# DESIGNING THE USER AND SYSTEM INTERFACES

## Lecture 8

1.11.2014, Saturday

# **Outline of This Lecture**

- User and System Interfaces
- Understanding the User Interface
- User-Interface Design Concepts
- The Transition from Analysis to User-Interface Design
- User-Interface Design
- Identifying System Interfaces
- Designing System Inputs
- Designing System Outputs

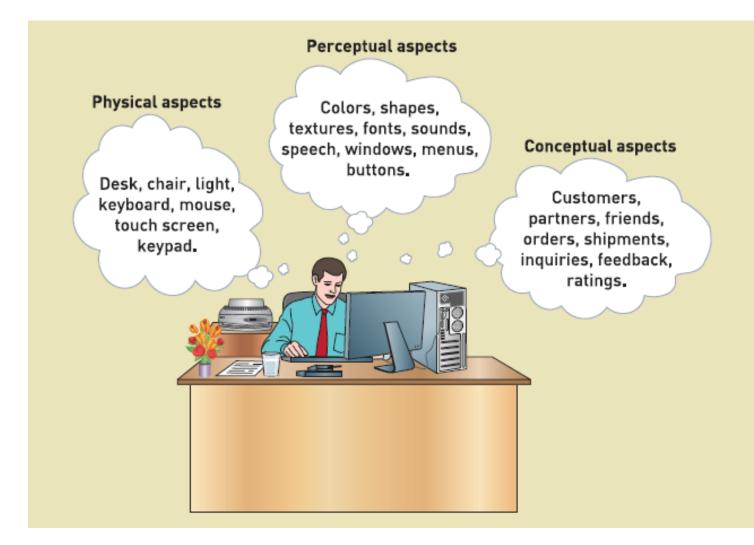
## **User Interfaces and System Interfaces**

- User Interface inputs and outputs that directly involve a human user/actor
  - A dialog goes on between actor and system
- System Interface the inputs and outputs that require minimal human intervention
  - Inputs captured automatically
  - Outputs direct to other systems
  - Printed and distributed outputs (statements, reports)

## **User Centered Design**

- Design techniques that embody the view that the user interface is the system to the user
- Dates back to the 1980s (more for Mac)
- Principles of User Centered Design
  - Focus early on users and their work
  - Evaluate designs to ensure usability
  - Use iterative development
- Note that contemporary A&D finally incorporates these principles

# Three Components of the User Interface



### Metaphors of Human Computer Interaction

### Direct manipulation metaphor

 metaphor in which objects on a display are manipulated to look like physical objects (pictures) or graphic symbols that represent them (icons)

### Desktop metaphor

 metaphor in which the visual display is organized into distinct regions, with a large empty workspace in the middle and a collection of tool icons around the perimeter

### Document metaphor

 metaphor in which data is visually represented as paper pages or forms

### Dialog metaphor

 metaphor in which user and computer accomplish a task by engaging in a conversation or dialog via text, voice, or tools such as labeled buttons

# **Metaphor Details**

Metaphor	Description	Example
Direct manipulation	Manipulating objects on a display that look like physical objects (pictures) or that repre- sent them (icons)	The user drags a folder icon to an image of a recycle bin or trash can to delete a collection of files.
Desktop	Organizing visual display into distinct regions, with a large empty workspace in the middle and a collection of tool icons around the perimeter	At computer startup, a Windows user sees a desktop, with icons for a clock, calendar, notepad, inbox and sticky notes (the computer interface version of a physical Post-It note).
Document	Visually representing the data in files as paper pages or forms. These pages can be linked together by references (hyperlinks)	The user fills in a form field for a product he or she owns, and the manufacturer's Web site finds and displays the product's manual as an Adobe Acrobat file, which contains a hyper- linked table of contents and embedded links to related documents.
Dialog	The user and computer accomplishing a task by engaging in a conversation or dialog by using text, voice, or tools, such as labeled buttons	The user clicks a button labeled "troubleshoot" because the printer isn't working. The com- puter prints questions on the display, and the user responds by typing answers or selecting responses from a printed list.

### Direct Manipulation, Desktop, and Document Metaphors On One Screen

Recycle Bin			Dass Diagram Microsoft Visio	10 12 12
	• • <del>1</del>	Insert Design Dida Roven View Unit. Today Historia Islanda Badada da da Roberta Bada	RTGM Exercises (Compatibility Mode) - Microsoft Word	
Textbook Files		Physician	CHAPTER 4	✓ Mar11 ► S M T W T F S 1 2 3 4 5 5 7 8 9 10 11 10
Calculator	<b>1 1 1</b>	H H Institution Institution Institution D_A Institution D_A Institution Institutio Institu	Sandia Medical Systems Real-Time Glucose Monitoring System Figure xxx shows a first-cut class diagram for Sandia Medical Devices' Real-Time Glucose Monitoring (RTGM.) system.	15 14 15 16 17 16 19 20 21 22 23 24 25 26 27 28 29 30 31 82°
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Pant	100		Figure xxx. First-cut class diagram for the RTGM system After consulting with system stakeholders, the following potential changes to the diagram are being considered: +	×
Chess Titans			<ul> <li>Include additional medical personnel (nurses and physicians' assistants, at minimum)</li> <li>Include alerts sent by the system to medical personnel and messages sent by medical personnel to the patient</li> <li>Modify the diagram to incorporate the changes under consideration. Incorporate generalization, specialization, and inheritance into the diagram to minimize attribute overlap among classes. Are a set of abstract and concrete classes needed to represent variations among cell phones? Why or why not?</li> </ul>	swer key for RTGM
		Static Structure-1 🥠		
	Page 1 of 1 English	(2U)	CHAPTER 5	
			Page 4 of 5 Words 1.066 ③	

