

# Further HCI

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# Overview of the course

- **Theory driven approaches to HCI**
- Design of visual displays
- Goal-oriented interaction
- Designing efficient systems
- Designing smart systems (guest lecturer)
- Designing meaningful systems (guest lecturer)
- Evaluating interactive system designs
- Designing complex systems

# Lecture 1:

# Theory driven approaches to HCI

What is a theory in HCI? Why take a theory driven approach to HCI?

**Why theory in HCI?**

HP Color LaserJet M452dn 19 x Luke

192.168.1.55/info\_config\_network.html?tab=Networking&menu...

# HP Color LaserJet M452dn

HP Color LaserJet M452dn NPIC7F9E3 192.168.1.55

Home System Print Networking HP Web Services

Network Summary Configuration IPv4 Configuration IPv6 Configuration Network Identification Advanced Google Cloud Print Setup Proxy Settings AirPrint Status Security Settings Certificates HTTPS Enforcement SNMP Access Control List 802.1X Authentication Firewall

## Network Summary

Shop for Supplies Support

### TCP/IP(v4)

|                              |                               |
|------------------------------|-------------------------------|
| Status:                      | Ready                         |
| IPv4 Address:                | 192.168.1.55                  |
| Subnet Mask:                 | 255.255.255.0                 |
| Default Gateway:             | 192.168.1.1                   |
| IP Configured By:            | DHCP                          |
| IP Preferred Address Method: | DHCP                          |
| DHCP/BOOTP Server:           | 192.168.1.1                   |
| TFTP Server:                 | Not Specified                 |
| DHCP Expiration Time:        | 00:23:15 (Days:Hours:Minutes) |
| WINS Server:                 | Not Specified                 |
| Preferred DNS Address:       | 212.50.160.100                |
| Alternate DNS Address:       | 213.249.130.100               |

### TCP/IP(v6)

|                          |                           |
|--------------------------|---------------------------|
| Status:                  | Ready                     |
| Link-Local Address:      | FE80::1A60:24FF:FEC7:F9E3 |
| Stateless (from Router): | Not Specified             |
| Stateful (from DHCPv6):  | Not Specified             |
| Preferred DNS Address:   | Not Specified             |
| Alternate DNS Address:   | Not Specified             |

### Network Identification

|                                   |                                   |
|-----------------------------------|-----------------------------------|
| Host Name:                        | NPIC7F9E3                         |
| Domain Name (IPv4/IPv6):          |                                   |
| Domain Name (IPv6 only):          |                                   |
| Bonjour Service Name:             | HP Color LaserJet M452dn (C7F9E3) |
| Bonjour Domain Name:              | NPIC7F9E3.local.                  |
| Bonjour Highest Priority Service: | IPP Printing                      |

### Network Hardware Configuration

Installing a family printer in 2017

How would you design this?

Is this a good UI?

How do we know?

Could we improve it?

⚙️ General

🛡️ Security and login

🔒 Privacy

📄 Timeline and taggi...

🛑 Blocking

🗣️ Language

🌐 Notifications

📱 Mobile

📡 Public posts

📱 Apps

📄 Ads

💳 Payments

📧 Support Inbox

🎬 Videos

Privacy Settings and Tools

|                                     |   |          |                  |
|-------------------------------------|---|----------|------------------|
| Your activity                       | Who can see your future posts?  | Friends  | Edit             |
|                                     | Review all your posts and things you're tagged in                             |          | Use Activity Log |
|                                     | Limit the audience for posts you've shared with friends of friends or Public? |          | Limit Past Posts |
| How people can find and contact you | Who can send you friend requests?   | Everyone | Edit             |
|                                     | Who can see your friends list?  | Public   | Edit             |
|                                     | Who can look you up using the email address you provided?                     | Everyone | Edit             |
|                                     | Who can look you up using the phone number you provided?                      | Everyone | Edit             |
|                                     | Do you want search engines outside of Facebook to link to your Profile?       | Yes      | Edit             |

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English (UK) English (US) Română Magyar Italiano Español (España) Français (France) Deutsch Türkçe Português (Brasil) العربية

+

# Facebook privacy in 2017

How would you design this?

Is this a good UI?

