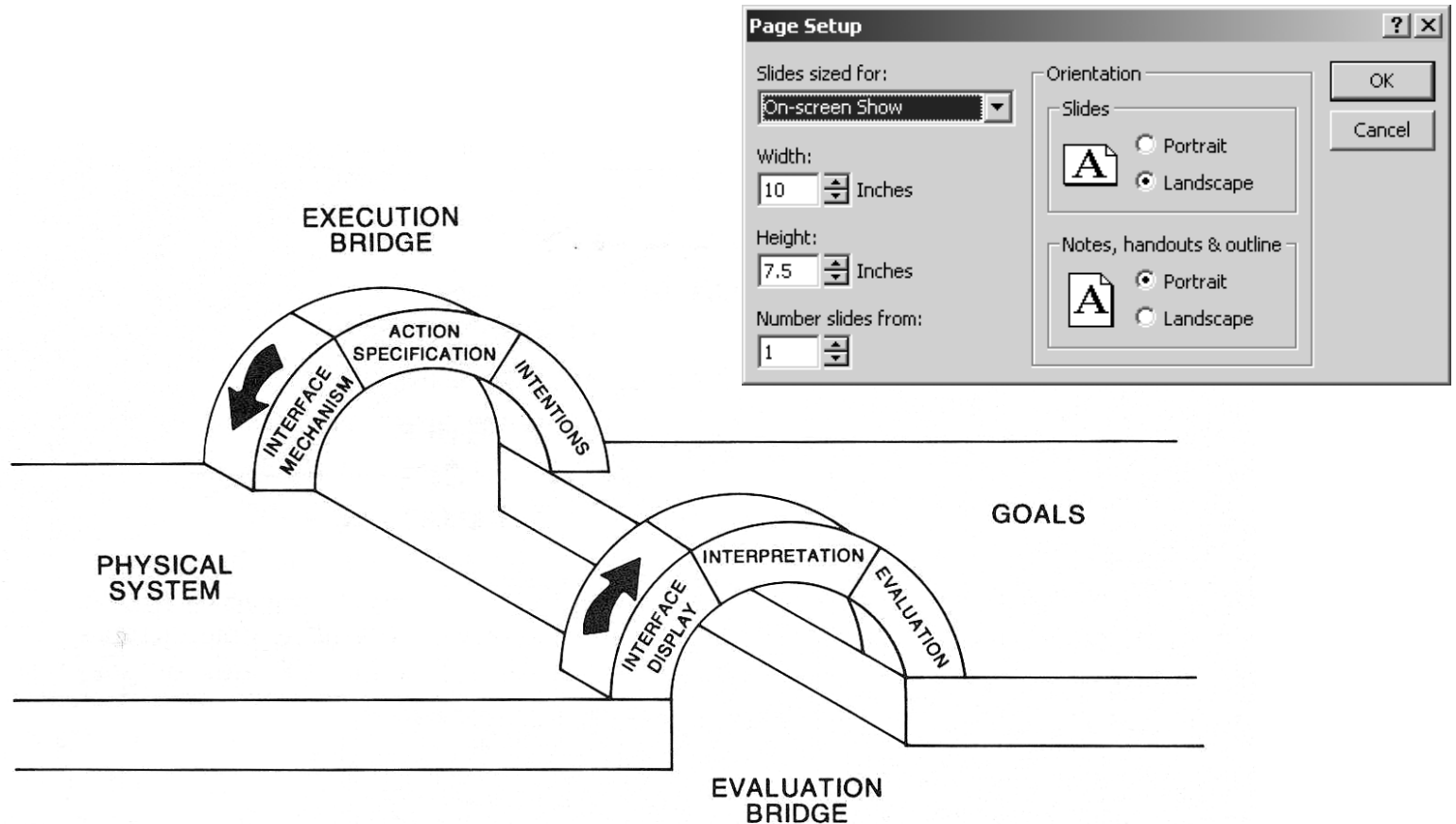


# Questions?

- Project #2
- Grad project proposals due this Thursday
- Won't be able to answer questions after class this Thursday
- Next week office hours moved to Wednesday

# Cognitive engineering

- Gulfs of execution and evaluation [Norman 86]



