

Task-Centered System Design - Walkthrough

Lecture /slide deck produced by Saul Greenberg modified by Tony Tang



Learning Objectives

By the end of this lecture, you should be able to:

- » conduct a walkthrough using task-centered design method
- » discuss what a task-centered design method is good for, and why you might use it

Recap: Task Centered System Design

Phase 1: Identifying users and developing task descriptions

Phase 2: User-centered requirements analysis

Phase 3: Design using scenarios

Phase 4: Evaluate using task-centered walkthroughs

Cheap Shop

Screen 1

Purchaser

Name: Phone:

Postal Code: Province: City:

Delivery Address:

Today's date:

Credit Card No.: for dept use: validation id:

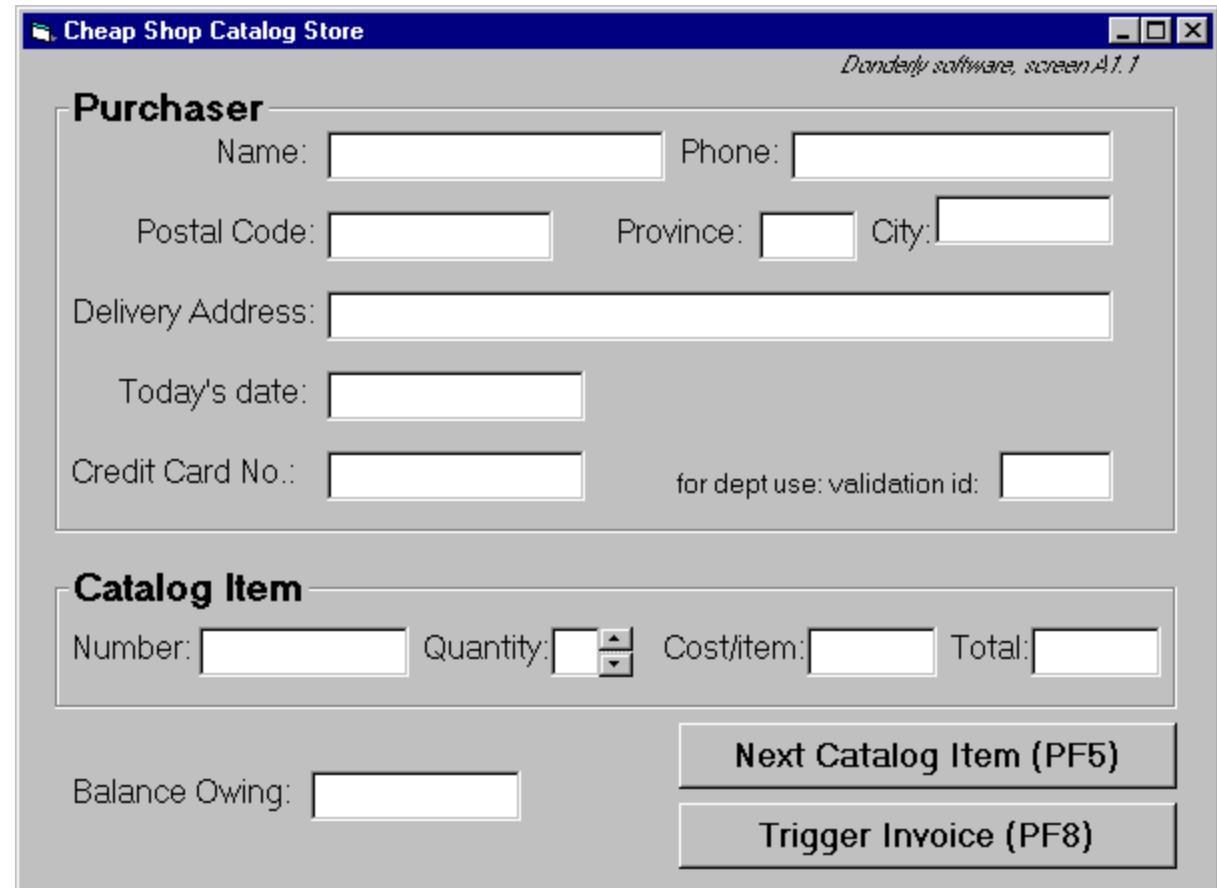
Catalog Item

Number: Quantity: Cost/item: Total:

Balance Owing:

Next Catalog Item (PF5)

Trigger Invoice (PF8)



