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

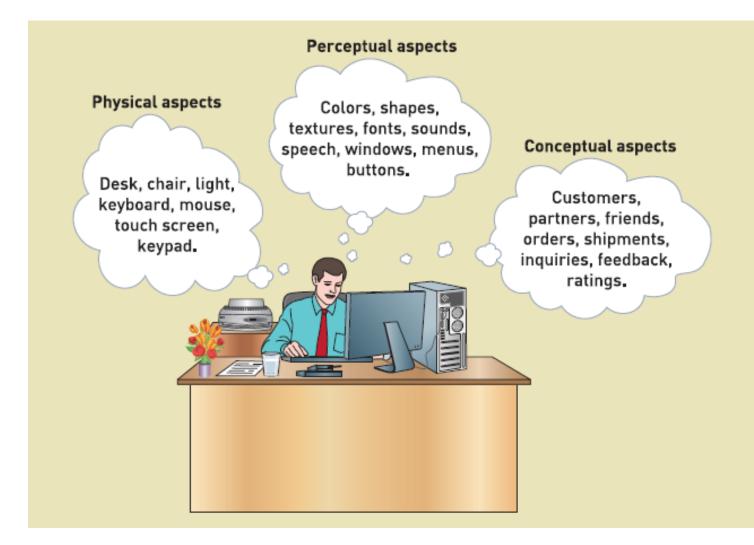
User Interfaces and System Interfaces

- 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
	• • 1	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	1 1 1	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°
Write		MoritaringBeaks periathumitee NataButtaring MoritaringBeaks I.1 MoritaringBeaks I.1 MoritaringBeaks I.1 MoritaringBeaks I.1	Providem d hathame Institume 1.1 d d d d d d d d d d d d d	Core of puske-dama
Dav Dav	to the second s		MonitoringDevice 0.* 1.1 MonitoringDevice 0.* 1.1 SerialNamber manafacturer dateOfAnnafacture firmwaroVirsion 1.1 GellPhone id phoneYourber oparatingSystem oppratingSystem applicationVersion	Mindle N., San Mar 22 Tournani Sama West in Statistica, San Mar 24 NVC tour bus crash kin. Mindle N., San Mar 22 Resease officint in high- minance. San Mar 22 (A 2-1-4)
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			 Include additional medical personnel (nurses and physicians' assistants, at minimum) Include alerts sent by the system to medical personnel and messages sent by medical personnel to the patient 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? 	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

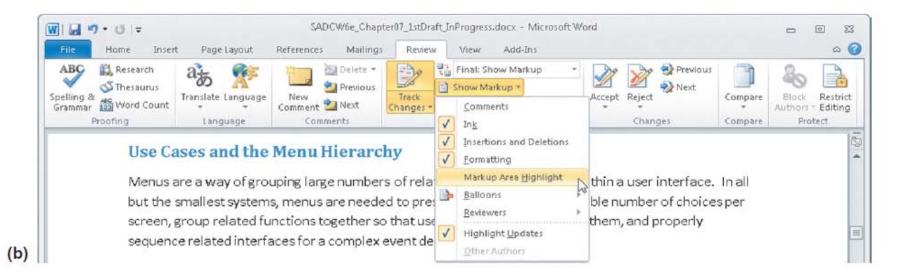
- Design for Consistency
- Provide Shortcuts
- Provide Feedback
- Dialogs Should Yield Closure
- Error Handling that Provides Guidance
- Easy Reversal of Actions
- Reduce Short Term Memory Load

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

90.	M http://www.microsoft.com	n/en-us/default.aspx			🔫 😽 🗙 🛃 Go	ogie	
🚖 Favorites	Microsoft Corporation:	Cloud Computing, Softw.	•		👌 • 🗟 • 🖻	🛛 🖶 🔻 Page 🕶	Safety - Tools -
		Weld	come & Feedback	Shop Share A	All Microsoft Sites U	Inited States (Englis	sh) Microsoft
				-			
Mic	crosoft" Be wit	hat's next."					
Mic	COSOFT" Be wit	hat's next."					
Mic	CrOSOft" Be wit	_	h Microsoft.com		Ding:		
Mic	Products	_	h Microsoft.com Buy Download	s Solutions	Security Support	t About	