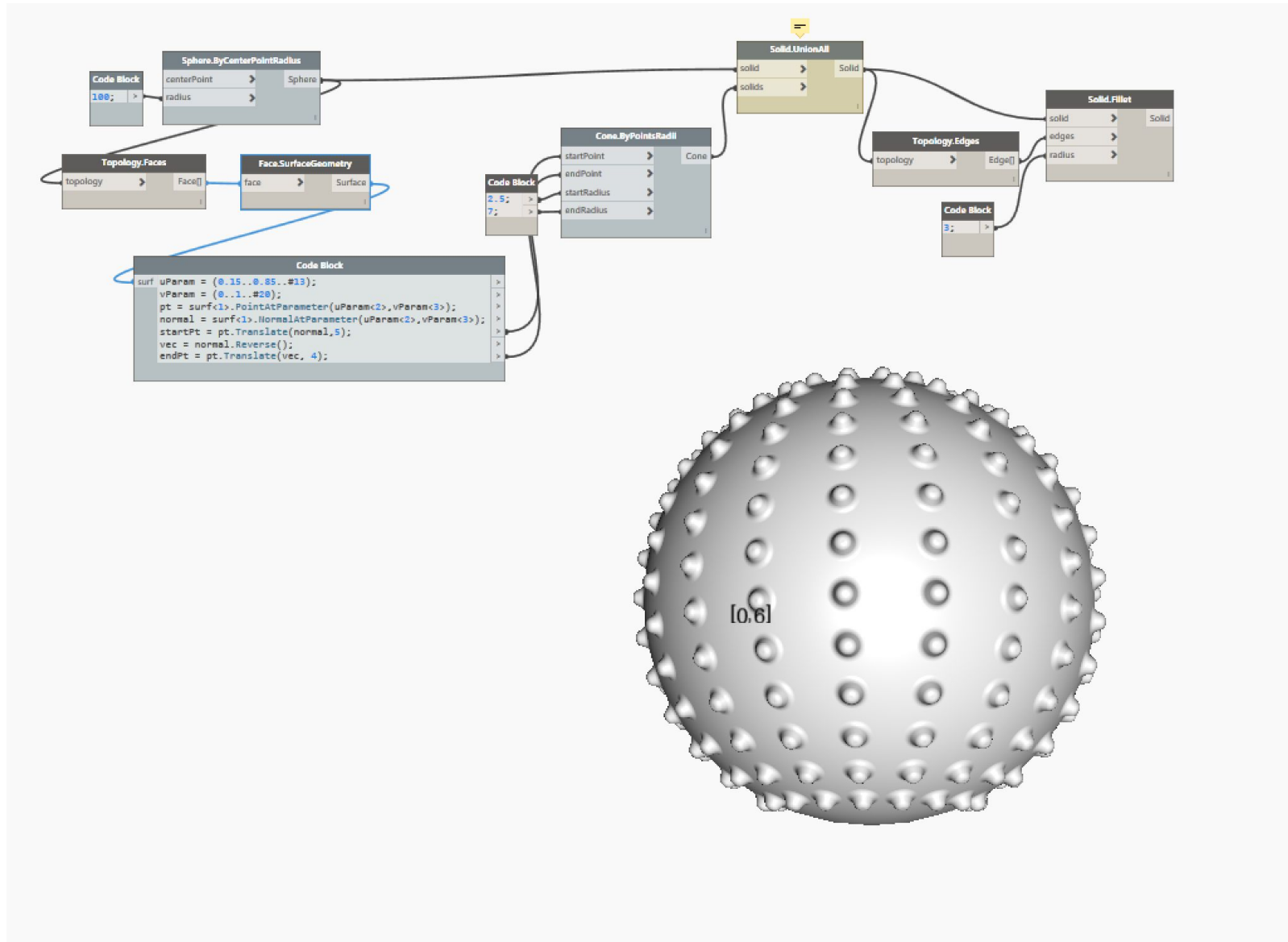
How do we know?

Could we improve it?

# Visual Programming in 2017

How would you design this?

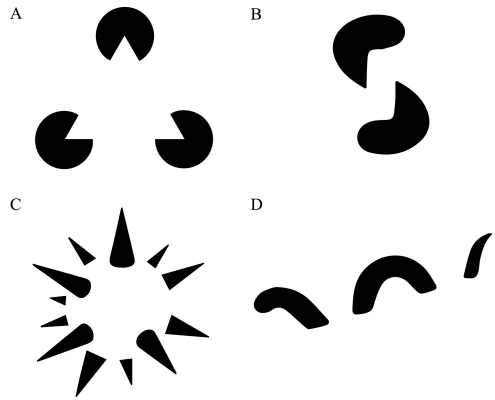
Is this a good programming language?



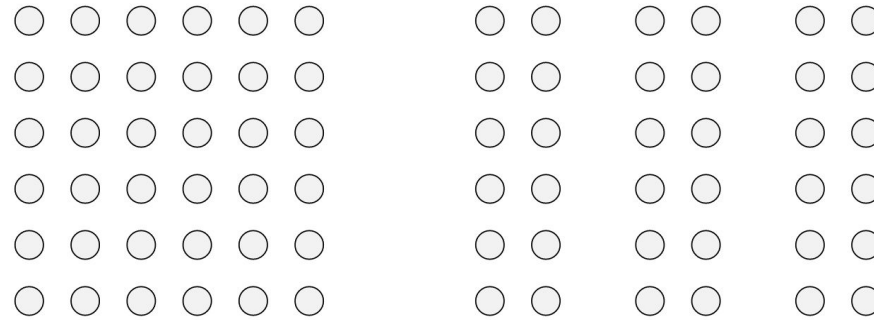
Theories give a *critical perspective*



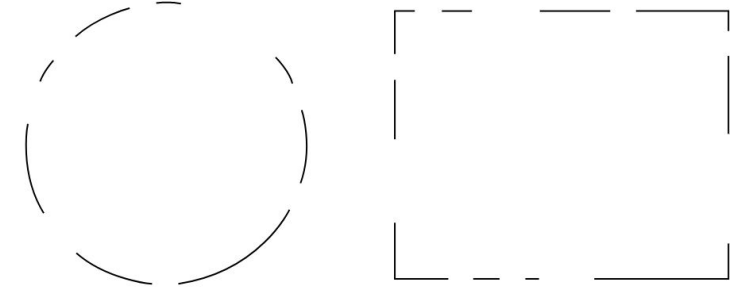
# Reminder of a theory: Gestalt theory of perceptual organisation



