

UX Design Principle Fundamentals for Non- Designers

Billy Hollis

Next Version Systems

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Waves of Change

- Devices are multiplying like rabbits
 - Even desktop hardware varies all over the place
- Users expect mobility and connectivity
- Touch is an expected capability

- Users are conditioned to expect modern apps with polished, intuitive UX

A photograph of several alligators in a zoo enclosure. The alligators are resting on a gravelly bank next to a body of water. The word "Android" is overlaid in white text on the left side of the image, and the word "iOS" is overlaid in white text on the right side. A palm tree is visible in the background on the right.

Android

iOS

The limitations are not in our technology

- HTML5 / JS / ASP.NET / Etc. on the web
- XAML on the Windows desktop
- Even Windows Forms is a powerful native UI technology

But too often we use them to produce twenty year old user experiences

Customer Name

Business Type

Status

Active Date

Main Phone

Billing Phone

Main Address

Street Address

Line 2

City, State, Zip

Billing Address

Street Address

Line 2

City, State, Zip

Shipping Address

Street Address

Line 2

City, State, Zip

Main contact

Name (First, Last)

Phone

Email

Billing contact

Name (First, Last)

Phone

Email

Indicators



Sales Rep

Last contacted

Marketing source

Notes

Some more

Really

Important

Data goes

Over here

Cram a bunch of options in here

- Probably don't really
- Need most of these
- Options most of the time
- But we're terrified
- To put them anywhere else