### **Dialog Metaphor**



## User Interface Design Concepts

- Human-Computer Interaction (HCI)
  - A field of study concerned with the efficiency and effectiveness of user interaction with computer systems, human-oriented input and output technology, and psychological aspects of user interfaces

## Visibility and Affordance

- To be usable, a control must be visible to the user and its appearance should suggest its functionality
  - Media player controls, buttons, scroll bars

## **User Interface Design Guidelines**

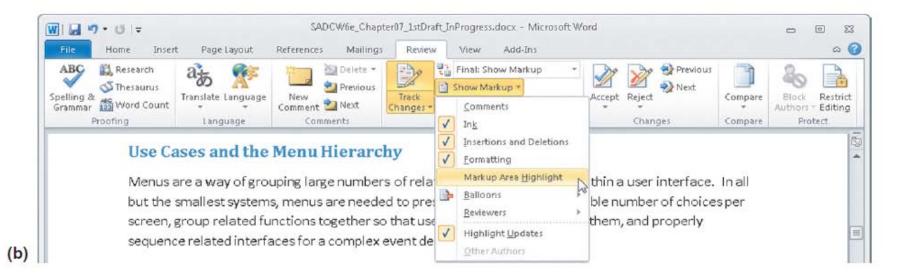
- Design for Consistency
- Provide Shortcuts
- Provide Feedback
- Dialogs Should Yield Closure
- Error Handling that Provides Guidance
- Easy Reversal of Actions
- Reduce Short Term Memory Load

## Use Cases and the Menu Hierarchy

- We design use case by use case
- Menus are a typical way to organize access to use case functionality
- Different types of users might have different menus
- Useful to design an overall menu hierarchy and then subsets for different users
- Once the hierarchy is established, menus can be implemented in a variety of ways

# **Two Different Menu Styles**

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Some RMO Use Cases

Grouped by Actor and Subsystem

Subsystem	Use Case	Users/Actors
Sales	Search for item	Customer, customer service representative, store sales representative
Sales	View product comments and ratings	Customer, customer service representative, store sales representative
Sales	View accessory combinations	Customer, customer service representative, store sales representative
Sales	Fill shopping cart	Customer
Sales	Empty shopping cart	Customer
Sales	Check out shopping cart	Customer
Sales	Fill reserve cart	Customer
Sales	Empty reserve cart	Customer
Sales	Convert reserve cart	Customer
Sales	Create phone sale	Customer service representative
Sales	Create store sale	Store sales representative
Order fulfillment	Ship items	Shipping
Order fulfillment	Manage shippers	Shipping
Order fulfillment	Create backorder	Shipping
Order fulfillment	Create item return	Shipping, customer
Order fulfillment	Look up order status	Shipping, customer, management
Order fulfillment	Track shipment	Shipping, customer, marketing
Order fulfillment	Rate and comment on product	Customer
Order fulfillment	Provide suggestion	Customer

### RMO Use Cases Grouped into First Cut Menu Hierarchy

Menu Description	Menu Choices (Use Cases)	Intended User(s)
Shopping cart functions (primary or reserve)	<ul> <li>Search for item</li> <li>View product comments and ratings</li> <li>View accessory combinations</li> <li>Switch carts (primary to reserve or vice versa)</li> <li>Fill shopping cart</li> <li>Empty shopping cart</li> <li>Check out shopping cart</li> </ul>	Customer
Sale creation	<ul> <li>Search for item</li> <li>View product comments and ratings</li> <li>View accessory combinations</li> <li>Create sale</li> </ul>	Customer service and store sales representatives
Order shipment	<ul> <li>Ship items</li> <li>Manage shippers</li> <li>Create backorder</li> <li>Create item return</li> <li>Look up order status</li> <li>Track shipment</li> </ul>	Customer service and store sales representatives
Customer order control	<ul> <li>Look up order status</li> <li>Track shipment</li> <li>Create item return</li> <li>Rate and comment on product</li> <li>Provide suggestion</li> </ul>	Customer

# **Dialog Design**

- For each use case, think of the natural flow of a dialog between user and computer
  - Based on the flow of activities in use case description and/or the system sequence diagram
  - Use natural language to emphasize feedback to user
  - Create a storyboard of the dialog, showing the sequence of sketches of the screen each step of the dialog. (storyboarding)
  - Review the storyboard with users

### From Dialog to Storyboard (part 1) Use case Check out shopping cart

System:	What would you like to do?
USER:	I'd like to check out.
System:	Okay. What is your e-mail address or account number?
USER:	My e-mail address is nwells22@gmail.com.
System:	Fine. You are Nancy Wells at 1122 Silicon Avenue. Correct?
USER:	Yes.
System:	All items in your cart are in stock and can be shipped today.
	Because your order subtotal is over \$100, you qualify for free
	UPS ground shipping (3-5 days). Other shipping options

All items in your cart are in stock and can be shipped today. Because your order subtotal is over \$100, you qualify for free UPS ground shipping (3–5 days). Other shipping options include next day (\$35.00), two day (\$20.00), and USPS parcel post (\$11.70, 5–7 days). How would you like your items to be shipped?