Continuity

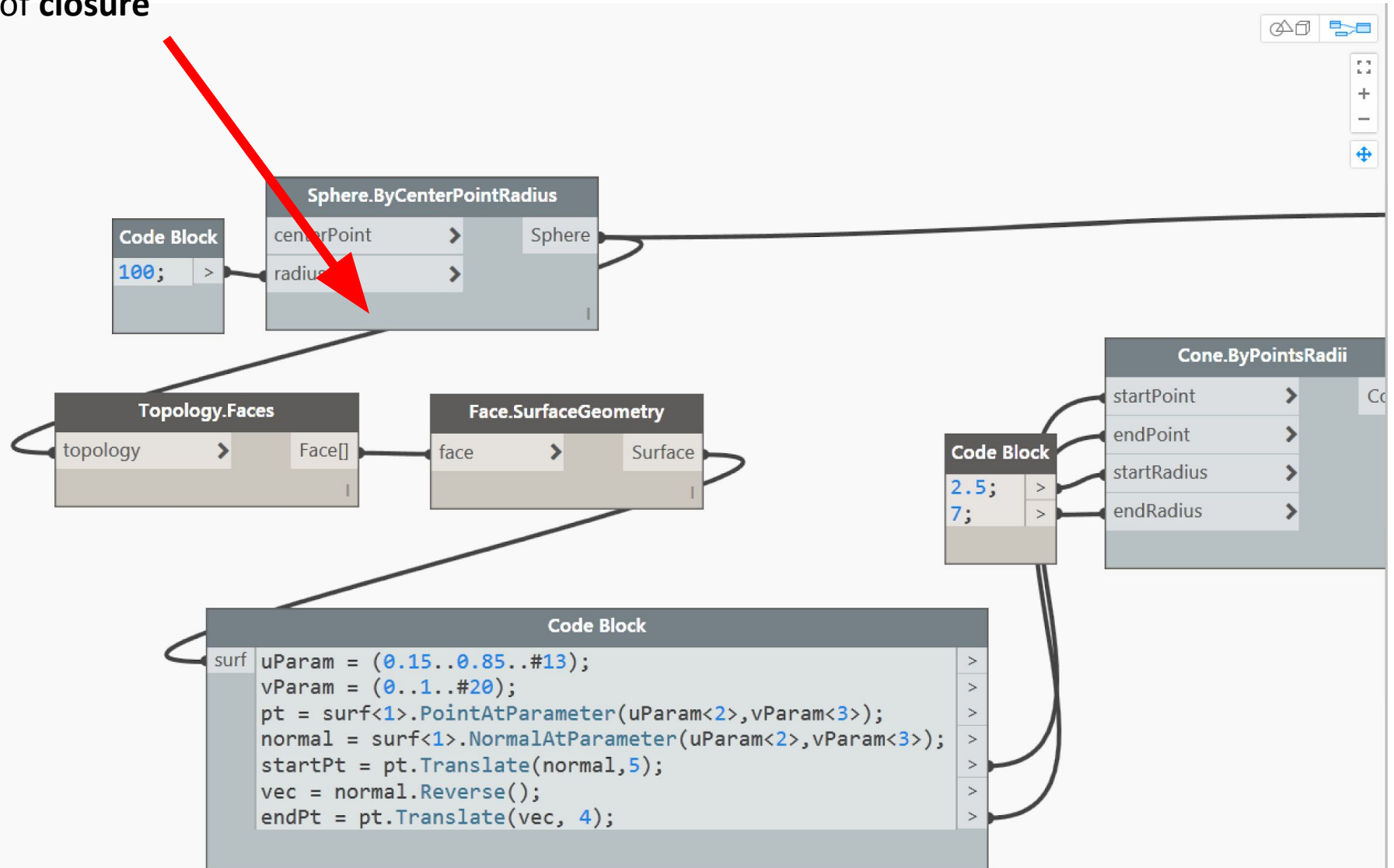


Similarity

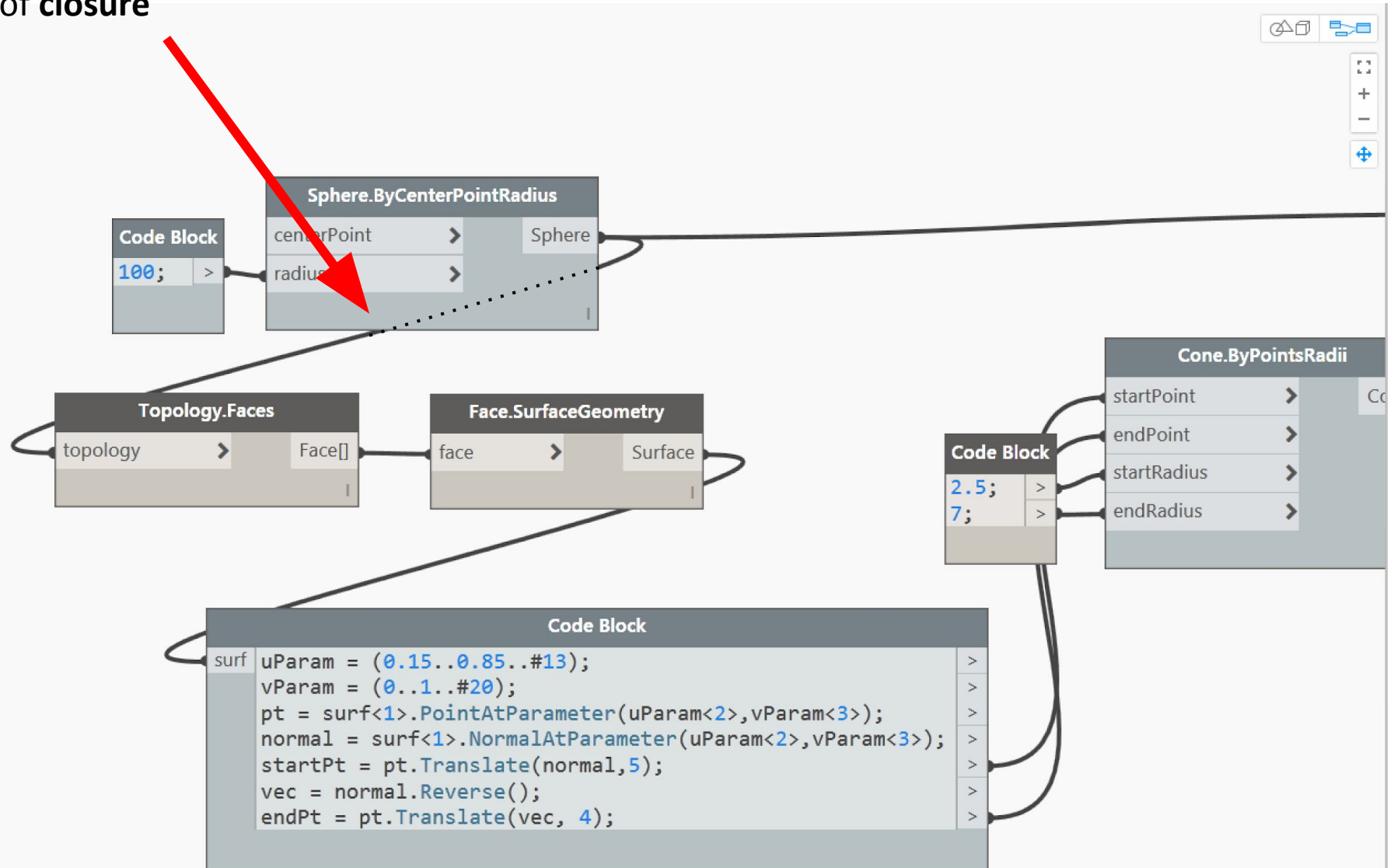


Closure

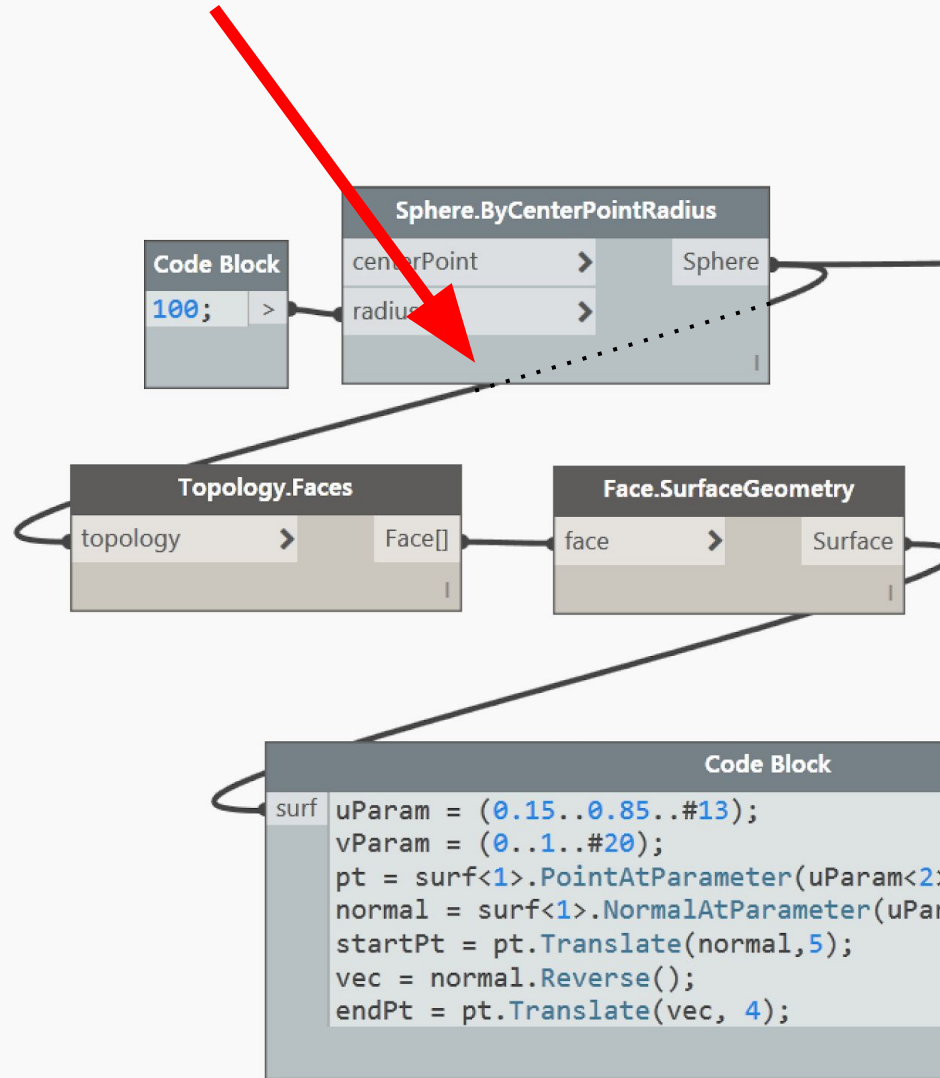
## Use of closure



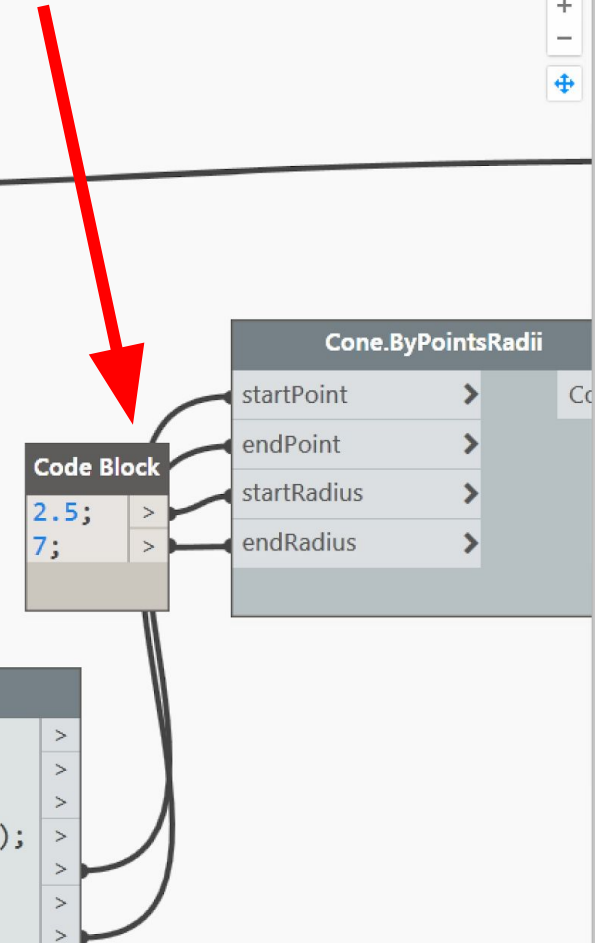
