Questions?

• Warning Grades
• Project #2
• Homework #4
• Midterm next Tuesday (11th)
  – Closed books
Cognitive engineering

- Gulfs of execution and evaluation [Norman 86]
Gulf of evaluation: car mileage

Real world:

<table>
<thead>
<tr>
<th>Mile</th>
<th>Fuel (quart)</th>
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<tbody>
<tr>
<td>1</td>
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<tr>
<td>2</td>
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<tr>
<td>3</td>
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<td>4</td>
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<td>5</td>
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<td>6</td>
<td>0.09</td>
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<td>20</td>
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</tr>
</tbody>
</table>

Conceptual model:

Miles per Gallon?
Gulf of evaluation: car mileage

Real world:

Conceptual model:

Miles per Gallon?

Evaluation
Gulf of evaluation: car mileage

Real world:

Conceptual model:

Miles per Gallon?
Gulf of evaluation: car mileage

Real world:

- MPG = 25

Conceptual model:

- Miles per Gallon?
Gulf of execution: Drawing a rectangle (1)

Real world

Move 90 30
Rotate 35
Pen down
...

Conceptual model:
Draw a rectangle

Execution
Gulf of execution: Drawing a rectangle (2)

Real world
- Draw a rectangle
- Rotate the shape

Conceptual model:
- Draw a rectangle

Execution
Gulf of execution: Drawing a rectangle (3)

Real world

Gulf

Execution

Conceptual model:
Draw a rectangle
Interaction design: a double gulf?

Interaction user

Evaluation

Execution

Conceptual model

Interaction designer

Representation

Interface

Manipulation

Data
Interface metaphors

• Definition
  – Use of one kind of object or idea in place of another to suggest a likeness or analogy between them

• Purpose
  – 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

• Central ideas
  – Object understood by their visual characteristic
    • Using good affordances
    • Using a good conceptual model and convincing metaphors
  – Actions understood in term of their effects on the screen
    • Rapid and incremental
    • Immediate visual feedback
    • Easily reversible

• Outcome
  – Direct engagement
    • the feeling of working directly on the task
    • No need to know the implementation details
  – The display becomes reality: the WYSIWYG interface
  – Less error messages?
Direct manipulation: Good or Evil?

• Good for intermediate users
  – Recognition versus recall trade-off
  – What about expert?

• 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,…*