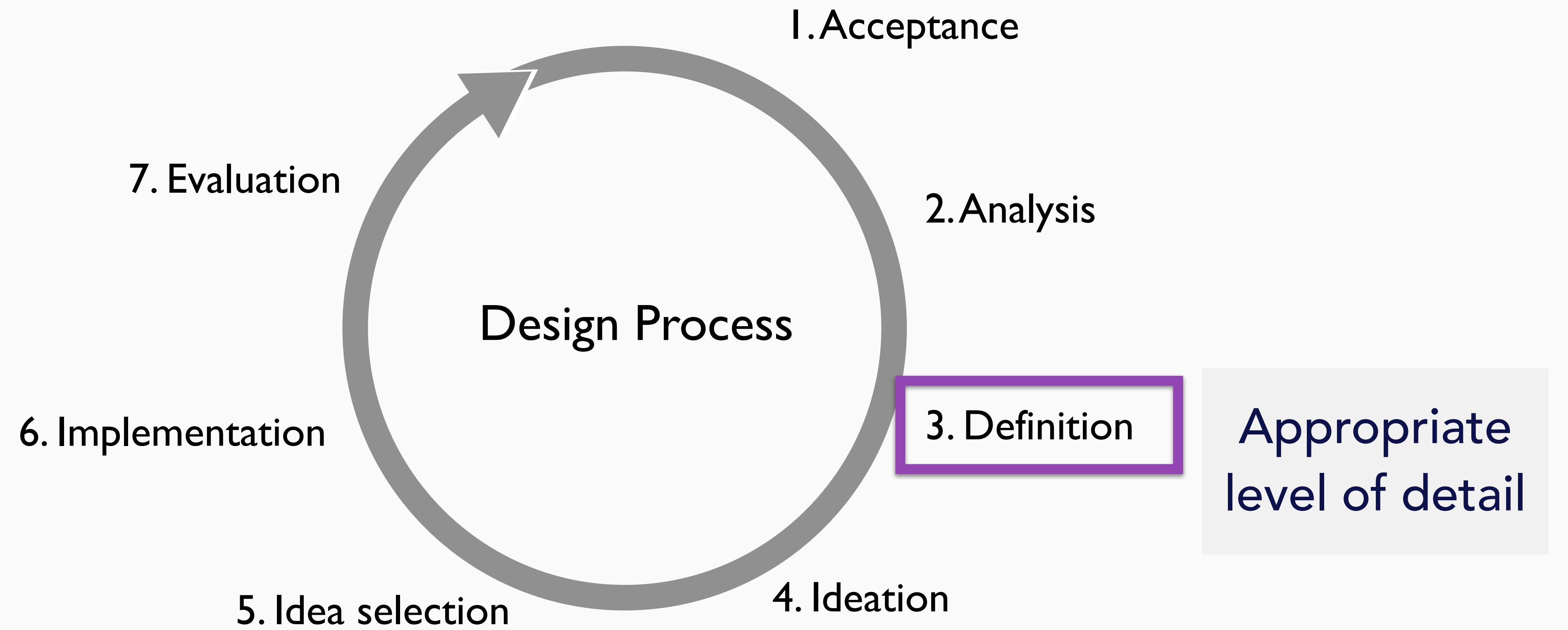


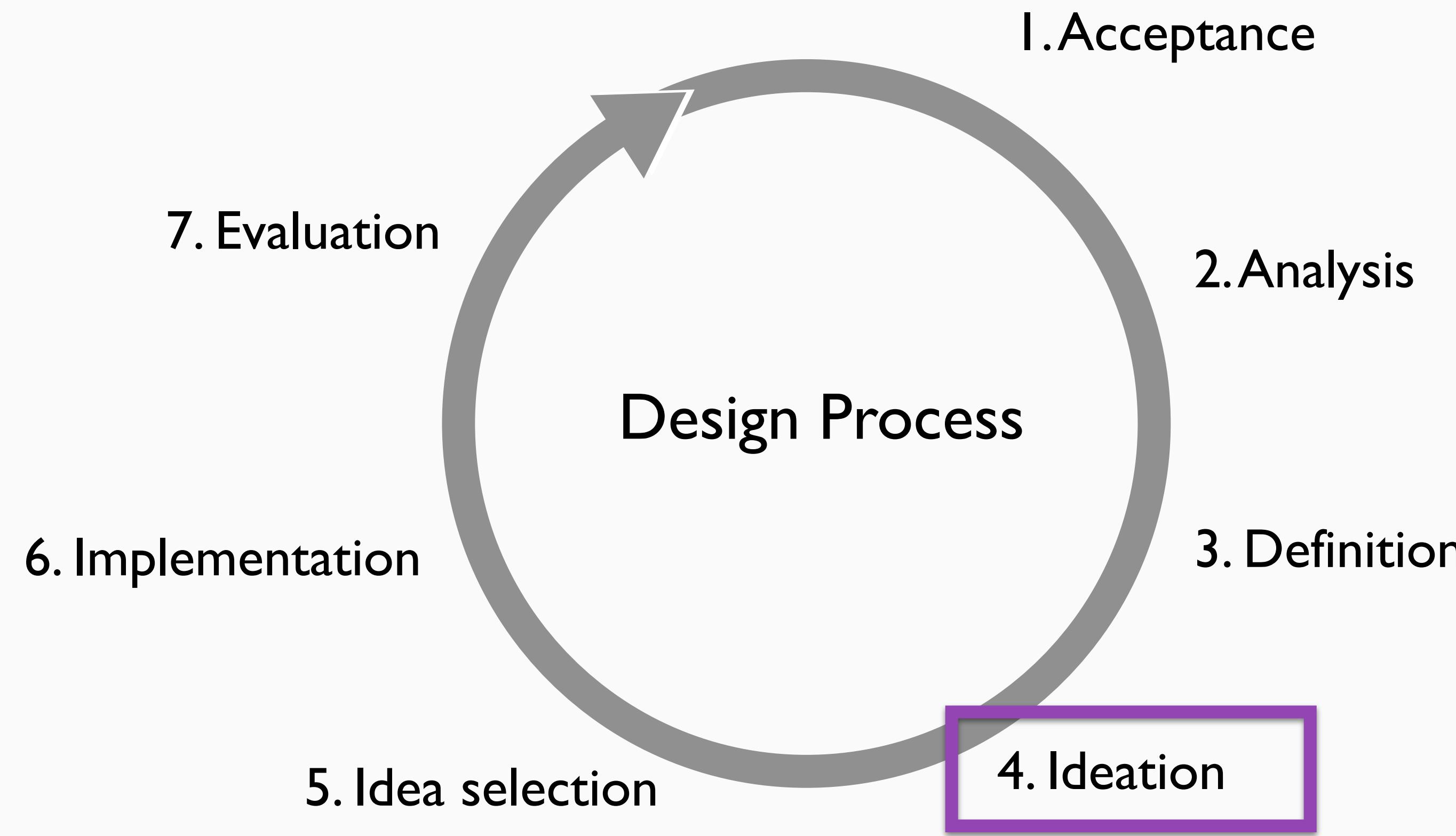


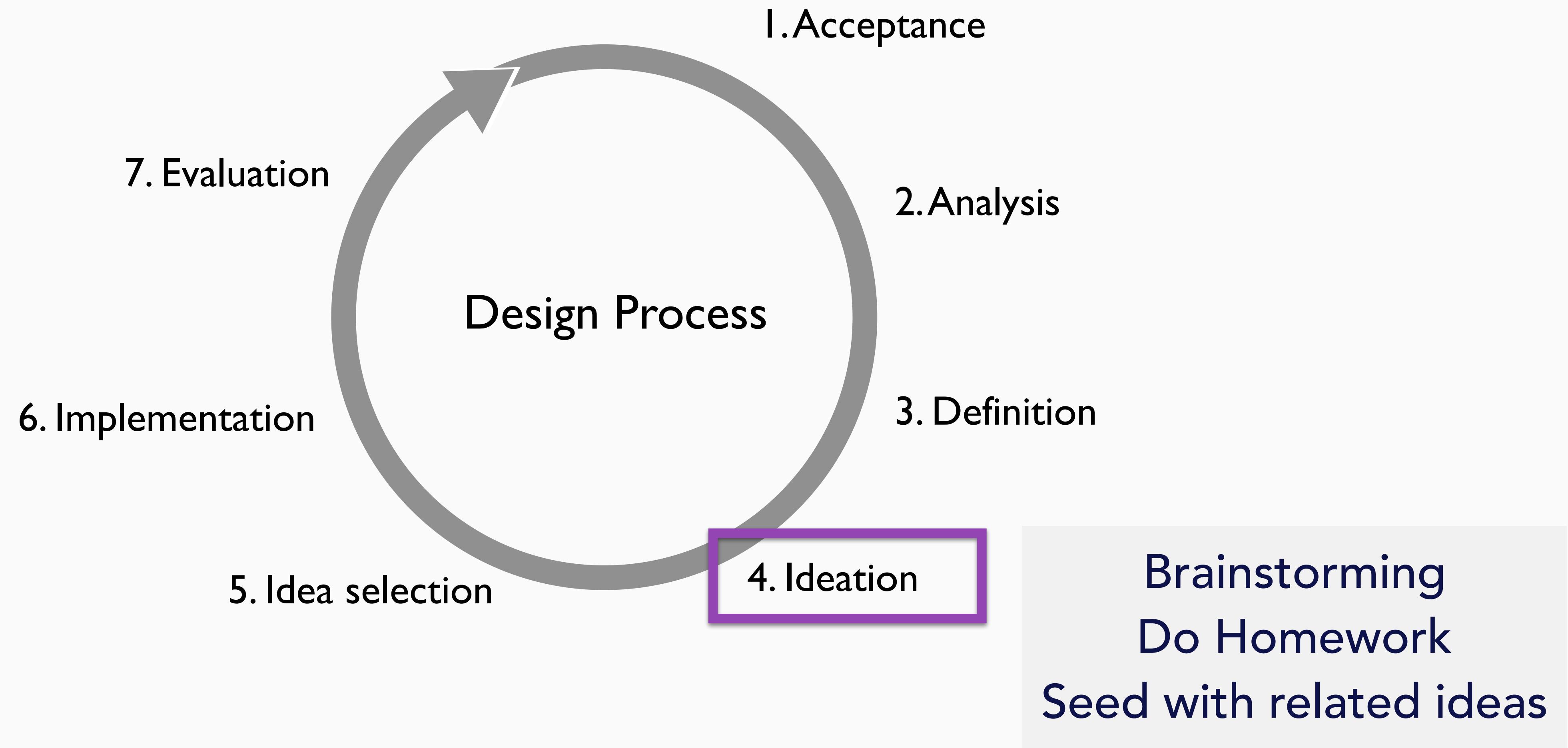


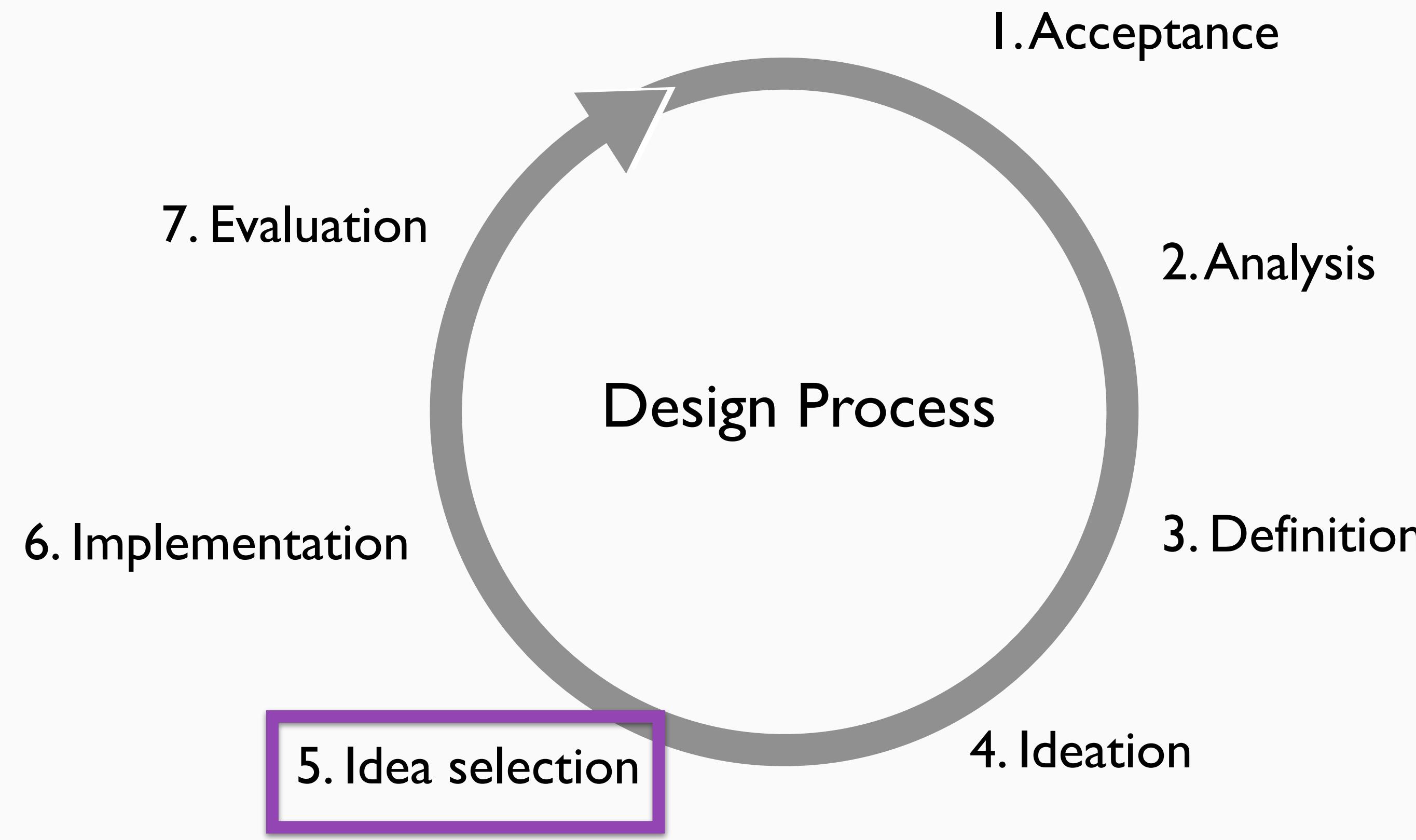


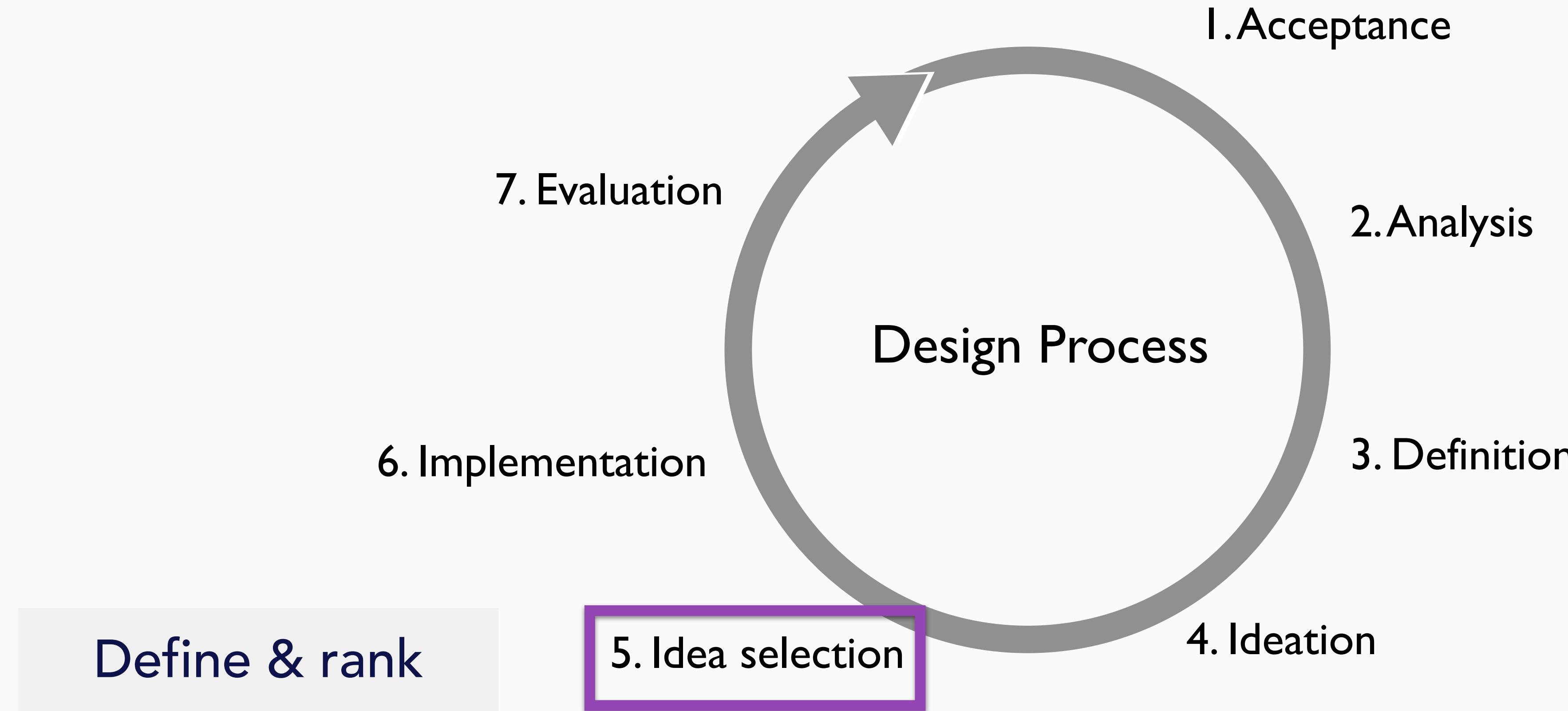


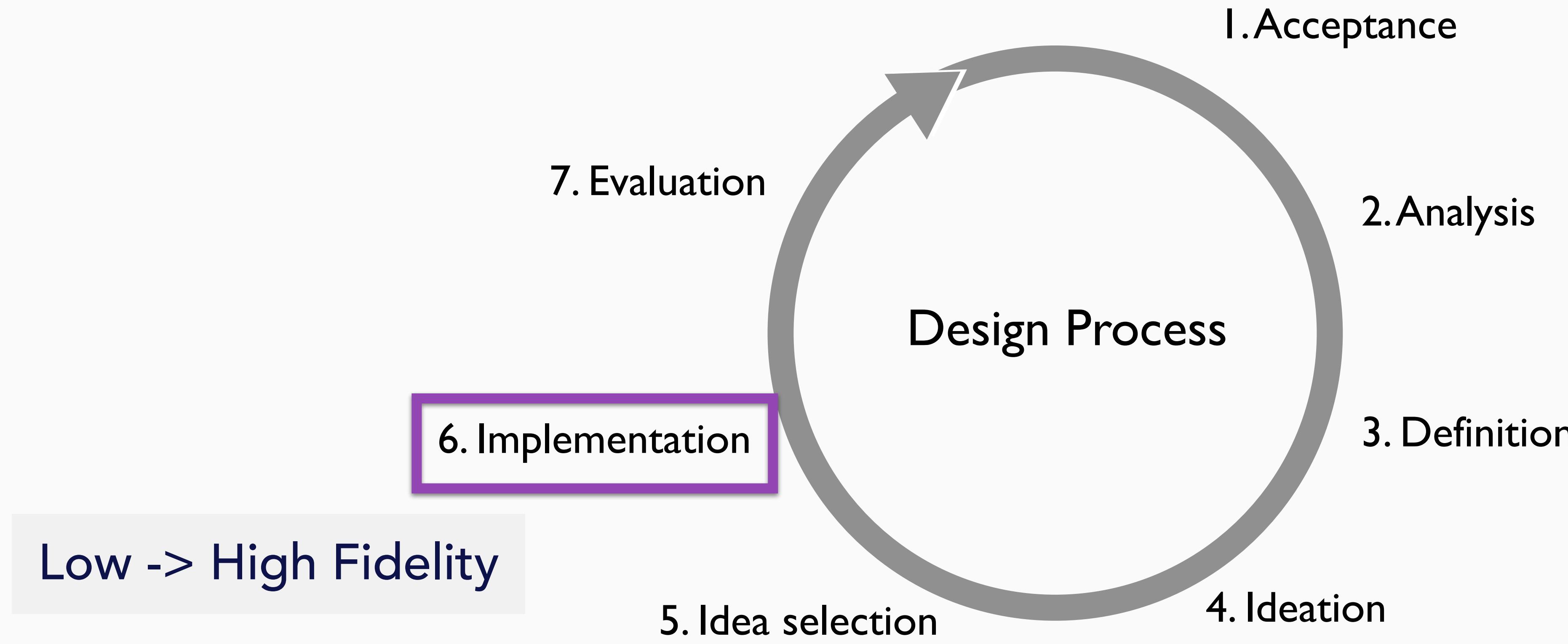




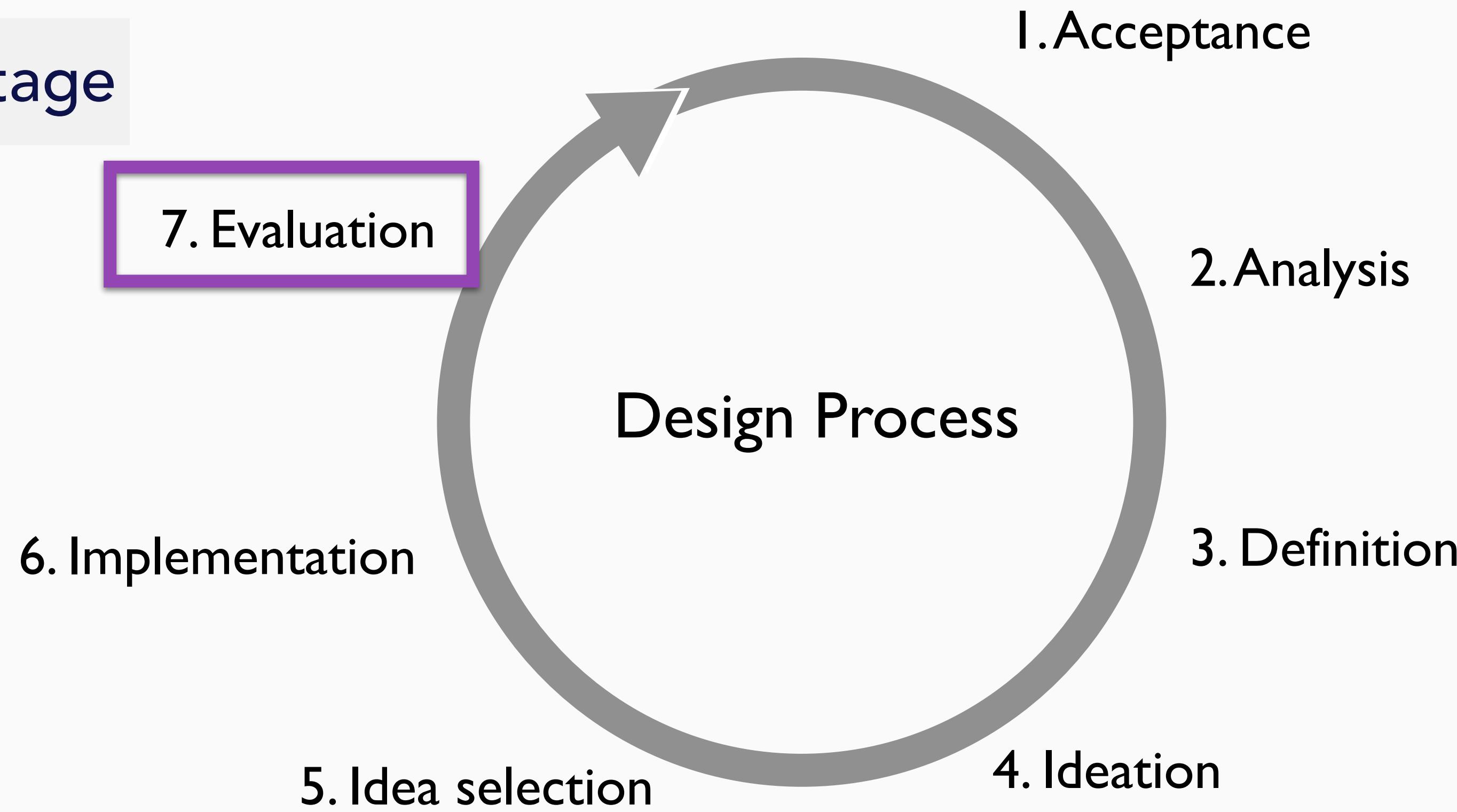


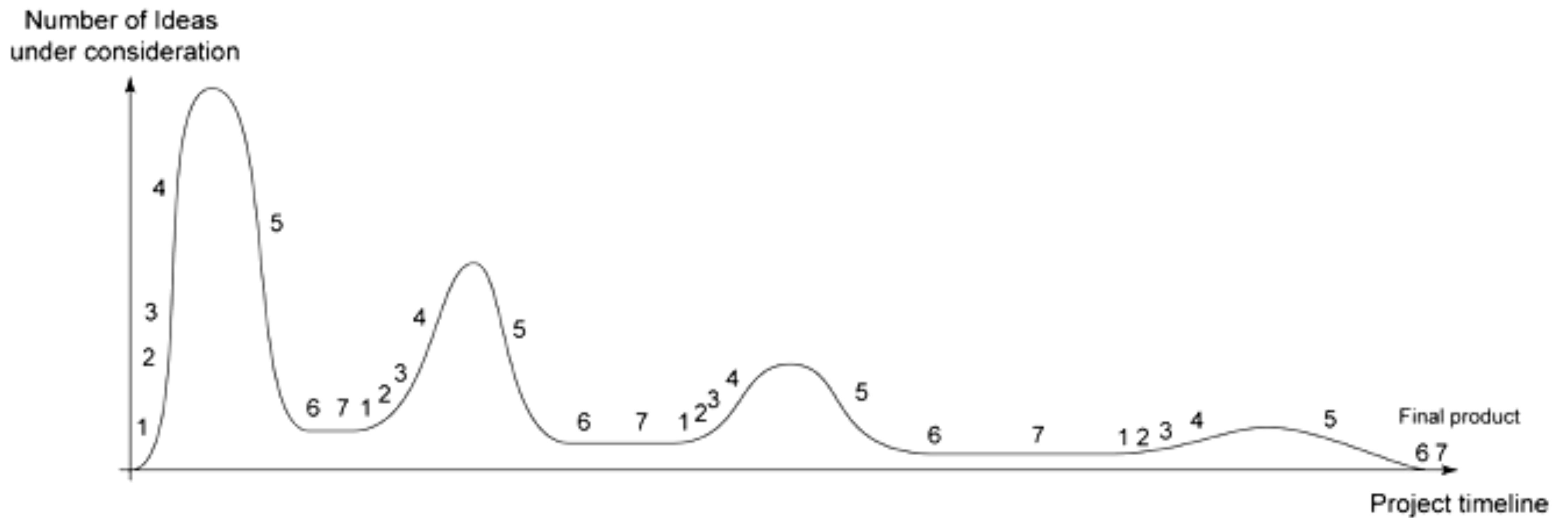




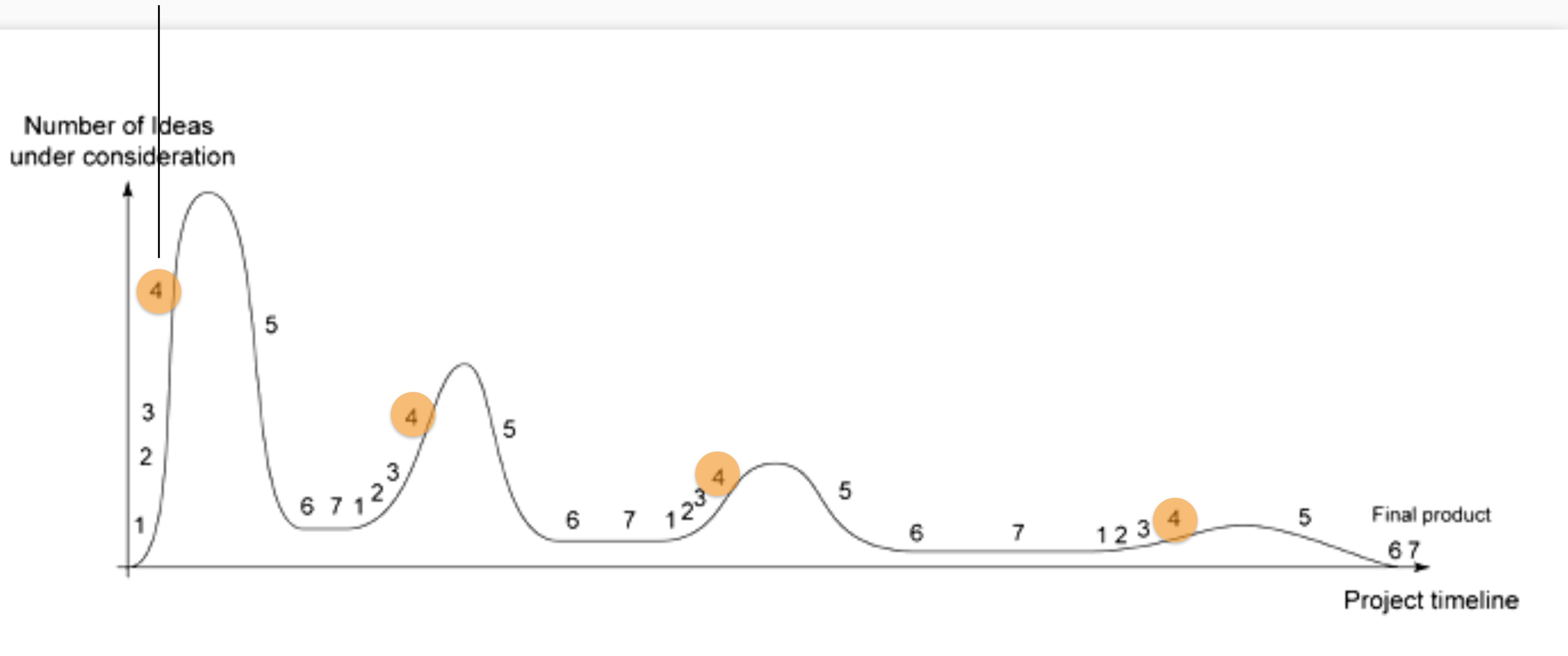


Differ based on stage

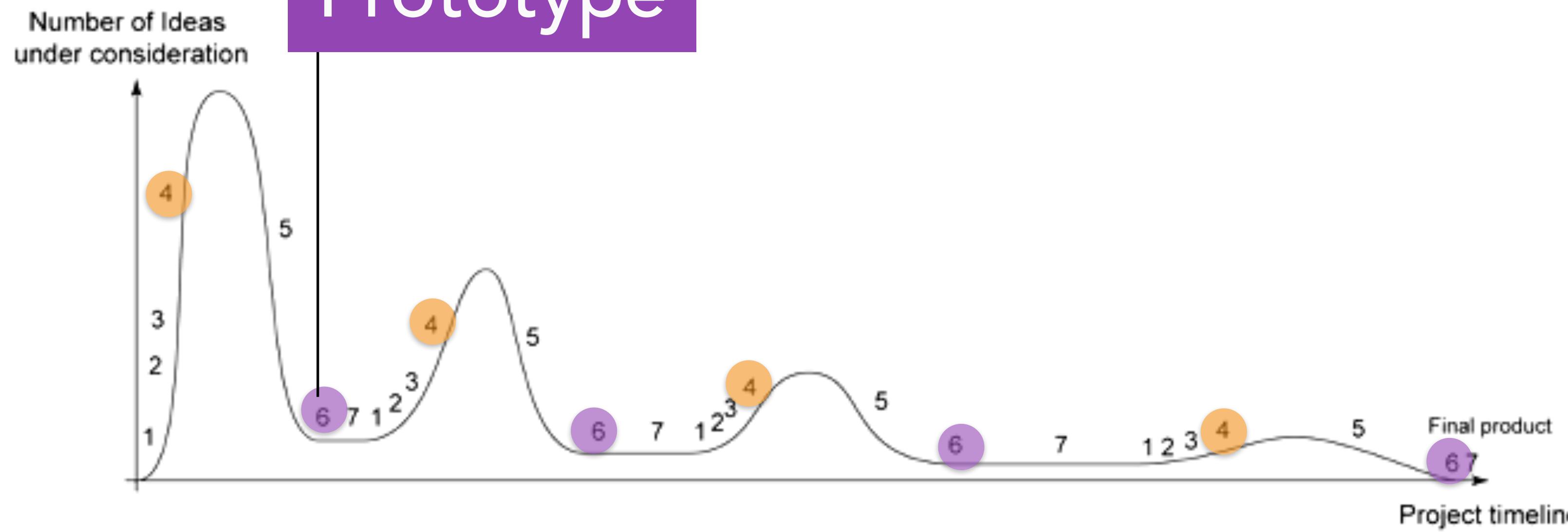




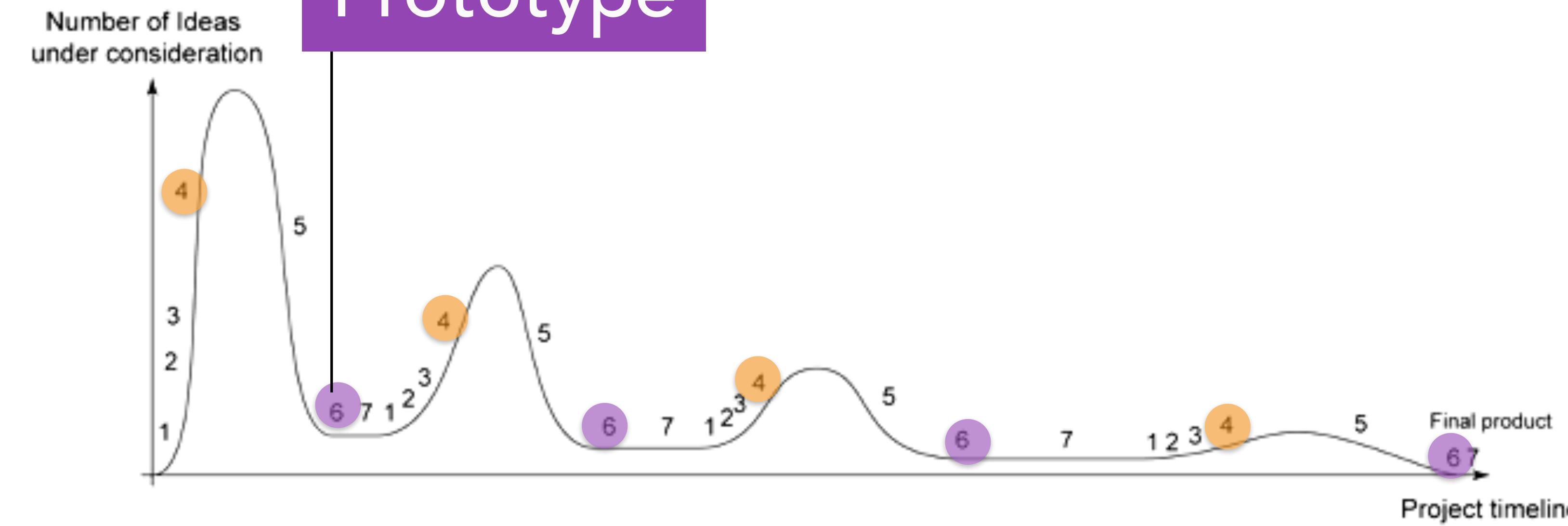
# Ideation



# Prototype



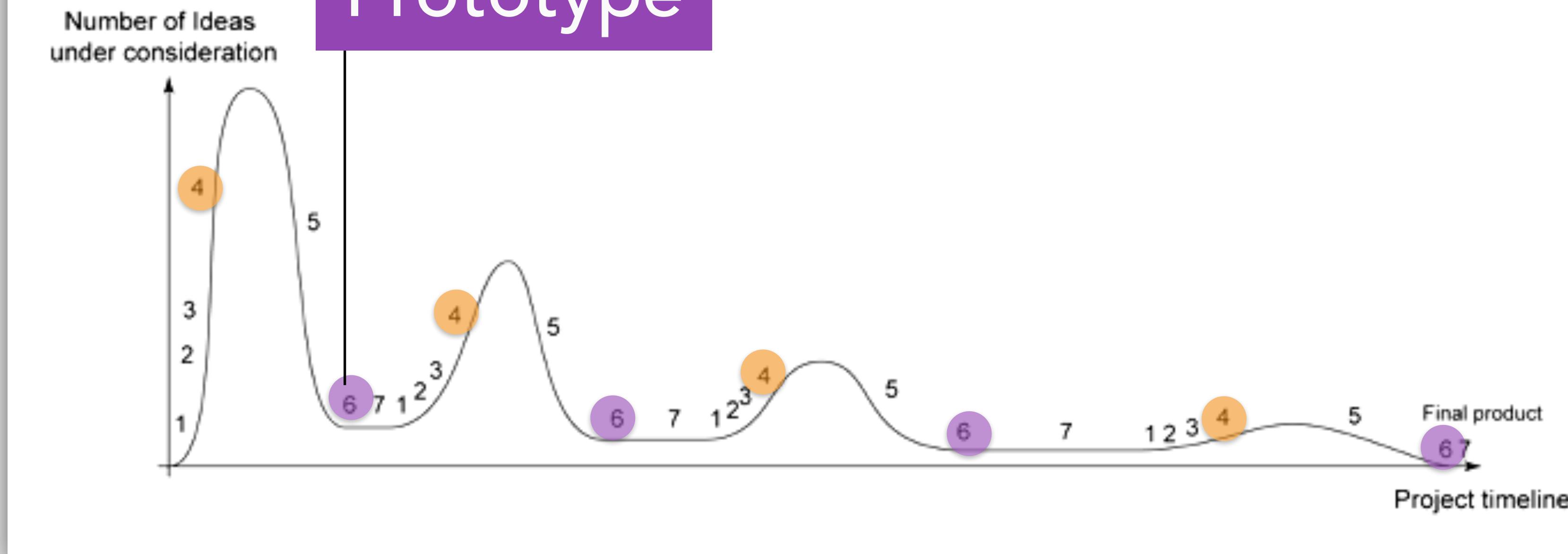
# Prototype



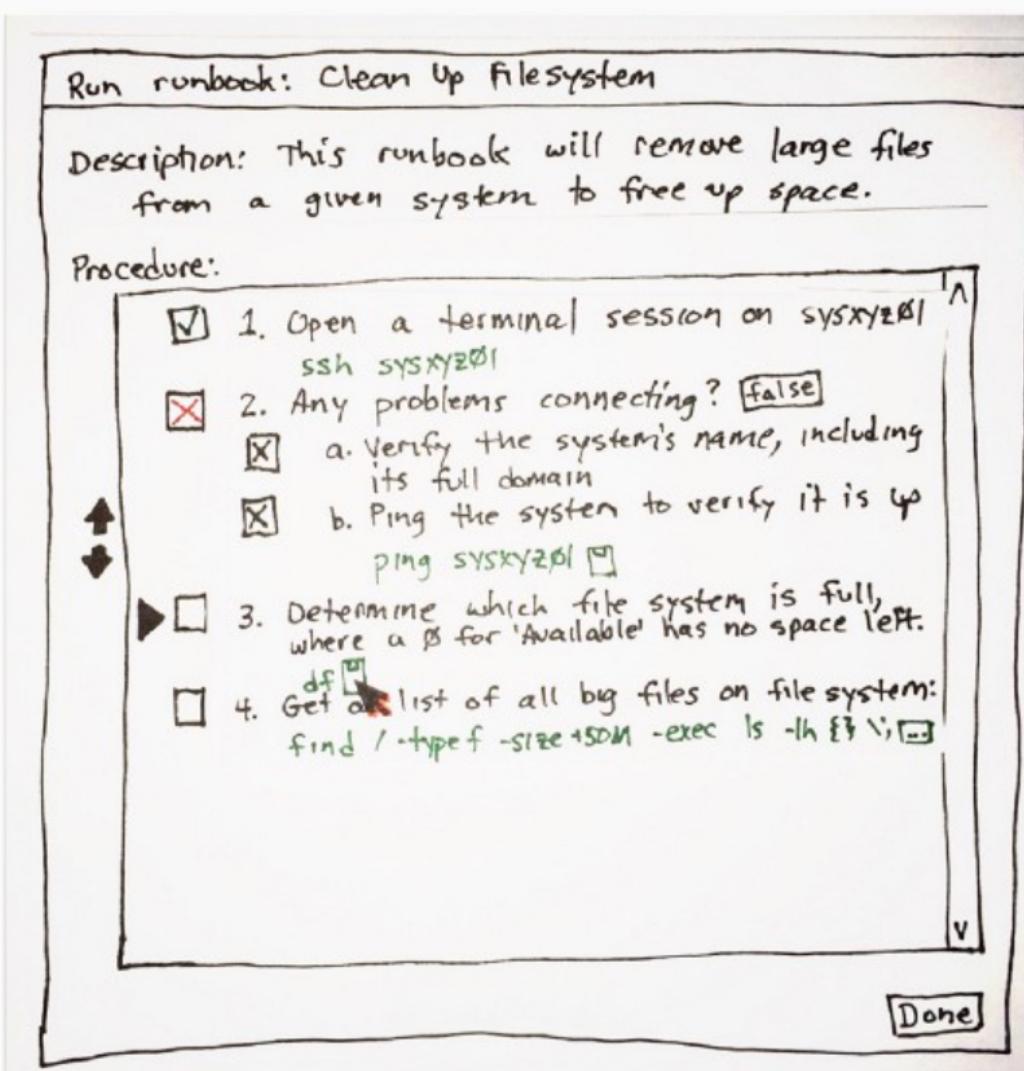
A: ???