## Use of closure



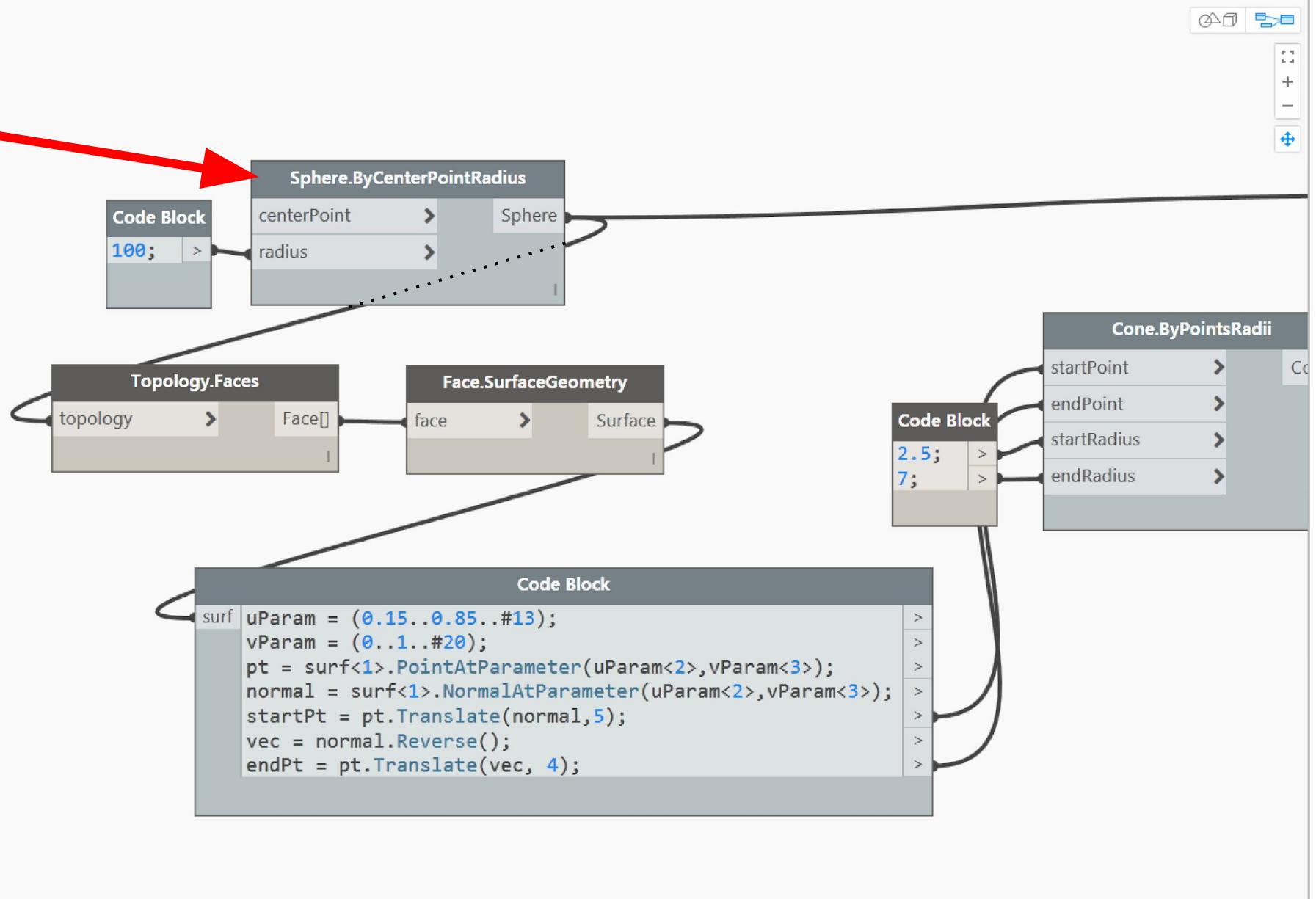
## Use of closure



## Problematic use of closure

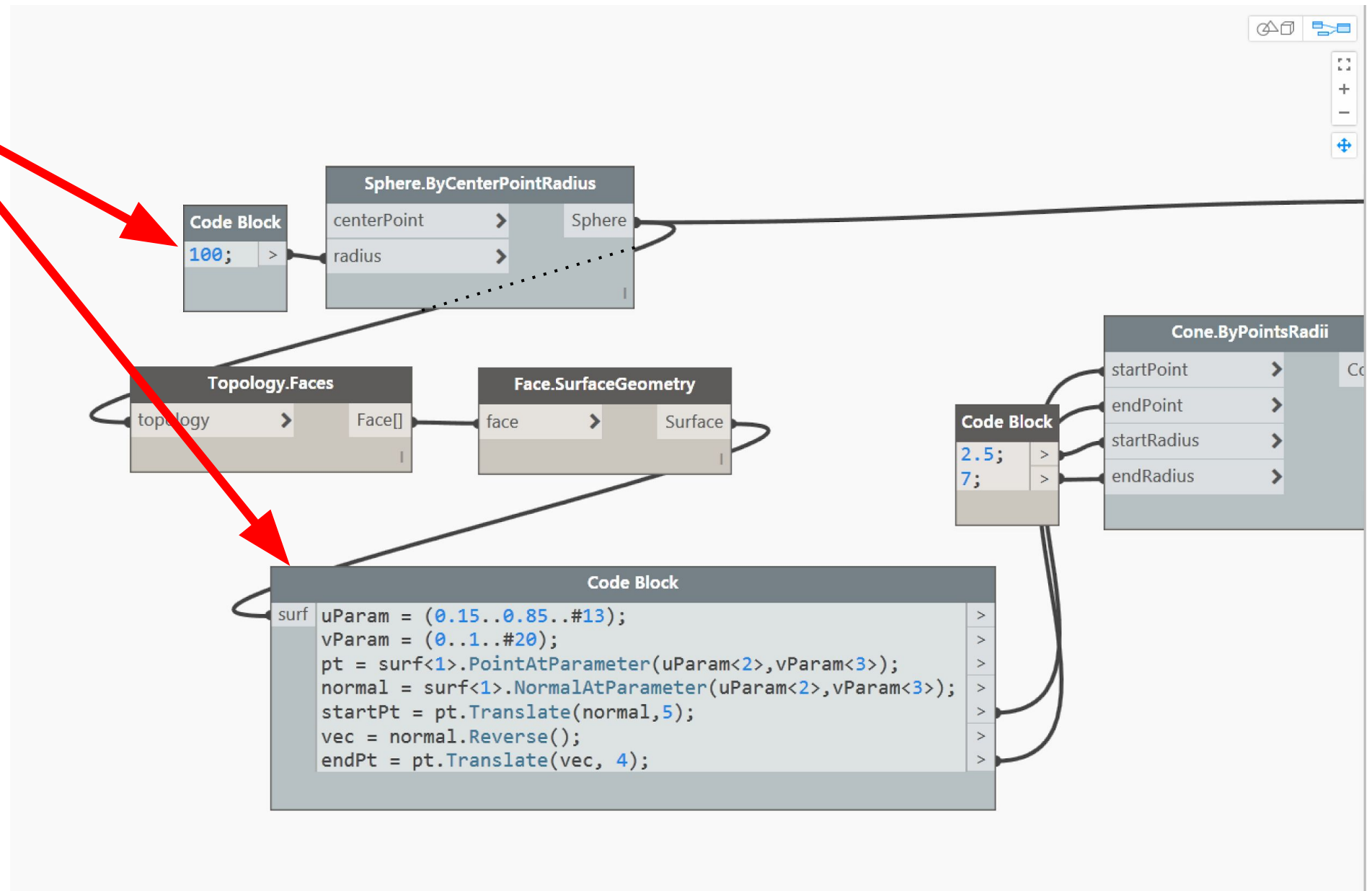


No use of **continuity**



