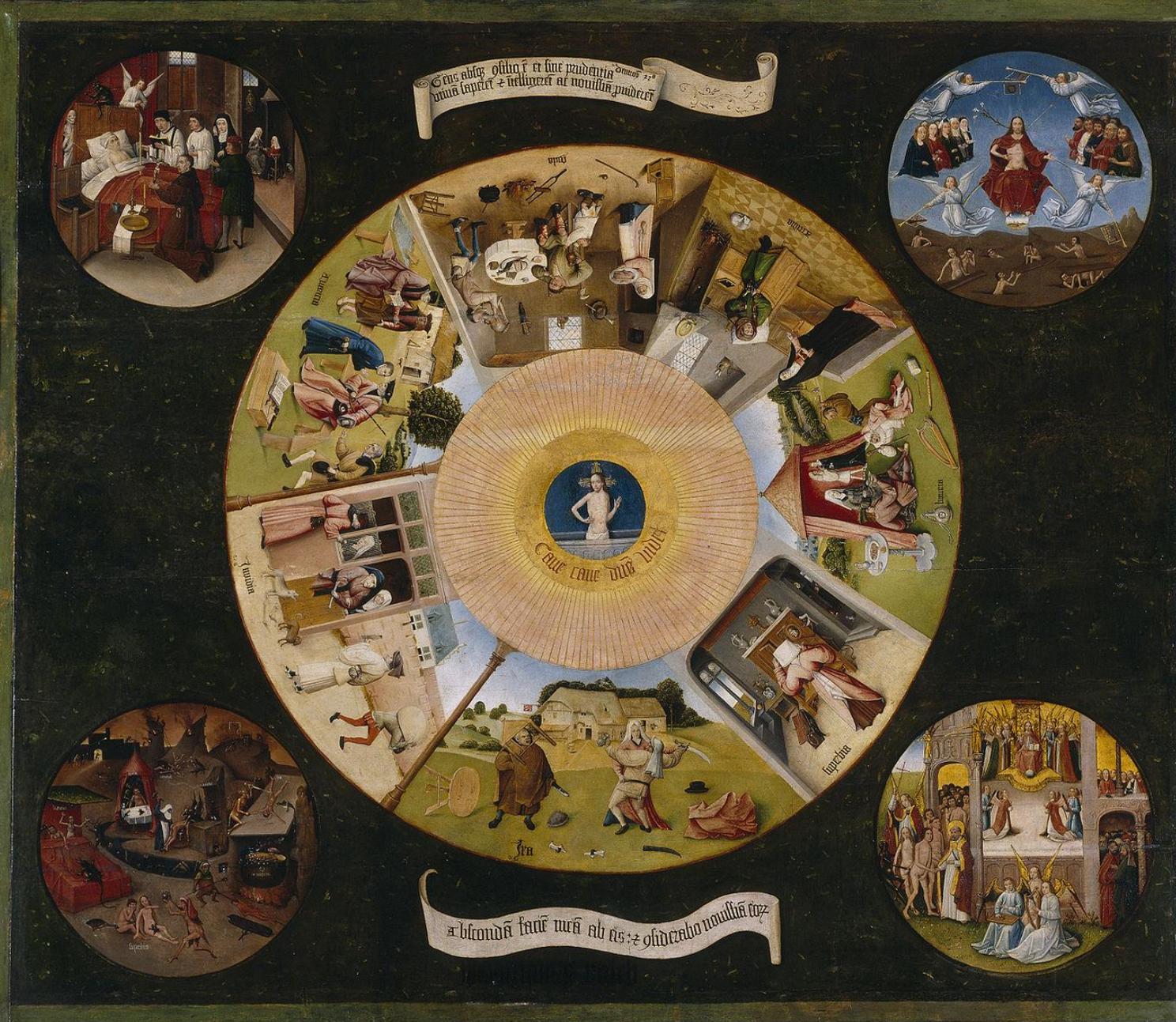


# User Needs

Image Source



# Learning Goals

- Understand ...
  - the complexity of user needs and the challenges to uncover them.
  - the relationship between user needs and technologies available.
  - how human needs impact the technologies we develop and how technologies influence needs
- Be able to explain ...
  - the basics of Maslow's theory of motivation
  - the concept of the task-artifact cycle and give examples

# User Needs

Ask the (potential) users?

# User Needs- Homer Simpson

Show (about 20 sec)

<https://www.youtube.com/watch?v=Pw9gaEiQAxY>

# User Needs

Ask the (potential) users?

That Disastrous Car Homer Simp x +  
<https://www.wired.com/2014/07/homer-simpson-car/>  
WIRED That Disastrous Car Homer Simpson Designed Was Actually Ahead

**Share**

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- EMAIL

## That Disastrous Car Homer Simpson Designed Was Actually Ahead of Its Time



FX

In *The Simpsons* episode "Oh Brother, Where Art Thou?," Homer is asked to design a car for the company run by his long-lost brother, and fails so spectacularly he drives him out of business. It's a brilliant episode because, on top of being hilarious, kind of predicted the automotive future: Some of the features that made Homer's car so terrible are actually commonplace in 21st century vehicles.