B: ???

# Prototype



## Low-fidelity



### Run Runbook

Clean Up File system

Description

This runbook will remove large files from a given system to free up space.

Procedure

Open a terminal session on sysxyz01

Any problems connecting?

a. Verify the system's name, including its full domain.  
b. Ping the system to verify it is up ping sysxyz01

Determine which file system is full, where a 0 for 'Available' has no space left.

Get a list of all big files on file system:  
find / -type f -size +50M -exec ls -lh {} \;

Press ALT 0 for help

Cancel Save as Draft Publish

### New runbook

Name: Clean Up File system

Runbook ID: 39939999999999999999999999999999

Description: This runbook will remove large files from a given system to free up space.

Tags: Free\_space #1, Clean\_Up #2

STEP 1 - Determine file systems that need cleanup

Find the MonitorCommand or Username by issuing  
lscpu -s Name Clustername - IBM Application Name MonitorCommand UserName

If Cluster is not Online this is the reason for the resource shown as Failed. You can End the runbook.

Go back to Runbook Details, and add the Username as a value for runbook parameter USERNAME

Go back to Runbook Details, and add the MonitorCommand as a value for runbook parameter MONITORCOMMAND

STEP 2 - Start the following automation

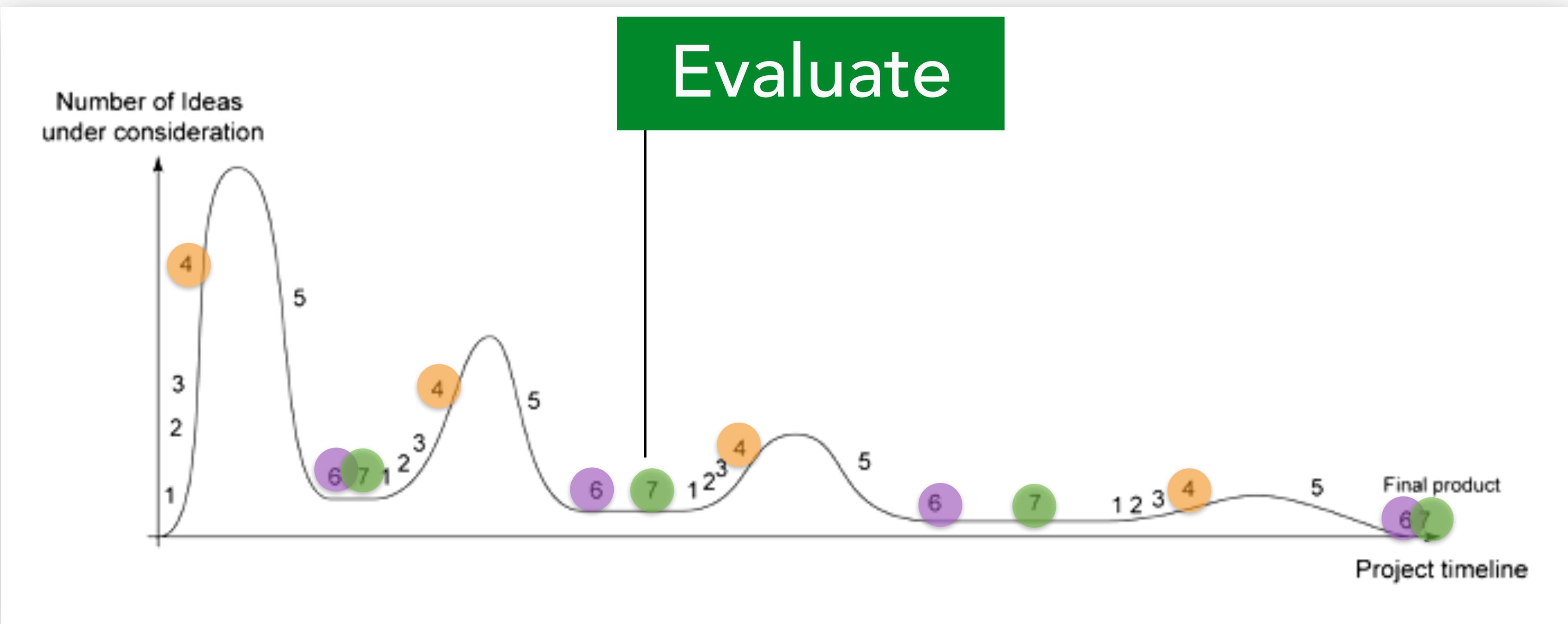
New automation name: add the MonitorCommand as a value for runbook parameter MONITORCOMMAND

New manual step

New automated step

Cancel Save draft Publish

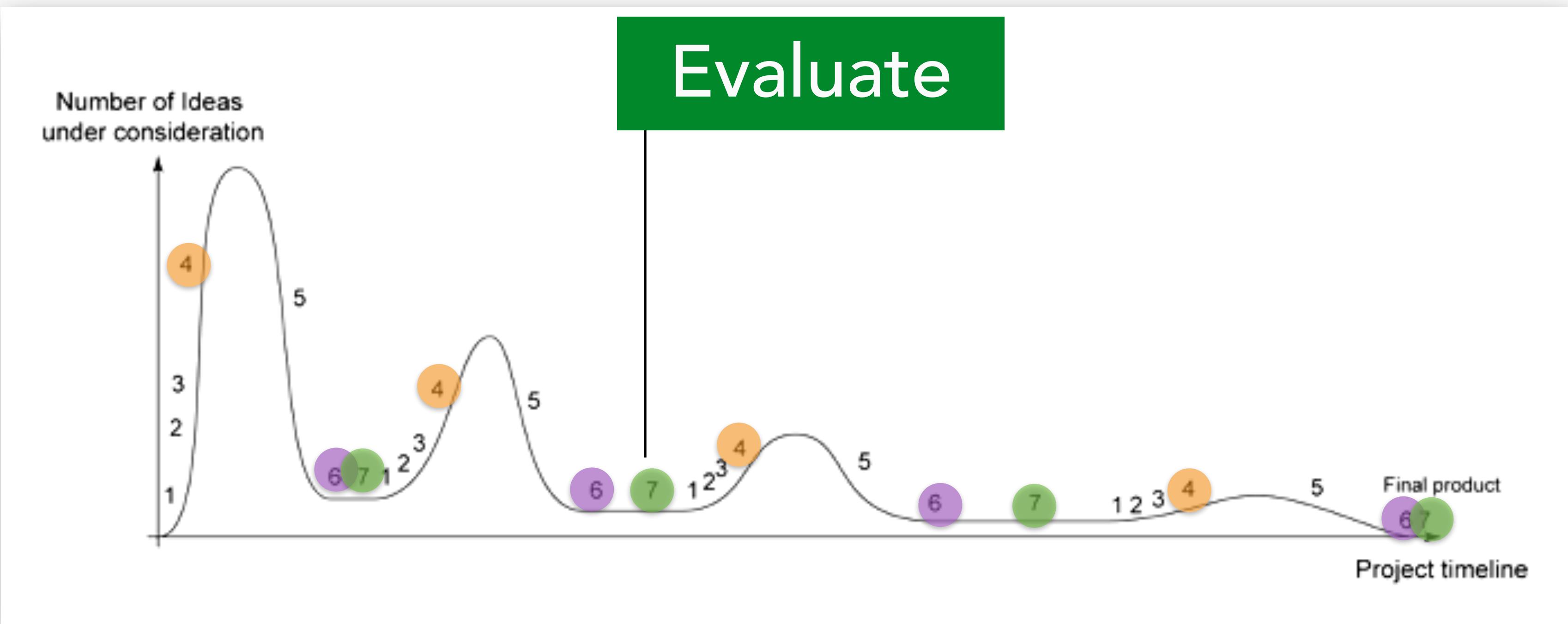
# Evaluate



A: ???

B: ???

# Evaluate



Heuristic Analysis

Cognitive Walkthrough

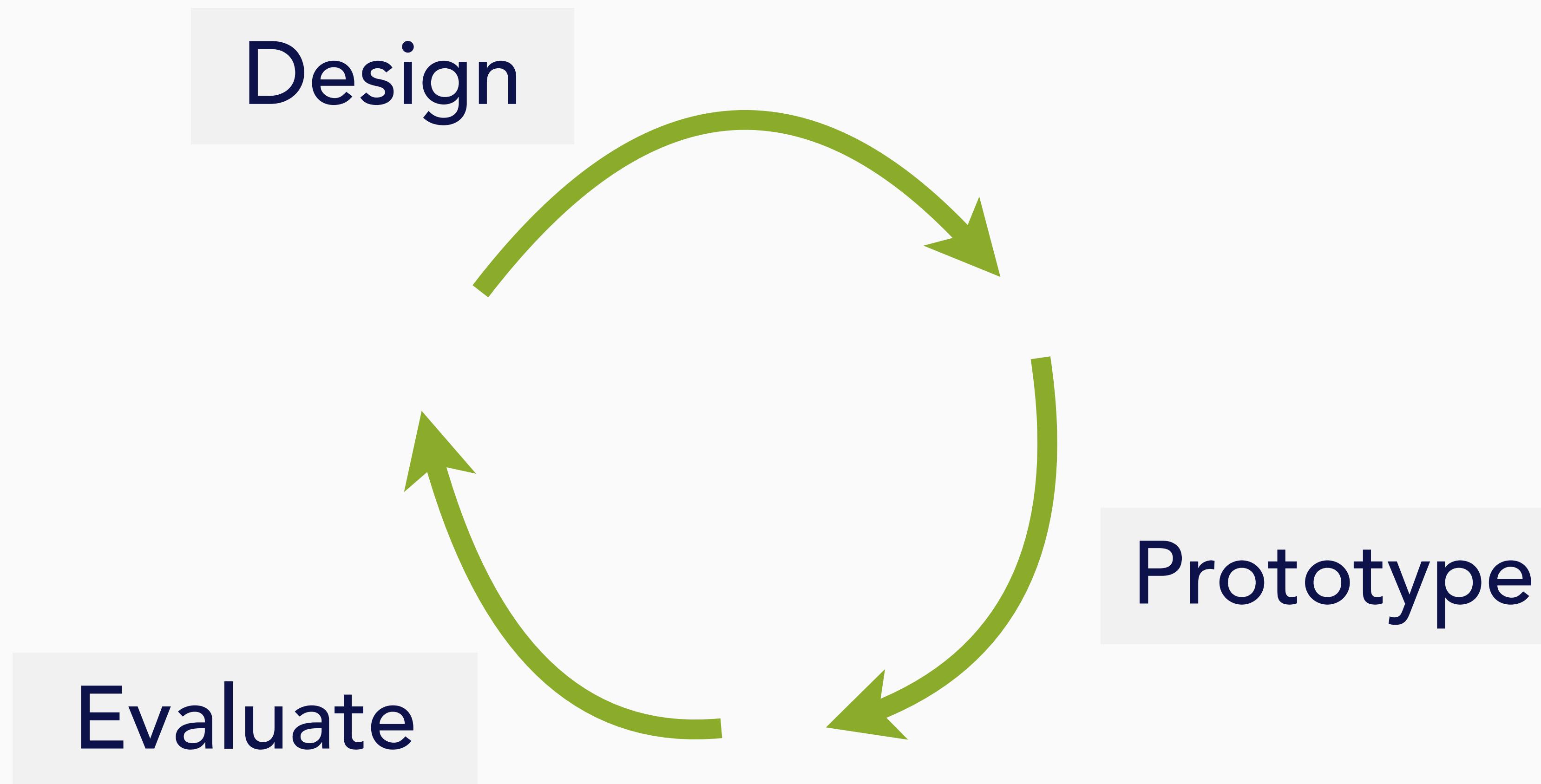
Wizard of Oz

Lab study

Longitudinal study

Algorithmic evaluation

# Design methods



*Many method options at each stage*

# Design methods

Design Methods help structure the journey around the iterative design cycle.

