Task-Centered System Design

How to develop task examples

How to evaluate designs via task-centered walkthroughs

Exercise: The Cheap Shop interface

The Cheap Shop Catalog Store

In Cheap Shop, people shop by browsing paper catalogs scattered around the store.

When people see an item they want, they enter its item code from the catalog onto a form.

People give this form to a clerk, who brings the item(s) from the back room to the front counter.

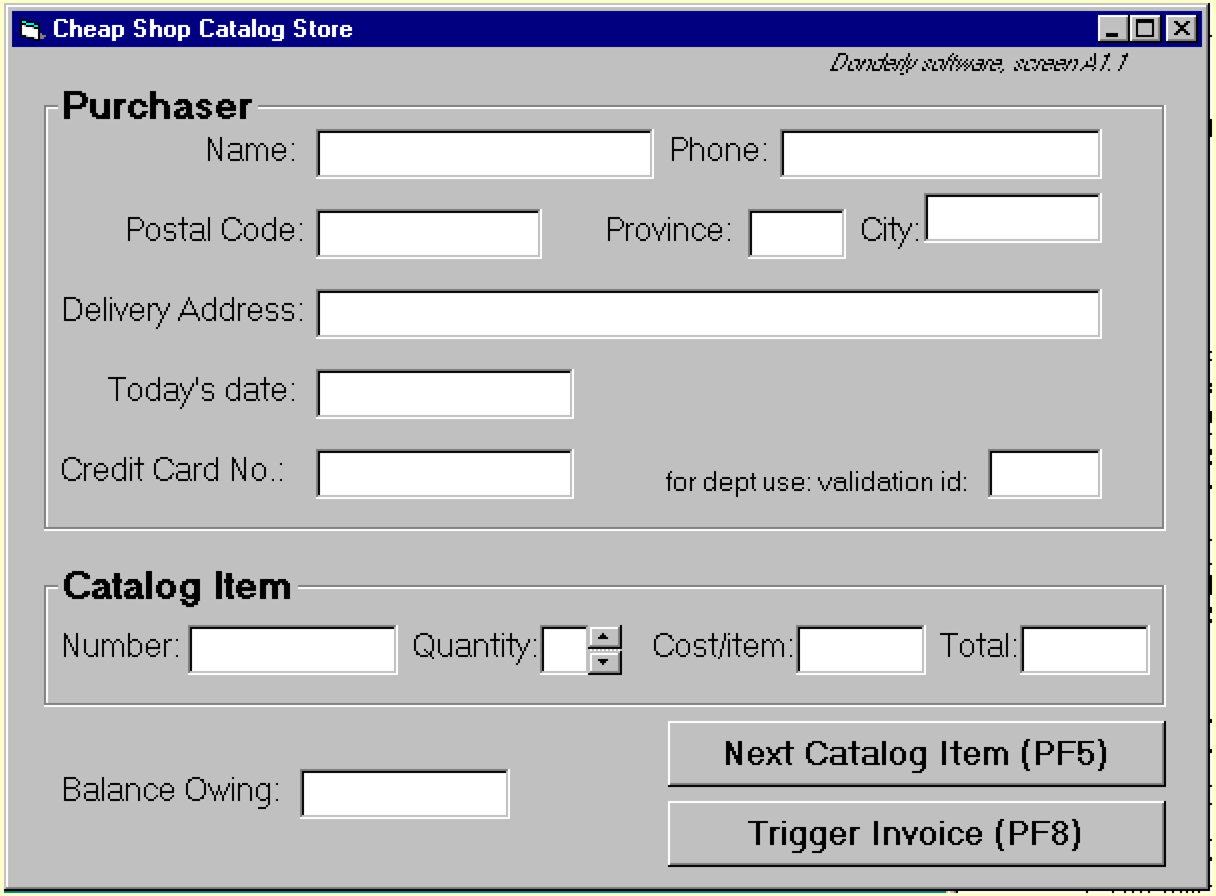
People then pay for the items they want.