## Problematic Similarity

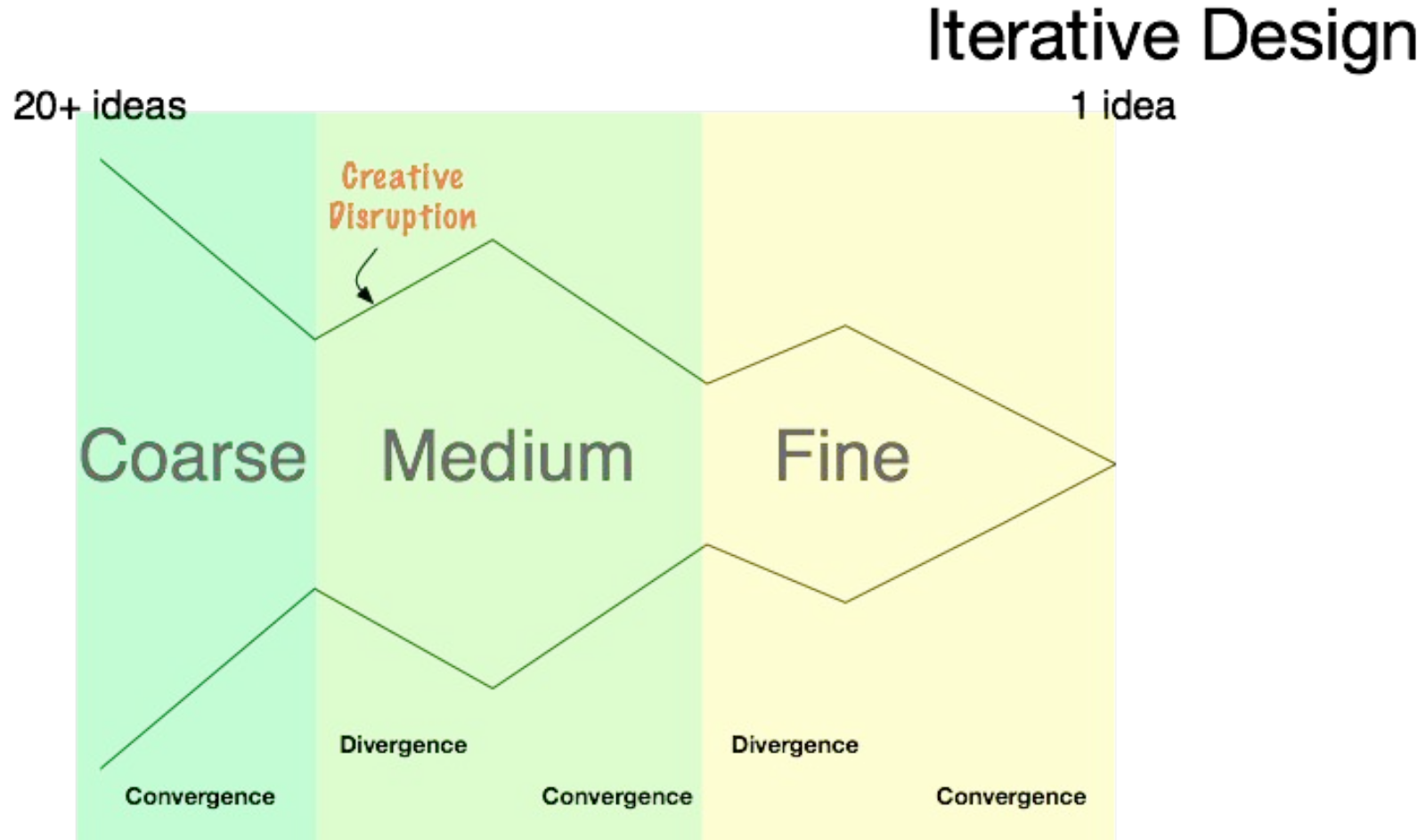
Do users think these  
are the same?



# Summary of gestalt theory application

- Took a candidate design (Dynamo UI)
  - Predicted some properties that probably work well
  - Predicted some properties that might cause problems
- Over the course of the lectures you'll many theories like this
- How do we make use of critique?

