

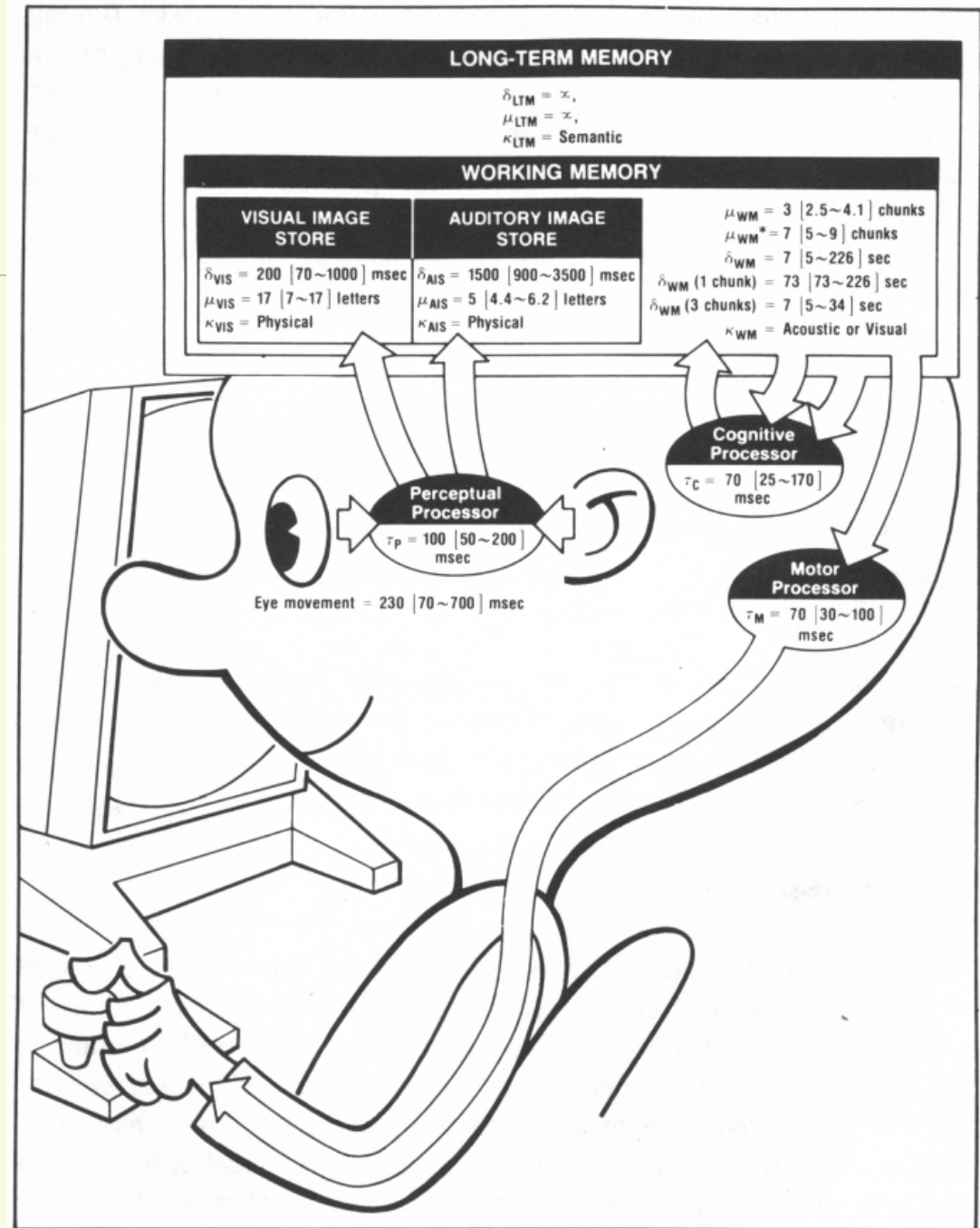
CS 160: Web Design Patterns

Professor John Canny

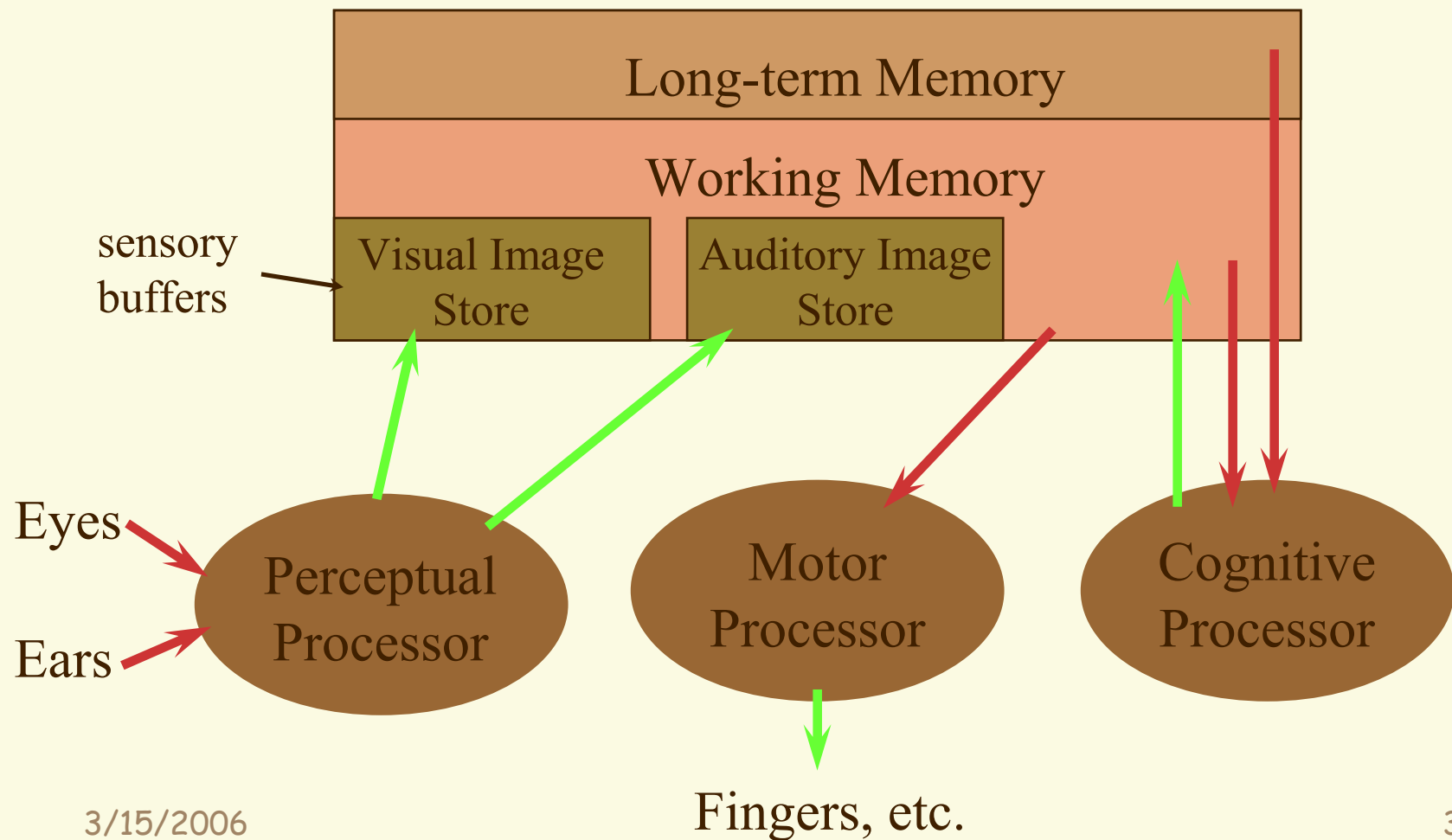
3/15/2006

1

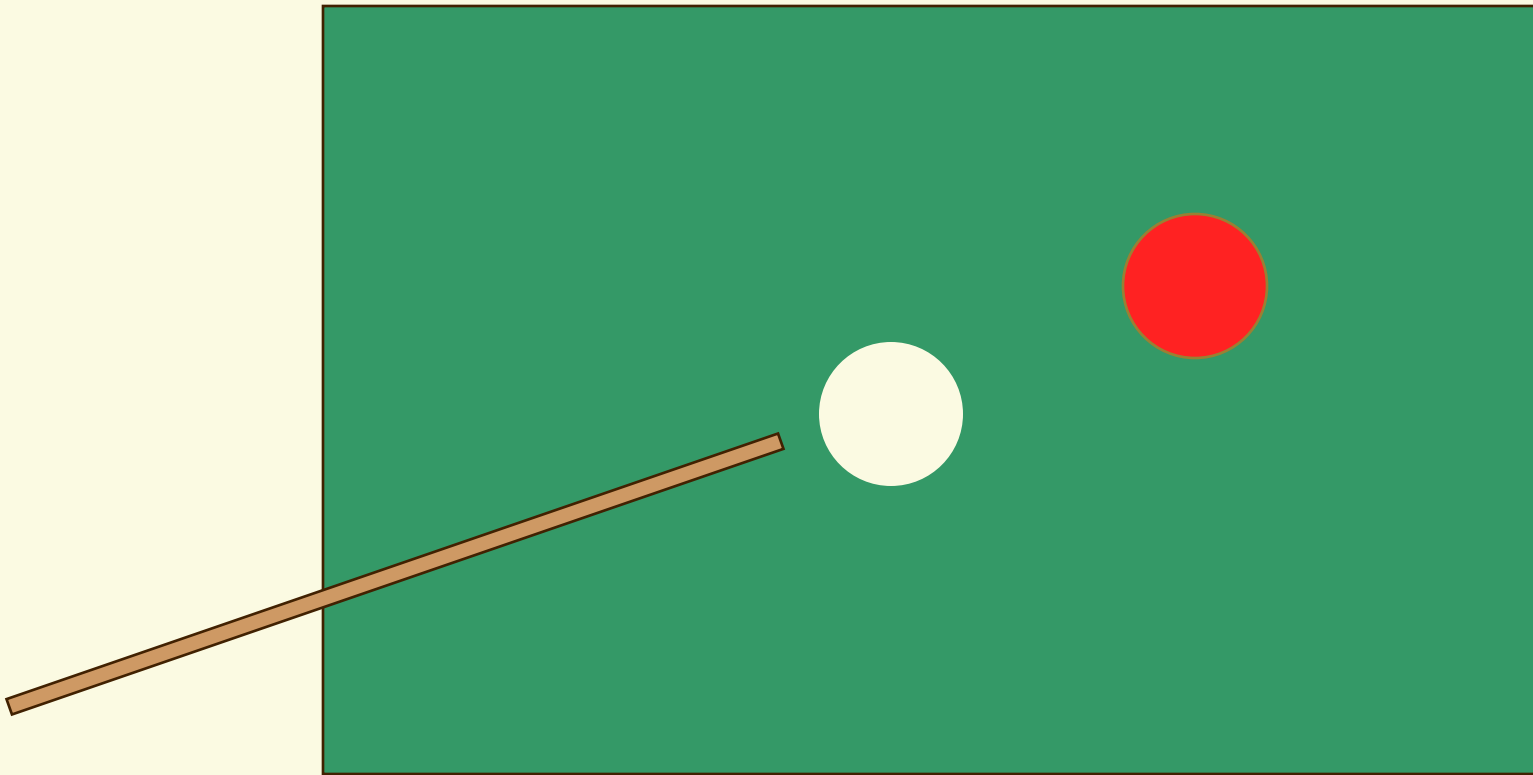
Model Human Processor



The Model Human Processor

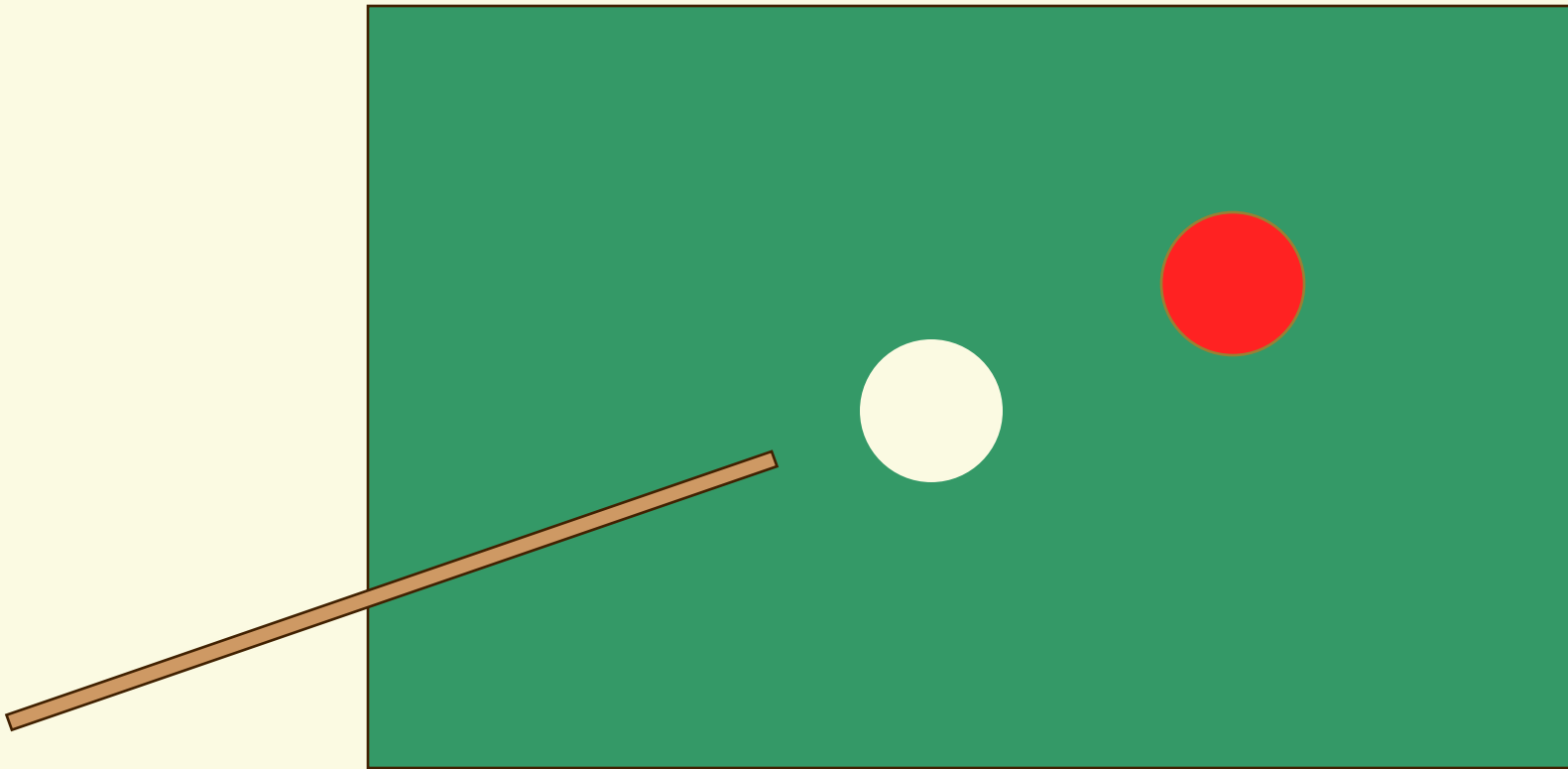



Perceptual Causality



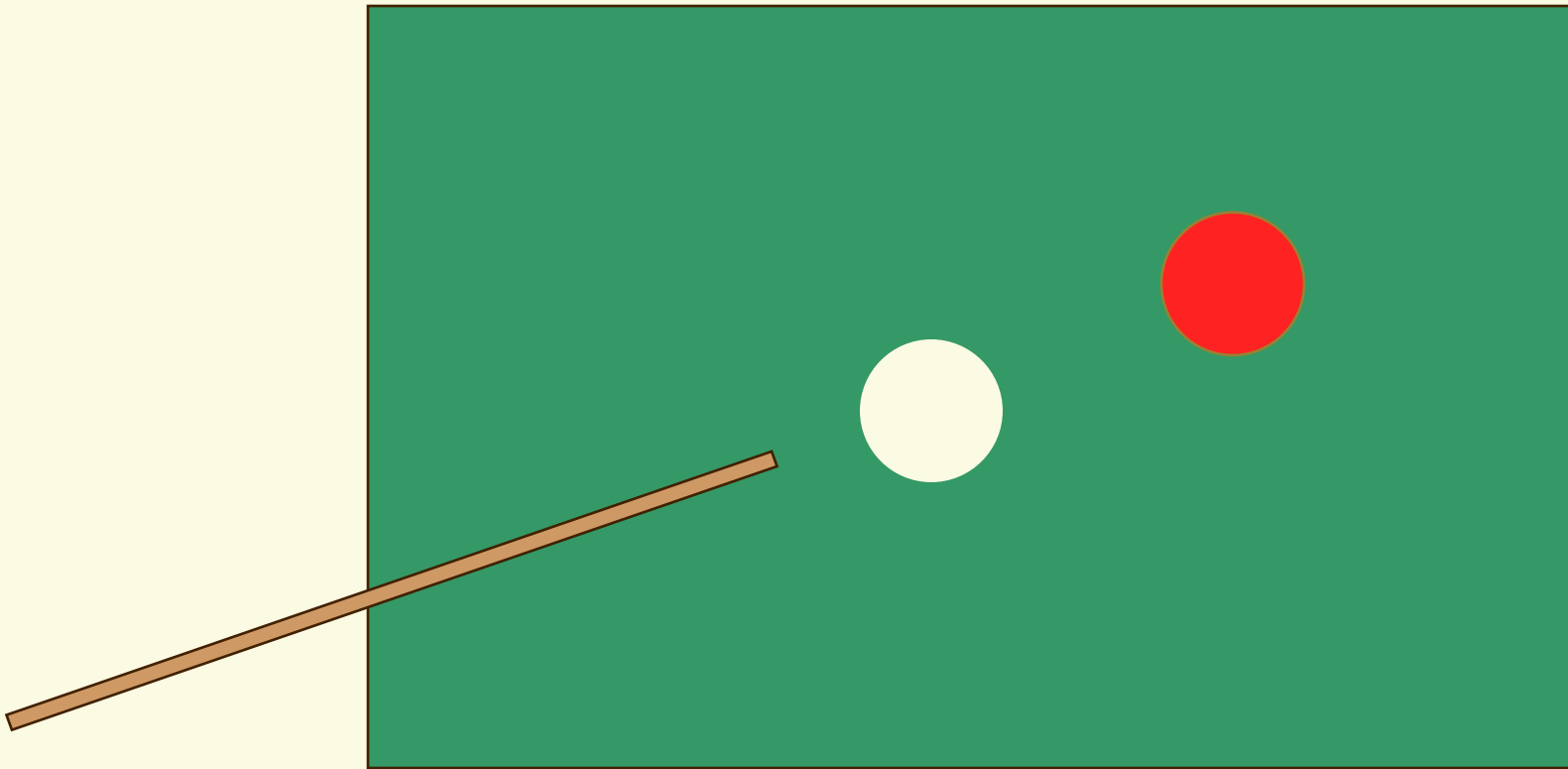
 How soon must red ball move after cue ball collides with it?


Perceptual Causality



 Must move in $< T_p$ (100 msec)

Perceptual Causality



 Must move in $< T_p$ (100 msec)

Perception

 Stimuli that occur within one PP cycle fuse into a single concept

- * Frame rate necessary for movies to look real?
 - + time for 1 frame $< T_p$ (100 msec) \rightarrow 10 frame/sec.
- * Max. morse code rate can be similarly calculated

 Perceptual causality

- * Two distinct stimuli can fuse if the first event appears to *cause* the other
- * Events must occur in the same cycle


Simple Experiment

 Volunteer

 Start saying **colors** you see in list of words

- * When slide comes up

- * As fast as you can

 Say "done" when finished

 Everyone else time it...