SAVE $10
Century
Eddie Bauer
new
EDDIE BAUER™ BY COSCO® ALL-TERRAIN STROLLER
323 066 570 – Each
NEW! CENTURY 'EURO ADVENTURE' STROLLER
697 – Each 169.99

Item code	Amount
323066 697	1

Cheap Shop

Screen 1



Cheap Shop Catalog Store

Donderly software, screen A1.1

Purchaser

Name:

Phone:

Postal Code:

Province:

City:

Delivery Address:

Today's date:

Credit Card No.:

for dept use: validation id:

Catalog Item

Number:

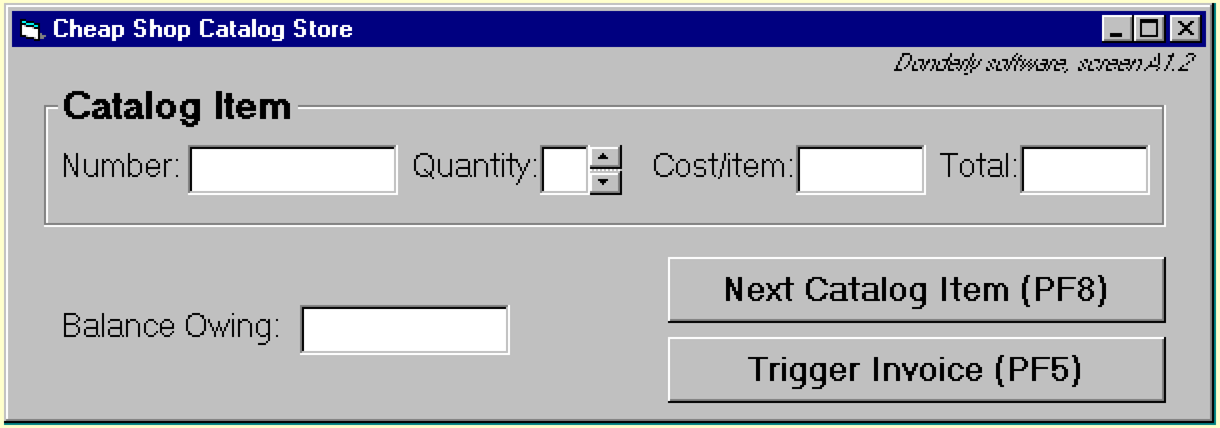
Quantity:

Cost/item:

Total:

Balance Owing:

Screen 2



Cheap Shop Catalog Store

Donderly software, screen A1.2

Catalog Item

Number:

Quantity:

Cost/item:

Total:

Balance Owing:

Seat-of-your-pants interface design

Is this a good or bad interface?

- do you go by gut feel?
- do you go by how it looks?
- do you judge it by familiarity to other interfaces?
- if there are problems, are they minor or serious?
- did you miss anything that you really shouldn’t have?
- is your opinion correct?
- how can you tell?

Alternative: are there methods where you can

- systematically determine if this interface matches the needs of its end users?
- systematically discover the usability bugs?

Requirements analysis

A software perspective

- exactly what functions should the system have?

The User

a person who will mould themselves to fit your system

Requirements analysis

An end-users perspective

- exactly who would use the system to do exactly what?

Mary Franklin
a real person with real constraints trying to get her job done

Task Centered System Design

An end-users perspective

- exactly who would use the system to do exactly what?

Phases:

1. Identification

   identify ***specific users*** and articulate their ***concrete tasks***

2. Requirements

   decide which of these tasks and users the design will support

3. Design

   base design representation & dialog sequences on these tasks

4. Walkthrough Evaluations

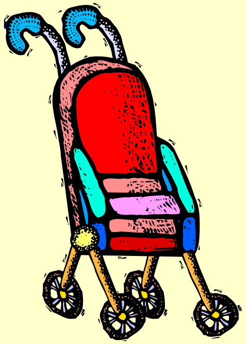
   using your design, walk through these tasks to test the interface

Adapted from Lewis, C. and Rieman, J. (1993) Task-Centered User Interface Design: A Practical Introduction. http://hcibib.org/tcuid/