# Gulf of evaluation: statistical analysis (1)

Gulf

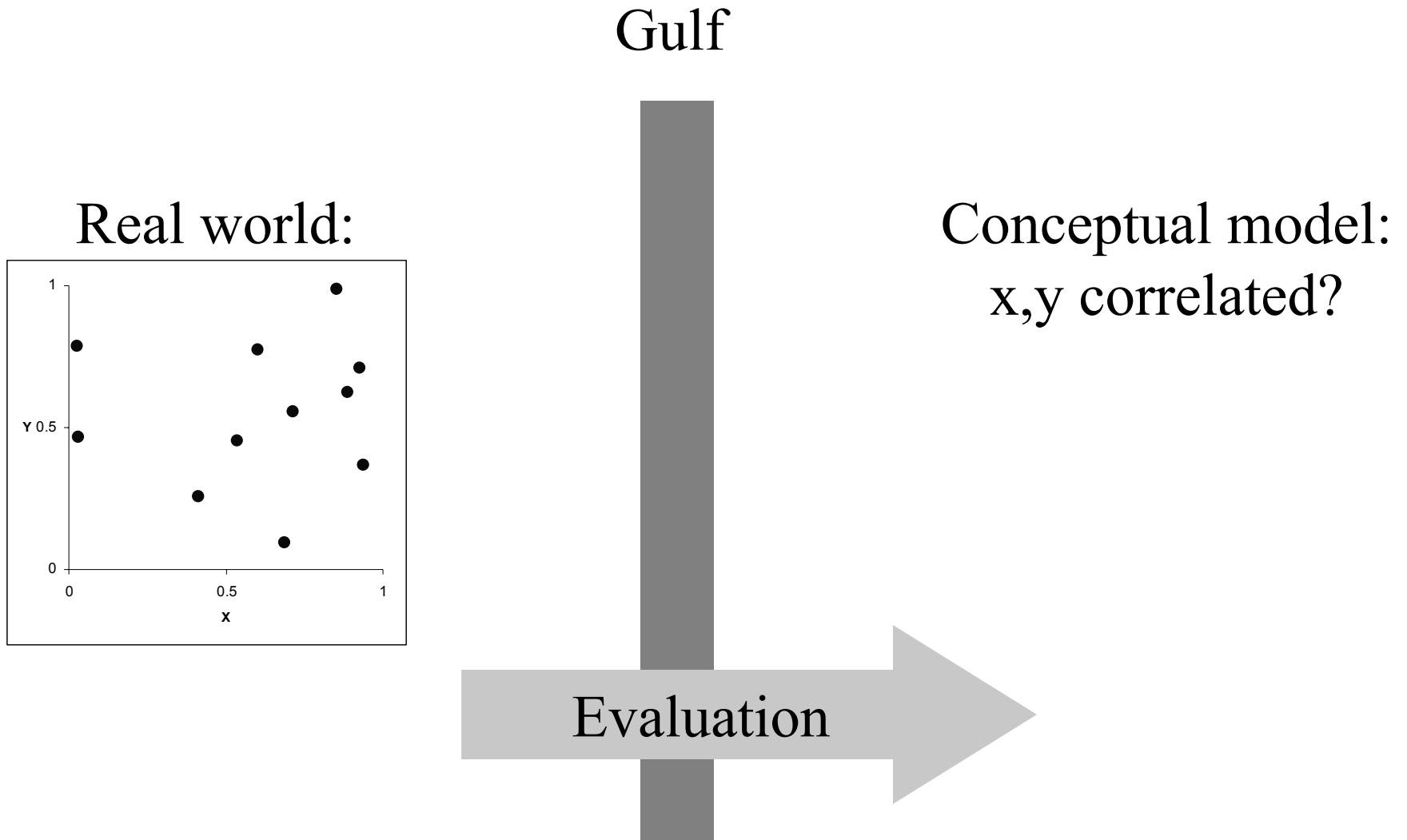
Real world:

x	y
0.67	0.79
0.32	0.63
0.39	0.72
0.27	0.85
0.71	0.43
0.63	0.09
0.03	0.03
0.20	0.54
0.51	0.38
0.11	0.33
0.46	0.46