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They are a **toolbox of activities** you can perform to help you deal with the ambiguity and amorphous nature of the design process.

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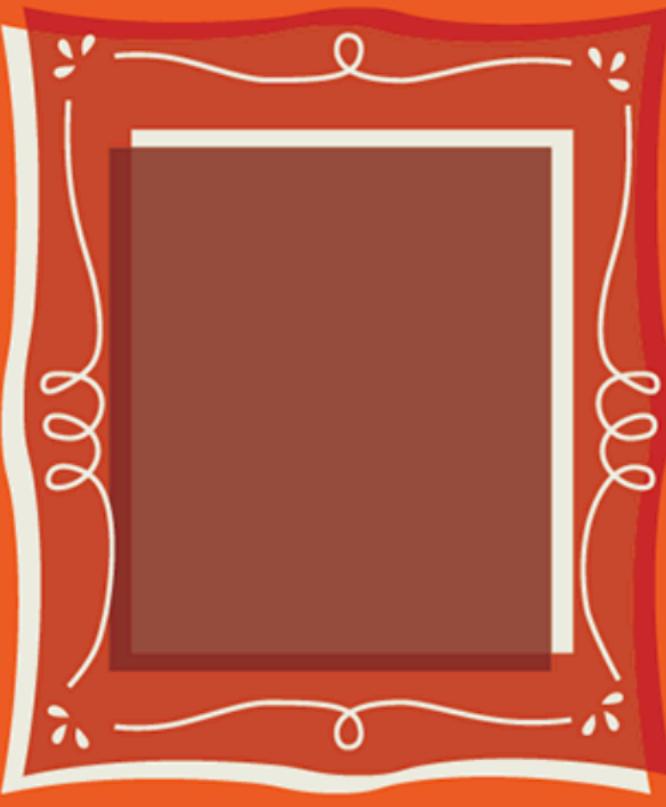
Many methods create **visual artifacts** (diagrams, images) that help your team form a shared understanding of what you are trying to accomplish.

<https://www.designkit.org/methods>

FILTER METHODS

INSPIRATION IDEATION IMPLEMENTATION BY QUESTION VIEW ALL

FRAME YOUR DESIGN CHALLENGE



RECRUITING TOOLS



INTERVIEW



HOW DO I CONDUCT AN INTERVIEW?

CONVERSATION STARTERS



ANALOGOUS INSPIRATION



GROUP INTERVIEW



EXPERT INTERVIEW



MY METHODS

<https://www.nngroup.com/>

## 20 UX Methods in Brief

Here's a short description of the user research methods shown in the above chart:

**Usability-Lab Studies:** participants are brought into a lab, one-on-one with a researcher, and given a set of [scenarios that lead to tasks](#) and usage of specific interest within a product or service.

**Ethnographic Field Studies:** researchers meet with and [study participants in their natural environment](#), where they would most likely encounter the product or service in question.

**Participatory Design:** participants are given design elements or creative materials in order to construct their ideal experience in a concrete way that expresses what matters to them most and why.

**Focus Groups:** groups of 3–12 participants are lead through a discussion about a set of topics, giving verbal and written feedback through discussion and exercises.

**Interviews:** a researcher meets with participants one-on-one to discuss in depth what the participant thinks about the topic in question.

**Eyetracking:** an eyetracking device is configured to precisely measure where participants look as they perform tasks or interact naturally with websites, applications, physical products, or environments.

**Usability Benchmarking:** tightly scripted usability studies are performed with several participants, using precise and predetermined measures of performance.

**Moderated Remote Usability Studies:** [usability studies conducted remotely](#) with the use of

# Design Methods

In Practice

# Video Critique

- (1) What did you like about this approach? What do you think worked well?
- (2) What did you dislike about this approach? What do you think they might miss?
- (3) What design methods did they use? How would you improve their process?





# Video Critique

- (1) What did you like about this approach? What do you think worked well?
- (2) What did you dislike about this approach? What do you think they might miss?
- (3) What design methods did they use? How would you improve their process?

# What people said...

## Likes/Successes

Did research first (e.g., statistics)

Observation/field work

Lots of prototypes

Different types of prototypes  
(e.g., drawing, props, physical)

Fast

Collaborative

Co-located

Egalitarian

Critique rules (e.g., bell)

## Dislikes/Less successful

No defined user goal/“How Might We”

Limited input and evaluation

- Lack of user feedback & testing
- Lack of representation in design
- Not data driven

Did not address real world challenges

- Tall kid might get head whacked
- Other stores have big items (e.g., Costco)

Too much?

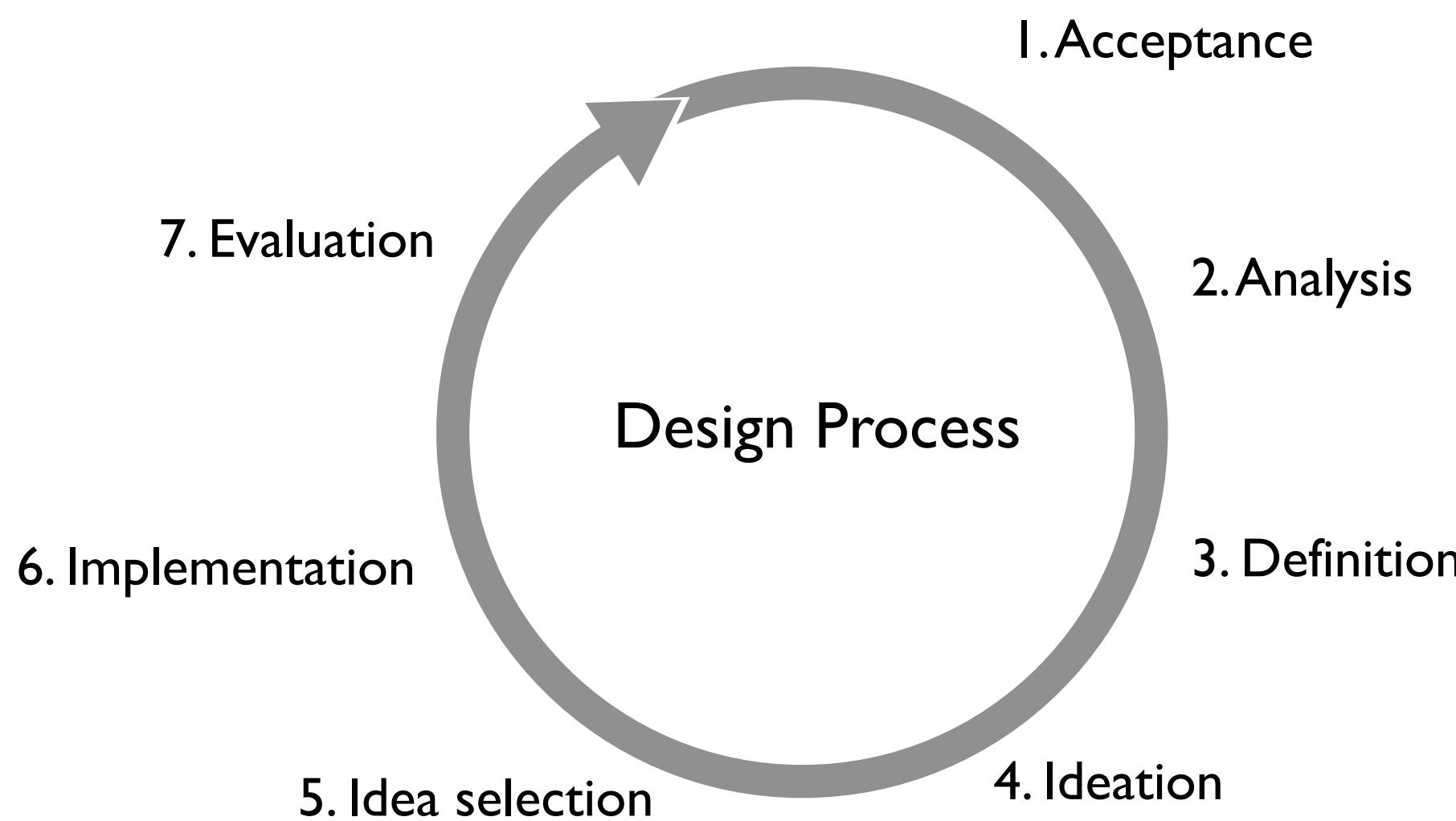
- Cost/feasibility/durability missing
- “Over-engineered”

Long hours

# Limitations

## Classic Design Methods

e.g., as performed by external consultants,  
researchers, or technology creators



## Known Limitations

Who is designing?

Who gets benefit? (see Ethics)

Is this the right type of solution?

# Who is designing?

*And what is their relationship to the people they're designing for?*

Impacts access to people and their candid feedback

Early stage: Building trust takes time, miss key problems or known fixes

Later stage: Evaluation bias

How might we mitigate these issues?

# Mitigating limitations

## Approaches:

- Longer relationship-building and/or understanding period  
(💡 *ethnographies*: observation, 💡 *Action Research*: prioritize adding value)
- Provide design opportunities to people with firsthand experience
  - 💡 Change who designs: Toyota “pulled” changes from front line
  - 💡 Design together: *Participatory Design, Co-design Workshops*  
Involve domain experts in design process  
(consider: accessibility, perception of usefulness)
- Evaluation: 💡 *Observation-based evidence*

# Prototyping

# What is a prototype?

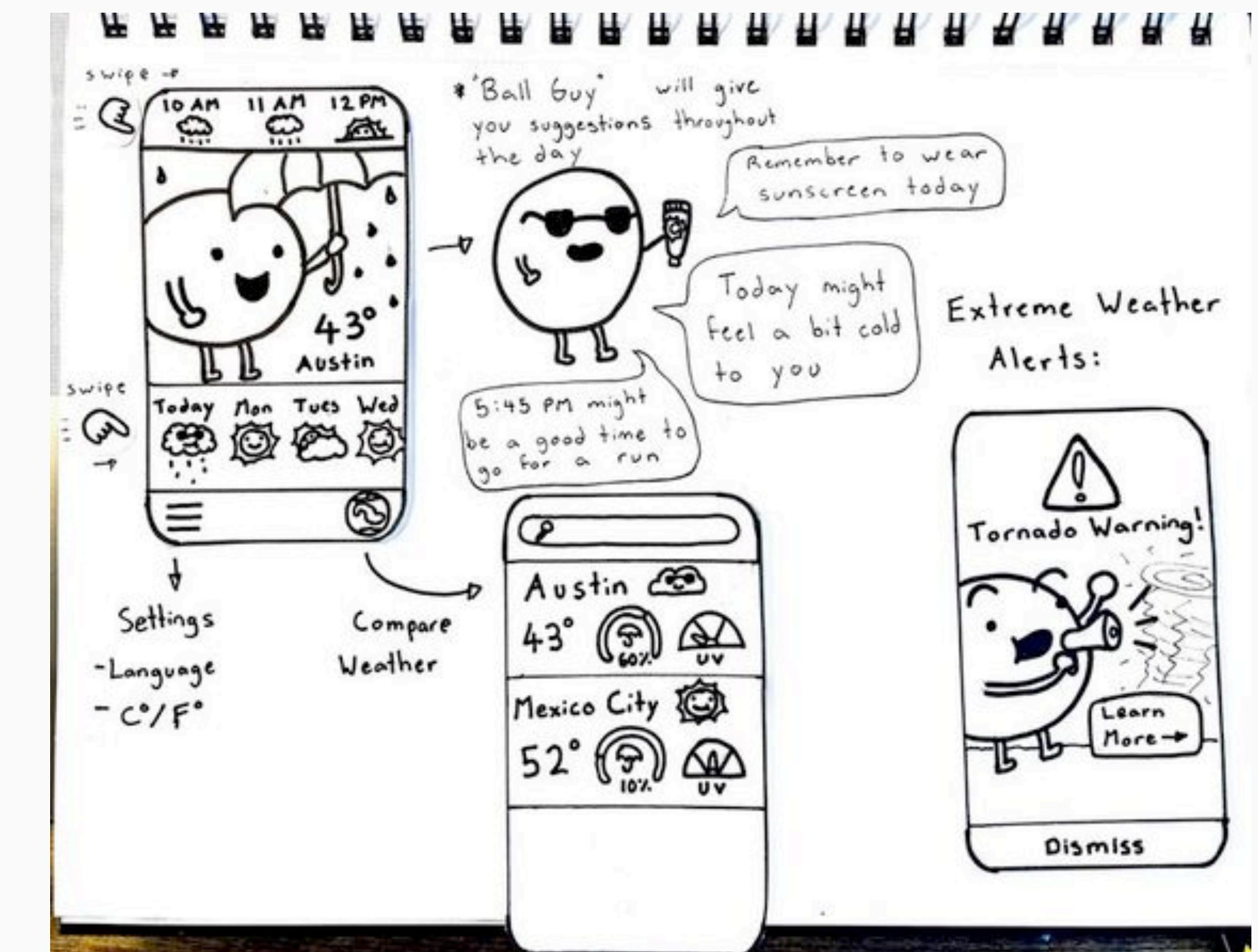
Interactive systems are complex, can't prototype the entire system at once.