Foreshadowing…

Task example 1

- Fred Johnson, who is caring for his demanding toddler son, wants a good quality umbrella stroller (red is preferred, but blue is acceptable).
- He browses the catalog and chooses the JPG stroller (cost $98. item code 323 066 697).
- He pays for it in cash, and uses it immediately.
- Fred is a first-time customer to this store, has little computer experience, and says he types very slowly with one finger. He lives nearby on Dear Bottom Avenue NW



JPG Stroller. This well made but affordable Canadian stroller fits children between 1-3 years old. Its wheels roll well in light snow and mud.
…**$98.**

Red:	**323 066 697**
Blue:	**323 066 698**

Foreshadowing…

Discussion

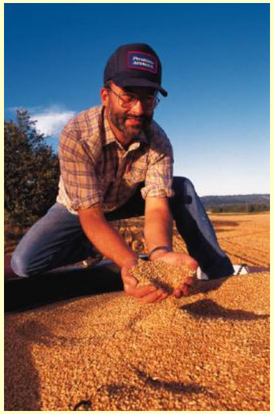
- Fred has many properties of our typical expected user:
  - many customers are first time shoppers,
  - a good number have no computer experience
  - a good number are poor typists.

- The task type is routine and important.
  - many people often purchase only one item
  - a good number of those pay by cash
  - as with Fred, people often have a general sense of what they want to buy, but decide on the actual product only after seeing what is available.

Phase 1: Identify users + tasks

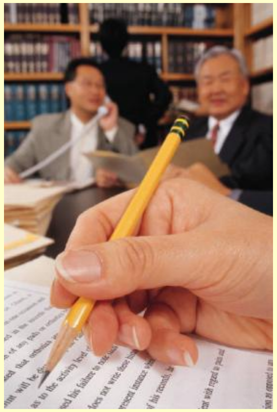
Get in touch with real people who will be potential users of your system

- prototypical categories
- extremes



Learn about their real tasks

- articulate concrete, detailed examples of tasks they perform or want to perform that your system should support
  - routine
  - infrequent but important
  - infrequent and incidental



Phase 1: Identify users + tasks

How do you identify tasks?

Immerse yourself in a real person's environment

Observe people in their actual work context

Interview people as they do their work

Shadow a person over the course of his or her day

Serve people's requests

…

Phase 1: Identify users + tasks

If there are no real users or tasks…

- think again, there probably are!

Jeff Hawkins, the inventor of the Palm Pilot, was said to have carried a small block of wood around in his shirt pocket … As various everyday situations arose, he would take out the block of wood and imagine how he would use the device.[1]

[1] *see Sato and Salvador, interactions* 6(5)

The same technique can be used to evoke a response from expected end-users

Phase 1: Identify users + tasks

If all else fails…

- describe your expected set of users,
- describe your expected set of tasks

These will become your ‘assumed users and tasks’

- verify them later as information comes in
- modify them as needed

Phase 1: Developing good task examples

1. Says what the user wants to do but does not say how they would do it
   - –no assumptions made about the interface
   - –can be used to compare design alternatives in a fair way

2. Are very specific
   - –says exactly what the user wants to do
   - –specifies actual items the user would somehow want to input

Phase 1: Developing good task examples

3. Describes a complete job

- forces designer to consider how interface features work together
- contrasts how information input / output flows through the dialog
  - where does information come from?
  - where does it go?
  - what has to happen next?

Do not

- create a list of simple things the system should do
- present a sub-goal independent of other sub-goals

Phase 1: Developing good task examples

4. Says who the users are

- name names, if possible
- says what they know

- Why?
  - design success strongly influenced by what users know
  - can go back and ask them questions later
  - reflects real interests of real users
  - helps you find tasks that illustrate functionality in that person’s real work context

Phase 1: Developing good task examples

5. Are evaluated
   - Circulate descriptions to users, and rewrite if needed
     - ask users for
       - omissions
       - corrections
       - clarifications
       - suggestions

6. As a set, identifies a broad coverage of users and task types

– the typical ‘expected’ user,	typical routine tasks
– the occasional but important user,	infrequent but important tasks
– the unusual user	unexpected or odd tasks

Phase 2: Requirements

Which user types will be addressed by the interface?