## From Dialog to Storyboard (part 1)

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	View Empty Check ou	it 🔪					

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	Nancy Wells								
	1122 Silicon								
	Alamagordo,	NM 87989							
	That's me	Т	hat's not me						
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Browse	Share	Cart	Orders	Acce				
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1								
	Order summary							
Qty	SKU	Description	Price	Status				
1 1	0967335 Tod	dler parka red	44.95	in-stock				
1 9	4462 Lad	ies parka blue	72.95	in-stock				
All item	All items will ship today. Please choose ship. metho Free - UPS ground (3-5 days) 335.00 - UPS next day \$20.00 - UPS two days							

## From Dialog to Storyboard (part 2)

USER:	Free UPS ground shipping.
System:	We have a shipping address on file for you (1122 Silicon Avenue). Do you want your order shipped to that address?
USER:	No.
System:	To what address would you like the order shipped?
USER:	John Wells, 1612 Jefferson Street NE, Albuquerque, NM 87123.
System:	Okay, the total charge is \$125.56 (\$117.90 item subtotal plus \$7.66 sales tax). Shall I charge that amount to your credit card on file (a Visa with an account number ending in 0899)?
USER:	Yes.
System:	Your payment has been approved, and your order is being prepared for shipment. A confirmation e-mail has been sent to you, and another will be sent with a shipment tracking number when the order is shipped later today. Can I help you with anything else?
User:	No.

# From Dialog to Storyboard (part 2)

	Ridg	jeline Mounta	in Outfit	ters				Ridgelin	e Mountain	Outfitters	
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		Order sun	nmary								
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# Guidelines for Windows and Forms

- Interface Layout and Formatting
  - Consistency, labels and headings, distribution and order, fonts and colors
- Data Entry
  - Text box, list box, combo box, radio buttons, check boxes
- Navigation and Support Controls
  - Minimize, maximize, close, scroll bars, resize

## **RMO** Windows Form

10 Customer Support System -	Product Detail		2
RIDGELINE MOUNTAIN OUTFITTERS	Product Information Product ID 109 Size 6 Color Red	067335	Product Picture
Pro Toddlers medium-weight parka. Fle Elastic sleeve openings with glove/ exterior pockets with velcro closur Nylon/polyester shell. Cotton lining	mitten hooks. One interior a es. Machine wash and dry.		Next/Previous Picture
Regular Price \$49.95 Sale Price \$44.95 Inventory ID COT77448 In Stock 41	Search Criteria Key Words parka velcro	Catalog Any Gender Toddler Product Type	Price Min I
On Order 0 Due Date 00/00/0000		atches Next/Previou	Add to Order Exit

### Guidelines for Web Browser User Interfaces

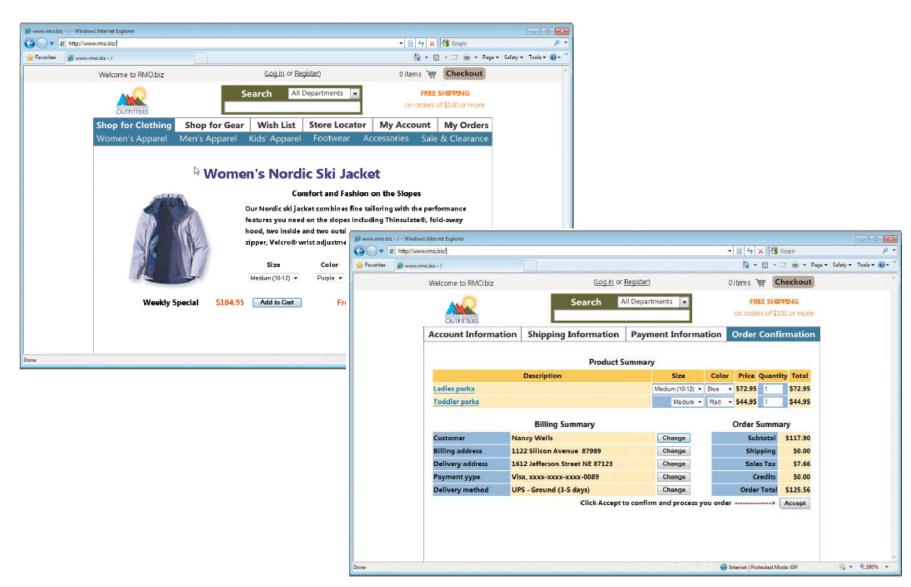
### Consistency

 Cascading Style Sheets (CSS) – Web page encoding standard that enables a Web site designer to specify parts of a page that will always look the same and parts that will vary by task or audience

#### Performance Considerations

- Sensitive to network connection, amount of information transmitted, type of information transmitted
- Pictures, Video, and Sound
  - Powerful, but compatibility issues arise
- Users with Disabilities
  - Assistive technologies -- software (such as text-to-speech and voicerecognition utilities) that adapts user interfaces to the special needs of persons with disabilities