Screen 2

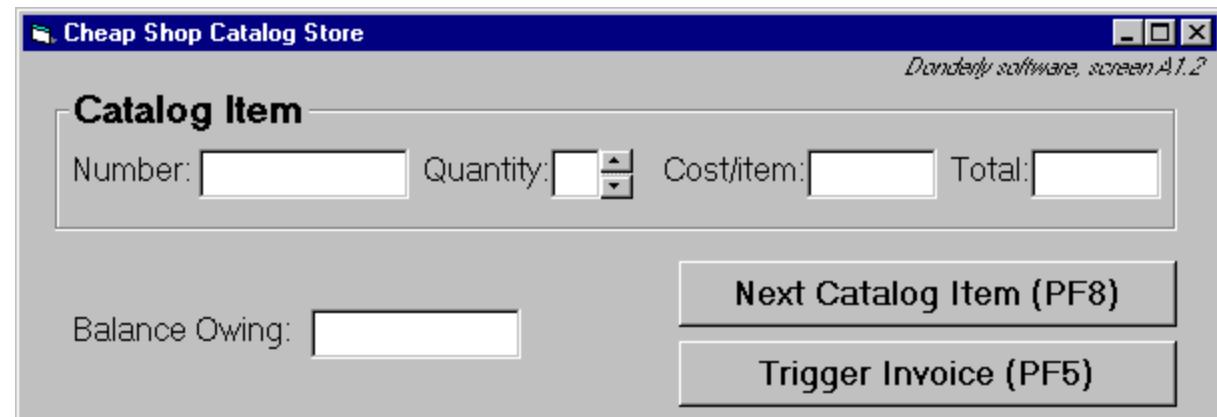
Catalog Item

Number: Quantity: Cost/item: Total:

Balance Owing:

Next Catalog Item (PF8)

Trigger Invoice (PF5)



Specifications

Cheap Shop Catalog Store Dandarly software, screen A7.1

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:

Next Catalog Item (PF5)
Trigger Invoice (PF8)

Cheap Shop Catalog Store Dandarly software, screen A7.2

Catalog Item

Number: Quantity: Cost/item: Total:
Balance Owing:

Next Catalog Item (PF8)
Trigger Invoice (PF5)

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

Specifications

Cheap Shop Catalog Store Dandely 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:

Next Catalog Item (PF5)

Trigger Invoice (PF8)

Cheap Shop Catalog Store Dandely software, screen A1.2

Catalog Item

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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.

Task example: Fred Johnson

- 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

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:
 - o you've located a problem in the interface!
 - o note the problem, including any comments
 - o assume it has been repaired
 - d) go to the next step in the task

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

Fred: entering shop, finding a computer (1)

Task step	Knowledge? Believable? Motivated?	Comments/solutions.
—	—	—

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a Enters store	ok	
b Looks for catalog	Ok if paper catalog is used, but what if the catalog is on-line?	<p>Finding paper catalogs is not a problem in the current store. However, we were not told if the paper catalog would still be used, or if the catalog would be made available on line.</p> <p><i>Note:</i> ask Cheap Shop about this. If they are developing an electronic catalog, we will have to consider how our interface will work with it. For now, we assume only a paper catalog is used.</p>

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c Finds red JPG stroller in catalog	Ok	The current paper catalog has proven itself repeatedly as an effective way for customers to browse Cheap Shop merchandise and to locate products.

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c Finds red JPG stroller in catalog	Ok	The current paper catalog has proven itself repeatedly as an effective way for customers to browse Cheap Shop merchandise and to locate products.
d Looks for computer	Modest problem	<p>As a first time customer, Fred does not know that he needs to order through the computer. Unfortunately, we do not know how the store plans to tell customers that they should use the computer. Is there a computer next to every catalog (so its association can be inferred), or are there limited number of computers on separate counters? Are there signs telling Fred what to do?</p> <p>Note: ask Cheap Shop about the store layout and possible signage. Possible solution: Instead of screen 1, a startup screen can clearly indicate what the computer is for e.g., “Order your items here” in large letters.</p>

Specifications

Cheap Shop Catalog Store Dandely software, screen A1.1

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Delivery Address:

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Credit Card No.: for dept use: validation id:

Catalog Item

Number: Quantity: Cost/item: Total:

Balance Owing:

Buttons:

Next Catalog Item (PF5)

Trigger Invoice (PF8)

Cheap Shop Catalog Store Dandely software, screen A1.2

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Fred: entering personal information (2)

Task step	Knowledge? Believable? Motivated?	Comments/solutions.