- designs can rarely handle everyone!
- includes why particular users are included / excluded

Which tasks will be addressed by the interface?

- designs can rarely handle all tasks
- requirements listed in terms of how they address tasks
  - Absolutely must include:
  - Should include
  - Could include:
  - Exclude:
- Discussion includes why items are in those categories

Phase 3: Design as Scenarios

Develop designs to fit users and specific tasks

- ground interfaces in reality

Use tasks to

- get specific about possible designs
- consider the real world contexts of real users
- consider how design features work together
  - what would the user do / see step-by-step when performing this task?

Phase 4: Walk-through Evaluation

Good for debugging an interface

Process

1 Select one of the task scenarios

2 For each user’s step/action in the task:

- a) can you build a believable story that motivates the user’s actions?
- b) can you rely on user’s expected knowledge and training about system?
- c) if you cannot:
  - you’ve located a problem in the interface!
  - note the problem, including any comments
  - assume it has been repaired
- d) go to the next step in the task

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People then pay for the items they want.

LER
rge
oot.
uro-
wheels.
29.99

EDDIE BAUER™ BY COSCO® ALL-TERRAIN STROLLER feature 6 extra-sturdy w[illegible]ls with knobby tires, fenders and shock a[illegible] 2-position reclining seat. Deluxe Eur[illegible] canopy with ventilating mesh pane[illegible] through window. Zip-off front sun/wi[illegible] Includes snack-tray. Sears reg. 199.99.
323 066 570 – Each ....sale

NEW! CENTURY 'EURO ADVENTURE' STROLLER feature large over-sized, all-terrain wheels with front swivel. Ergonomic handle. Wide-frame design. Seat reclines. Includes front tray, parent tray and cup holder. Extra storage pockets. Removable, washable polyester-cotton, [illegible]-style canopy and pad.
[illegible] 697 – Each 169.99

Item code	Amount
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Developing task examples: Cheap Shop

Task example 1

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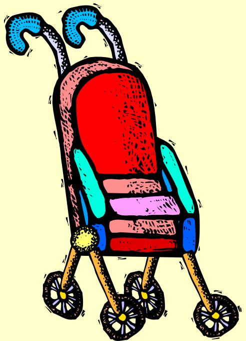

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Developing task examples: Cheap Shop

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- The task type is routine and important.
  - many people often purchase only one item
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  - as with Fred, people often have a general sense of what they want to buy, but decide on the actual product only after seeing what is available.

Developing task examples: Cheap Shop

Task example 2

- Mary Vornushia is price-comparing the costs of a child’s bedroom set, consisting of a wooden desk, a chair, a single bed, a mattress, a bedspread, and a pillow all made by Furnons Inc.
- She takes the description and total cost away with her to check against other stores.
- Three hours later, she returns and decides to buy everything but the chair.
- She pays by credit card,
- She asks for the items to be delivered to her daughter’s home at 31247 Lucinda Drive, in the basement suite at the back of the house.

- Mary is elderly and arthritic.

Developing task examples: Cheap Shop

Discussion

- Like Mary,
  - a reasonable number of store customers are elderly, with infirmities that inhibit their physical abilities.
  - a modest number of them also enjoy comparison shopping, perhaps because they have more time on their hands or because they are on low income.
- The task type is less frequent, but still important.
  - although this would be considered a ‘major’ purchase in terms of the total cost, the number of items purchased is not unusual.
  - delivery of large items is the norm
  - most customers pay by credit card for larger orders.

Developing task examples: Cheap Shop

Task example 3

- John Forham, the sole salesperson in the store, is given a list of 10 items by a customer who does not want to use the computer.
- The items are:
  - 4 pine chairs, 1 pine table, 6 blue place mats, 6 “lor” forks, 6 “lor” table spoons, 6 “lor” teaspoons, 6 “lor” knives, 1 “tot” tricycle, 1 red ball, 1 “silva” croquet set
- After seeing the total, the customer tells John he will take all but the silverware
- The customer then decides to add 1 blue ball to the list.
- The customer starts paying by credit card, but then decides to pay cash. The customer tells John he wants the items delivered to his home the day after tomorrow. While this is occurring, 6 other customers are waiting for John.