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)	 Search for item View product comments and ratings View accessory combinations Switch carts (primary to reserve or vice versa) Fill shopping cart Empty shopping cart Check out shopping cart 	Customer
Sale creation	 Search for item View product comments and ratings View accessory combinations Create sale 	Customer service and store sales representatives
Order shipment	 Ship items Manage shippers Create backorder Create item return Look up order status Track shipment 	Customer service and store sales representatives
Customer order control	 Look up order status Track shipment Create item return Rate and comment on product Provide suggestion 	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)

Ridgeline Mountain Outfitters							
vse Sha	Share Cart	Orders	Account				
	View Empty Check ou	it 🔪					

Browse	Share	Cart	Orders	A
browse	Snare	Cart	Orders	Accourt
		In a la Diana		
			se enter you	r I
	e-mail addr	ess or acco	unt number.	
	pwolle228	gmail.com		
	nwenszzig	ggman.com		
1.1			~	
			· ·	
			•	
			·	
			· ·	



	Ridgeline Mountain Outfitters								
Browse	Share	Cart	Orders	Account					
_				_					
	Please conf	irm account	information						
	Nancy Wells								
	1122 Silicon								
	Alamagordo,	NM 87989							
	That's me	Т	hat's not me						
		N		_					

Browse	Share	Cart	Orders	Acce				
				_				
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	
rowse	Shar	e Cart	Or	rders	Account	6	Browse	Share	Cart	Orders	Accoun
	Nancy V 1122 Sili	icon Avenue ordo, NM 8798	-				Name Apt# Street City State Zip Co	John 1612 Albuq New M	Jefferson Stro uerque Mexico		
	Ridg	jeline Mounta	in Outfit	ters				Ridgelin	e Mountain	Outfitters	
Browse	Shar	e Cart	Or	rders	Account	8	Browse	Share	Cart	Orders	Accoun
		Order sun	nmary								
Qty 1 1	SKU 10967335 94462	Descriptic Toddler parka re Ladies parka bli	ed ue	Price 44.95 72.95	Ext 44.95 72.95		cree		X-XXXX-XXXX-	oroved. Your 0899) has be	
Nano Visa	y Wells xxxx-xxxx- 02/17	n payment xxxx-0899 her method	Subtr Shipp Sales Total	ping s Tax	117.90 0.00 7.66 \$125.56		The in 3	order will b -5 days.	ber is 67738 e shipped to oping with R	oday for deliv	very