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e Enters name	No motivation to do this!	<p>Fred's task is to buy the stroller, but the scenario shows that the system is asking him for his name. Fred may be reluctant to do so if (say) he believes that he will be added to a mailing list without his permission.</p> <p><i>Note.</i> Ask Cheap Shop why they are asking for the customer's name and other contact information.</p>

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f Selects the name field	Knowledge lacking. Fred does not know how to select a field.	<p>To enter his name, Fred is expected to click and type into the first text field on this form. Yet Fred has little computer experience, and thus he may not know what to do. He may also be reluctant to experiment with the system.</p> <p>Possible solutions:</p> <ul style="list-style-type: none">a)have the first field pre-selected, with the cursor in it.b)have a poster next to the computer describing these basic acts.

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g Types his name	Knowledge lacking: Fred types poorly, does not know name format.	<p>Because Fred types poorly, text entry will be slow and tedious. This further dampens Fred's motivation, as he is entering information that is unimportant to the task.</p> <p>Fred is uncertain about formats: does he type his name as 'Fred Johnson' or 'Johnson, Fred'?</p>

Fred: entering personal information (2)

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h Moves to phone field	Knowledge lacking	Fred may not know how to tab or mouse over to the next field because of his unfamiliarity with computers.

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i Fill in phone, postal code, province, and city.	Poor motivation. Poor format knowledge	If Fred can complete steps e-h, he will be able to continue with the following fields. However, motivation will decrease even further as Fred painfully types unnecessary information into the system. Fred continues to have formatting concerns about how he should enter information. Should the phone number include the area code, spaces and/or dashes? Should he spell out the province or use the abbreviation? Should he leave a space in the postal code?

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j Enter delivery address	Violates the task	<p>Fred will use the stroller immediately, but the system asks for his delivery address. Fred may incorrectly assume that he is filling in the wrong form, and may give up.</p> <p>We also noticed that the order of the contact information does not follow the typical flow i.e., one would expect 'Name, Address, City, Province, Postal Code', 'Phone' rather than the odd order shown in the form.</p>

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k Enters today's date	No motivation	This is an odd field... why should Fred enter the date when the system already knows it? Can he skip it? If he does fill it in, he would be quite lucky to enter a recognizable date format.

Fred: entering personal information (2)

Task step	Knowledge? Believable? Motivated?	Comments/solutions.
1 Enters credit card information	Violates the task	Fred is paying by cash, and thus he is unwilling enter his credit card number. He is also concerned that others may see his credit card information as he types it onto the screen. Finally, this seems an odd place to ask for payment information. Most stores ask for it at the end of transaction, not at the beginning.

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m Ignore validation id	Ok	While Fred will likely do the right thing, this field should not be here. It has nothing to do with Fred's task. Possible solution. Remove it.

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m Ignore validation id	Ok	While Fred will likely do the right thing, this field should not be here. It has nothing to do with Fred's task. Possible solution. Remove it.
Steps e-m	Not needed for task.	Possible solution. This entire part of the interface is not needed or is, at best, optional (e.g., if it is for getting onto the mailing list). Delete it entirely or move it into a very secondary area that can be filled in after the transaction is completed.

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n Enter item number for the JPG red stroller	Is motivated, but has problems. Error-prone.	The item number for Fred's stroller is written in the paper catalog as 323 066 397. Because catalogs are common, he may be able to figure out what he has to do. However, the format is a bit mysterious – should he include spaces or not? If the paper catalog is in an awkward place, Fred will have to rely on his memory to enter the number or he will constantly be running back and forth between the catalog and the computer. Because Fred is a poor typist, he may have difficulty typing the number correctly.

Fred: entering item information (3)

Task step	Knowledge? Believable? Motivated?	Comments/solutions.
o Enter quantity	Knowledge low, motivation high	<p>Fred wants one stroller only. However, this ‘spinner widget’ is somewhat mysterious to Fred. Because he does not know computers, he will likely not know that he can type the amount directly or just click the arrows to select the quantity.</p> <p><i>Partial solution.</i> Have the spinner show a 1 by default.</p>

Fred: entering item information (3)