- John has been on staff for 1 week, and is only partway through his training program

Developing task examples: Cheap Shop

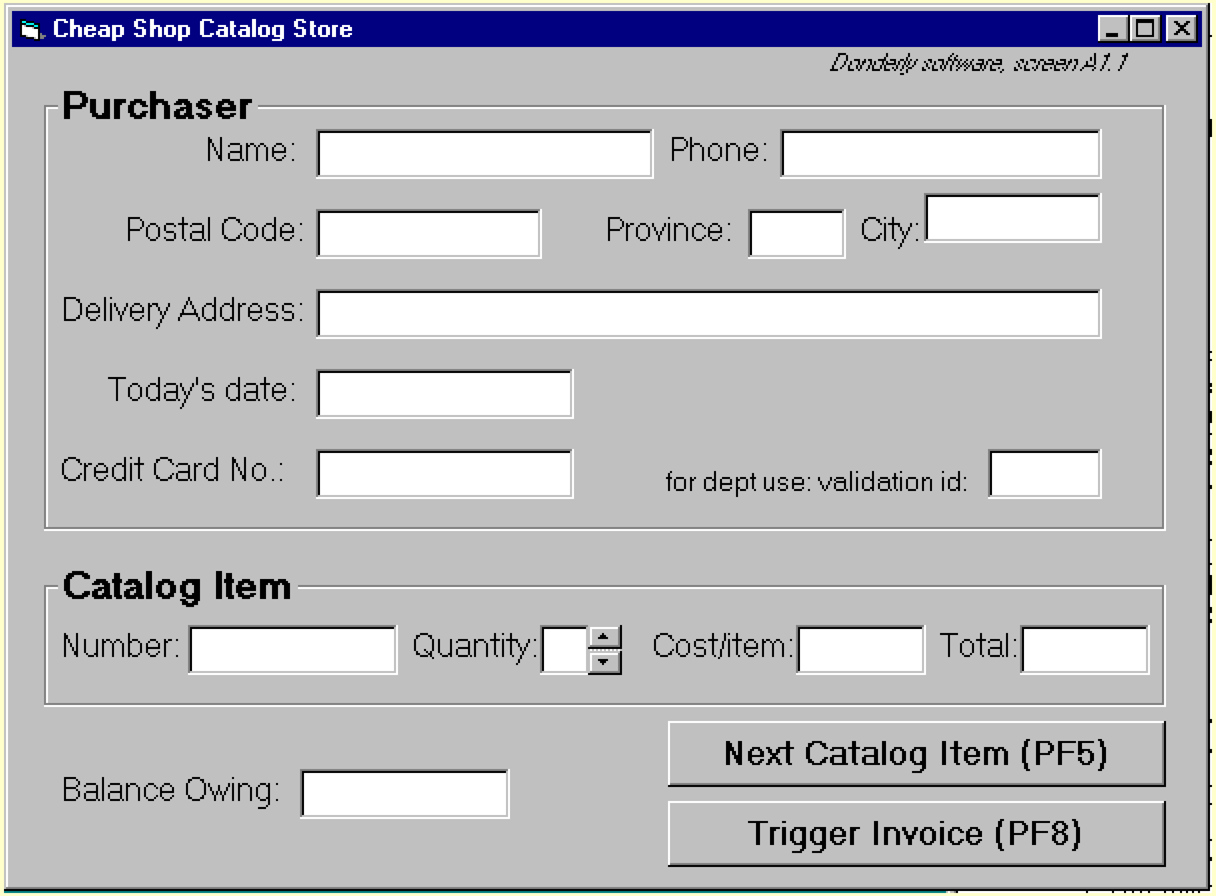
Discussion

- This task introduces the clerk as a system user.
  - Because the store has a high turnover in its staff, new employees such as John are also common.
  - Thus John reflects a ‘rare’ but important group of users.