# What is a prototype?

Interactive systems are complex, can't prototype the entire system at once.

Choosing the right kind of focused prototype and communicating the purpose of that prototype can be challenging





# Prototype Considerations

*What to consider when selecting a prototype*

What design **question** should my prototype answer?

Related to: What type of **feedback** do I need?

How much **time** do I have to create a prototype?

What will be **easy/hard** to prototype based on my context, resources, expertise?

What will users' **introduction** be to my prototype?  
(e.g., will I be able to introduce it verbally, or does it need to "stand on its own")

# Parallel Prototyping

CHI 2006 Proceedings • Usability Methods

April 22-27, 2006 • Montréal, Québec, Canada

## Getting the Right Design and the Design Right: Testing Many Is Better Than One

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**Abigail Sellen**

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Cambridge, UK  
[asellen@microsoft.com](mailto:asellen@microsoft.com)

### ABSTRACT

We present a study comparing usability testing of a single interface versus three functionally equivalent but stylistically distinct designs. We found that when presented with a single design, users give significantly higher ratings and were more reluctant to criticize than when presented with the same design in a group of three. Our results imply that by presenting users with alternative design solutions, subjective ratings are less prone to inflation and give rise to more and stronger criticisms when appropriate. Contrary to our expectations, our results also suggest that usability

Much of the often cited literature [11, 14] emphasizes the use of paper prototypes in usability testing [8]. The primary benefit in this case is to provide an inexpensive way to refine a design earlier in the process than would otherwise be possible. In this, they serve as an aid in *getting the design right*.

Another aspect of the relatively low cost of paper prototypes is their potential to enable the early exploration of more design alternatives than would otherwise be affordable (in time and money). Taking these two things

# Parallel Prototyping

With a single design achieving criticism can be challenging.

*Why?*

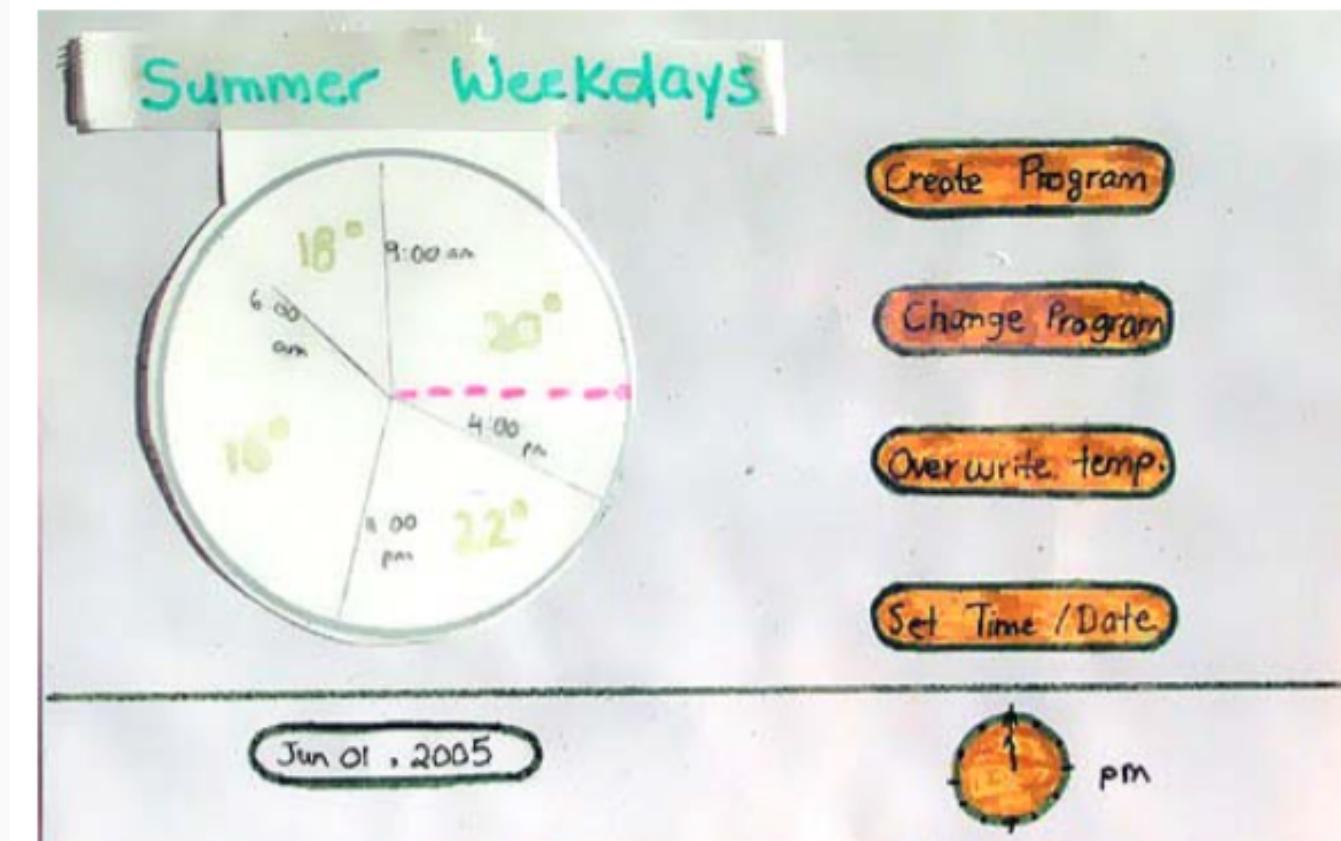


Figure 1. The “Circular” paper prototype

A tabular paper prototype for the same smart home application. It starts with a dropdown menu set to "Summer on Vacation". Below are four rows for "Morning", "Day", "Evening", and "Night", each with "from" and "to" time pickers and a "temperature" slider. At the bottom are three input fields: "Date" (Jun 01, 2005), "Time" (12:00 PM), and "Temperature" (23).

Program	Summer on Vacation
Morning	from 7:00 to 9:00 temperature 15
Day	from 11:00 to 15:00 temperature 15
Evening	from 15:00 to 12:00 temperature 15
Night	from 12:00 to 7:00 temperature 15
Date	Jun 01, 2005
Time	12:00 PM
Temperature	23

Figure 2. The “Tabular” paper prototype

A linear paper prototype. At the top, "Today:" is written above a date input field. To the right, "Time:" is followed by a digital clock showing "12:00". Below is a section titled "Summer Weekend" with a horizontal timeline from 0:00 to 24:00. A red slider is set to "15°" under the heading "Temp.". At the bottom are three buttons: "Program", "Time / Date", and "Change Temp.".

Today:	12:00	
Summer Weekend		
Time	0:00 1:00 2:00 3:00 4:00 5:00 6:00 7:00 8:00 9:00 10:00 11:00 12:00 13:00 14:00 15:00 16:00 17:00 18:00 19:00 20:00 21:00 22:00 23:00 24:00	
Temp.	15°	
Program	Time / Date	Change Temp.

Figure 3. The “Linear” paper prototype

# Parallel Prototyping

With a single design achieving criticism can be challenging.

*Why?*

Tohidi et al. find that when only one prototype is seen it provokes higher ratings and more +