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o Enter quantity	Knowledge low, motivation high	<p>Fred wants one stroller only. However, this ‘spinner widget’ is somewhat mysterious to Fred. Because he does not know computers, he will likely not know that he can type the amount directly or just click the arrows to select the quantity.</p> <p><i>Partial solution.</i> Have the spinner show a 1 by default.</p>
p Enter cost/item	Motivation low	<p>Why should Fred enter the cost? Surely the system knows this. If this field is actually used to display the cost, then it has the wrong visual affordance as it looks like a text box.</p> <p>Perhaps Fred would be willing to enter a deeply discounted cost, but this will probably be treated as a system error.</p>

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q Enter total	Motivation low	See above point

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q Enter total	Motivation low	See above point
r Enter balance owing	Motivation low, knowledge low	<p>See above point.</p> <p>Fred will also be uncertain about how this field differs from the ‘Total’ field.</p>

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q Enter total	Motivation low	See above point
r Enter balance owing	Motivation low, knowledge low	<p>See above point.</p> <p>Fred will also be uncertain about how this field differs from the ‘Total’ field.</p>
s Click Trigger invoice or press PF5	Knowledge low	<p>Being inexperienced with computers, Fred may not recognize or know how to use a clickable button. The ‘PF5’ label is also mysterious, as Fred does not recognize it as a keyboard shortcut. Fred will find the meaning of ‘Trigger Invoice’ cryptic, as it is in the language of the database system rather than in his language. This may leave him at a loss of what to do.</p> <p><i>Possible solutions.</i> Remove the PF5 label. Change ‘Trigger Invoice’ to something more meaningful.</p>

Fred: Picking up and paying for the stroller (4)

Task step	Knowledge? Believable? Motivated?	Comments/solutions.
t Wait for item at sales counter	Knowledge low, motivation high	<p>Fred has to go to the sales clerk and wait for the item to appear. Yet he may not know this, especially because the computer returns to the initial empty screen. Has the transaction completed successfully? Is there signage that says what has to happen?</p> <p>Possible solution. Provide a final screen that tells Fred what he has bought and what he has to do next.</p>
u Get item from Sales Clerk.	Knowledge low, motivation high	<p>If other items are appearing aside from Fred's, he may not know which items are his unless the boxes are clearly labeled or if the box size and shape give it away. Similarly, the sales clerk has no easy way to identify whose items have appeared, unless the name given in the Name field is somehow attached to the items.</p> <p>Possible solution. After completing Trigger Invoice, the system could print out a sheet listing the chosen items which Fred can then give to the sales clerk.</p>
v Pay for item in cash	Ok	<p>While this is straight-forward, there is a question about how the clerk will tally up this bill. This is the clerk's problem, but we don't want Fred to wait excessively.</p>
w Use it immediately	Ok	

Thoughts...?

You can evaluate an interface without a user

Forces us to be systematic: Useful to think about the significance of each field to the user (and how they might/might not use it)

Flow-based technique: May leave out some issues – error cases, and exception cases

Because we're going into the minutiae – really low level, allows us to see things that we might have ignored if we were just glancing

Takes a long time -- tedious

How low-level do we go

As a designer, I may not know what a “bird-watcher is like”

Also consider exceptional cases...

The previous step would have explored all the tasks
as you've spelled them out in your first phase

Also consider error, failure, exception cases, just to
see how well your interface would do.

Fred: interruptions, errors and exceptions

Task step	Knowledge? Believable? Motivated?	Comments/solutions.
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Fred: interruptions, errors and exceptions

Task step	Knowledge? Believable? Motivated?	Comments/solutions.
<i>1 Event: interruptions and timeout.</i>		
a Deal with toddler	Knowledge high, motivation high	Fred's toddler starts demanding his attention part way through this task (say after he has entered the item number). Fred comforts his child.

Fred: interruptions, errors and exceptions

Task step	Knowledge? Believable? Motivated?	Comments/solutions.
<i>1 Event: interruptions and timeout.</i>		
a Deal with toddler	Knowledge high, motivation high	Fred's toddler starts demanding his attention part way through this task (say after he has entered the item number). Fred comforts his child.
b Deal with timeout	Knowledge low, motivation low	Unfortunately, this took more than 30 seconds, which means that the system has cleared the screen. Fred has to re-enter all this information, which he will likely not do. Note that a similar problem will happen if Fred lingers too long on any step in this task.

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<i>2 Error: incorrect item number</i>		
a Recognize error message	Knowledge low	If Fred enters an incorrect item number, the system will blink that field for 3 seconds and then clear it. It is extremely unlikely that Fred will know what this means.