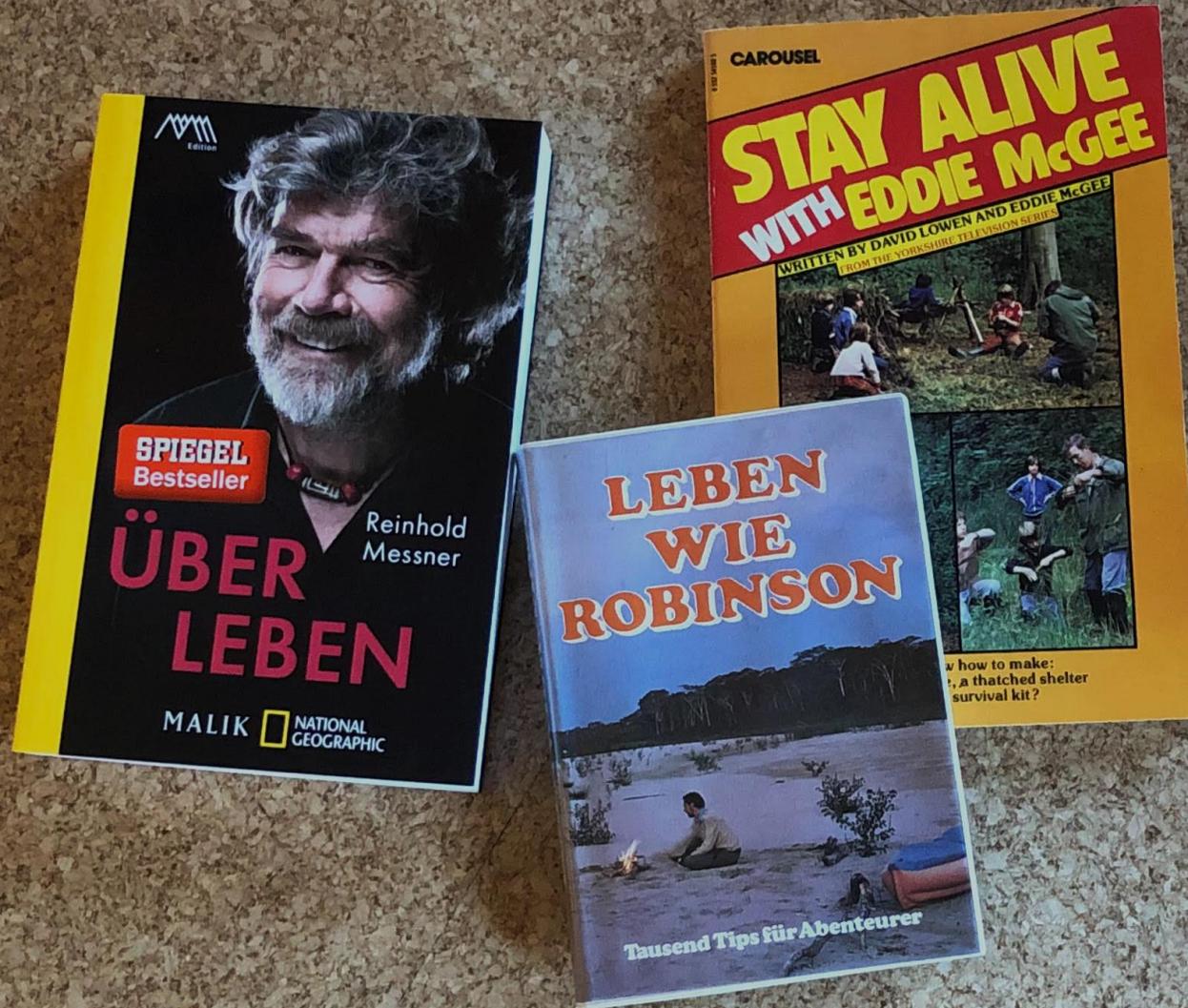
# User Needs Current Technologies

Ask the (potential) users?