Oh, gosh, we've

Got a few more

Things to cram in

- Inactive
- Obnoxious
- Wish they would die

Delete

Save

Cancel

Clone

HALO

WAYPOINT

SERVICE RECORD

LAST PLAYED 06.01.13



DAK XAK

LUNG



CSR

—

SR 45

SPARTAN-IV

10100XP / 38360XP

28260 XP TO NEXT RANK



WAR GAMES MATCHMAKING >>

0

GAMES COMPLETED

0

WINS

00H 00M

TOTAL PLAYTIME

WAR GAMES CUSTOM >>

1

GAMES COMPLETED

0

WINS

00H 11M

TOTAL PLAYTIME

SPARTAN OPS >>

50 / 50

COMPLETED SOLO

0 / 50

COMPLETED COOP

2D 21H

TOTAL PLAYTIME

CAMPAIGN >>

8 / 8

MISSIONS COMPLETED



SOLO



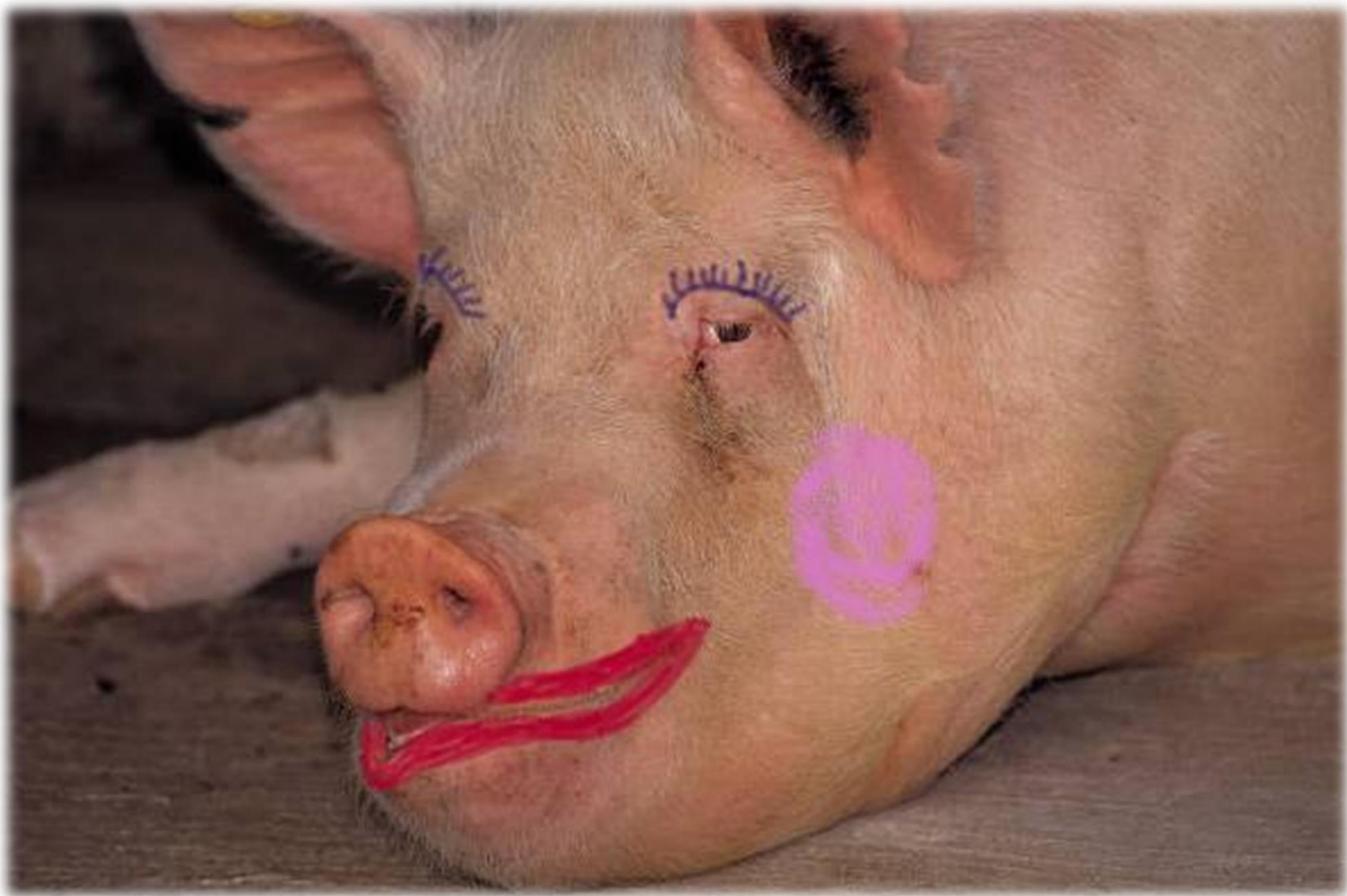
CO-OP

Designers



Developers





Better UX - Areas to work on

- Design principles
- Design process
- Interaction and navigation patterns

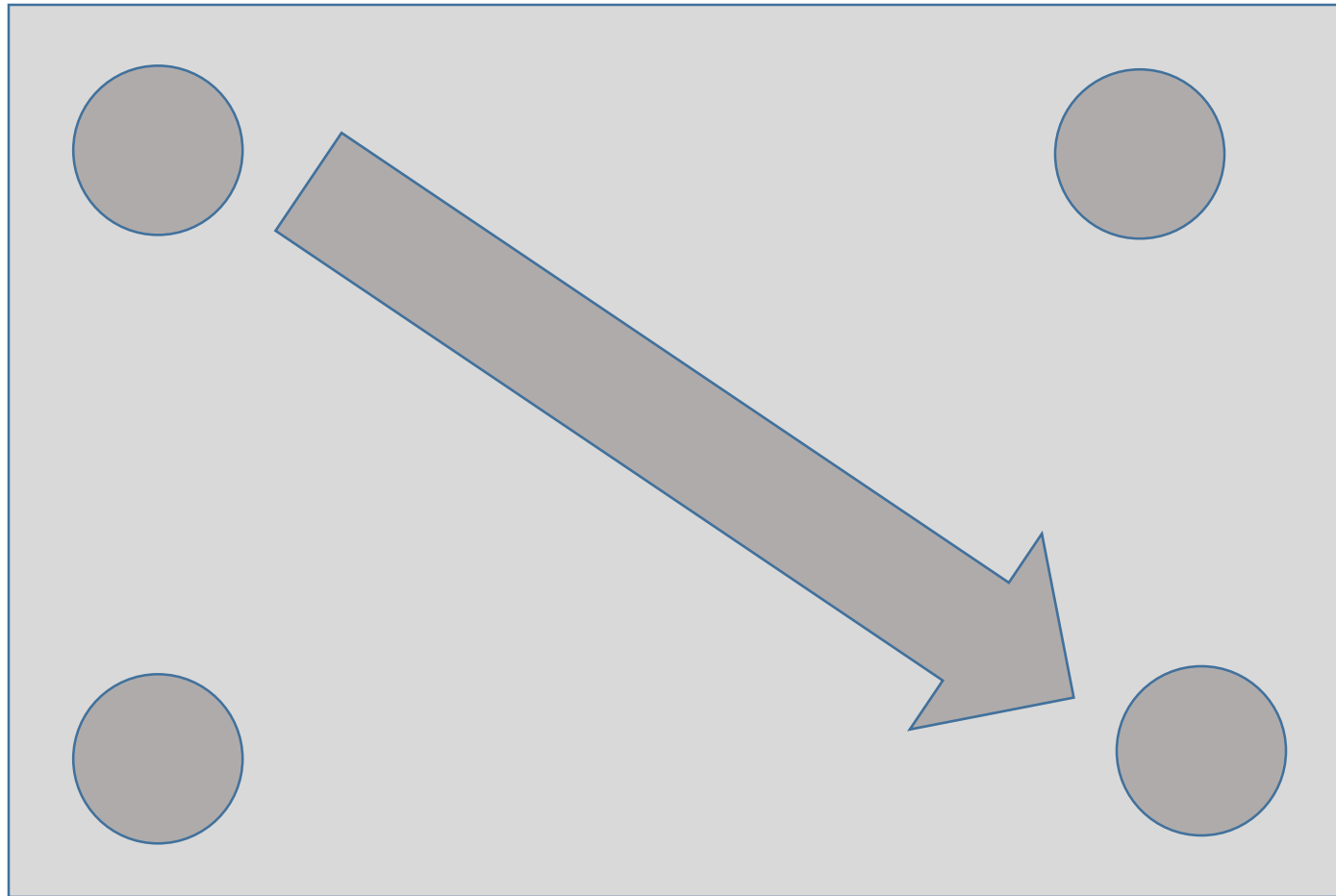
- If you are doing new mobile apps, you'll also need:
 - Specific design guidelines for your platform
 - Guidelines for new interaction techniques, such as touch