### RMO Example Using CSS for Consistency



# **Guidelines for Handheld Devices**

## Challenges

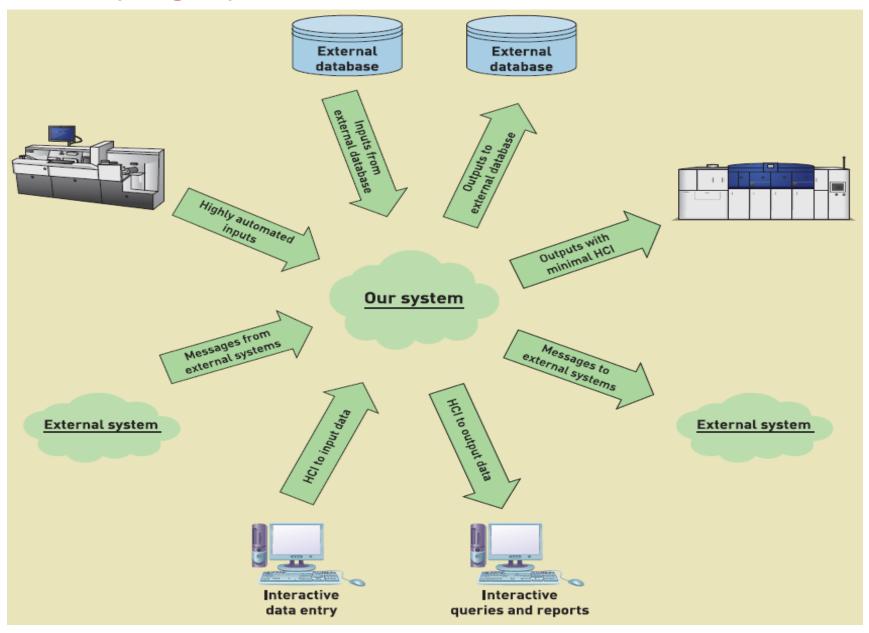
 Small screen size, small keyboards and touch screens, limited network capacity, app design guidelines and toolkits

Home   Stores   Log In   Cart							
	Search						
Shop for Clothing							
Women's Apparel	>						
Men's Apparel	>						
Kids' Apparel	>						
Footwear	>						
Accessories	>						
Sale & Clearance	>						
Shop for Gear							
Wish List							
My Account							

### Identifying System Interfaces Inputs/outputs with minimal human intervention

- Inputs from and outputs to other systems
  - These are direct interfaces with other information systems, normally formatted as network messages.
- Highly automated inputs and outputs
  - These are captured by devices (such as scanners) or generated by persons who start a process that proceeds without further human intervention.
- Inputs and outputs to external databases
  - These can supply input to or accept output from a system.

### **Identifying System Interfaces**



### XML for System Interfaces

- Extensible Markup Language (XML) -- extension of HTML that embeds self-defining data structures within textual messages
  - XML tags -- character sequences (such as <name> and </name>) that define the beginning, end, and meaning of the text that appears between them

```
<customer record>
     <accountNumber>RMO10989</accountNumber>
     <name>William Jones</name>
     <billingAddress>
           <street>120 Roundabout Road</street>
           <city>Los Angeles</city>
           <state>CA</state>
           <zip>98115</zip></billingAddress>
    <shippingAddress>
           <street>120 Roundabout Road</street>
           <city>Los Angeles</city>
           <state>CA</state>
           <zip>98115</zip></shippingAddress>
    <dayPhone>215.767.2334</dayPhone>
     <nightPhone>215.899.8763</nightPhone>
</customer record>
```

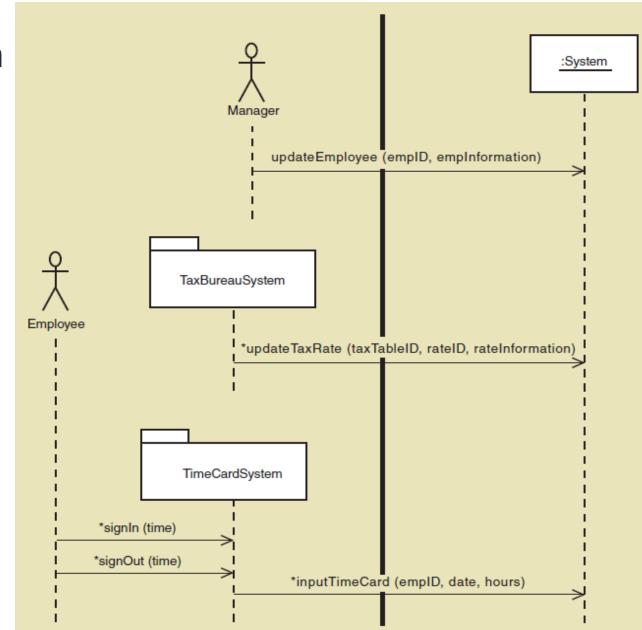
## System Inputs

- Primary Objective is Error Free Input
  - Use electronic devices wherever possible
  - Avoid human involvement as much as possible
  - If information is already available in electronic form, use it instead of re-entering information
  - Validate and correct information at time and location entered

### Device Examples

 Magnetic card strip readers, bar code readers, optical character recognition, radio frequency ID tags (RFID), touch screen, electronic pens, digitizers, speech recognition

- Defining System Inputs Details
  - Sequence
     Diagram
  - Details for messages



## System Outputs

- Detailed reports -- reports that contain specific information on business transactions
- Summary reports -- reports that summarize detail or recap periodic activity
- Exception reports -- reports that provide details or summary information about transactions or operating results that fall outside a predefined normal range of values
- Executive reports -- reports used by high level managers to assess overall organizational health and performance

## System Outputs

- Internal outputs -- reports or other outputs produced for use within the organization
  - Types of internal reports apply here
- External outputs -- reports or other outputs produced for use by people outside the organization
  - Statements, notices, stockholder reports
  - Higher quality, color, reflect image of organization
- Turnaround documents -- external outputs that includes one or more parts intended to be returned with new data or information
  - Bills