# What do you need to survive?

- 3 Minutes
- 3 Days
- 3 Weeks



# The Theory of Human Motivation

Maslow, A.H. (1943)

Maslow, A. H. (1943). A theory of human motivation. *Psychological Review*, 50(4), 370–396. <https://doi.org/10.1037/h0054346>

## A THEORY OF HUMAN MOTIVATION

BY A. H. MASLOW

*Brooklyn College*

### I. INTRODUCTION

In a previous paper (13) various propositions were presented which would have to be included in any theory of human motivation that could lay claim to being definitive. These conclusions may be briefly summarized as follows:

1. The integrated wholeness of the organism must be one of the foundation stones of motivation theory.
2. The hunger drive (or any other physiological drive) was rejected as a centering point or model for a definitive theory of motivation. Any drive that is somatically based and localizable was shown to be atypical rather than typical in human motivation.
3. Such a theory should stress and center itself upon ultimate or basic goals rather than partial or superficial ones, upon ends rather than means to these ends. Such a stress would imply a more central place for unconscious than for conscious motivations.
4. There are usually available various cultural paths to the same goal. Therefore conscious, specific, local-cultural desires are not as fundamental in motivation theory as the more basic, unconscious goals.
5. Any motivated behavior, either preparatory or consummatory, must be understood to be a channel through which many basic needs may be simultaneously expressed or satisfied. Typically an act has *more* than one motivation.
6. Practically all organismic states are to be understood as motivating and as motivating.
7. Human needs arrange themselves in hierarchies of prepotency. That is to say, the appearance of one need usually rests on the prior satisfaction of another, more pre-potent need. Man is a perpetually wanting animal. Also no need or drive can be treated as if it were isolated or discrete; every drive is related to the state of satisfaction or dissatisfaction of other drives.
8. *Lists* of drives will get us nowhere for various theoretical and practical reasons. Furthermore any classification of motivations

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# Needs

## Maslow, A.H. (1943)

- 5) The Need for Self-Actualization.
- 4) The Esteem Needs
- 3) The Love Needs
- 2) The Safety Needs
- 1) The 'physiological' Needs

Maslow, A. H. (1943). A theory of human motivation. *Psychological Review*, 50(4), 370–396. <https://doi.org/10.1037/h0054346>