What is a design principle?

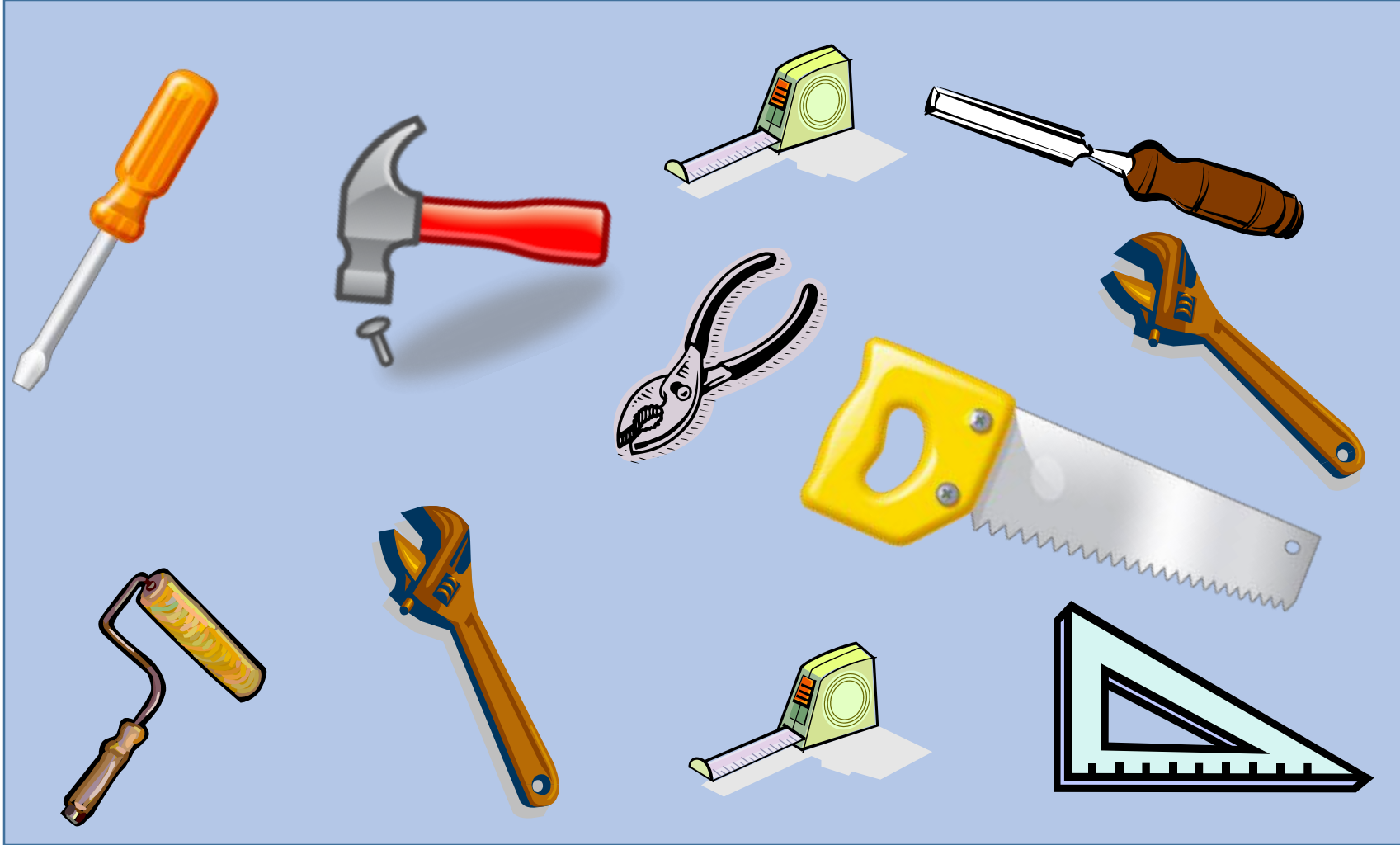
- Because of the way our brains and visual systems work, we are pre-disposed to perceive the world in certain ways
- Design principles tell us how to use those pre-dispositions to create effective designs
- They've been around for thousands of years
- Many are based in the science of the brain and visual system