### External Output Example

E MOLINTAN FITTERS	Ridgeline M	Iountain Outfitt	ers—Shopp	ing Ca	rt Order				
	Order Number: 4673064 Today's Date: May 18, 2013								
ping Address:			Billing Ad	dress:					
936 N Swivel Street Hillville, Ohio 59222				936 N Swivel Street Hillville, Ohio 59222					
Product ID	Descripti	Size	Color	Price	Extended Price				
458238WL	Jordan Men's Jumpman Team J				White/ Light Blue	\$119.99	\$119.99		
347827OP	Woolrich Men's Backpacker Shirt				Oatmeal Plaid	\$41.99	\$41.99		
8759425SH	Nike D.R.I. – Fit Shirt				Black	\$30.00	\$60.00		
5858642OR	Puma Hiking Shorts				Tan	\$15.00	\$15.00		
						Subtotal	\$236.98		
						Shipping	\$8.50		
Shipping Information: Payment Information:						Tax	\$11.25		
Shipping Method: Normal 7–10 day American Express MasterCard VISA 🗵 Discover						Total	\$256.73		
ing Number:	UPS To be sent via email FredW253@aol.com	Account Number							
	FITTERS omer Name: omer Number: ping Address: ping Address: Product ID 458238WL 3478270P 8759425SH 58586420R 58586420R	e MOUNTAIN FITTERS omer Name: Fred Westing omer Number: 6747222 ping Address: 936 N Swivel Street Hillville, Ohio 59222 Product ID Descripti 458238WL Jordan Men's Jumpr 347827OP Woolrich Men's Back 8759425SH Nike D.R.I. – Fit Shir 5858642OR Puma Hiking Shorts ping Information: ing Method: Normal 7–10 day ing Company: UPS ing Number: To be sent via email	PITTERS         omer Name:       Fred Westing         omer Number:       6747222         ping Address:       936 N Swivel Street         936 N Swivel Street       936 N Swivel Street         Hillville, Ohio 59222       936 N Swivel Street         Product ID       Description         458238WL       Jordan Men's Jumpman Team J         347827OP       Woolrich Men's Backpacker Shirt         8759425SH       Nike D.R.I. – Fit Shirt         5858642OR       Puma Hiking Shorts         ping Information:       Image Method:         Normal 7–10 day       Marcican Express         ing Company:       UPS         ing Number:       To be sent via email	PRODURTAN       Fred Westing       Order Num         omer Number:       6747222       Billing Address:         ping Address:       936 N Swivel Street       Billing Address:         936 N Swivel Street       Billing Address:       Billing Address:         Product ID       Description       0         458238WL       Jordan Men's Jumpman Team J       3478270P         458238WL       Jordan Men's Backpacker Shirt       8759425SH         8759425SH       Nike D.R.I. – Fit Shirt       58586420R         ping Information:       Puma Hiking Shorts       MasterCard       VISA X         Account Number:       To be sent via email       Account Number       X X X – X X X – X X X – X X X	PROMINANT       Order Number: 4673         Today's Date:       May 1         ping Address:       936 N Swivel Street         936 N Swivel Street       936         Hillville, Ohio 59222       Billing Address:         936 N Swivel Street       936         Hillville, Ohio 59222       Billing Address:         936 N Swivel Street       936         Hillville, Ohio 59222       Billing Address:         936 N Swivel Street       936         Hillville, Ohio 59222       Size         458238WL       Jordan Men's Jumpman Team J       12         347827OP       Woolrich Men's Backpacker Shirt       XL         8759425SH       Nike D.R.I. – Fit Shirt       M         5858642OR       Puma Hiking Shorts       L         Ing Method:       Normal 7–10 day       MasterCard       VISA ID Discover         Account Number:       To be sent vis email       Address:       FredW253 @aol.com	FITTERS       Order Number:       Fred Westing         omer Number:       6747222         ping Address:       936 N Swivel Street         936 N Swivel Street       936 N Swivel Street         Hillville, Ohio 59222       936 N Swivel Street         Product ID       Description         Size       Color         458238WL       Jordan Men's Jampman Team J       12         White/Light Blue       347827OP       Woolrich Men's Backpacker Shirt       XL         347827OP       Woolrich Men's Backpacker Shirt       XL       Oatmeal Plaid         8759425SH       Nike D.R.I Fit Shirt       M       Black         5858642OR       Puma Hiking Shorts       L       Tan         ping Information:       Image: Color       MasterCard       VISA ID Discover         ing Method:       Normal 7-10 day       MasterCard       VISA ID Discover       Account Number         ing Company:       UPS       MasterCard       VISA ID Discover       Mo YR	Product ID       Description       Size       Color       Price         458238WL       Jordan Men's Jumpman Team J       12       White/Light Blue       \$119.99         3478270P       Woolrich Men's Backpacker Shirt       XL       Oatmeal Plaid       \$419.99         8759425SH       Nike D.R.I. – Fit Shirt       M       Black       \$30.00         58586420R       Puma Hiking Shorts       L       Tan       \$15.00         Payment Information: American Express       MasterCard       VISA       Discover       Subtotal         Shipping       Marrican Express       MasterCard       VISA       No YR       YR         Address:       FredW253@sol.com       FredW253@sol.com       FredW253@sol.com       YR       YR		

Thank you for your order. It is a pleasure to serve you. Check back next week for new weekly specials!!