## A THEORY OF HUMAN MOTIVATION

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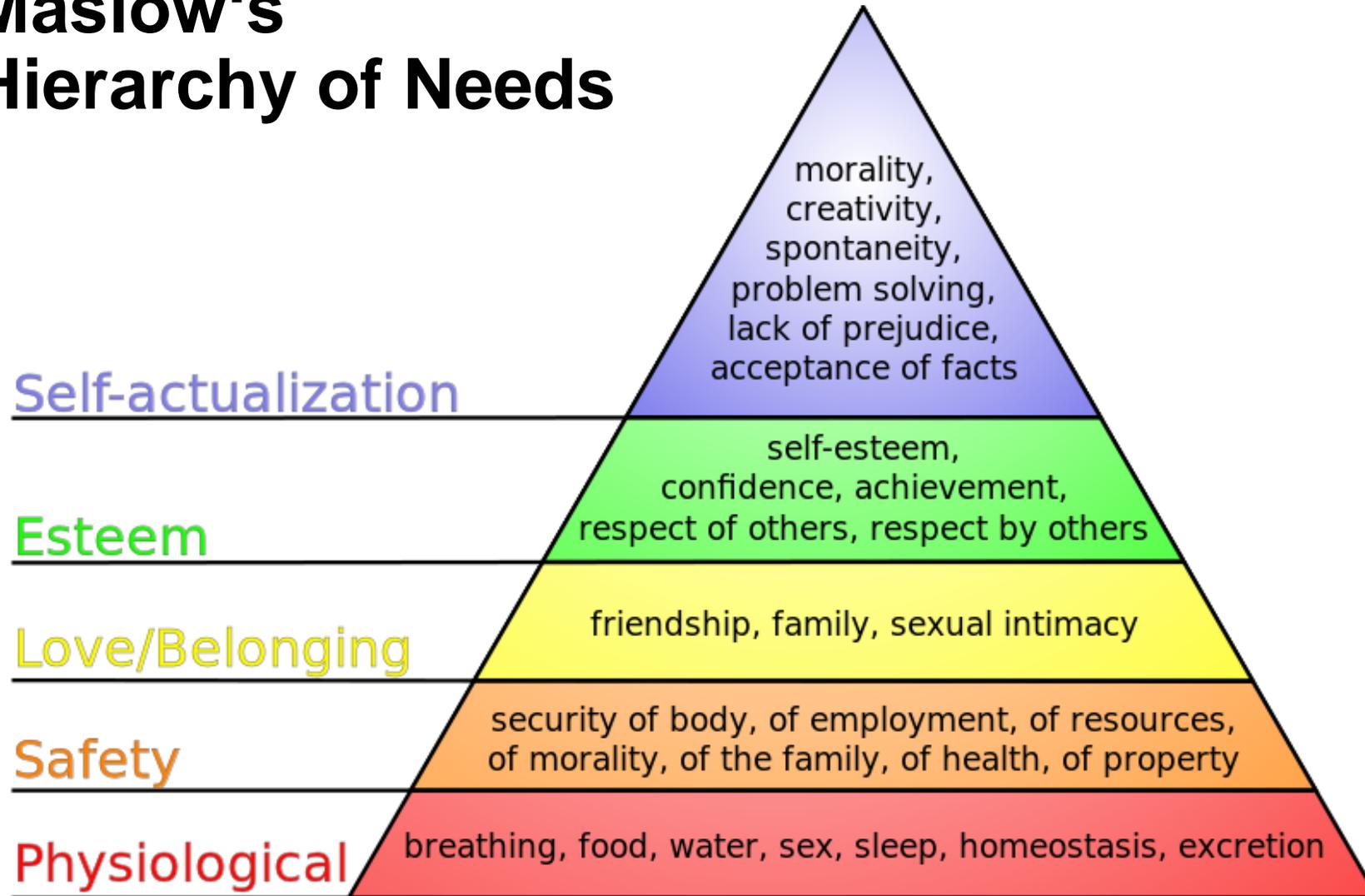
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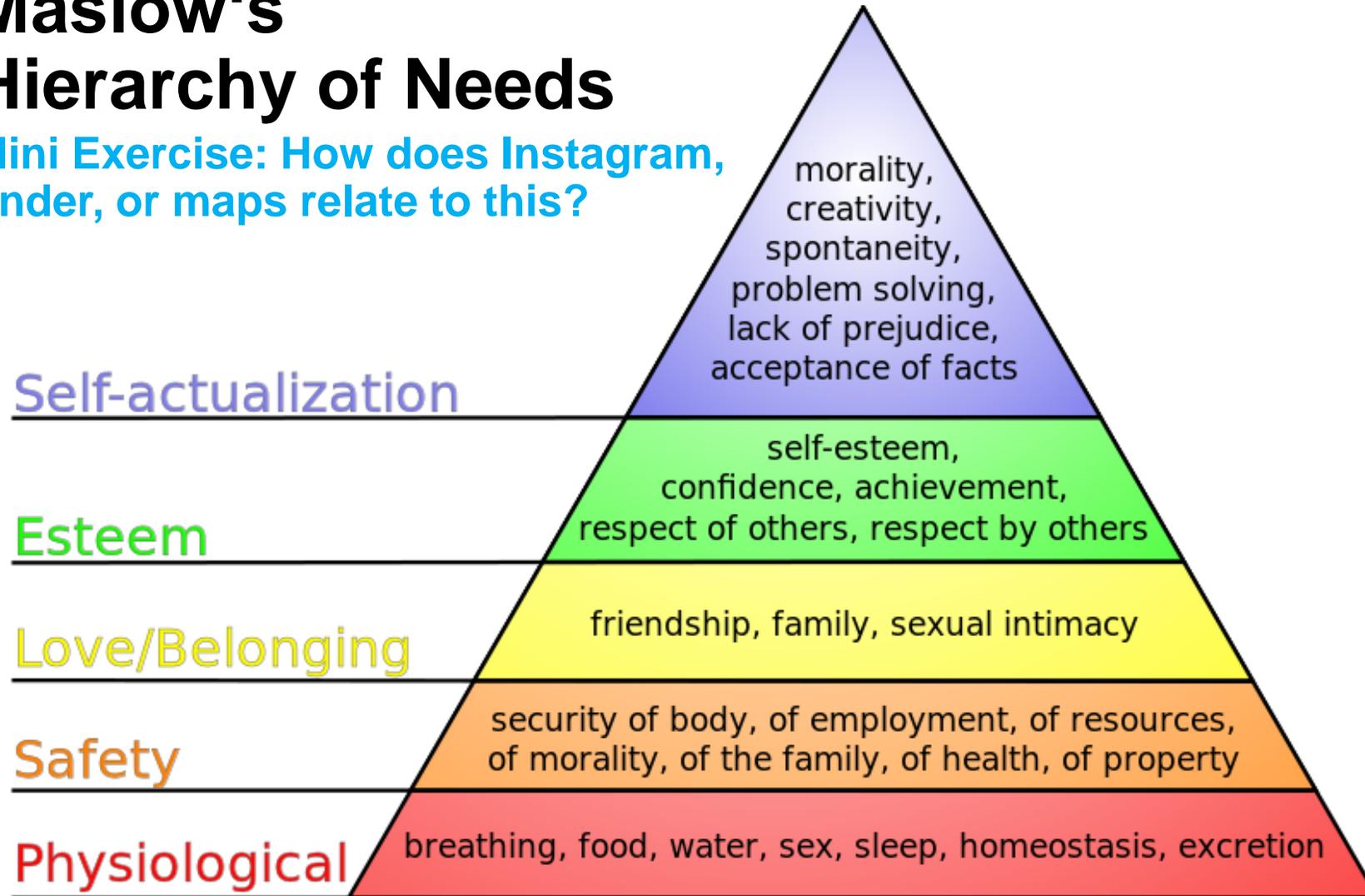
# Maslow's Hierarchy of Needs