Paper

Home

Back


Schedule

Page

Change

Simple Experiment

 Do it again

 Say "done" when finished

Blue

Red

Black

White

Green

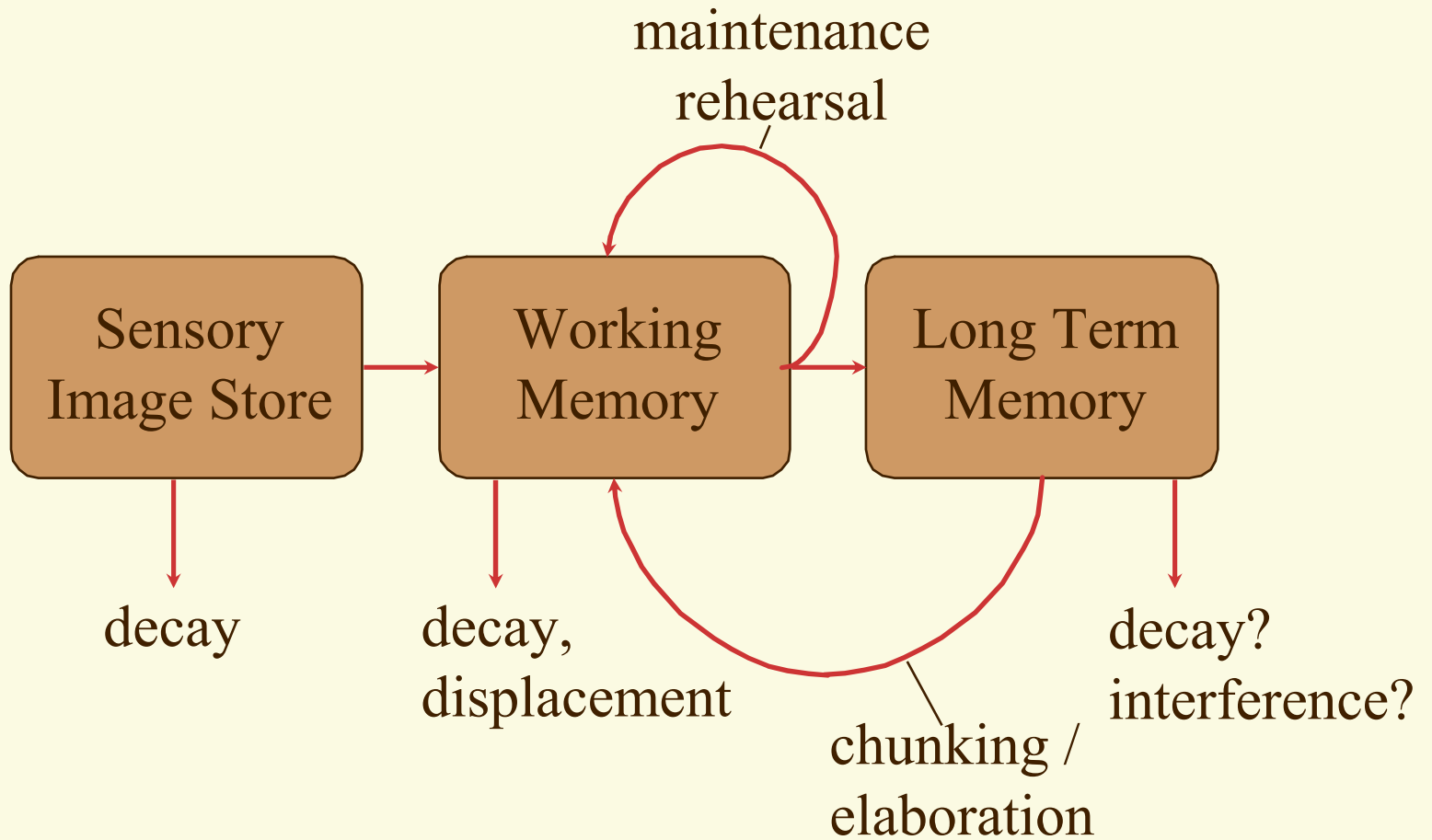
Yellow

Memory

Interference

- * Two strong cues in working memory
- * Link to different chunks in long term memory

Stage Theory



Stage Theory

Working memory is small

- * Temporary storage
 - + decay
 - + displacement

Maintenance rehearsal

- * Rote repetition
- * Not enough to learn information well


Answer to problem is organization

- * Faith Age Cold Idea Value Past Large
- * In a show of faith, the cold boy ran past the church

Elaboration

- 📄 Relate new material to already learned material
- 📄 Recodes information
- 📄 Attach meaning (make a story)
 - * e.g., sentences
- 📄 Visual imagery
- 📄 Organize (chunking)
- 📄 Link to existing knowledge, categories

LTM Forgetting

-  Causes for not remembering an item?
- * 1) Never stored: encoding failure
 - * 2) Gone from storage: storage failure
 - * 3) Can't get out of storage: retrieval failure

Recognition over Recall

Recall

- * Info reproduced from memory

Recognition






- * Presentation of info provides knowledge that info has been seen before
- * Easier because of cues to retrieval

 We want to design UIs that rely on recognition!

Facilitating Retrieval: Cues

- ☞ Any stimulus that improves retrieval
 - * Example: giving hints
 - * Other examples in software?
 - + icons, labels, menu names, etc.
- ☞ Anything related to
 - * Item or situation where it was learned
- ☞ Can facilitate memory in any system
- ☞ What are we taking advantage of?
 - * Recognition over recall!

Outline

-  Motivation
-  Design patterns in architecture & SE
-  Web design patterns
-  Home page patterns
-  E-commerce patterns

How can we Codify Design Knowledge?

- Now that you've worked on your project for > 6 weeks, you know a lot about your solution.
- How would you communicate your solution to another design team in a "portable" way?
- i.e. what specific elements should this description of your design have?
- Discuss this with some neighbors now, make a list!

Motivation for Design Patterns

Most articles in the UI literature are critiques

- * Norman, Nielsen, etc.