- The task type is less frequent, but still important
  - The task, while complex, is fairly typical i.e., people making large numbers of purchases often ask the clerk to help them.
  - Similarly, clerks mention that customers often change their mind partway through a transaction i.e., by changing what they want to buy and/or by changing how they want to pay for it.
  - Customers, however, rarely give specific delivery dates, with most wanting delivery as soon as possible.
  - Lineups for clerks are common during busy times.

Cheap Shop

Screen 1



Cheap Shop Catalog Store

Dondedy software, screen A1.1

Purchaser

Name:

Phone:

Postal Code:

Province:

City:

Delivery Address:

Today's date:

Credit Card No.:

for dept use: validation id:

Catalog Item

Number:

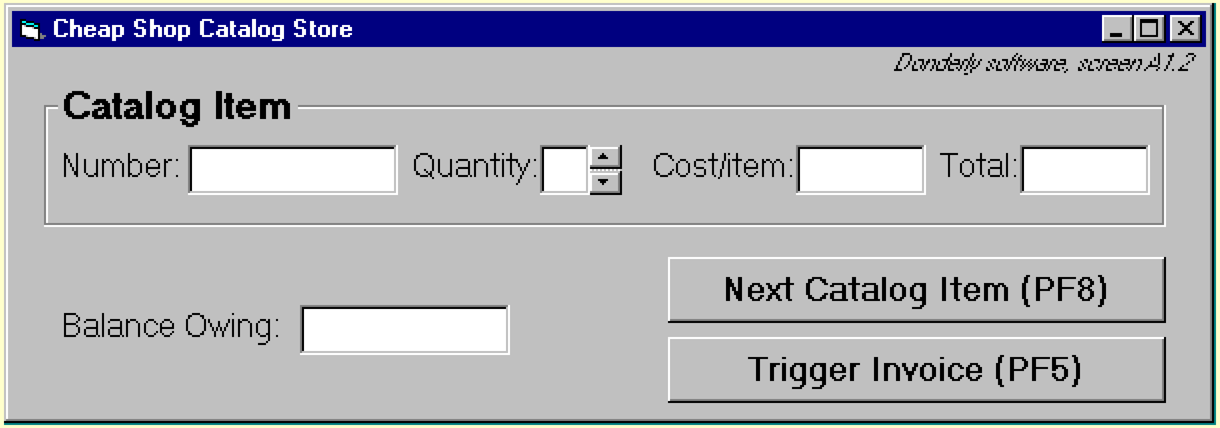
Quantity:

Cost/item:

Total:

Balance Owing:

Screen 2



Cheap Shop Catalog Store

Dondedy software, screen A1.2

Catalog Item

Number:

Quantity:

Cost/item:

Total:

Balance Owing:

Specifications

To create an order

- On screen 1, shoppers enter their personal information and their first order
- text is entered via keyboard
- the tab or mouse is used to go between fields.

Further orders

- shoppers go to the 2nd screen by pressing the Next Catalog Item button

Order completion

- shoppers select ‘Trigger Invoice’.
- the system automatically tells shipping and billing about the order
- the system returns to a blank screen #1

To cancel order

- Shoppers do not enter input for 30 seconds (as if they walk away)
- The system will then clear all screens and return to the main screen

Input checking

- all input fields checked when either button is pressed.
- erroneous fields will blink for 3 seconds, and will then be cleared.
- the shopper can then re-enter the correct values in those fields.

Walkthrough template

Task number: ____

Description of Step	Does the user have the knowledge/training to do this?	Is it believable that they would do it? Are they motivated?	Comment / solution

A walkthrough for this exercise is found in Greenberg, S. "Working through Task-Centered System Design. in Diaper, D. and Stanton, N. (Eds) The Handbook of Task Analysis for Human-Computer Interaction. Lawrence Erlbaum Associates.