J. Finkelstein / CC BY-SA (<http://creativecommons.org/licenses/by-sa/3.0/>)  
[https://commons.wikimedia.org/wiki/File:Maslow%27s\\_hierarchy\\_of\\_needs.svg](https://commons.wikimedia.org/wiki/File:Maslow%27s_hierarchy_of_needs.svg)

# Maslow's Hierarchy of Needs

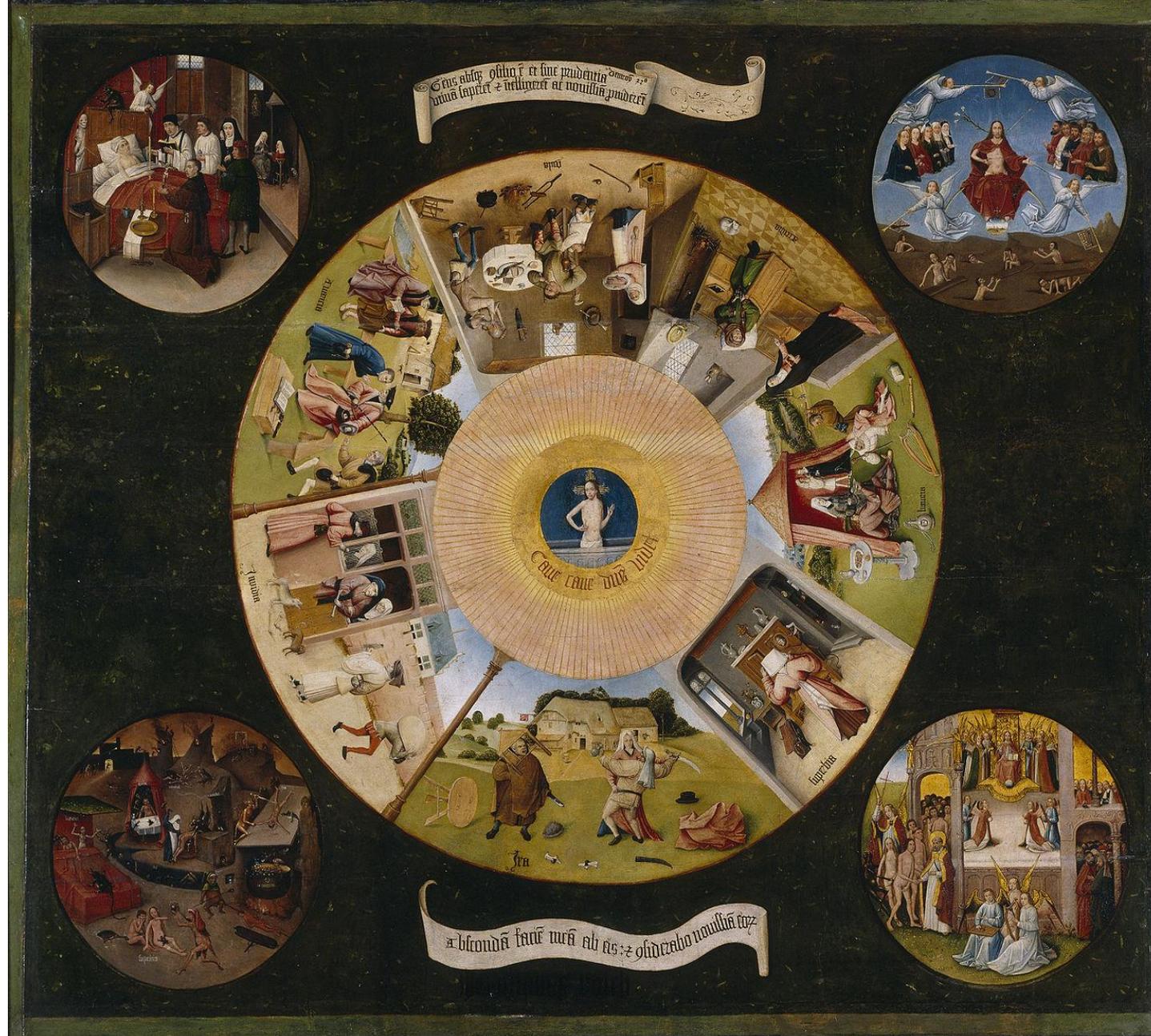
Mini Exercise: How does Instagram, tinder, or maps relate to this?