Design is about finding solutions

Good designs borrow & steal from other designs

- * But its hard to know how things were done before

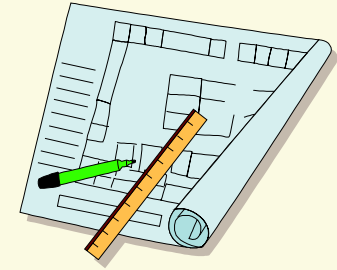
- * And hard to reuse specific solutions

Design patterns are a solution

- * Reuse existing knowledge of what works well



Design Patterns

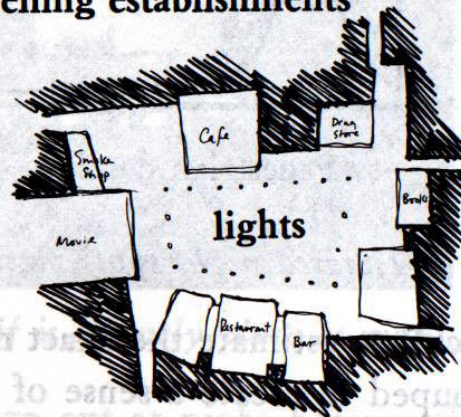


- 📄 First used in architecture [Alexander]
- 📄 Communicate design problems & solutions
 - * How big doors should be & where...
 - * How to create a beer garden where people socialize...
 - * How to use handles (remember Norman)...
- 📄 Not too general & not too specific
 - * Use solution "a million times over, without ever doing it the same way twice"

Example from Alexander: *Night Life*

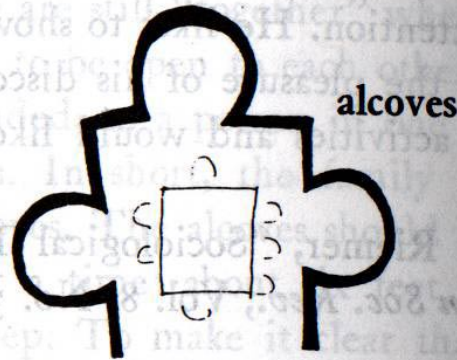
Knit together shops, amusements, and services which are open at night, along with hotels, bars, and all-night diners to form centers of night life: well-lit, safe, and lively places that increase the intensity of pedestrian activity at night by drawing all the people who are out at night to the same few spots in the town. Encourage these evening centers to distribute themselves evenly across the town.

clustered evening establishments



Example from Alexander: *Alcoves*

Make small places at the edge of any common room, usually no more than 6 feet wide and 3 to 6 feet deep and possibly much smaller. These alcoves should be large enough for two people to sit, chat, or play and sometimes large enough to contain a desk or a table.



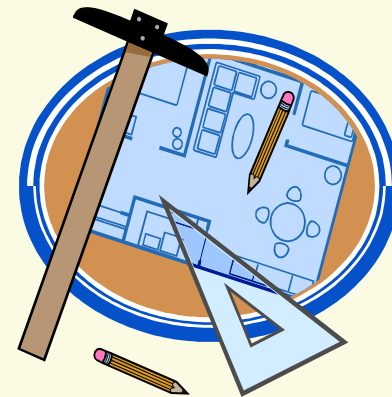
Design Patterns

- Next used in software engineering [Gamma et al.]
- Communicate design problems & solutions
 - * Proxy: surrogate for another object to control access to it
 - * Observer: when one object changes state, its dependents are notified



Design Patterns

- ☞ What software design patterns did we describe recently?
- ☞ Model-view controller
- ☞ Event Queues
- ☞ ??



Design Patterns



- ☞ We can do the same for Web Design
 - * Communicate design problems & solutions
- ☞ How can on-line shoppers keep track of purchases?
 - * Use the idea of shopping carts in physical stores
- ☞ How do we communicate new links to customers?
 - * Use consistent colors and mouseover highlights
- ☞ *Leverage* people's usage habits on/off-line
 - * if Yahoo does things a way that works well, use it

Pattern Format

1. Pattern Title
2. Context
3. Forces
4. Problem Statement
5. Solution
 - ⌘ Solution Sketch
6. Other Patterns to Consider

Example - Alcoves

1. Pattern Title: Alcoves

2. Context:

Collaborative and common areas in buildings.

3. Forces

Open spaces are inviting, but people want a sense of enclosure for private discussions.

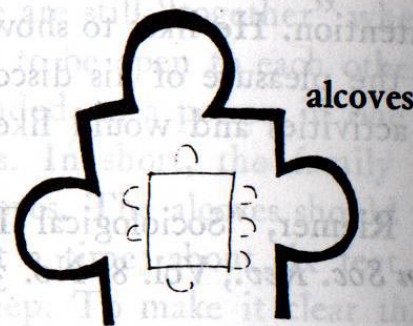
4. Problem Statement

Create an space that invites collaboration but also supports private discussion.

Example - Alcoves

5. Solution + sketch

Make small places at the edge of any common room, usually no more than 6 feet wide and 3 to 6 feet deep and possibly much smaller. These alcoves should be large enough for two people to sit, chat, or play and sometimes large enough to contain a desk or a table.



Pattern languages

- ❑ Alexander emphasized the importance of pattern *languages* - more than just collections of patterns.
- ❑ Languages are sets of patterns that fill out a design space, and are chosen to complement each other.
- ❑ Forces in each pattern may explain the relations with other patterns.

Patterns and idioms

- ❑ Not every design idea that uses the pattern syntax is a pattern.
- ❑ If an idea is too specific (e.g. programming language specific), then it is not a pattern.
- ❑ Specific ideas are called *idioms*.
- ❑ Similarly, patterns cannot be too general.
- ❑ It must be clear how the pattern should be applied in a context.