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b Enter corrected item number	Knowledge low, motivation medium	Even if Fred realizes that he has made a mistake entering the item number, he will be uncertain about what he did wrong (since the number is no longer there), or how to correct it.

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<i>3 Event: red stroller unavailable</i>		
a No red stroller is in stock	Knowledge low	If there is no red stroller in stock, how does Fred find this out? Will the sales clerk tell him (in which case the clerk needs to identify Fred)?

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<i>3 Event: red stroller unavailable</i>		
a No red stroller is in stock	Knowledge low	If there is no red stroller in stock, how does Fred find this out? Will the sales clerk tell him (in which case the clerk needs to identify Fred)?
b Reenter all information for blue stroller	Motivation low	We cannot imagine that Fred would be willing to go through this whole process again, especially because his demanding toddler is likely loosing patience.
<i>Possible solution:</i> As the customer selects an item, the interface should clearly indicate if it is in stock.		

Regarding John... (walkthrough in a nutshell)

Changes in order are not supported well

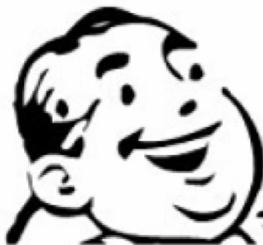
Slow items entry

Slow reaction time will result in more customers waiting in line (not good).

Are there better ways to do it?

What to do

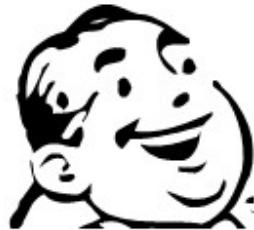
Find the item you want
in the catalog and scan
the bar code next to it



Barcode reader
Touch screen
“Wizard” guidance

What to do

Find the item you want in the catalog and scan the bar code next to it.



What you selected

Item

Style

Cost

tax:

Total: \$ 0.00

All done?

[Place your order](#)

[Print this list](#)

[Throw this list away](#)



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

JPG Stroller

Style

Green

Cost

98.00

Delete



tax: 6.98

Total: \$104.98

All done?

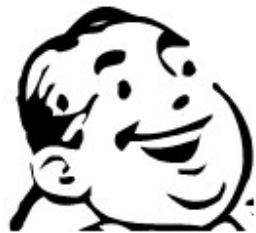
Place your order

Print this list

Throw this list away

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

Blue

98.00

Delete

tax: 6.98

Total: \$104.98

All done?

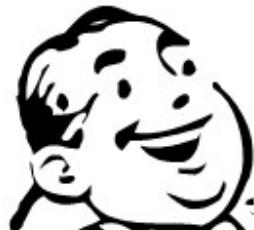
[Place your order](#)

[Print this list](#)

[Throw this list away](#)

What to do

To get your items,
bring your printout to
the front counter.



What you selected

<u>Item</u>	<u>Style</u>	<u>Cost</u>
JPG Stroller	Green	98.00

⊗

tax: 6.98

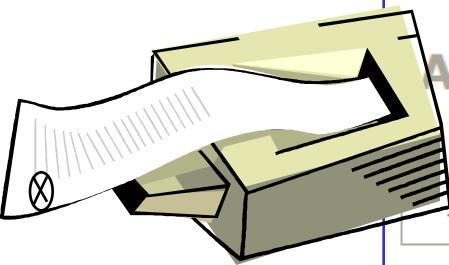
Total: \$104.98

All done?

Place your order

Print this list

Throw this list away



What to do

Printing...

To recall this order,
scan the bar code on
the printout



What you selected

Item

Style

Cost

Ø

tax:

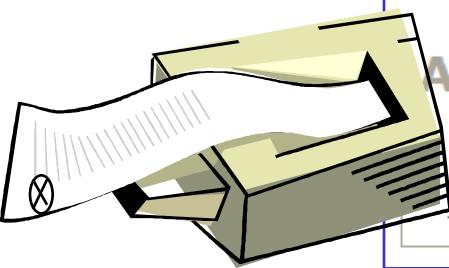
Total: \$ 0.00

All done?

Place your order

Print this list

Throw this list away



Task-Centered System Design: Summary

Formulaic method of designing systems based on user needs

Provides a systematic mechanism evaluate interfaces without users (pedantic, tedious)

Provides a method of identifying bugs, and to iteratively improve an interface → may be good at getting the design right, but maybe not the right design

Simple to use, and effective in many cases

Learning Objectives

You should now be able to:

- » conduct a walkthrough using task-centered design method
- » describe what a task-centered design method is good for, and why you might use it