J. Finkelstein / CC BY-SA (<http://creativecommons.org/licenses/by-sa/3.0/>)  
[https://commons.wikimedia.org/wiki/File:Maslow%27s\\_hierarchy\\_of\\_needs.svg](https://commons.wikimedia.org/wiki/File:Maslow%27s_hierarchy_of_needs.svg)

# Hieronymus Bosch The Seven Deadly Sins

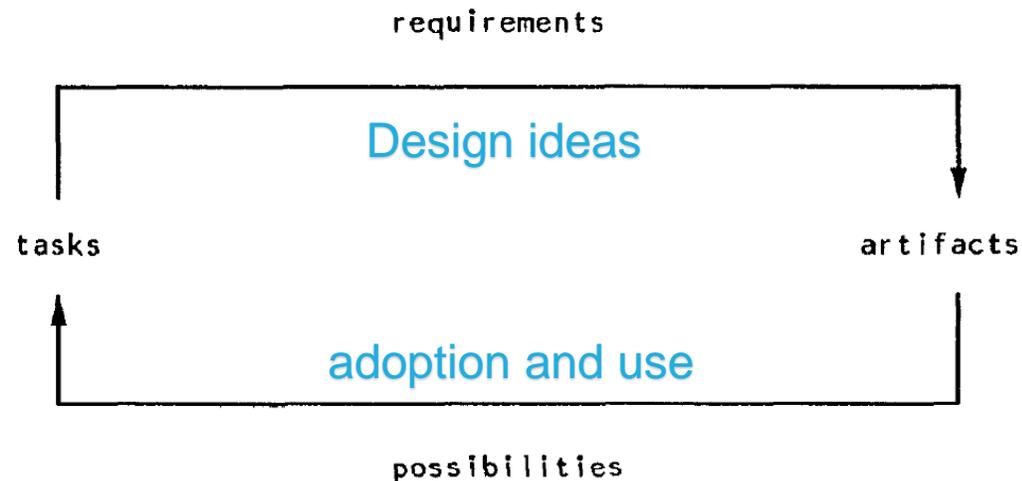
Mini Exercise: How does Instagram, tinder, or maps relate to this?



# Task-Artifact Cycle

John Carroll 1990

- Humans have needs and preferences
- Technologies are created to suit these needs
- As humans use the technologies needs and preferences change



John M. Carroll. 1990. Infinite detail and emulation in an ontologically minimized HCI. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '90)*. Association for Computing Machinery, New York, NY, USA, 321–328. DOI:<https://doi.org/10.1145/97243.97303>

## INFINITE DETAIL AND EMULATION IN AN ONTOLOGICALLY MINIMIZED HCI

John M. Carroll  
IBM Watson Research Center  
P.O.Box 704  
Yorktown Heights, NY 10598

### ABSTRACT

By default, we attempt to define practical areas of technological endeavor as “applications.” For example, the applied psychology of human-computer interaction has characteristically been defined in terms of the methods and concepts basic psychology can provide. This has not worked well. An alternative approach is to begin from a characterization of current practice, to take seriously the requirements of the domain of endeavor, and to define areas of “science” and “application” as possible and appropriate in that context.

**KEYWORDS:** ontology, theory, hermeneutics, interpretation, task-analysis, design rationale

One of the most appealing aspects of human-computer interaction (HCI), and also one of the most vexing, is the commitment — pursued energetically through the 1980s — to produce an intellectually rich applied psychology that could effectively support the design of usable computer equipment. Appealing chutzpah! The general case is that basic science provides uncertain and indirect support to practical endeavors [4, 20, 24, 29].

This ambitious project in HCI has unfortunately not succeeded, however, at least not yet. The most sustained, focussed and sophisticated attempts to develop explicit extensions of academic information processing psychology for HCI have had no discernible impact on design practice [8, 34]. Indeed, even the more mundane efforts to adapt the laboratory methods of experimental psychology have often foundered: to get clear and statistically strong results, too many investigators have been led to “discover,” for example, that organized menus are better than disorganized menus [25].

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The key problem is that both the concepts and the methods of basic psychology have been specialized for simple and abstract situations. Too much attention was paid to applying psychology and too little to understanding what it was that psychology was being applied to.

In this paper, I adopt a framework developed by Pat Wright, John Long and Phil Barnard for understanding applied psychology. I seek to develop this framework to address two difficult requirements in the HCI domain, that I call Infinite Detail and Emulation. The general thrust of my approach is to urge that we take seriously as *scientific* objects the objects that are of obvious practical importance in the everyday commerce of a domain (hence the term “ontologically minimized”). In HCI, the important objects are user tasks and designed artifacts. This approach meets the requirements that no other approach can, and because it is built out of the practical essence of the domain, it offers unique and direct leverage for the pragmatics of design as well.

### INFORMATION FLOW

How can we do better at coordinating and integrating basic science with practical endeavor? An interesting line of thinking starts with Wright’s [41] examination of the relationships between pure and applied work on text. She found “few points of contact” between psycholinguistics and design of text. She suggested an “information flow among researchers ... that starts with applied solutions to practical problems, continues through pure explanations of why these solutions are successful, and so enables the refinement of the original applied solutions.”