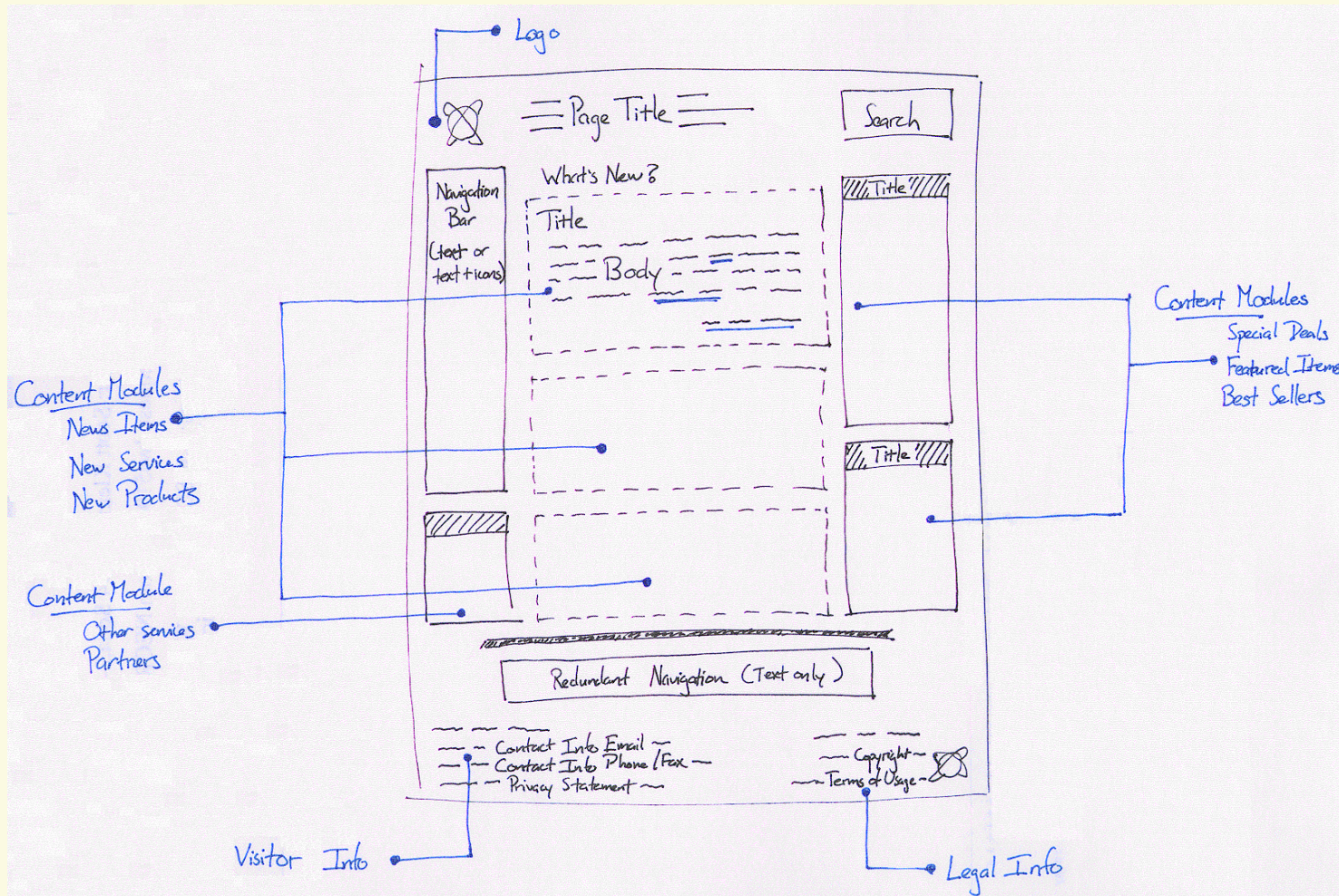
Home page design

1. Pattern Title: Home page
2. Context:
3. Forces
4. Problem Statement

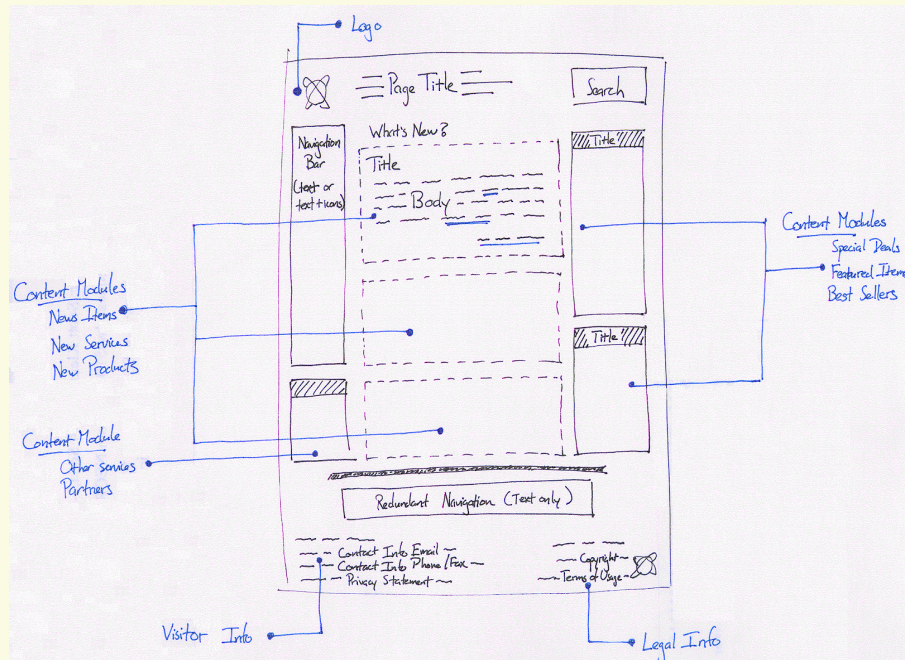
Home page design

1. Pattern Title: Home page
2. Context:
Pages that are the entry point for a web site.
3. Forces
People are attracted by novelty and good design, attention span is very short on the web, home pages are regularly updated.
4. Problem Statement
What to capture and hold visitors attention, encourage return visits, and be easy to maintain

Solution sketch



Home Page Design Rules



Strong 1st impressions

- * compelling titles & logos
- * simple navigation

Modularity simplifies updating

Home Page Design Rules

BUY IT NOW!

CNN.com Search CNN.com Go

MAIN PAGE myCNN | Video | Audio | **Headline News Brief** | Free E-mail | Feedback

October 13, 1999 -- Updated 4:38 p.m. EDT, 2038 GMT, @901 swatch internet time

WORLD
U.S.
LOCAL
POLITICS
WEATHER
BUSINESS
SPORTS
TECHNOLOGY
SPACE
HEALTH
ENTERTAINMENT
BOOKS
TRAVEL
FOOD
STYLE
NATURE
IN-DEPTH
ANALYSIS
myCNN

Headline News brief
news quiz
daily almanac

MULTIMEDIA:
video
video archive

Pakistani army delays release of post-coup plans

Pakistan was in political limbo Wednesday, a day after a military coup toppled the democratically elected government of Prime Minister Nawaz Sharif.

The army delayed release of a statement outlining its plans for

Sting marks 2000 arrival with 'Brand New Day'

In Other News:

[Dozens of Colombians arrested on U.S. drug charges](#)

[JonBenet grand jury meets again](#)

[Senate still working on test ban compromise; Vote possible Wednesday evening](#)

[Euro theory leads to Nobel Prize](#)

[Alabama rejects governor's plan for a lottery](#)

[Philip Morris says publicly that tobacco causes cancer](#)

- ☰ Breadth on left
- ☰ Highlights articles of general interest in center & right
- ☰ Links distinguished
- ☰ Subsections further down show more detail in particular areas

Home Page Design Rules

More Forces

- * without a compelling home page (H/P), no one will ever go on to the rest of your site
- * surveys show millions of visitors leave after H/P
 - + most will never come back -> lost sales, etc.