More criticism and fewer positive comments with multiple designs

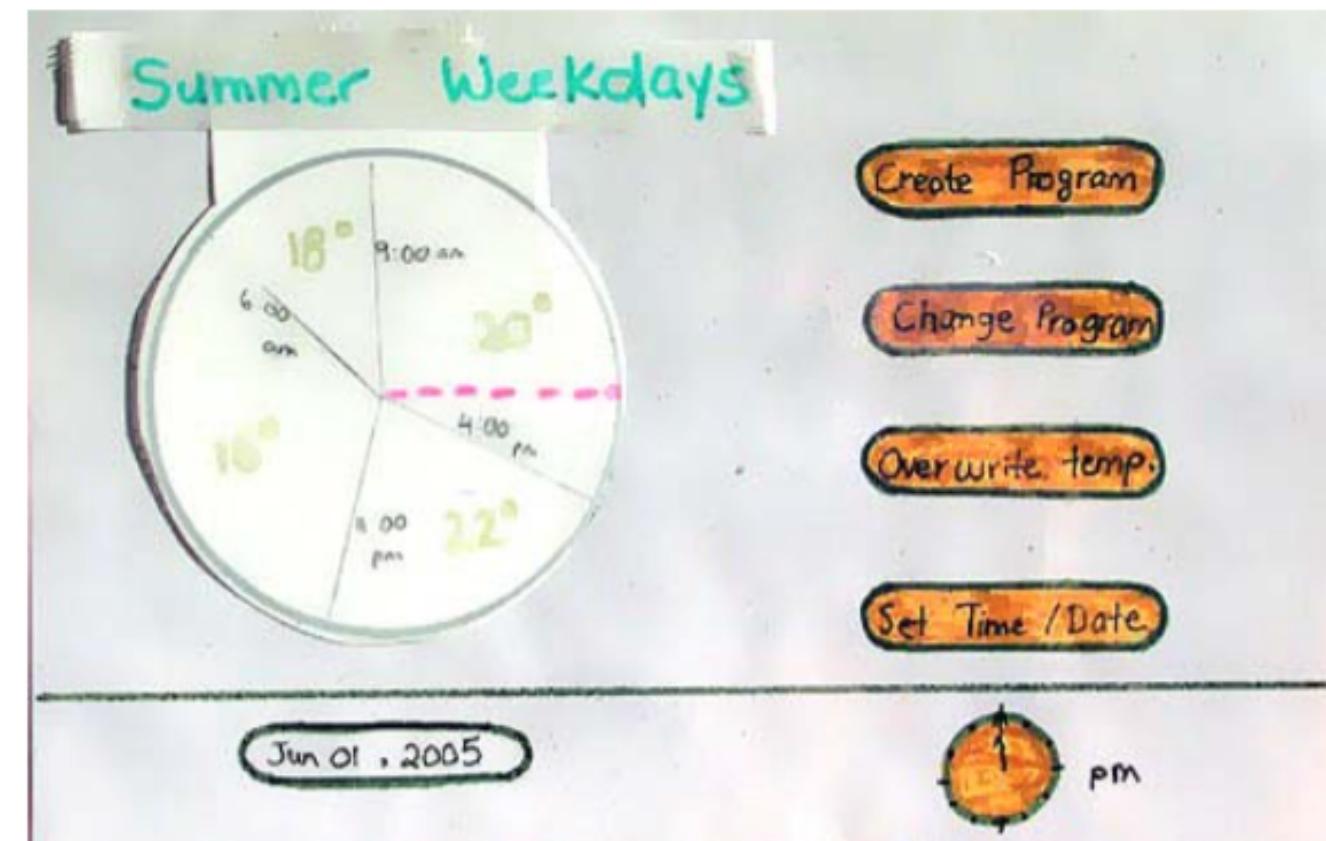


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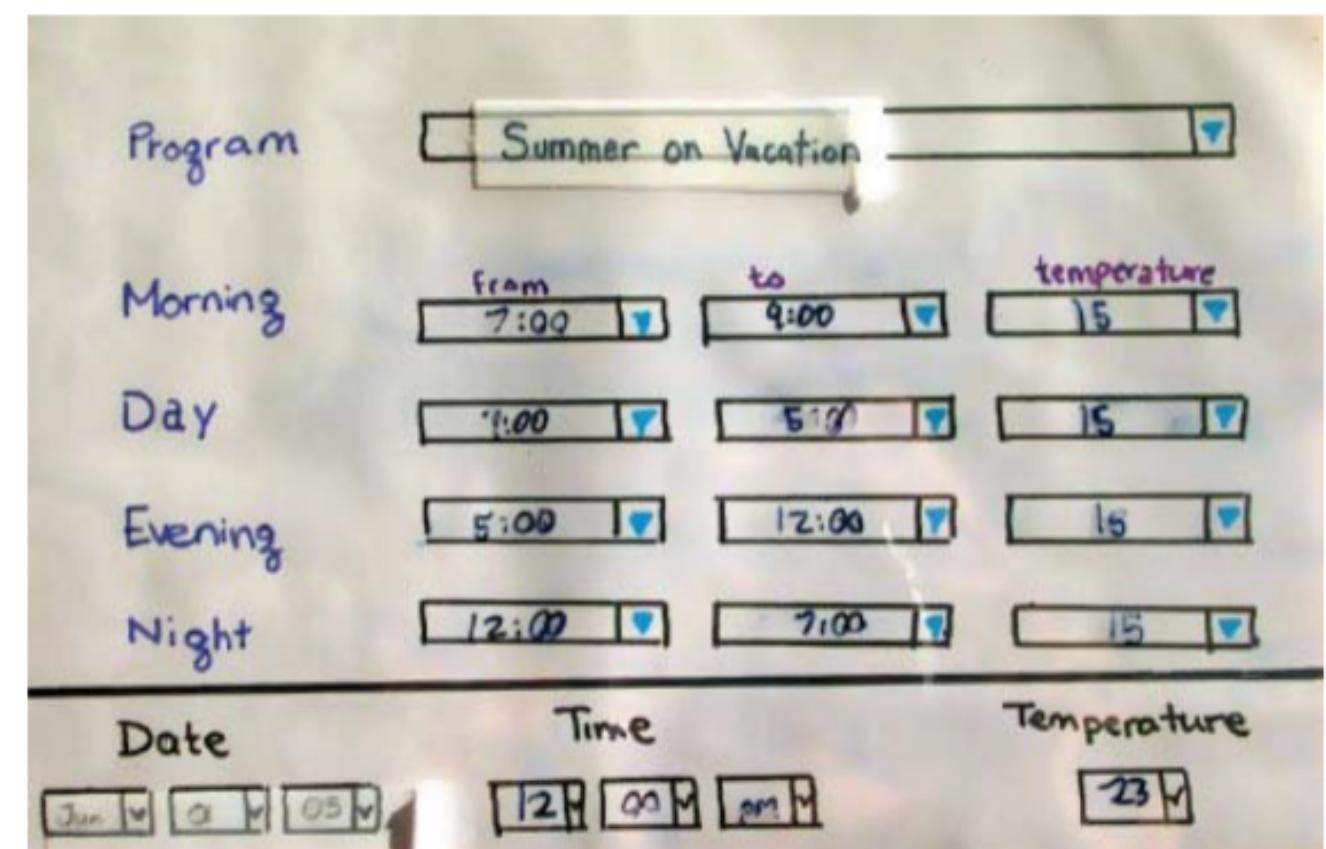


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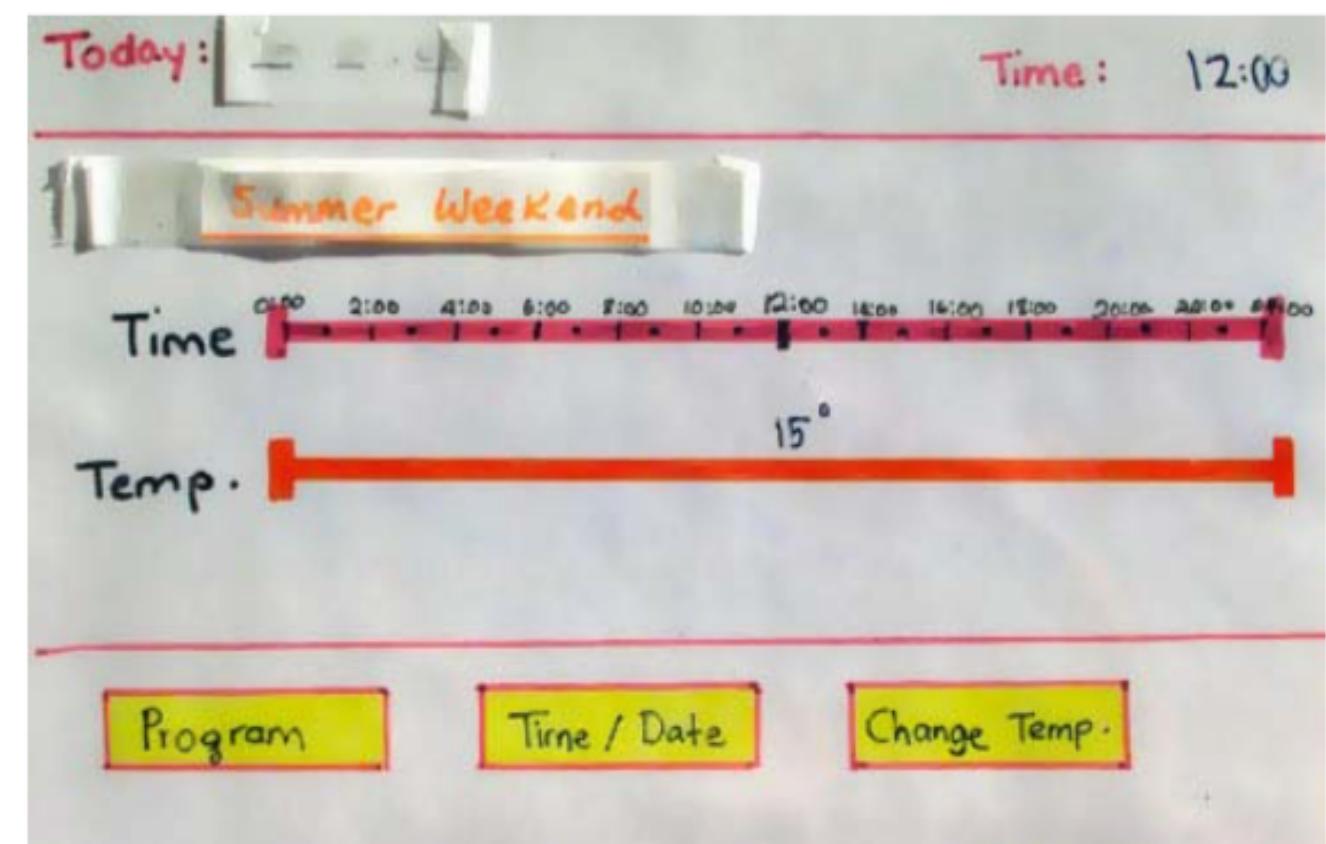


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# Parallel Prototyping

With a single design achieving criticism can be challenging.

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Superficial suggestions decreased in the case of multiple designs.

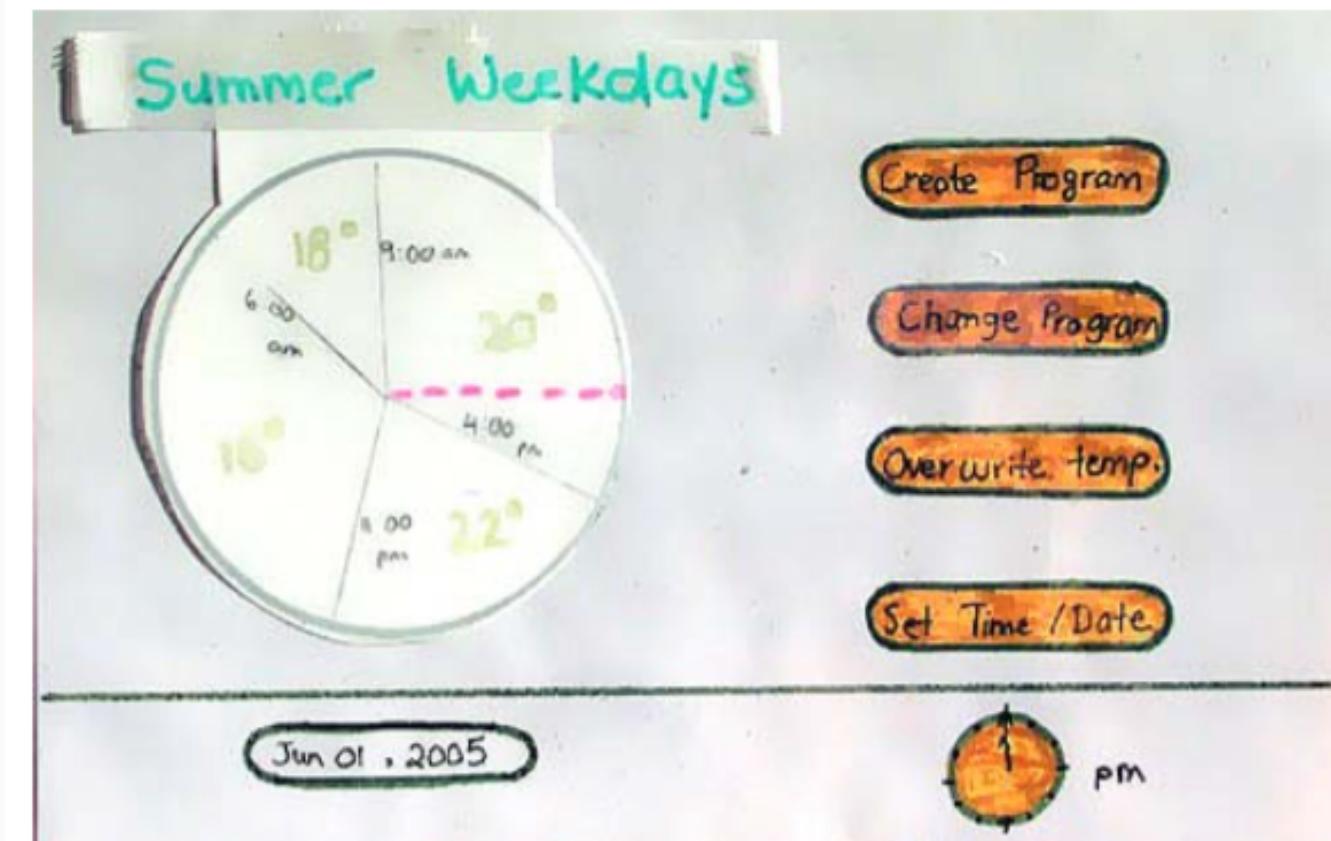


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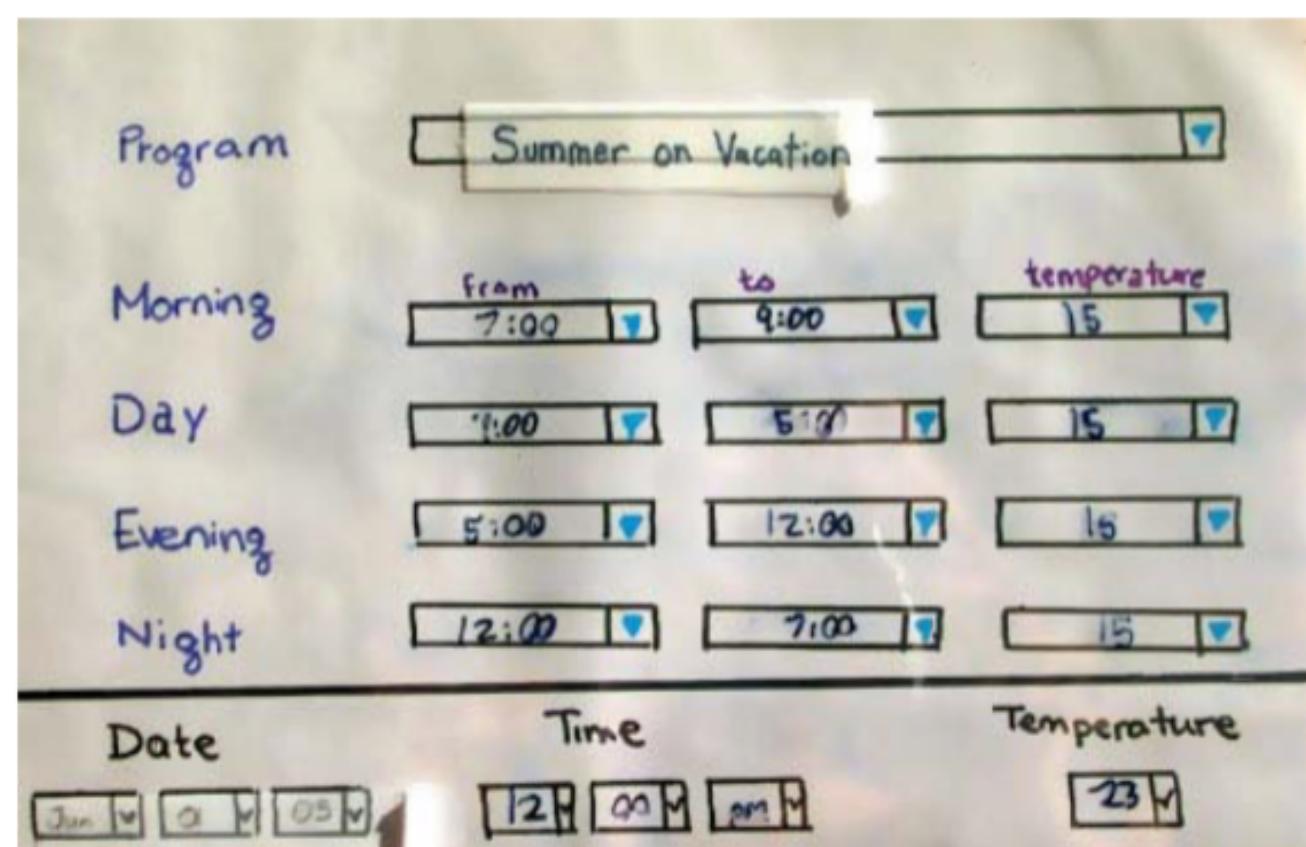