John Long [27] and Phil Barnard [2] are developing a framework for understanding the activity in HCI as what amounts to an information flow in Wright’s sense. (From my standpoint, it is convenient to collapse Long and Barnard’s work, though they would clearly want to make distinctions). This is sketched in Figure 1 (based on figures from Long and Barnard). The key idea is that science provides a *representation* of the real world. To construct and to apply this representation, we must be able to map between it and the world. This mapping involves intermediary, or bridging representations, specialized for the intended domain of endeavor.

# Task-Artifact Cycle

John Carroll 1990.

*“Human activities implicitly articulate needs, preferences and design visions. **Artifacts are designed in response**, but inevitably do more than merely respond. Through the course of their adoption and appropriation, **new designs provide new possibilities** for action and interaction. Ultimately, this activity articulates **further human needs, preferences, and design visions.**”*

Carroll, John M. (2013): Human Computer Interaction - brief intro. In: Soegaard, Mads and Dam, Rikke Friis (eds.). "The Encyclopedia of Human-Computer Interaction, 2nd Ed.". Aarhus, Denmark: The Interaction Design Foundation. Available online at [http://www.interaction-design.org/encyclopedia/human\\_computer\\_interaction\\_hci.html](http://www.interaction-design.org/encyclopedia/human_computer_interaction_hci.html)

# Task-Artifact Cycle: Example Mobility

Need for transport → car → changed mobility behavior and town layouts



Image from OpenStreetMap:  
<http://www.openstreetmap.org/?lat=48.85154&lon=10.48856&zoom=17&layers=M>

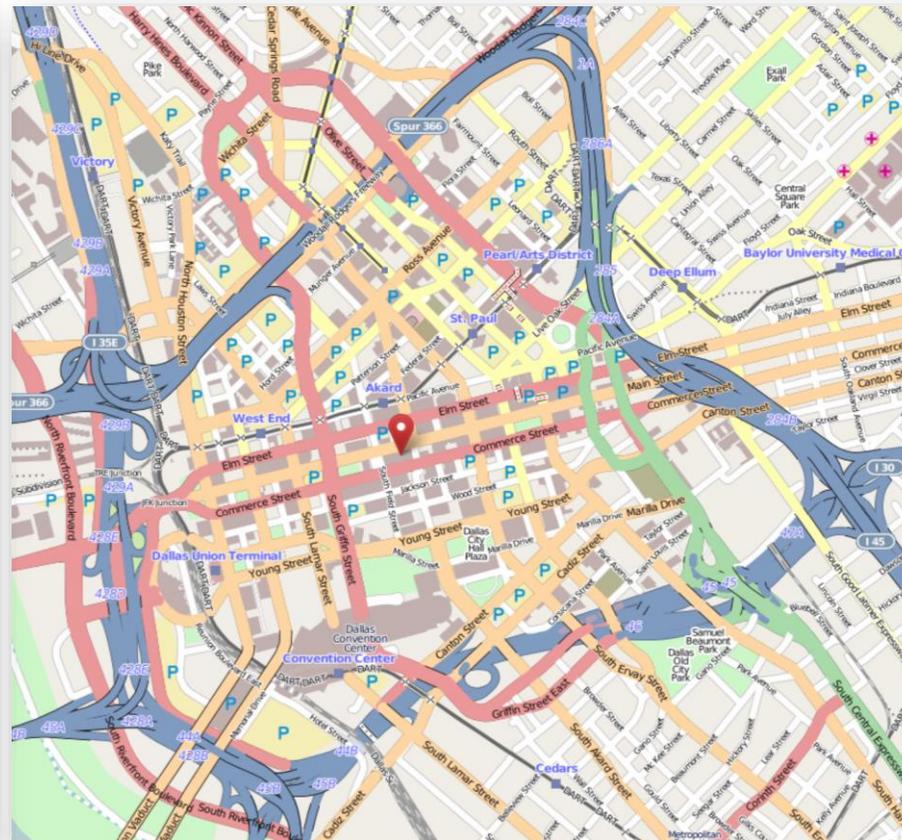


Image from OpenStreetMap:  
<http://www.openstreetmap.org/?lat=49.48761&lon=8.46736&zoom=16&layers=M>

# Task-Artifact Cycle

## Mini Exercise: Mobile Phone

Desire to communicate

→ phone

→ changed social behavior

→ ...

1. Explain the task-artifact cycle in the context of mobile telephony.
2. How did people meet in town 1990? And how in 2020? Discuss the impact beyond a single artifact.