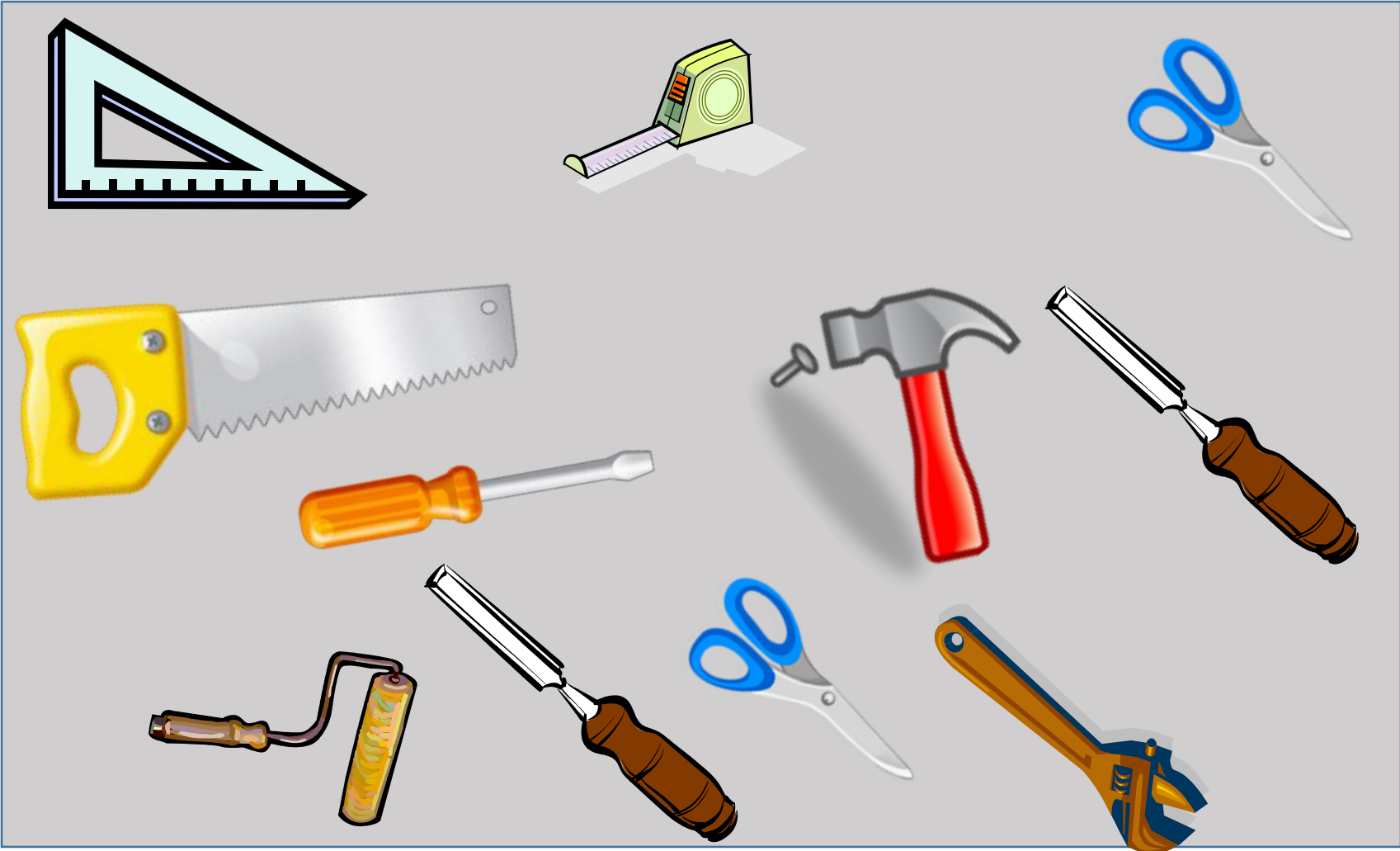


Gutenberg Diagram

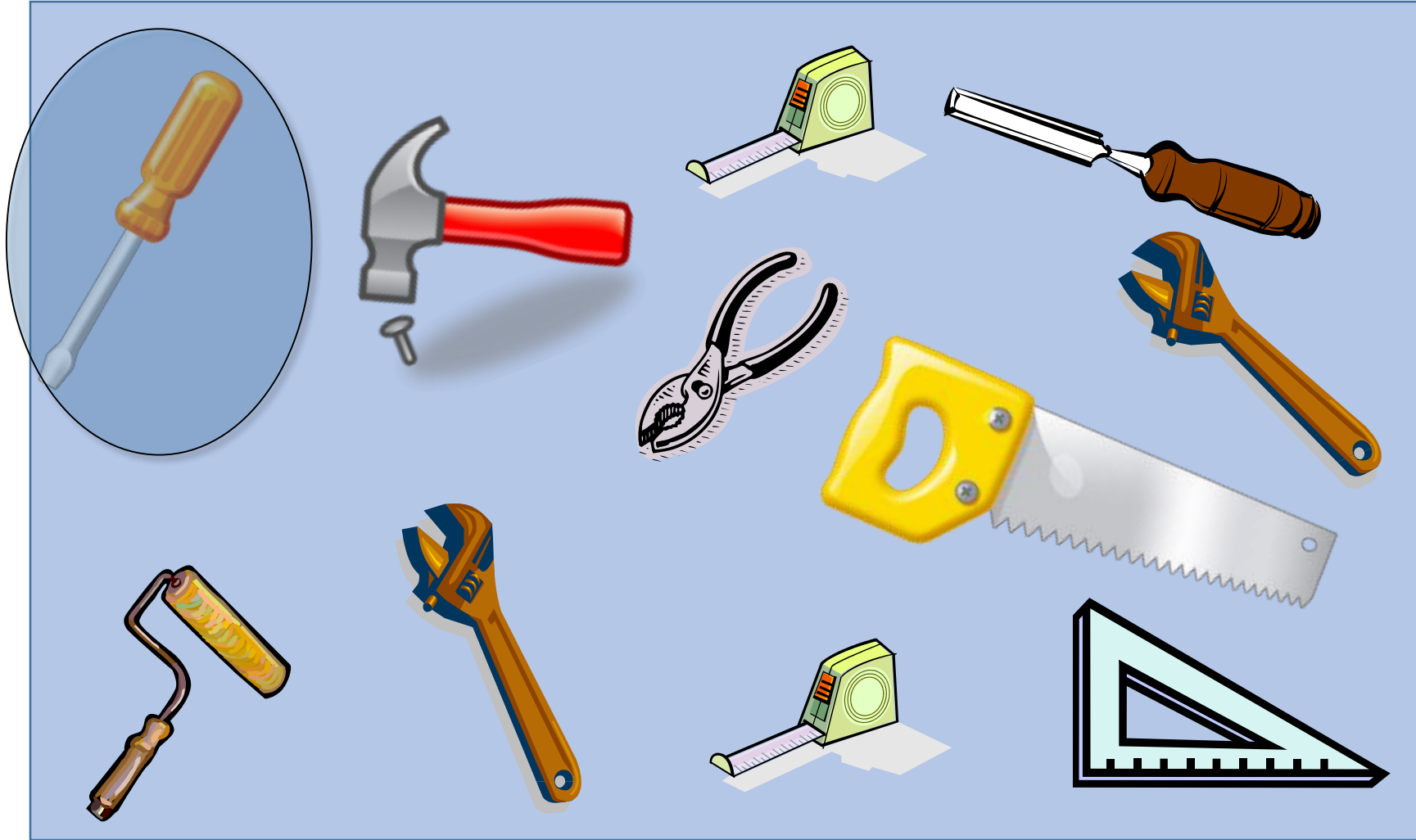


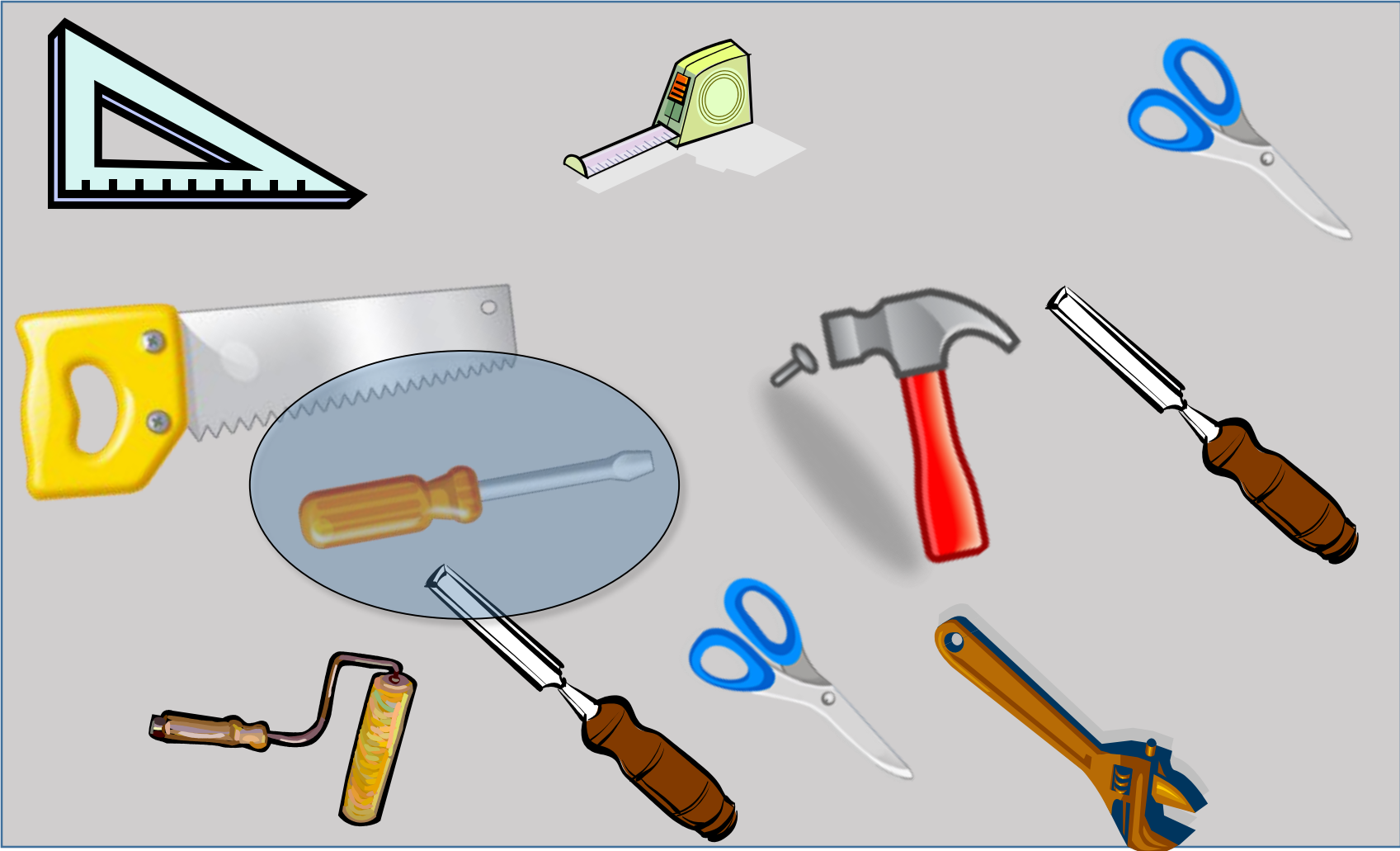












Design Principle Families (examples)

<p><i>Visual System</i></p> <p>Inattentional Blindness Gestalt Principles (proximity, similarity, etc.)</p>	<p><i>Cognitive</i></p> <p>Hick's Law Forgiveness Gutenberg Diagram</p>
<p><i>Intuitive</i></p> <p>Whitespace Horror Vacui Contour Bias Aesthetics</p>	<p><i>Psychological</i></p> <p>Status Quo Bias Expectation Effects Unconscious Influence</p>

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Gestalt Principles

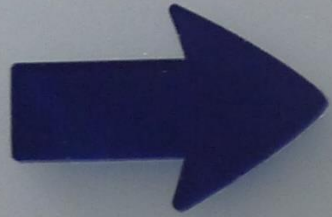
- Human visual system is optimized to see structure and relationships
- This leads to several principles of design that are collectively known as gestalt principles
 - Proximity
 - Similarity
 - Common fate
 - Continuity and Closure (filling gaps)
 - Figure / ground

Stages of human visual processing

- Stage One: processing inside the retina
 - High resolution and intense color in the fovea
 - Lower resolution and less intense color elsewhere
 - Tuning to detect edges
- Stage Two: “Preattentive” processing
 - Less than $\frac{1}{4}$ second
 - Unconscious
 - Information from retina assembled into shapes and groups
- Stage Three: “Attentive” processing
 - Stores of experience used to interpret the output of state two
 - “That’s a knife”

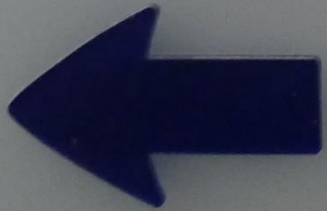
Gestalt principles come from stage two

- The visual system is predisposed to interpret edges, shapes, and groups in certain ways
- Again, this is unconscious, and takes place before conscious interpretation
 - Conscious interpretation can override the perceptions from stage two, but it takes cognitive work