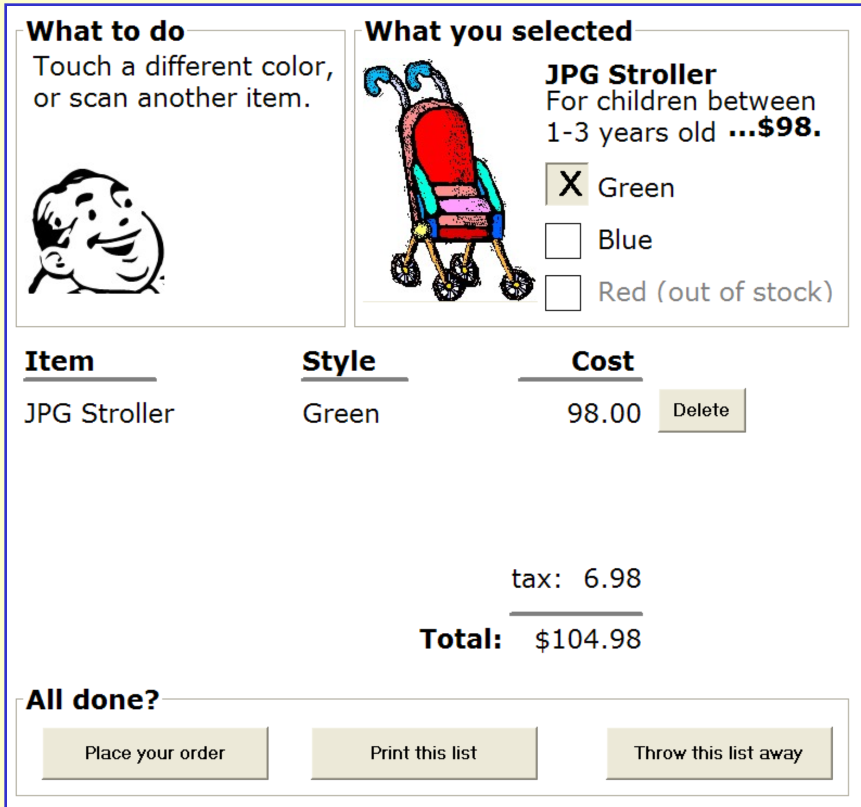
Are there better ways to do it?

A task-centered prototype

- partial wizard approach to tasks
- prototyped several different ways
  - paper - 45 minutes
  - scripted animation - 2 hours

Does it work?

- do a task-centered walkthrough to find out!



What to do

Touch a different color, or scan another item.

What you selected

JPG Stroller
For children between 1-3 years old **...$98.**

☒ Green

□ Blue

□ Red (out of stock)

Item	Style	Cost
JPG Stroller	Green	98.00

tax: 6.98

Total: $104.98

All done?

Goal-centered system design

Articulate user goals instead of task sequences

- Goal:
  - a desired end condition
  - tend to be stable
- Task:
  - an intermediate process needed to achieve the goal
  - may change as technology / work patterns change

See Allan Cooper ‘The inmates are running the asylum’, Sams (Macmillan), especially Chapter 9 and 11.

Goal-centered system design

Designer

- looking for solutions that satisfy these goals
- task sequence may differ substantially from current process

Approach:

- Develop a ***persona***
  - precise, specific description of the user and the goal they wish to accomplish
  - a pretend user that are hypothetical archetypes of actual users
  - discovered as a by-product of investigating the problem domain
- Develop a cast of characters
  - 3 – 12 unique personas
  - one will be the primary persona – the main focus of the design