# Internal Output Example

Detailed control break report

RMO12587         Spr/Fall         Mens C         8201         \$39.00         \$34.95         N           Description Outdoor Nylon Jacket with Lining         Units in Stock         Reorder Level         Units o           Small         Blue         691         150         Units o           Small         Blue         691         150         Vellow         827         150           Medium         Blue         722         150         Secondary         Secondary         150         Secondary         Secondary	Season			
Description Outdoor Nylon Jacket with Lining           Size         Color         Style         Units in Stock         Reorder Level         Units of Green           Small         Blue         691         150         Green         723         150           Red         569         150         Fellow         827         150           Medium         Blue         722         150         Green         756         150           Red         698         150         Fellow         590         150         Fellow         150           Vellow         590         150         Fellow         1370         150         Fellow         Fellow         1370         150         Fellow         Fellow         1322         150         Fellow         Fellow         1322         150         Fellow         F				
Size         Color         Style         Units in Stock         Reorder Level         Units of Green           Small         Blue         691         150         Green         723         150           Red         569         150         Fellow         827         150           Medium         Blue         722         150         Green         756         150           Medium         Blue         722         150         Green         756         150           Hed         698         150         Green         150         Fellow         590         150           Large         Blue         1289         150         Fellow         150         Fellow         150         Fellow         1370         150         Fellow         1370         150         Fellow         1322         150         Fellow         1322         150         Fellow         1322         150         Fellow         1322         150         Fellow         Fellow         1322         150         Fellow         Fellow         1322         150         Fellow         Fellow         1322         150         Fellow         Fellow         Fellow         Fellow         Fellow         Fellow				
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Green         723         150           Red         569         150           Yellow         827         150           Medium         Blue         722         150           Green         756         150           Yellow         590         150           Large         Blue         1289         150           Green         1455         150           Red         1329         150           Kard         1329         150           Yellow         1370         150           Kard         1289         150           Kard         1266         150           Yellow         1322         150           Xlarge         Blue         1498         150           Green         1248         150         150           Red         1266         150         150           Pellow         1322         150         150           Brown         7993         \$49.95         \$44.89           Description Hiking Walkers with Patterned Tread Durable Uppers         100         10           Tan         422         100         100         100	Size Color		Size Color	
Red         569         150           Yellow         827         150           Medium         Blue         722         150           Green         756         150           Red         698         150           Yellow         590         150           Large         Blue         1289         150           Green         1455         150           Red         1329         150           Yellow         1370         150           Xlarge         Blue         1498         150           Green         1248         150           Red         1266         150           Yellow         1322         150           Description Hiking Walkers with Patterned Tread Durable Uppers         Disco           7         Brown         597         100           Tan         422         100         10           8         Brown         6597         100           Tan<				
Yellow         827         150           Medium         Blue         722         150           Green         756         150           Red         698         150           Yellow         590         150           Large         Blue         1289         150           Green         1455         150           Red         1329         150           Yellow         1370         150           Xlarge         Blue         1498         150           Green         1248         150         Green           Green         1248         150         Green           Red         1266         150         Feed           Yellow         1322         150         Feed           Yellow         1322         150         Feed           Season         Category         Supplier         Unit Price         Special Price         Disco           RMO28497         All         Footwe         7993         \$49.95         \$44.89           Description Hiking Walkers with Patterned Tread Durable Uppers         Tan         422         100           Tan         597         100         Tan				
Medium         Blue         722         150           Green         756         150           Red         698         150           Yellow         590         150           Large         Blue         1289         150           Green         1455         150           Red         1329         150           Yellow         1370         150           Xlarge         Blue         1498         150           Green         1248         150         Green           Red         1266         150         Season         Category         Supplier         Unit Price         Special Price         Disco           MO28497         All         Footwe         7993         \$49.95         \$44.89         Description Hiking Walkers with Patterned Tread Durable Uppers         Description Hiking Walkers with Patterned Tread Durable Uppers         Tan         422         100         All         Footwe         7993         \$49.95         \$44.89         Description Hiking Walkers with Patterned Tread Durable Uppers         Tan         422         100         Tan         422         100         Tan         633         100         Tan         654         100         Tan         654				
Green         756         150           Red         698         150           Yellow         590         150           Large         Blue         1289         150           Green         1455         150           Red         1329         150           Yellow         1370         150           Xlarge         Blue         1498         150           Green         1248         150         Green           Red         1266         150         Fed           Yellow         1322         150         Fed           MO28497         All         Footwe         7993         \$49.95         \$44.89           Description Hiking Walkers with Patterned Tread Durable Uppers         Vellow         100         Tan         422         100           8         Brown         597         100         Tan         654         100           10         Brown         633         100         Tan         654         100           11         Brown         862         100         11         100         12         Brown         754         100           12         Brown         754				
Red         698         150           Large         Blue         1289         150           Green         1455         150           Red         1329         150           Yellow         1370         150           Yellow         1370         150           Yellow         1370         150           Xlarge         Blue         1498         150           Green         1248         150         150           Red         1266         150         150           Pellow         1322         150         150           D         Season         Category         Supplier         Unit Price         Special Price         Disco           RMO28497         All         Footwe         7993         \$49.95         \$44.89           Description Hiking Walkers with Patterned Tread Durable Uppers         Units or         10         10         10         10         10         10           7         Brown         389         100         10         10         10         10           9         Brown         653         100         10         10         10         10         100         10				
Yellow         590         150           Large         Blue         1289         150           Green         1455         150           Red         1329         150           Yellow         1370         150           Xlarge         Blue         1498         150           Green         1248         150           Green         1248         150           Red         1266         150           Yellow         1322         150           D         Season         Category         Supplier         Unit Price         Special Price         Disco           RMO28497         All         Footwe         7993         \$49.95         \$44.89           Description Hiking Walkers with Patterned Tread Durable Uppers         Disco         7         Brown         389         100           Tan         422         100         10         Tan         521         100           9         Brown         633         100         10         10         10           10         Brown         836         100         10         11         10         10         10         10         10         10				
Large         Blue         1289         150           Green         1455         150           Red         1329         150           Yellow         1370         150           Xlarge         Blue         1498         150           Green         1248         150           Red         1266         150           Yellow         1322         150           D         Season         Category         Supplier         Unit Price         Special Price         Disco           RMO28497         All         Footwe         7993         \$49.95         \$44.89           Description Hiking Walkers with Patterned Tread Durable Uppers         Description         Tan         422         100           7         Brown         389         100         Tan         422         100           8         Brown         597         100         Tan         521         100           9         Brown         633         100         Tan         654         100           10         Brown         836         100         Tan         792         100           11         Brown         836         100         12<				