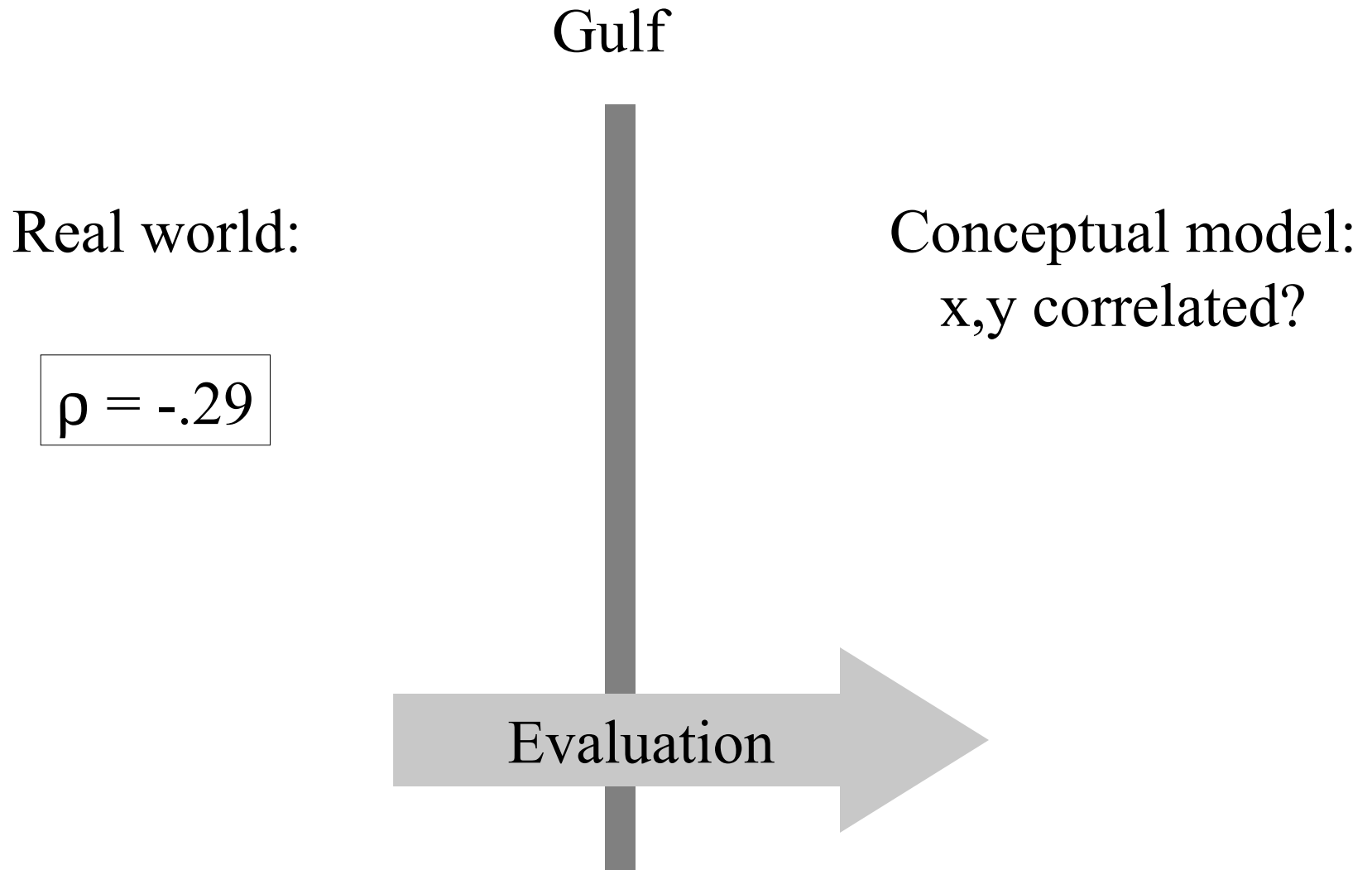
Conceptual model:  
x,y correlated?