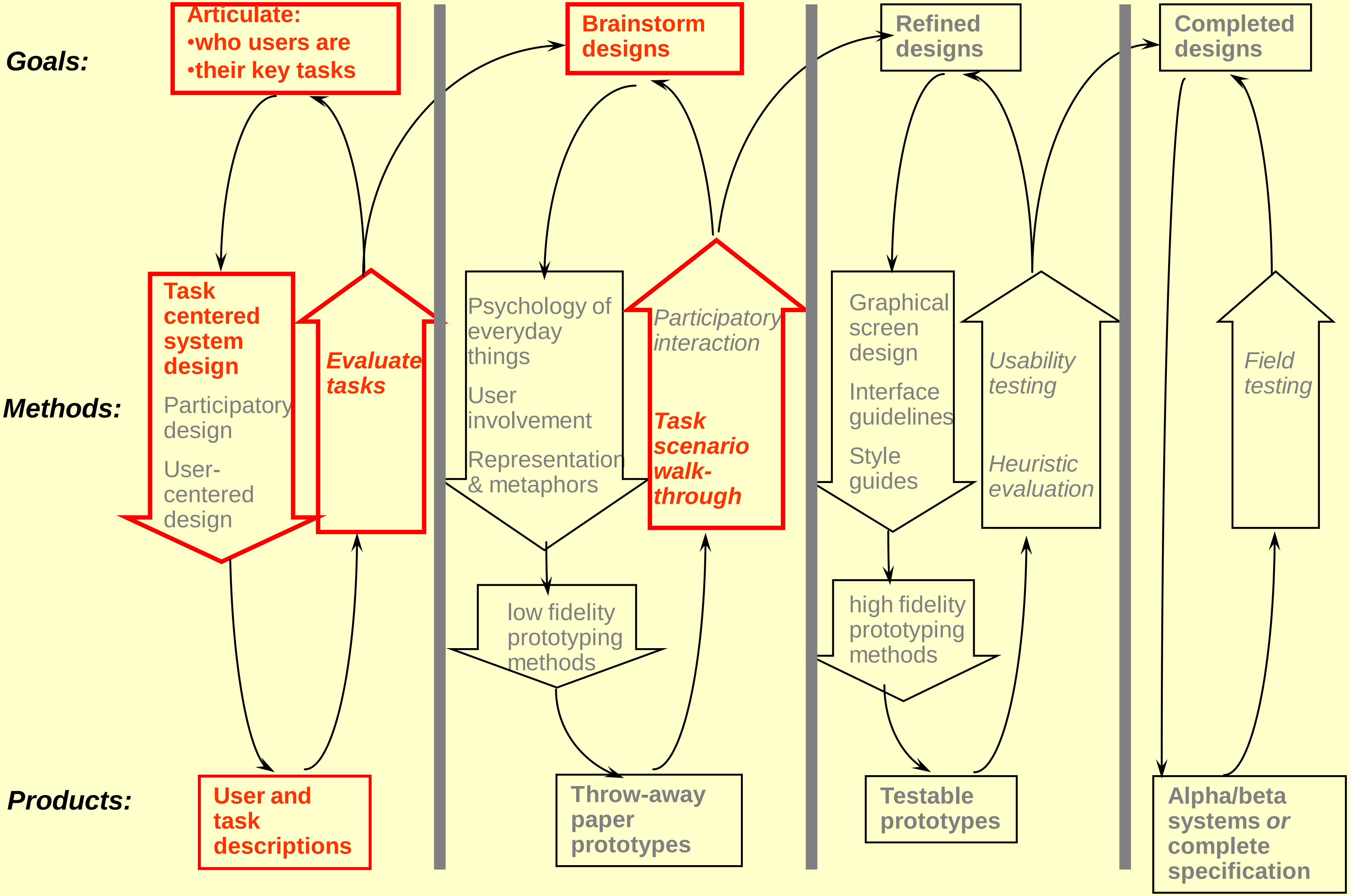
You know now

How to develop concrete task examples

How to use task examples to motivate your designs

How to evaluate designs through task-centered walkthroughs

Interface Design and Usability Engineering



Goals:

Articulate:
- who users are
- their key tasks

Brainstorm designs

Refined designs

Completed designs

Methods:

Task centered system design

Participatory design

User-centered design

Evaluate tasks

Psychology of everyday things

User involvement

Representation & metaphors

Participatory interaction

Task scenario walk-through

Graphical screen design

Interface guidelines

Style guides

Usability testing

Heuristic evaluation

Field testing

low fidelity prototyping methods

high fidelity prototyping methods

Products:

User and task descriptions

Throw-away paper prototypes

Testable prototypes

Alpha/beta systems *or* complete specification