Rooms

201-223, 225



Rooms



Rooms
201-223, 225



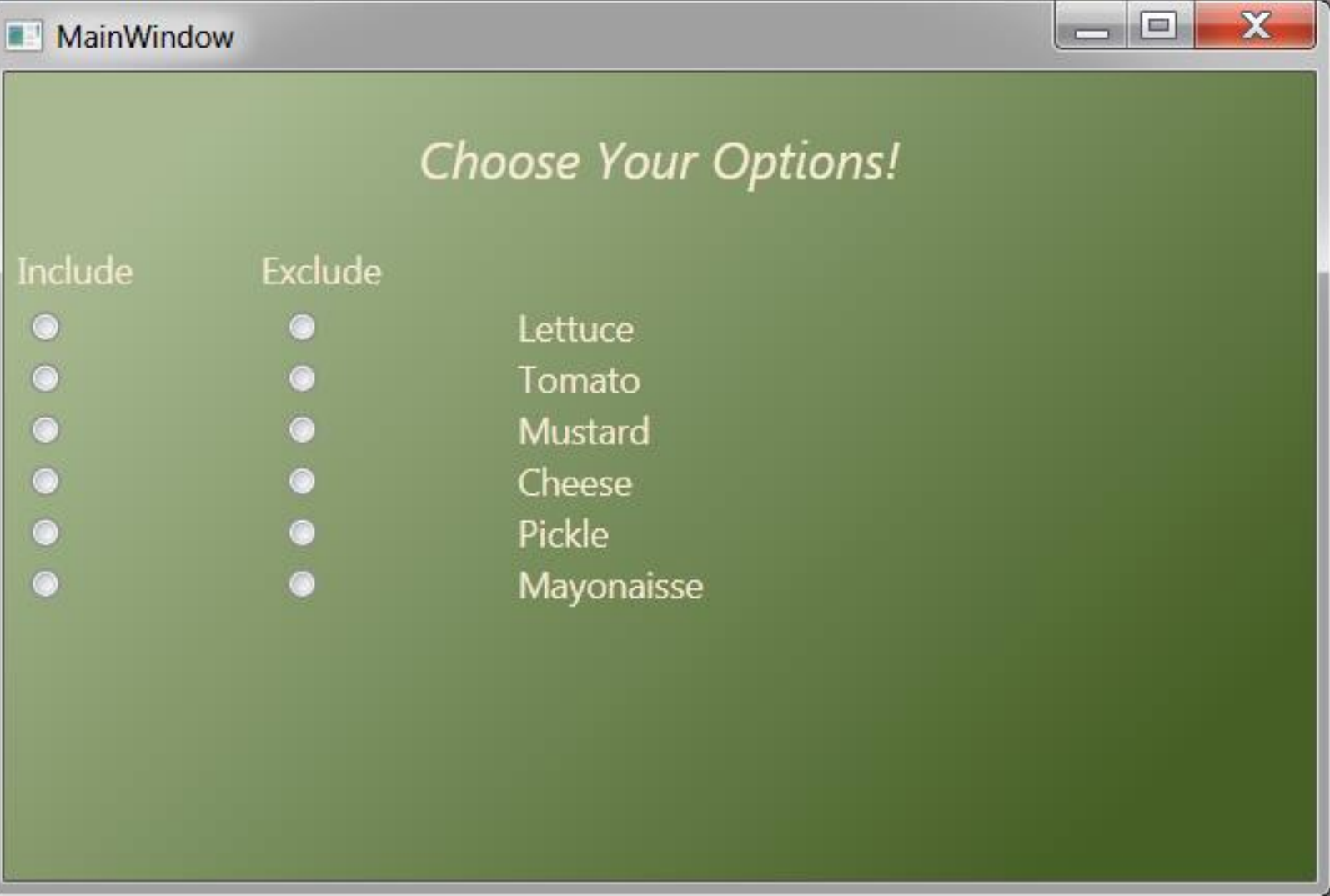
Rooms
224, 226-241

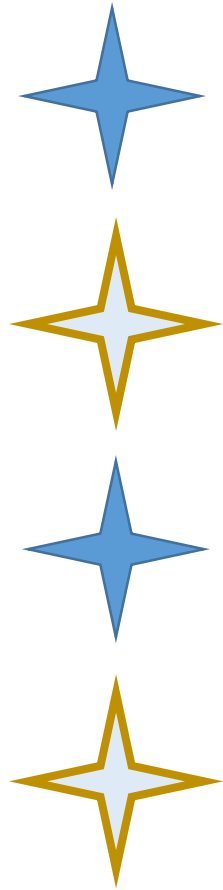
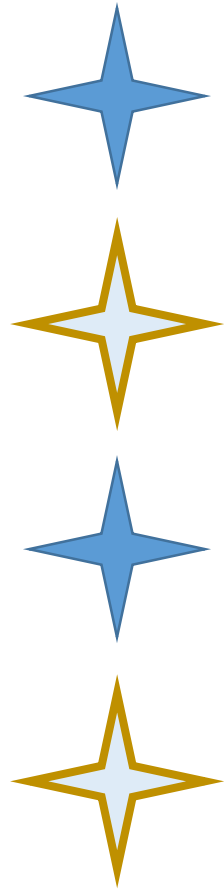
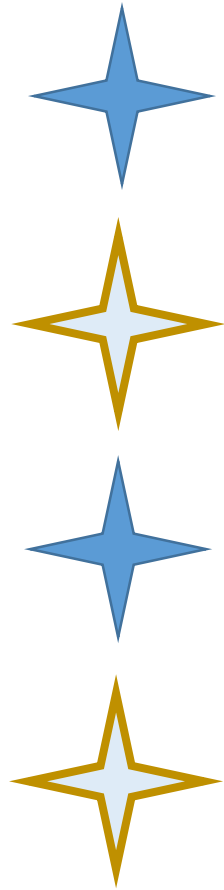
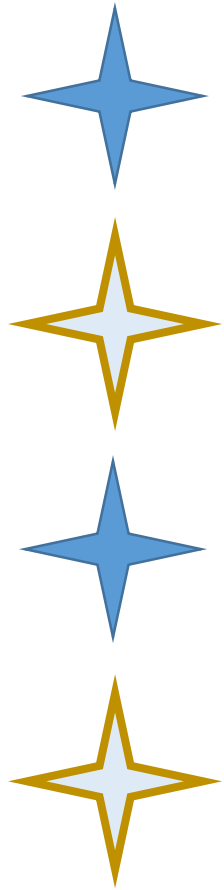


Let's look at the proximity principle