Green         1455         150           Red         1329         150           Yellow         1370         150           Xlarge         Blue         1498         150           Green         1248         150         150           Red         1266         150         150           Yellow         1322         150         150           D         Season         Category         Supplier         Unit Price         Special Price         Disco           AMO28497         All         Footwe         7993         \$49.95         \$44.89         50           Description Hiking Walkers with Patterned Tread Durable Uppers         Units or         7         Brown         389         100           7         Brown         389         100         10         10         10           8         Brown         597         100         100				
Red         1329         150           Yellow         1370         150           Xlarge         Blue         1498         150           Green         1248         150           Red         1266         150           Yellow         1322         150           D         Season         Category         Supplier         Unit Price         Special Price         Disco           RMO28497         All         Footwe         7993         \$49.95         \$44.89         Disco           Description Hiking Walkers with Patterned Tread Durable         Uppers         Units of         Tan         422         100         Tan         422         100         Tan         597         100         Tan         521         100         Tan         521         100         Tan         521         100         Tan         521         100         Tan         554         100         Tan         654         100         Tan         954         100         Tan         954         100         Tan         754         100				
Yellow         1370         150           Xlarge         Blue         1498         150           Green         1248         150           Red         1266         150           Yellow         1322         150           D         Season         Category         Supplier         Unit Price         Special Price         Disco           RMO28497         All         Footwe         7993         \$49.95         \$44.89         5           Description Hiking Walkers with Patterned Tread Durable Uppers         Vellow         100         7         Tan         422         100         7           7         Brown         389         100         7         100         7         100         1         1         100         1         1         100         1				
Xlarge         Blue         1498         150 Green           Red         1248         150 Feed           Yellow         1322         150           D         Season         Category         Supplier         Unit Price         Special Price         Disco           RMO28497         All         Footwe         7993         \$49.95         \$44.89           Description Hiking Walkers with Patterned Tread Durable         Uppers         Units of         Tan         422         100           7         Brown         389         100         Tan         422         100         Fan         654         100         Fan         954         100         Fan         754         100         Fan <t< td=""><td></td></t<>				
Green         1248         150           Red         1266         150           Yellow         1322         150           D         Season         Category         Supplier         Unit Price         Special Price         Disco           RMO28497         All         Footwe         7993         \$49.95         \$44.89           Description Hiking Walkers with Patterned Tread Durable Uppers         Velow         Units in Stock         Reorder Level         Units or           7         Brown         389         100         Tan         422         100           8         Brown         597         100         Tan         521         100           9         Brown         633         100         Tan         654         100           9         Brown         836         100         Tan         954         100           10         Brown         862         100         10         Tan         954         100           11         Brown         862         100         10         10         10         10         10         10         10           12         Brown         754         100         10         10				
Red Yellow         1266         150           D         Season         Category         Supplier         Unit Price         Special Price         Disco           RMO28497         All         Footwe         7993         \$49.95         \$44.89         Disco           Description Hiking Walkers with Patterned Tread Durable Uppers         Size         Color         Style         Units in Stock         Reorder Level         Units of           7         Brown         389         100	-			
Yellow         1322         150           D         Season         Category         Supplier         Unit Price         Special Price         Disco           RMO28497         All         Footwe         7993         \$49.95         \$44.89         Disco           Description Hiking Walkers with Patterned Tread Durable Uppers         Units in Stock         Reorder Level         Units of           Size         Color         Style         Units in Stock         Reorder Level         Units of           7         Brown         389         100         <				
D         Season         Category         Supplier         Unit Price         Special Price         Disco           RMO28497         All         Footwe         7993         \$49.95         \$44.89         Description Hiking Walkers with Patterned Tread Durable Uppers         \$49.95         \$44.89         Test and the second parabolic Uppers           Size         Color         Style         Units in Stock         Reorder Level         Units of the second parabolic Uppers           7         Brown         389         100				
RMO28497         All         Footwe         7993         \$49.95         \$44.89           Description Hiking Walkers with Patterned Tread Durable Uppers         Size         Color         Style         Units in Stock         Reorder Level         Units of           7         Brown         389         100	rein			
Size         Color         Style         Units in Stock         Reorder Level         Units of the style           7         Brown         389         100	Season			
Size         Color         Style         Units in Stock         Reorder Level         Units of           7         Brown         389         100         11         100         100         100         11         100         11         100         11         100         11         100         11         100         11         100         11         100         11         100         11         100         11         100         11         100         11         100         11         100         100         11         100         100         11         100         100         100         100         100         100         100	RMO28497 All			
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	tion Hiking Walk			
Tan         422         100           8         Brown         597         100           7an         521         100           9         Brown         633         100           7an         654         100           9         Brown         836         100           10         Brown         836         100           10         Brown         862         100           11         Brown         862         100           12         Brown         754         100           12         Brown         788         100	Size Colo			
Tan         422         100           8         Brown         597         100           Tan         521         100           9         Brown         633         100           7an         654         100           10         Brown         836         100           10         Brown         836         100           11         Brown         862         100           11         Brown         792         100           12         Brown         754         100           12         Brown         788         100	0120 0010			
8         Brown         597         100           Tan         521         100           9         Brown         633         100           7an         654         100           10         Brown         836         100           10         Brown         836         100           11         Brown         862         100           11         Brown         792         100           12         Brown         754         100           Tan         788         100         100				
9         Brown         633         100           Tan         654         100           10         Brown         836         100           Tan         954         100           11         Brown         862         100           Tan         792         100           12         Brown         754         100           Tan         788         100	7 Brow			
Tan         654         100           10         Brown         836         100           Tan         954         100           11         Brown         862         100           Tan         792         100           12         Brown         754         100           Tan         788         100	7 Brow Tan			
10         Brown         836         100           Tan         954         100           11         Brown         862         100           Tan         792         100           12         Brown         754         100           Tan         788         100	7 Brow Tan 8 Brow			
Tan         954         100           11         Brown         862         100           Tan         792         100           12         Brown         754         100           Tan         788         100	7 Brow Tan 8 Brow Tan			
11         Brown         862         100           Tan         792         100           12         Brown         754         100           Tan         788         100	7 Brow Tan 8 Brow Tan 9 Brow			
Tan         792         100           12         Brown         754         100           Tan         788         100	7 Brow Tan 8 Brow Tan 9 Brow Tan			
12 Brown 754 100 Tan 788 100	7 Brow Tan 8 Brow Tan 9 Brow Tan 10 Brow			
Tan 788 100	7 Brow Tan 8 Brow Tan 9 Brow Tan 10 Brow Tan			
	7 Brow Tan 8 Brow Tan 9 Brow Tan 10 Brow Tan 11 Brow Tan			
13 Brown 830 100	7 Brow Tan 8 Brow Tan 9 Brow Tan 10 Brow Tan 11 Brow Tan			
Tan 921 100	7 Brow Tan 8 Brow Tan 9 Brow Tan 10 Brow Tan 11 Brow Tan 11 Brow Tan 12 Brow Tan			