# Critique your way to a design

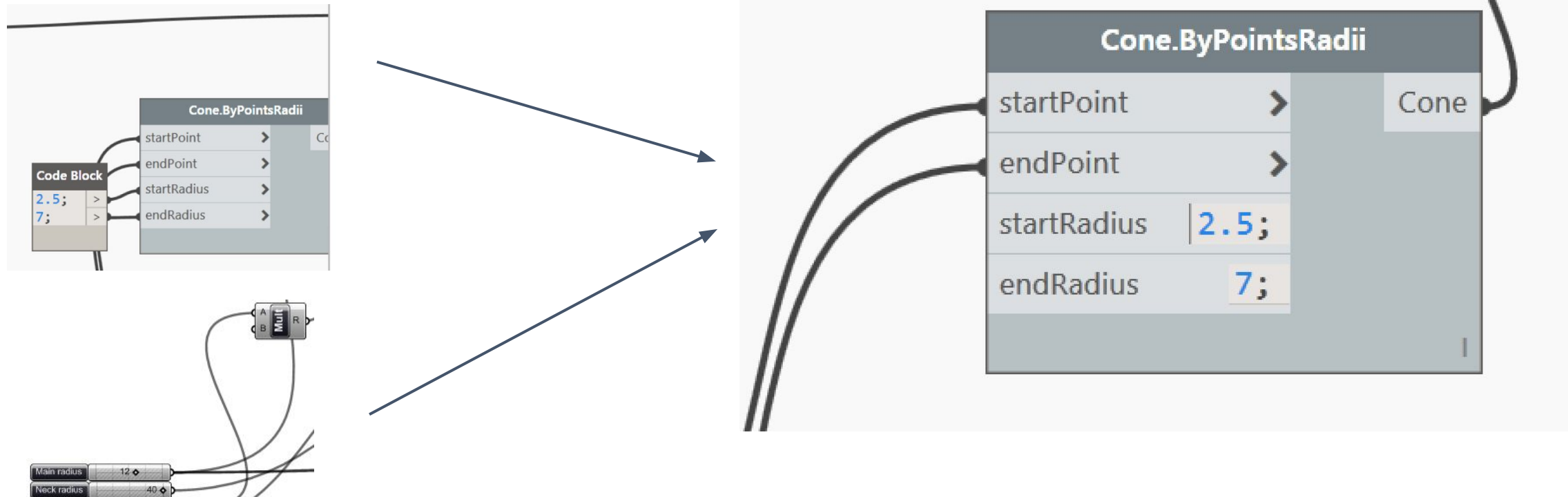


*Derived from Pugh '56*



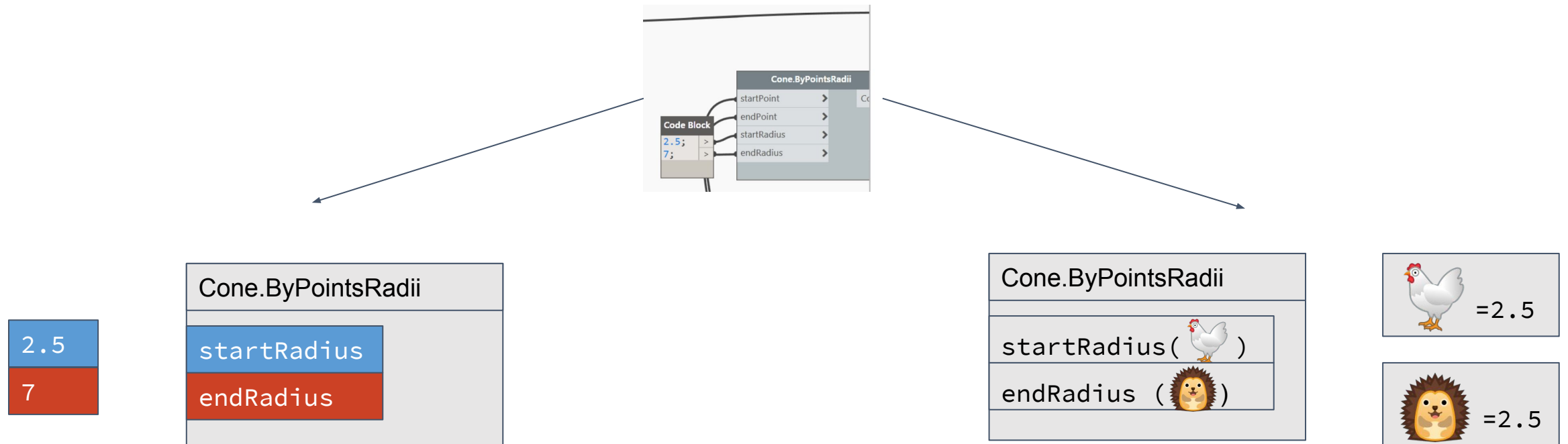
# Example of convergence

- Merge features from two candidate designs to produce a better one
- Discard ideas that poorly fit the desired outcome



# Example of divergence

- Generate new designs from existing one
- Use any creative technique, e.g. 'gestalt swapping', 'reduction to absurdity' or exploring metaphors  
(e.g. what happens if we replace connectedness with similarity)