Evaluation

# Gulf of evaluation: statistical analysis (2)



# Gulf of evaluation: statistical analysis (3)

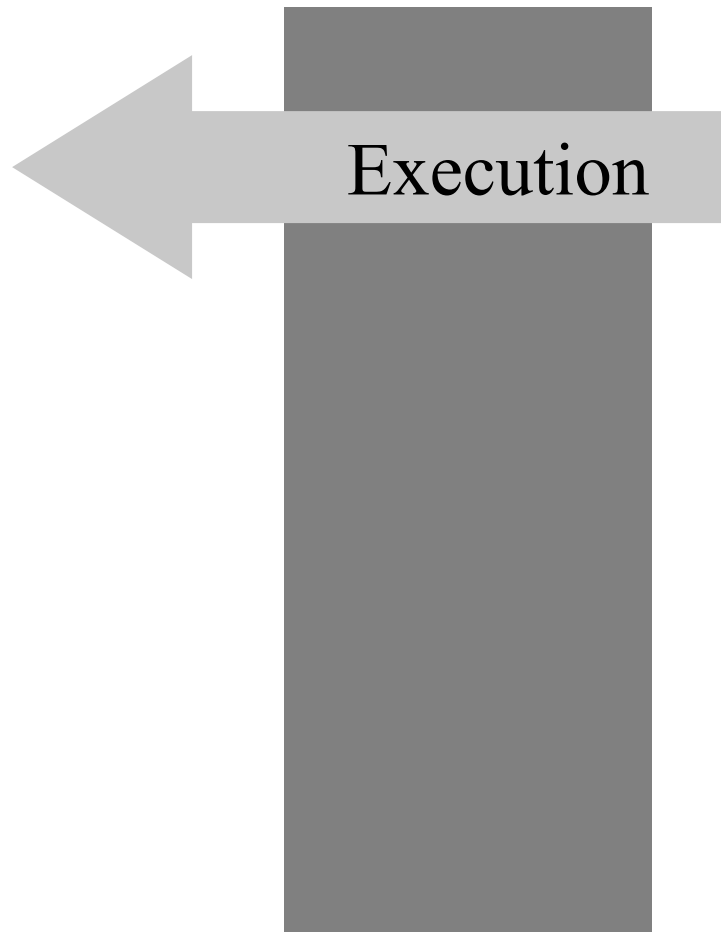


# Gulf of execution: Drawing a rectangle (1)

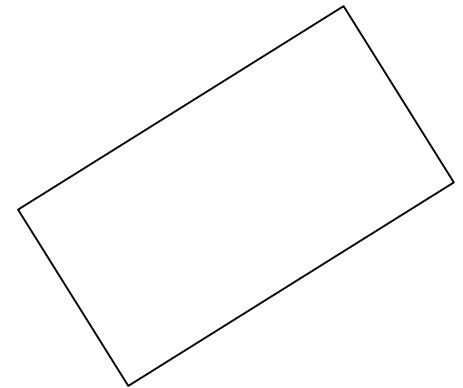
Real world

Conceptual model:  
Draw a rectangle

Gulf



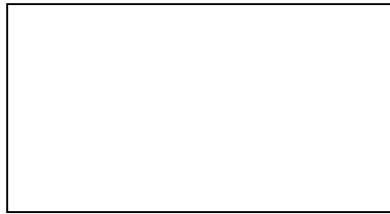
Move 90 30  
Rotate 35  
Pen down  
...



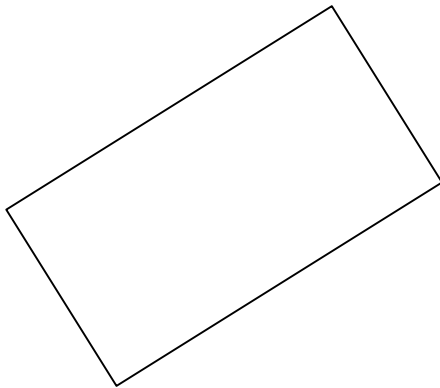
# Gulf of execution: Drawing a rectangle (2)