### Drill Down Online Report Summary and Detailed

Year 2013	Month	Janua	ry						_			
Category	Season Code	Web Sales		Teleph Sales		ail ales		otal ales				
Footwear	All	\$ 2	289,323	\$ 1,347	7,878 \$	540,88	33 \$	2,178,0	084			
Men's Clothing	Spring Summer Fall	1	768,454 213,938 142,823		9,243 \$ 7,121 9,873	437,87 123,59 112,23	90	4,691,4 724,0 384,9	649			
Totals	Winter All	2,9	980,489 839,729	6,453 4,897	3,896 7,235	675,29 349,23 1,698,22	90 34	10,109,0 7,086, 23,391,0	675 198			
Women's Clothing	Spring Summer Fall Winter All							965.(	510			
Totals			Mont	thly Sale	es Detail							
_			Year	2013	Month	Janu	uary C	ategory	Men's	Clothing	Sea	ason
			Produ ID		Product Descriptio	n	Web Sales	Т	elephone Sales	Mai Sal		
			RMO1 RMO1 RMO2 RMO1 RMO3	3788 3788 2980	Winter Park Fur-Lined G Wool Sweat Long Under Fleece-Line	loves ter wear	\$ 1,490,24 149,02 596,09 298,05 447,07	2 7 0	3,226,948 322,695 1,290,775 645,339 1,258,079	\$ 337, 33, 135, 68, 100,	765 058 556	\$

Winter

Total Sales

\$ 5,054,833 505,482 2,021,930 1,003,005 1,805,425 \$ 10,394,615

## Graphical Outputs



# Summary

- There are two types of interfaces user interfaces and system interfaces
- User interfaces involve direct user interaction with the system. System interfaces require minimal or no user interaction
- The design of the user interface has a long history as human computer interaction (HCI) and relies on usercentered design, which focuses early on users, evaluates designs to ensure usability, and uses iterative development
- Metaphors are used to think about the nature of the user interface, and they include direct manipulation, desktop, document, and dialog metaphors.

# Summary (continued)

- Key user interface concepts include affordance and visibility for controls
- Other key principles include consistency, shortcuts, feedback, dialog closure, error handling, reversal of actions, and reducing short term memory loads
- Use cases are organized into one or more menu hierarchies to arrange functionality for users
- Dialogs and storyboards are used to design the interaction for each use case based on use case flow of activates and system sequence diagrams
- Guidelines are available for designing for Windows, Web browsers, and Handheld devices

# Summary (continued)

- System interfaces include inputs and outputs to other systems, highly automated inputs and outputs, and inputs and outputs to external databases.
- Designing system inputs involves identifying devices and mechanisms, identifying inputs and the data content, and determining the controls necessary
- Designing system outputs includes designing detailed reports, summary report, exception reports, and executive reports
- Outputs are also classified as internal, external, or turnaround
- Electronic reports and other outputs can include drill down, graphics, and multimedia