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

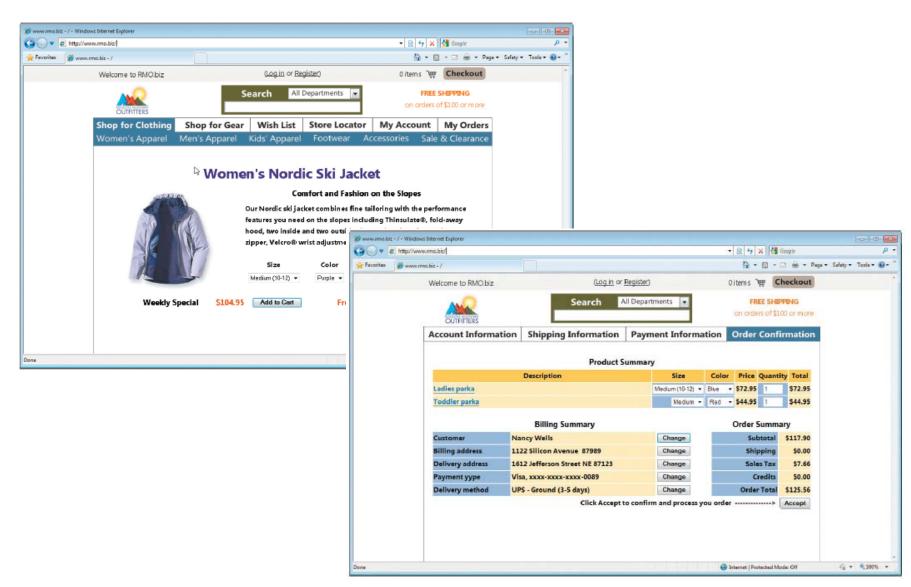
Consistency

 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

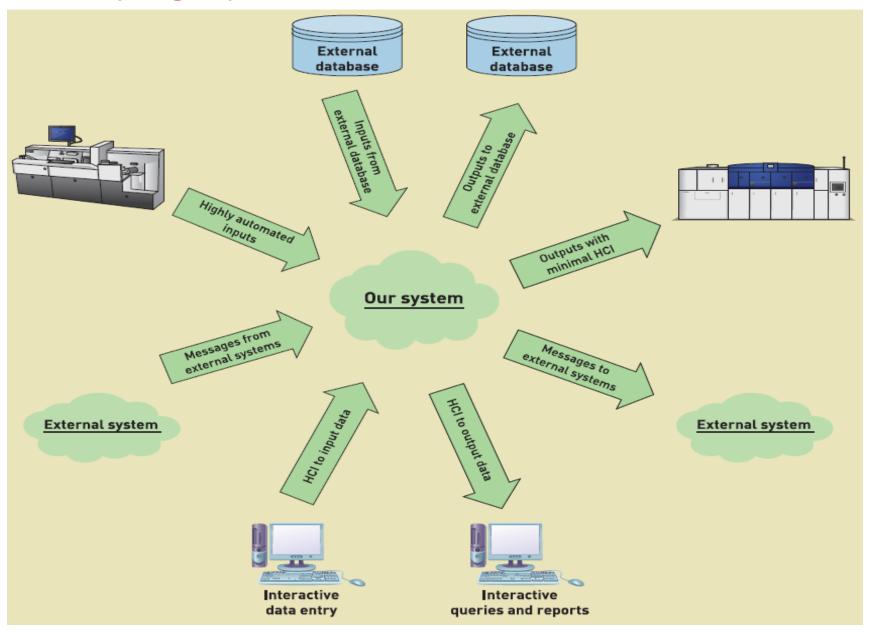
 Small screen size, small keyboards and touch screens, limited network capacity, app design guidelines and toolkits

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>
```

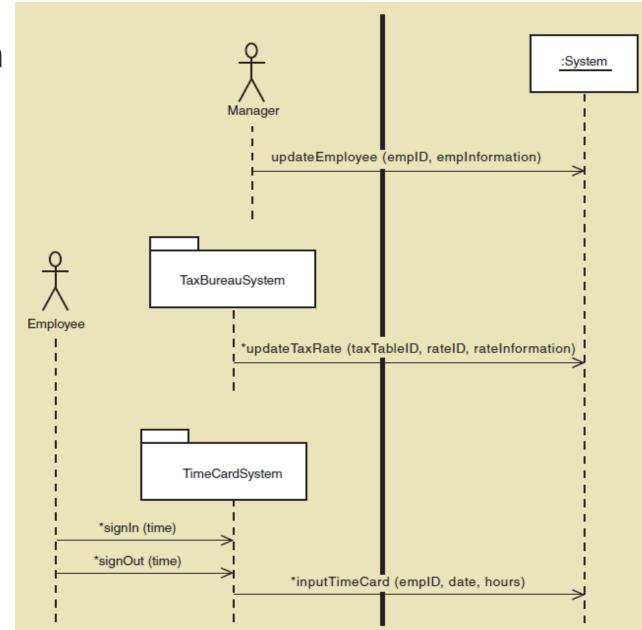
System Inputs

- 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				
Small Blue 691 150 Green 723 150 Red 569 150 Yellow 827 150 Medium Blue 722 150 Green 756 150 Yellow 590 150 Yellow 590 150 Yellow 590 150 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 Description Hiking Walkers with Patterned Tread Durable Uppers Disco Size Color Style Units in Stock Reorder Level Units on 7 Brown 389 100 Tan 100 Tan 521 100 Tan	tion Outdoor Ny			
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