Real world

Draw a rectangle

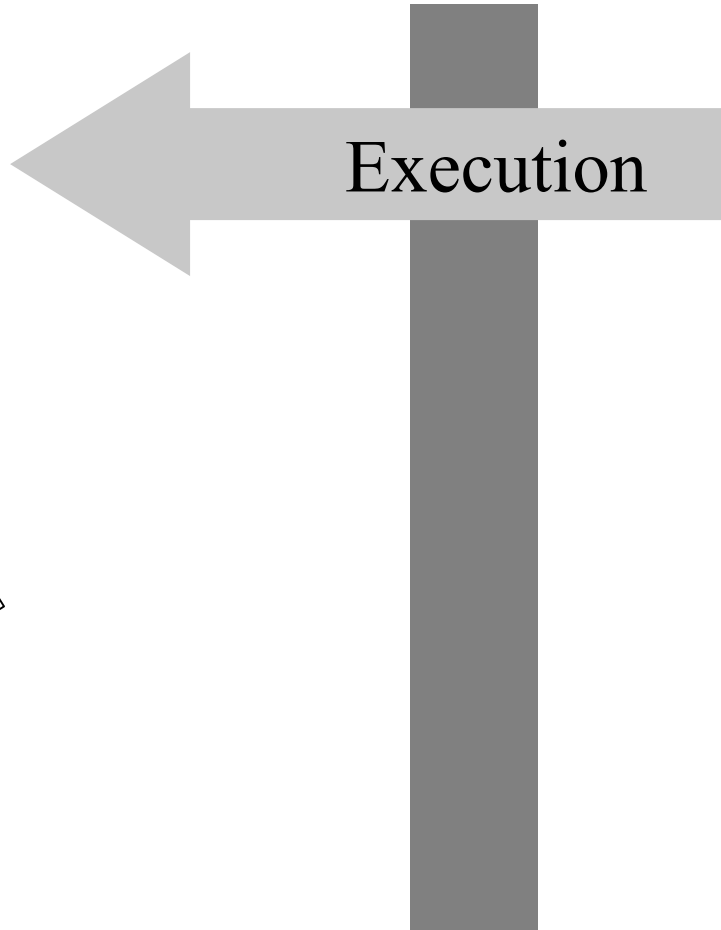


Rotate the shape



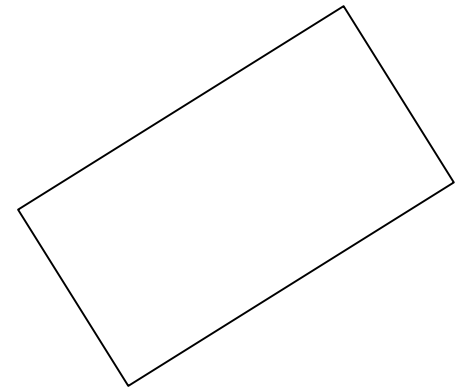
Gulf

Execution



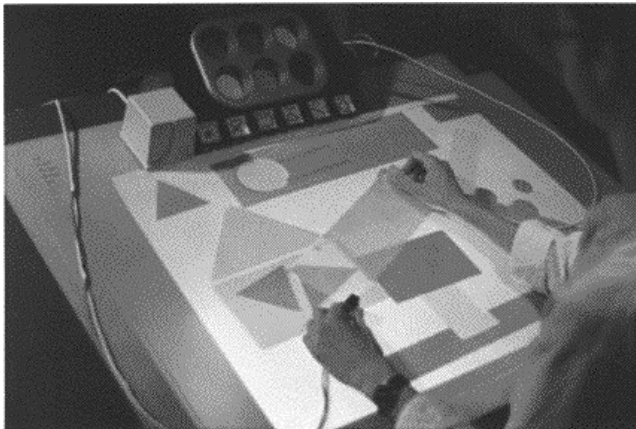
Conceptual model:

Draw a rectangle



# Gulf of execution: Drawing a rectangle (3)

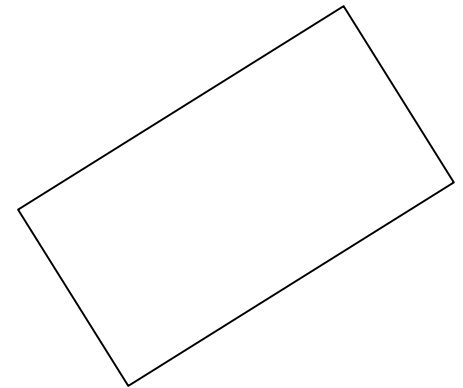
Real world



Gulf

Conceptual model:  
Draw a rectangle

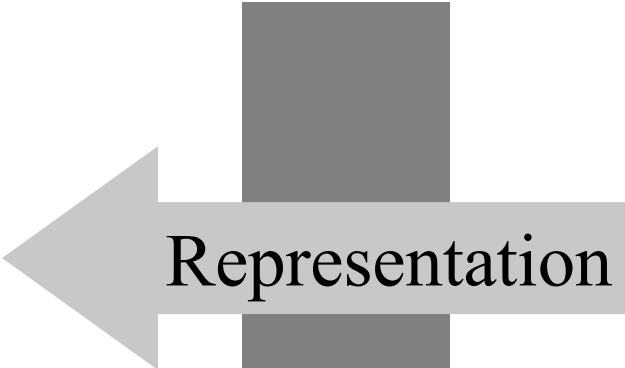
Execution



# Interaction design: a double gulf?

Interaction user

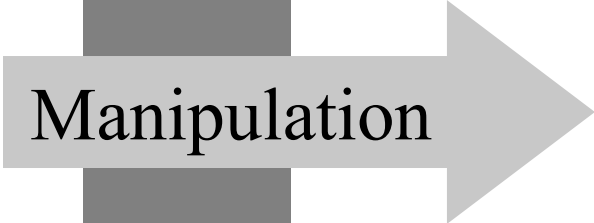
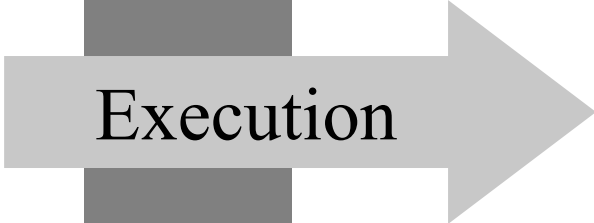
Interaction designer



Conceptual  
model

Interface

Data



# Interface metaphors

- **Definition**
  - Use of one kind of object or idea in place of another to suggest a likeness or analogy between them
- **Purposed**
  - Leverages our knowledge of familiar, concrete objects/experiences
  - Transfer this knowledge to abstract computer and task concepts
- **Examples**
  - Desktop, files, folders, trash can...
  - Paintbrush in a painting program

# Metaphors caveats

- Too limited
  - The metaphor restricts interface possibility
- Too powerful
  - The metaphor makes believe that the system can do things it can't
- Too literal or cute
  - Make it difficult to operate
- Mismatched
  - The metaphor makes it difficult to carry out the task

# Direct manipulation and Direct engagement

- Direct Manipulation Interface
  - Behaves as though the interaction was with a real-world object
  - Almost always based on a metaphor
    - *Mapped onto some facet of the real world task semantics*
- Direct Engagement experience
  - the feeling of working *directly* on the task
    - *No need to know the implementation details*
- Examples
  - Deleting a file by putting it in the trash
  - Copying text/file using drag and drop

# Direct manipulation

- Central ideas
  - Action understood in term of their effects on the screen
    - *Rapid, incremental actions*
    - *Need for causality*
      - Immediate display of results
    - *Need for reversibility*
      - Safe exploration
  - Intuitively reasonable action can be performed at any time
    - *Good conceptual model*
  - Object understood by their visual characteristic
    - *Affordances*
- Outcome
  - The display becomes reality: the WYSIWYG interface

# Grammatical structure

- Object-action (Noun verb)
  - Examples
    - *Select and delete*
    - *Drag and drop...*
  - ~~Modeless~~
  - Action always within the context of objects
  
- Action-Object (Verb noun)
  - Examples
    - *Pick a tool, then use it...*
  - Modal
    - *Mode can be dangerous*
  - Often more efficient

# Direct manipulation: Good or Evil?

- Explicit versus implicit command
  - “rename each file by adding ‘\_old’ to its name”
- Limit of reification
  - How to align an object?
- Metaphor might be too restrictive
  - WYSIAYG: What You See Is All You Get
- Applications mix
  - Direct manipulation
    - *Tools, drag and drop interactions...*
  - Abstraction
    - *Menus, dialog boxes,...*



# Readings for next class

- “Organization and visual structure”
- Chap 6 (if you have not done so yet)