Six Ways to Make a Good Home Page

Make a positive first impression by:

Testing

- * Appropriate link names and familiar language?



looking at GUEST PROFILES (another pattern)

- * Appropriate colors & graphics?
- * neon green & screaming graphics on a skateboarding site, but not on a business-to-business or health site



Six Ways to Make a Good Home Page

Focus on a single item of interest

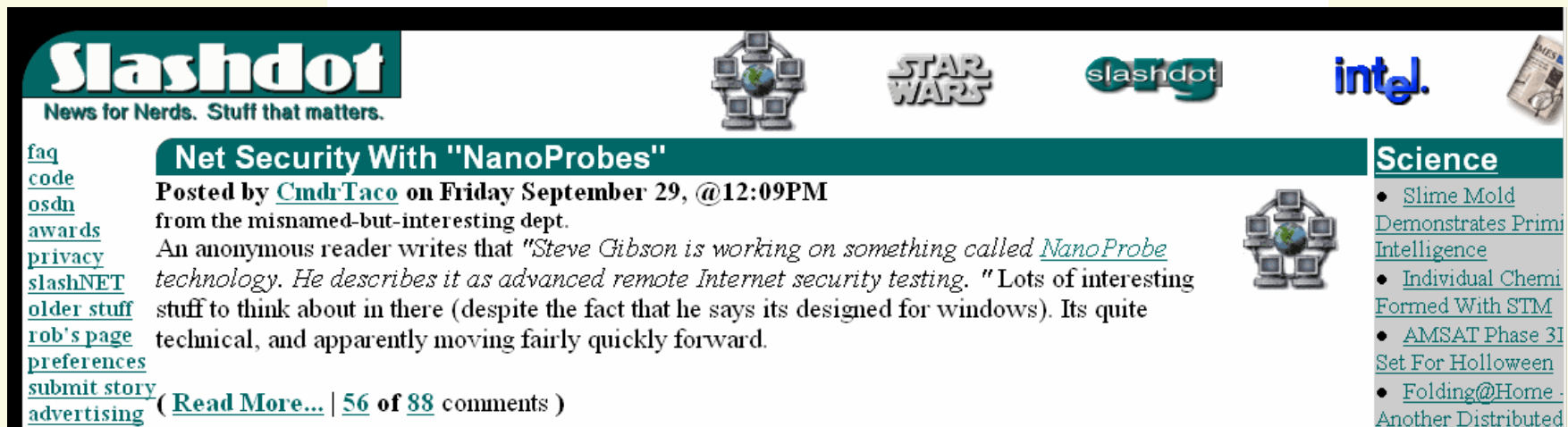
- ☞ Create a good "first read"
 - * Draw the eye to a single graphical item
- ☞ Make it clean & larger than rest on the page
- ☞ Cut down remaining elements to chosen few



Six Ways to Make a Good Home Page

Build your site brand

- Present the message of what your company does
- Include the value proposition (promise to visitors)
 - * Links to confidentiality information & site abuse policies to show you are trustworthy



The screenshot shows the Slashdot website interface. At the top, there is a navigation bar with the Slashdot logo and tagline "News for Nerds. Stuff that matters." followed by several icons: a globe with computer monitors, "STAR WARS", "slashdot", "intel.", and a newspaper icon. Below the navigation bar, there is a sidebar on the left with links: [faq](#), [code](#), [osdn](#), [awards](#), [privacy](#), [slashNET](#), [older stuff](#), [rob's page](#), [preferences](#), [submit story](#), and [advertising](#). The main content area features a headline "Net Security With 'NanoProbes'" posted by [CmdrTaco](#) on Friday September 29, @12:09PM. The article text reads: "An anonymous reader writes that 'Steve Gibson is working on something called [NanoProbe](#) technology. He describes it as advanced remote Internet security testing.' Lots of interesting stuff to think about in there (despite the fact that he says its designed for windows). Its quite technical, and apparently moving fairly quickly forward." Below the article text is a small icon of a globe with computer monitors. To the right of the article is a "Science" section with a list of links: [Slime Mold Demonstrates Primitive Intelligence](#), [Individual Chemicals Formed With STM](#), [AMSAT Phase 3I Set For Halloween](#), [Folding@Home - Another Distributed](#). At the bottom of the article, there is a link to "Read More..." and a comment count of "56 of 88 comments".

3/15/2006

Six Ways to Make a Good Home Page



Make navigation easy

- Novices & experts must instantly "get it"
- Use multiple ways to navigate
- Basic features of site as embedded links
- Navigation bars
- Colored background (HTML tables) to delineate sections
- Reusable accent graphics to highlight new things

Six Ways to Make a Good Home Page



Lure visitors to return

- With fresh content
- Keep it updated so there is a reason to come back
- By seducing with text (and graphics)
- You have only seconds
 - * Lively, sparkling, precise

Six Ways to Make a Good Home Page

Make it download quickly (2-3 seconds)

- * If not, they'll go elsewhere

Strategies

- * Use HTML text as much as possible
- * First thing to download
- * Images take 10 server-browser comms
- * Get a web-savvy graphic artist (font colors, styles, & b/g color)



Pattern Examples

 Shopping cart

Shopping Cart

Context:

- * Online stores

Forces

- * People like to browse and add items (like the supermarket) while shopping.
- * People want to review purchases before paying.
- * Make it very easy to add items (defer commitment).

Shopping Cart

Problem?

- * How to allow customers to add items without disrupting their browsing, and purchase multiple items in *one transaction*

Solution

- * Use shopping cart metaphor to keep track of items before customer finalizes the purchase
- * Track name, quantity, availability, & price

How to Apply Shopping Carts

Provide detailed info on each item in cart

The screenshot shows the Amazon.com shopping cart interface. At the top, there's the Amazon logo and navigation links like 'WELCOME', 'DIRECTORY', 'YOUR ACCOUNT', and 'HELP'. Below that are category buttons for 'BOOKS', 'zSHOPS', 'COMPUTER & VIDEO GAMES', 'KITCHEN', and 'NEW CARS'. A search bar and a browse dropdown are also visible. The main cart area features a 'Continue Shopping' button, a 'Proceed to checkout' button, and a list of items. The first item is 'Database Nation: The Death of Privacy in the 21st Century' by Simson Garfinkel, a hardcover book. Annotations with arrows point to various elements: 'name w/ link to detail' points to the book title; 'quantity w/ a way to change' points to the quantity input field; 'price' points to the 'Our Price' and 'You Save' information; 'availability' points to the 'Hardcover' and 'Usually ships in 24 hours' text; 'short description' points to the book title and author; 'a way to remove item' points to the 'delete' button; and 'update' points to the 'update' button at the bottom of the cart.

amazon.com. [YOUR ACCOUNT](#) | [HELP](#)

WELCOME | DIRECTORY

TODAY'S FEATURED STORES: [BOOKS](#) | [zSHOPS](#) | [COMPUTER & VIDEO GAMES](#) | [KITCHEN](#) | [NEW CARS](#)

Search: All Products GO! Browse: Books GO!

Shopping Cart [Sign in](#) [See more items like those in your cart](#)

[Continue Shopping](#) on the Video home page [Proceed to checkout](#) Returning customer? [Sign in](#) to turn on 1-Click ordering.