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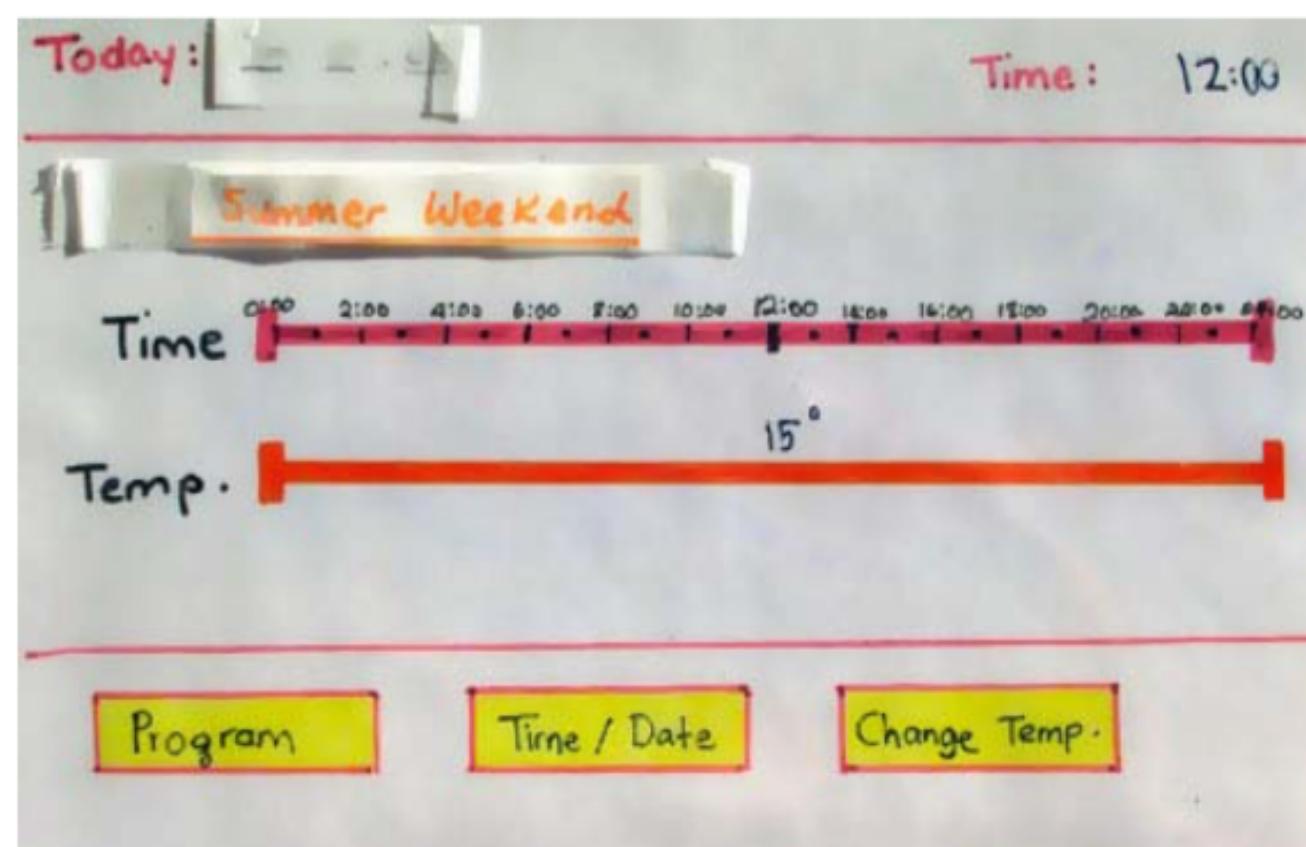
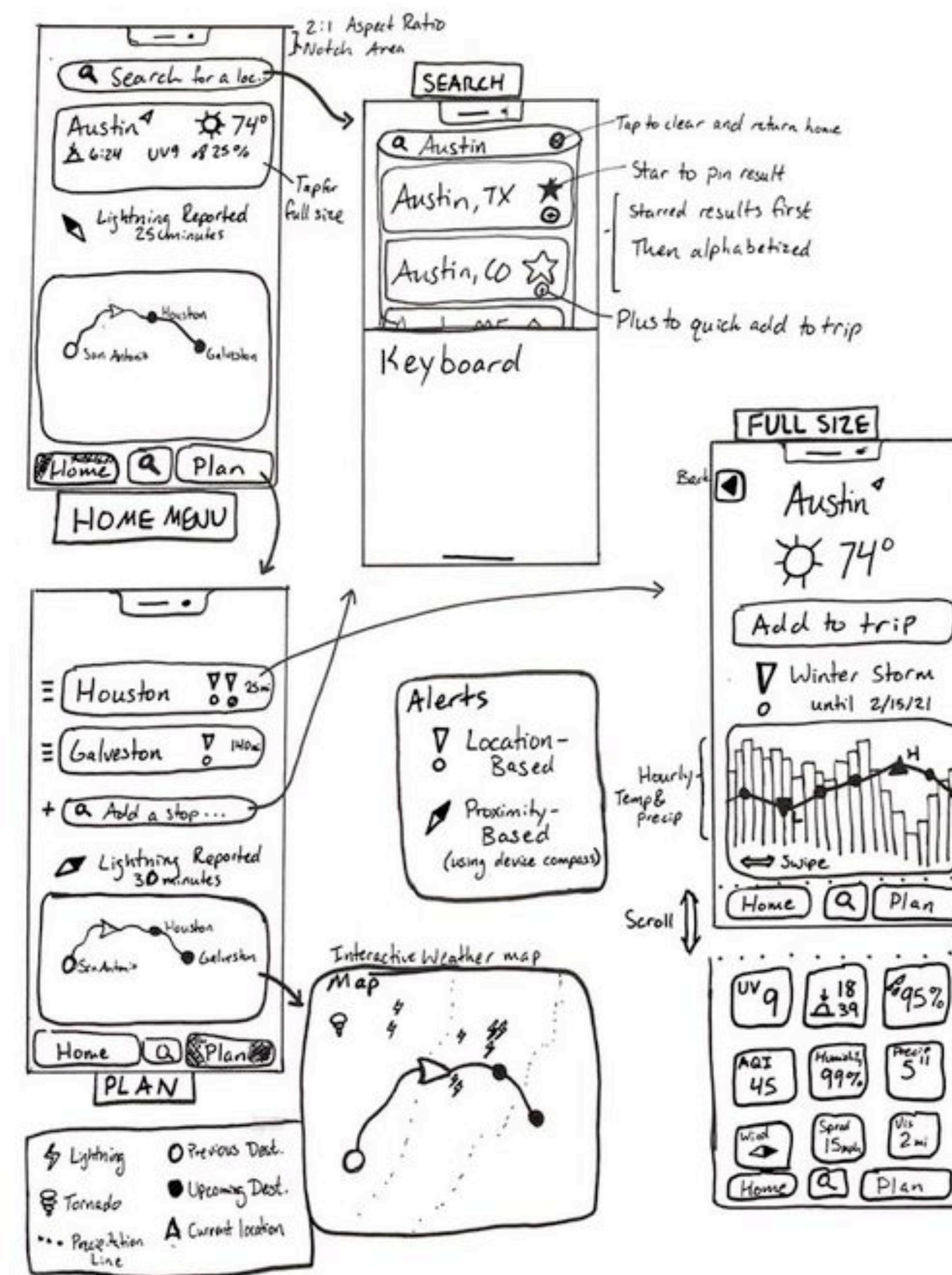
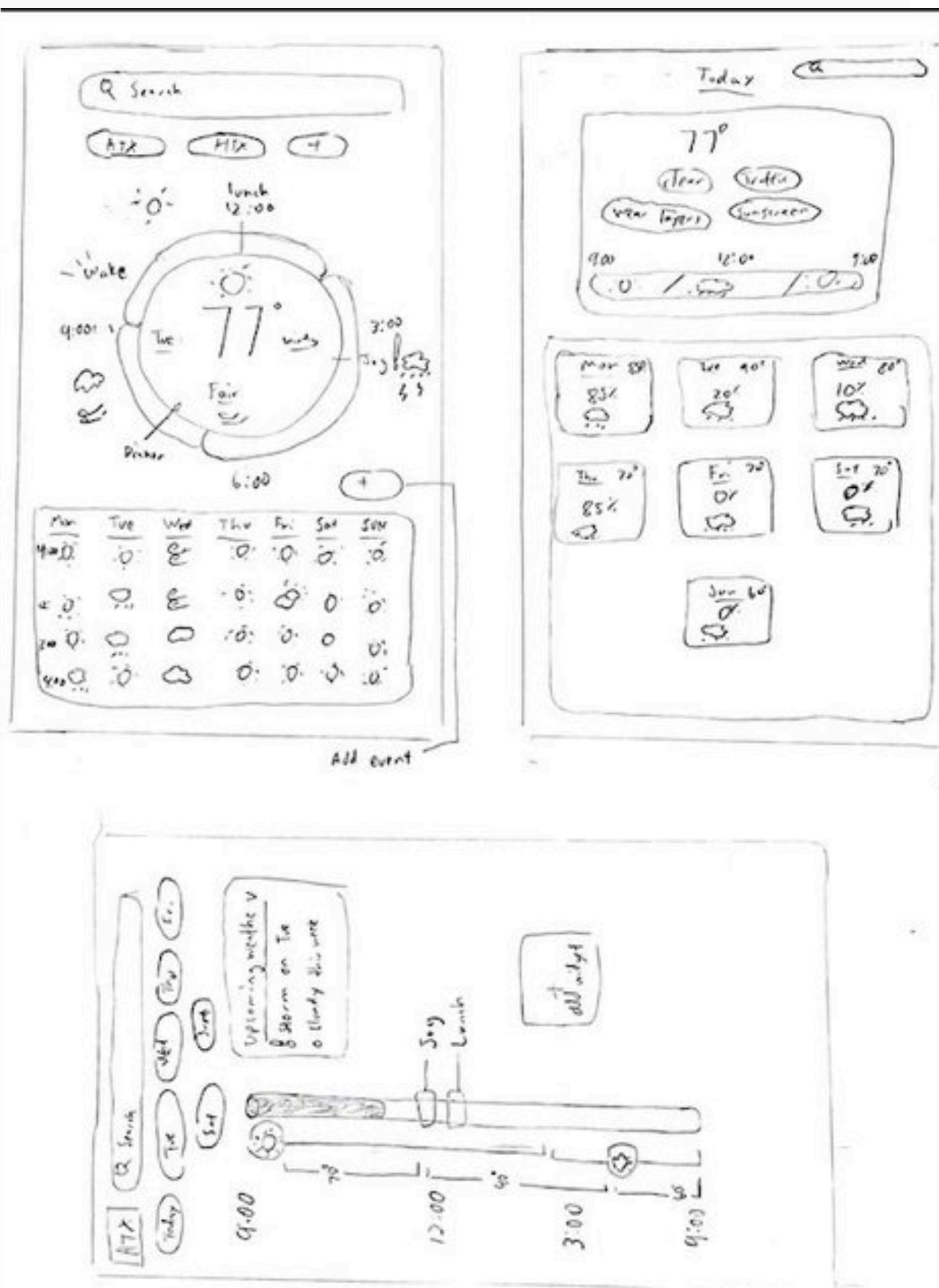


Figure 3. The “Linear” paper prototype

# Fidelity



20-1

# What is a prototype?

Not only the type of prototype.

But, what questions it answers:

- What role will the artifact play in a user's life?
- How should it look and feel?
- How should it be implemented?

# Prototypes (questions)

How would you prototype a robotic home assistant?

- Lays out an outfit each day to wear.
- Picks clothes off of the ground.
- Folds clothes.

*What questions does your prototype answer?*

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# Prototypes (questions)

How would you prototype a robotic home assistant?

- Lays out an outfit each day to wear.
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*What questions does your prototype answer?*

# How would you prototype...

A robotic home assistant:

- Lays out an outfit each day to wear. Look and feel?
- Picks clothes off of the ground. Implementation?
- Folds clothes. Role?

*What questions does your prototype answer?*