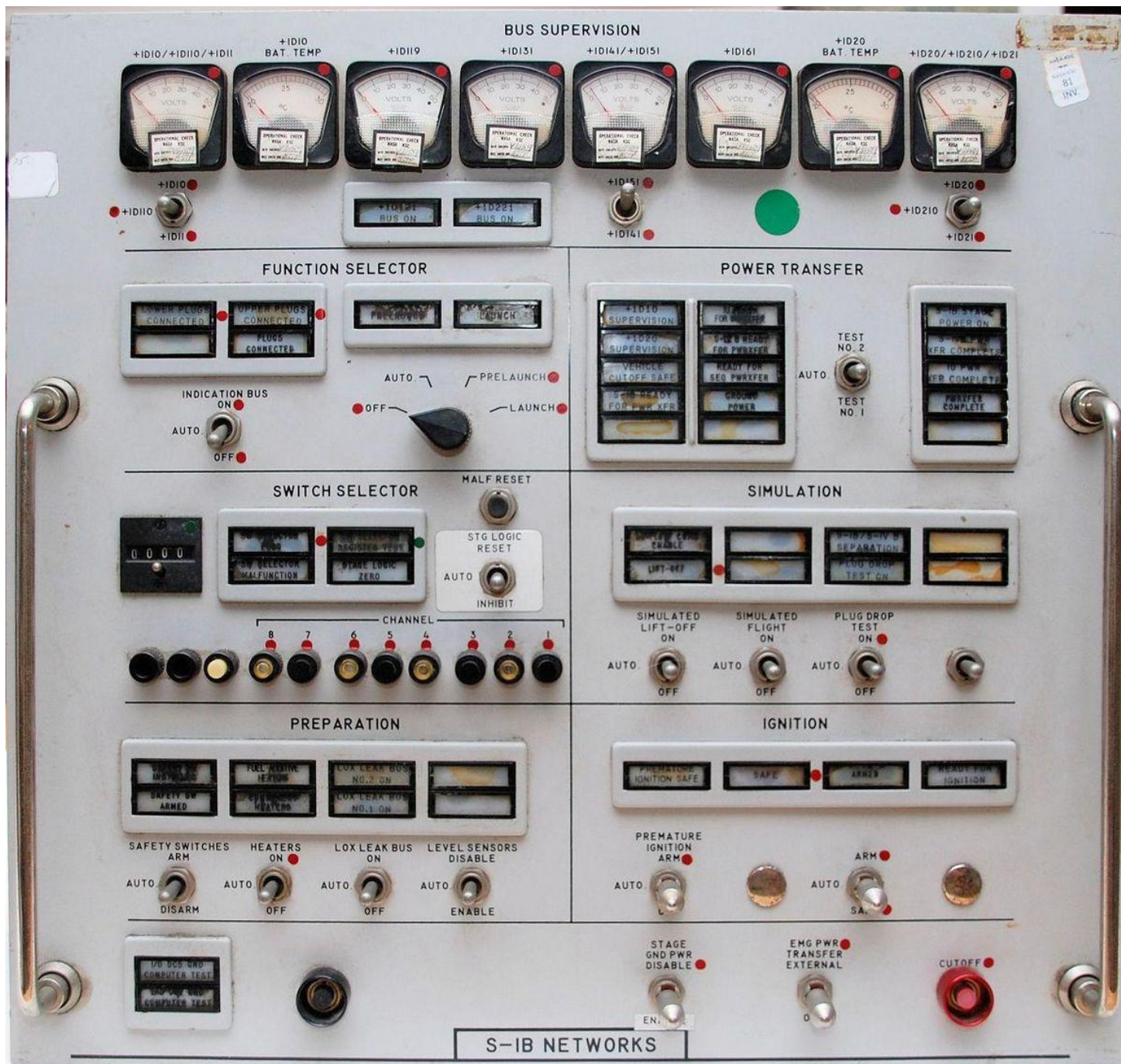


# Why theory in HCI?

- We've interested in making interaction with computers faster, more productive, more creative, more social, more fun, somehow 'better'.
- Theories give us ways of criticising proposed designs and toolkits for inventing new ones

# Three waves of HCI

- First wave (1980s):
  - Theory from Human Factors, Ergonomics and Cognitive Science
- Second wave (1990s):
  - Theory from Anthropology, Sociology and Work Psychology
- Third wave (2000s):
  - Theory from Art, Philosophy and Design



# Apollo-Soyuz controls 1975

How would you design this?

Is this a good UI?

How do we know?

Could we improve it?

# First wave: HCI as engineering “human factors”

- The “user interface” (or MMI “man-machine interface”) is a separate module, designed independently of the main system.
- Design goal is efficiency (speed and accuracy) for a human operator to achieve well-defined functions.
- Use methods from cognitive science to model users’ perception, decision and action processes and predict usability.





# An information system

How would you design this?

Is this a good UI?

How do we know?

Could we improve it?

# Second wave: HCI as social system

- The design of complex systems is a socio-technical experiment
  - Take account of other information factors including conversations, paper, and physical settings
- Study the context where people work
  - Use Ethnography and Contextual Inquiry to understand other ways of seeing the world
- Other stakeholders are integrated into the design process
  - Prototyping and participatory workshops aim to empower users and acknowledge other value systems





# Blood bag radio

How would you design this?

Is this a good UI?

How do we know?

Could we improve it?

# Third wave: HCI as culture and experience

- Ubiquitous computing affects every part of our lives
  - It mixes public (offices, lectures) and private (bedrooms, bathrooms)
- Outside the workplace, efficiency is not a priority
  - Usage is discretionary
  - User Experience (UX), includes aesthetics, affect,
- Design experiments are speculative and interpretive
  - Critical assessment of how this is meaningful

# Specialist topics not covered here:

- Graphics and VR - elsewhere in CS Tripos
- Digital media studies - CRASSH
- Game design - Anglia Ruskin University
- Social network analysis - elsewhere in CS Tripos
- Computer music - elsewhere in CS Tripos
- Security - elsewhere in CS Tripos
- Educational technology - Faculty of Education
- Information Systems - Judge Business School

# Alternative perspectives

- Positive computing (e.g. Calvo & Peters 2014)
  - Wellbeing, flow, empathy, mindfulness, altruism
- Inclusion and accessibility (e.g. CWUAAT #1-9)
  - physical and sensory capabilities, ageing, low income and human rights
- Feminist utopianism (e.g. Bardzell 2010)
  - Diagnostic critique of hegemonic research and practice, combined with practice-led participatory processes of anticipation that amplify marginalized voices

# Supervisions

- 2 supervisions after lecture 4 and lecture 8, recommend completing all the lectures before the last supervision

# Textbooks

- Preece, Sharp & Rogers *Interaction Design: Beyond human-computer interaction* 4th Edition 2015
  - Practical professional methods, with good summary of theory
- Carroll (Ed.) *HCI Models, Theories and Frameworks: Toward a multidisciplinary science* 2003
  - Expert introductions to different theoretical traditions