Shopping Cart Items--To Buy Now

	Qty.		
Database Nation: The Death of Privacy in the 21st Century Simson Garfinkel; Hardcover Usually ships in 24 hours	<input type="text" value="1"/>	List Price: \$24.95 Our Price: \$19.96 You Save: \$4.99 (20%)	save for later delete

Subtotal: \$19.96

If you changed any quantities, please press this button to [update](#)

How to Apply Shopping Carts

- ☰ Provide info about all items in cart
 - * sub-totals
 - * shipping, taxes, other charges (if known)

Outpost.com This Week's Contest Theme: Funniest Click

Computers & Software | Electronics by Tweeter | Cameras by Wolf Camera | Games & DVD Movies | Handhelds PDA & Cellular by Brookstone | Business Shopping | Gift Shopping | Customer Service

Home | International Orders | Express Account | Track Your Order

Search go Site Map | Shop By Product Type | Shop By Brand [Go to Cart](#) | [Checkout](#)

Shopping Cart **Scroll Down to Check Out**

Outpost #	Description	Quantity	TruePrice
93762	HP Jornada 548 Handheld PC	<input type="text" value="1"/> Qty. Change? Recalculate! Remove Item	\$549.00
84329	30.7GB Diamond Max Plus 40 UltraDMA/100 Internal Hard Drive	<input type="text" value="1"/> Qty. Change? Recalculate! Remove Item	\$149.95
79263	Samsung SyncMaster 17" TFT .264mm 1280x1024 LCD Color Monitor \$1249.95 After Rebate	<input type="text" value="1"/> Qty. Change? Recalculate! Remove Item	\$1,349.95
Subtotal:			\$2,048.90
Overnight Delivery Cost:			\$0.00

[Click Here to Choose More Items](#)

Welcome back James Landay. We've reserved your EXPRESS CHECKOUT lane. [Click here to checkout](#)

How to Apply Shopping Carts

Provide a prominent link to checkout

The screenshot shows the Amazon.com shopping cart interface. At the top, the Amazon logo and navigation links like 'YOUR ACCOUNT' and 'HELP' are visible. Below the search bar, there are buttons for 'WELCOME' and 'DIRECTORY'. The main navigation area includes 'Search: All Products' and 'Browse: Books'. A prominent blue bar contains a yellow 'Continue Shopping' button and a blue 'Proceed to checkout' button, which is circled in orange. To the right of the 'Proceed to checkout' button, it says 'Returning customer? Sign in to turn on 1-Click ordering.' Below this bar, the shopping cart items are listed. The first item is 'Database Nation : The Death of Privacy in the 21st Century' by Simson Garfinkel, Hardcover, priced at \$19.96 (20% off the list price of \$24.95). The quantity is 1. There are 'save for later' and 'delete' buttons for this item. At the bottom, there is an 'update' button and a 'Subtotal: \$19.96'.

amazon.com.

WELCOME DIRECTORY

YOUR ACCOUNT HELP

TODAY'S FEATURED STORES

BOOKS ZSHOPS COMPUTER & VIDEO GAMES KITCHEN NEW CARS

Search: All Products GO! Browse: Books GO!

Shopping Cart Already a customer? Sign in

See more items like those in your cart

Continue Shopping on the Video home page

Proceed to checkout Returning customer? Sign in to turn on 1-Click ordering.

Shopping Cart Items--To Buy Now Qty.

Database Nation : The Death of Privacy in the 21st Century 1 List Price: \$24.95 Our Price: \$19.96 You Save: \$4.99 (20%) save for later delete

Simson Garfinkel; Hardcover Usually ships in 24 hours

If you changed any quantities, please press this button to update

Subtotal: \$19.96

How to Apply Shopping Carts

Have a link to let people continue shopping

amazon.com. | YOUR ACCOUNT | HELP

WELCOME | DIRECTORY | TODAY'S FEATURED STORES: BOOKS | ZSHOPS | COMPUTER & VIDEO GAMES | KITCHEN | NEW CARS

Search: All Products [GO!] | Browse: Books [GO!]

Shopping Cart | Already a customer? [Sign in](#) | See more items like those in your cart

Continue Shopping on the Video home page

Proceed to checkout | Returning customer? [Sign in](#) to turn on 1-Click ordering.

Shopping Cart Items--To Buy Now	Qty.	
Database Nation : The Death of Privacy in the 21st Century Simson Garfinkel; Hardcover Usually ships in 24 hours	1	List Price: \$24.95 Our Price: \$19.96 You Save: \$4.99 (20%) save for later delete
If you changed any quantities, please press this button to update		Subtotal: \$19.96

How to Apply Shopping Carts

- 📄 Don't put other recommended items in the checkout sequence (pulls users back to shopping and they may not complete checkout).

How to Apply Shopping Carts

- Don't let unavailable things be added
 - * hard to find a good example of this

The screenshot shows the marthastewart.com shopping cart page. The header includes the site name, navigation links, and a red bar with category links. A left sidebar lists various product categories. The main content area is titled 'IN YOUR BASKET' and contains a table of items. Below the table, there is a note about shipping and a 'Back orders' section.

marthastewart.com SHOPPING [HOMEPAGE](#) | [ABOUT MSO](#) | [HELP](#)

MARTHA BY MAIL | **MARTHASFLOWERS** | MAGAZINES

CUSTOMER SERVICE

MARTHA BY MAIL

- COOKING & BAKING
- SETTING THE TABLE
- BED & BATH
- DECORATING
- HOMEKEEPING
- CRAFTS
- GARDENING
- WEDDINGS
- HOLIDAYS
- BABIES & KIDS
- PETKEEPING
- TRAVELING
- NEW PRODUCTS
- BEST SELLERS

IN YOUR BASKET

ITEM #	PRODUCT	QNTY	REMOVE	PRICE	TOTAL
Ship the following item(s) to: <u>Myself</u>					
from Martha by Mail					
KSH 001	Baking Sheets In stock	<input type="text" value="1"/>	<input type="checkbox"/>	\$16.00	\$16.00
KFP 001	European Coffee Press Eight-Cup Press Back ordered; available 10/6/00	<input type="text" value="1"/>	<input type="checkbox"/>	\$32.00	\$32.00

Back orders
The item you requested is currently out of stock, but it will be available again on the date indicated and shipped to you shortly thereafter. If no date is indicated, it will be shipped in three to four weeks. Your credit card will not be charged for the item until it is shipped.

Checkout

Shopping Cart =>

- * Details, quantity, availability, subtotal

Sign-in =>

- * New customers
- * Returning customers

Shipping =>

- * Address, shipping method, gift wrap?, special instructions



Payment =>

- * Method, billing address, gift certificate, coupons

Confirmation

- * Confirm button, confirmation page, email, order tracking into, Thank you

Checkout Heuristics

-  Make it easy to cancel or change order at any time before final confirmation
-  Don't have customers type things twice

Summary

- ☞ Motivation for patterns
- ☞ Design patterns in architecture & SE
- ☞ Web design patterns
- ☞ Home page patterns
- ☞ E-commerce patterns