# Conflicting User Needs

## Designers make value decisions

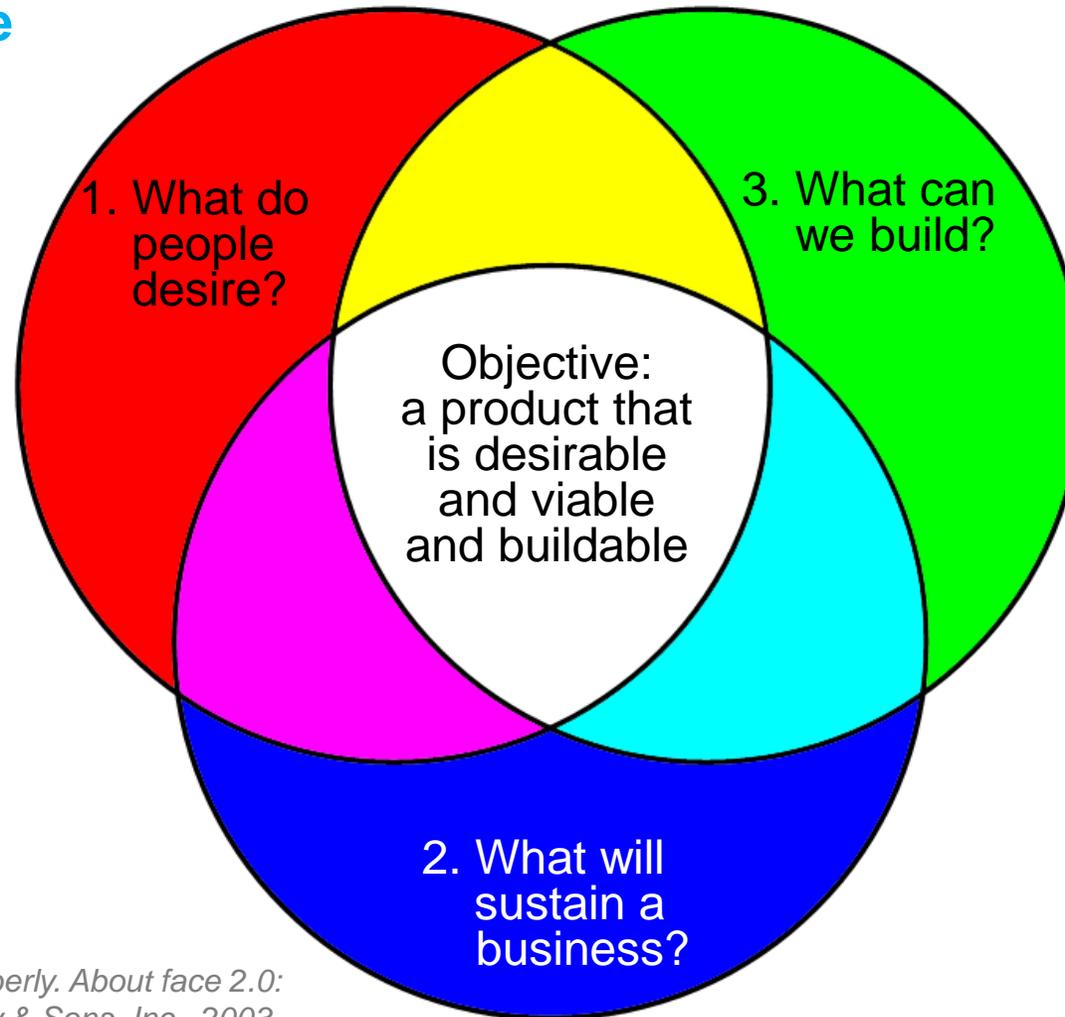
- User needs are a complex mix of (conflicting) needs
  - It is difficult to weight values against each other
  - Many values are not explicitly communicated
- Example – ask people about explicit values:
  - Should it be free of charge?
  - Should it be privacy preserving?
- Example – observe peoples implicit values:
  - Minimal effort in getting started and using it?
  - Using applications that are “sponsored” by ads
  - Social status of a technology (coolness factor)

# The Bigger Picture

## Building Successful Digital Products

It is not only about what the users want!

- Tension
  - different objectives
  - different design goals
- Context of a product design



*Cooper, Alan, Robert Reimann, and Hugh Dubberly. About face 2.0: The essentials of interaction design. John Wiley & Sons, Inc., 2003.*

# Summary

- Asking the user is not sufficient to reveal user needs.
- Humans have a basic set of needs.
- Maslow states a hierarchy of needs (physiological needs, safety needs, love needs, esteem needs, Need for Self-Actualization).
- The task-artifact cycle describes how humans use the technologies changes needs.
- In real world scenarios it is likely that user needs are conflicting.
- Understanding user needs is essential, but this is not sufficient to create a successful product.



# Did you understand this block?

## Can you answer these questions?

- Sketch the task-artifact cycle according to Carroll et al.
- How does this insight impact methods in human computer interaction?
- Give one real example that is explained by the task-artifact-Cycle.
- Name the levels in Maslow's hierarchy of human needs.
- Relate 3 widely use software products or web services to specific levels and explain this in one sentence each.
- How do user needs fit into Alan Cooper's concept for "Building Successful Digital Products".

# References

- Maslow, A. H. (1943): A theory of human motivation. *Psychological Review*, 50(4), 370-396.  
<https://doi.org/10.1037/h0054346>
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