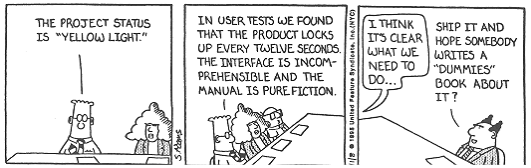
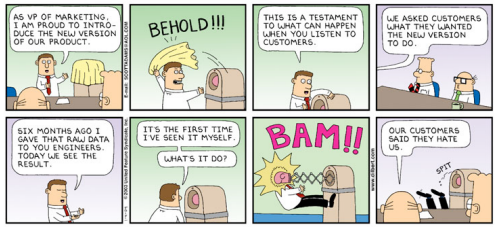
CPEN441: Human Computer Interfaces in Engineering Design

HCI in context and engineering



Dilbert, © Scott Adams



Exercise 1

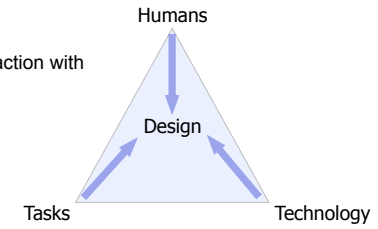
Draw a computer

Exercise 1

Draw a person

what is user interface design?

- methods and theories for iteratively
  - designing
  - prototyping
  - evaluating
- human interaction with a computer



some landmark HCI innovations

- mouse [Englebart, ’65]
- direct manipulation [Sutherland, ’63]
- desktop metaphor [Xerox Star, ’81]
- spreadsheet [VisiCalc, Frankston & Bricklin, ’77]

- more about these at the end of the term

HCI – a multidisciplinary field

- Computer Science
- Psychology
- Cognitive Science
- Sociology
- Education
- Anthropology
- Library Science
- Mechanical Engineering
- Industrial Engineering
- *… anything that uses computers!*

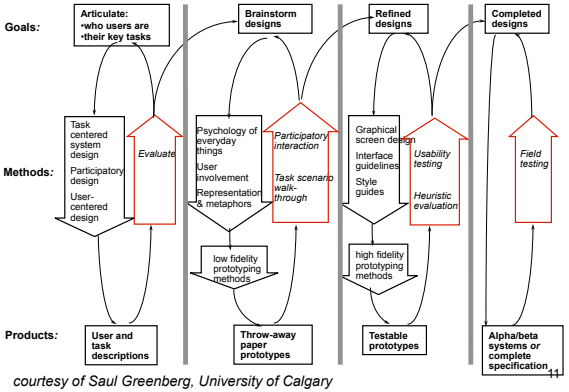
what is the HCI design process?

IDEO Design process

- NBC special on IDEO shopping cart example: the deep dive

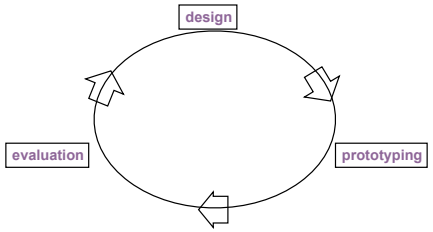
https://www.youtube.com/watch?v=M66ZU2PCIcM

interface design & usability engineering



courtesy of Saul Greenberg, University of Calgary

abstraction of design process: based on iteration



one definition

human-computer interaction
is a discipline concerned with
the design, evaluation and implementation
of interactive computing systems
for human use
and with the study of major phenomena
surrounding them.

ACM SIGCHI Curricula for Human-Computer Interaction, 1996

13

the machine: what's coming?

new form factor	larger memories / faster systems
	miniaturization
	↓ power requirements
deeply connected	new display & input technologies
	embedding of computation into appliances
pervasive	specialized computer hardware → new functions
	↑ networked + distributed computing
broadened user base	↑ adoption of computers & access by those currently denied

14

what does HCI cover?

it's a multidisciplinary area…

on the purely machine side:

- computer graphics
- operating systems
- programming languages
- development environments
- networking
- software engineering

and increasingly…

- industrial & product design
- digital media processing
- robotics

15

what does HCI cover?

on the human side:

- psychology and kinesiology
  - cognitive, perceptual and motor behavior
  - human capabilities to use and learn machines
- sociology and anthropology
  - group and cultural behaviour
- art and graphic design
  - aesthetics (layout, color, icon selection...)

what does HCI cover?

where they come together:

- the **joint performance** of tasks by humans and machines
- **structure of communication** between human / machine and humans mediated by machines

design methods:

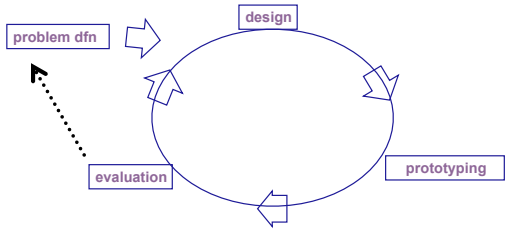
- the **process** of specification, design, and implementation of interfaces
- design **trade-offs**

course objectives

by end of term, you should:

- know what is meant by good design and how to think critically about it
- know how to apply guidelines and models to interface design
- have applied several methods for involving the user in the design process
- have explored various interface prototyping methods
- know and have applied multiple methods to evaluate interface quality

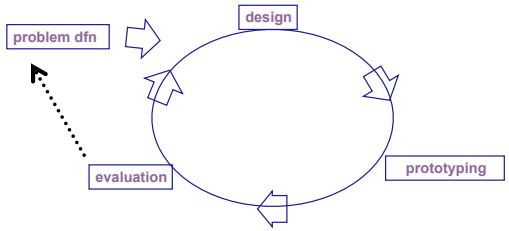
Organization of Course Workflow



19

Course Workflow (1st cycle)

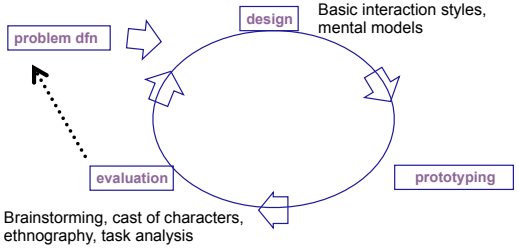
One line problem statement



20

Course Workflow (1st cycle)

One line problem statement

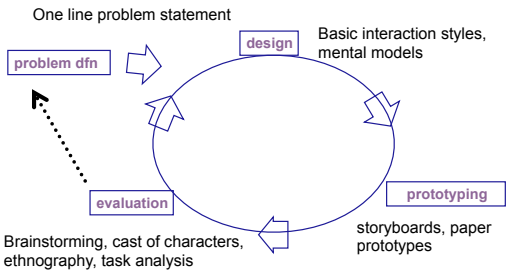


Basic interaction styles, mental models

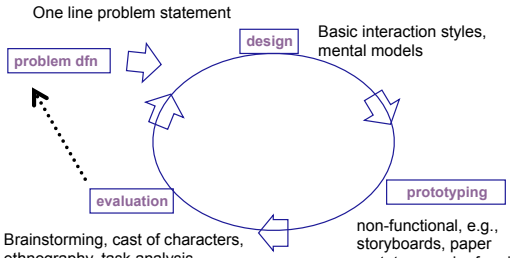
Brainstorming, cast of characters, ethnography, task analysis

21

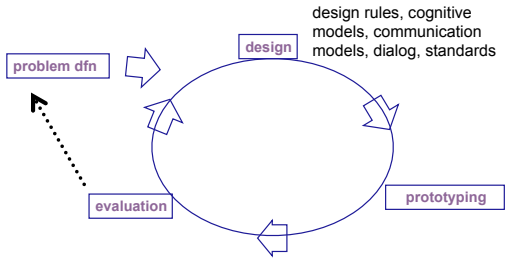
Course Workflow (1st cycle)



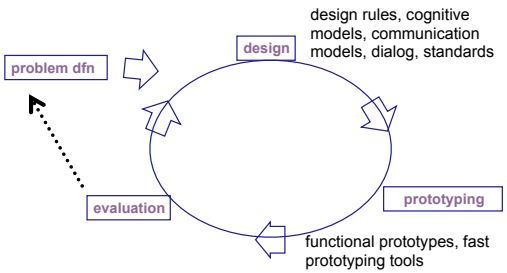
Course Workflow (1st cycle)



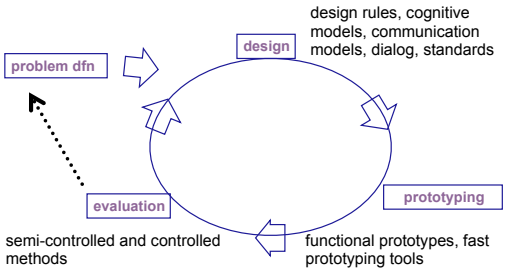
Course Workflow (2nd cycle)



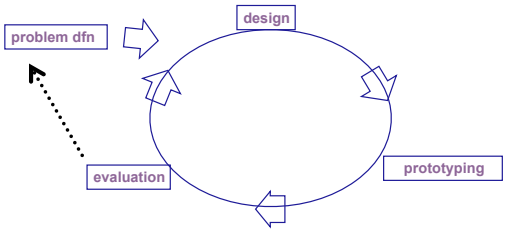
Course Workflow (2nd cycle)



Course Workflow (2nd cycle)



Course Workflow (2nd cycle)



Let’s begin…

28

29