- I'll show a slide with four-pointed stars
- You decide if you see rows of stars or columns of stars

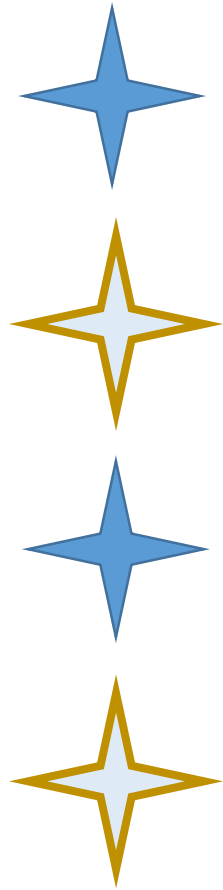
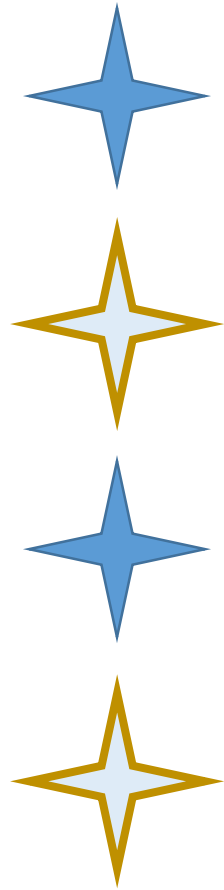
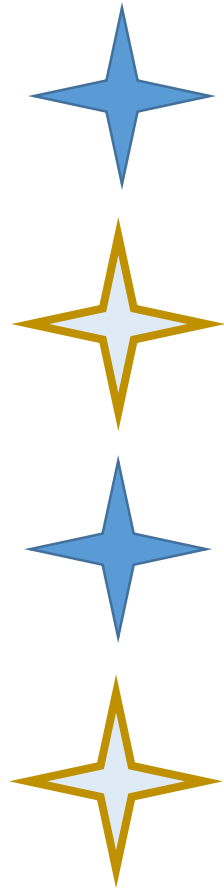
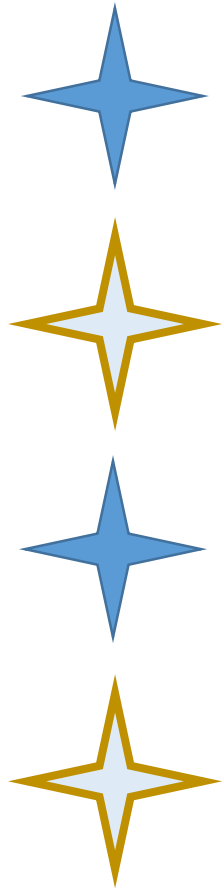


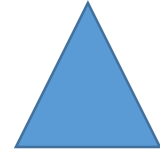


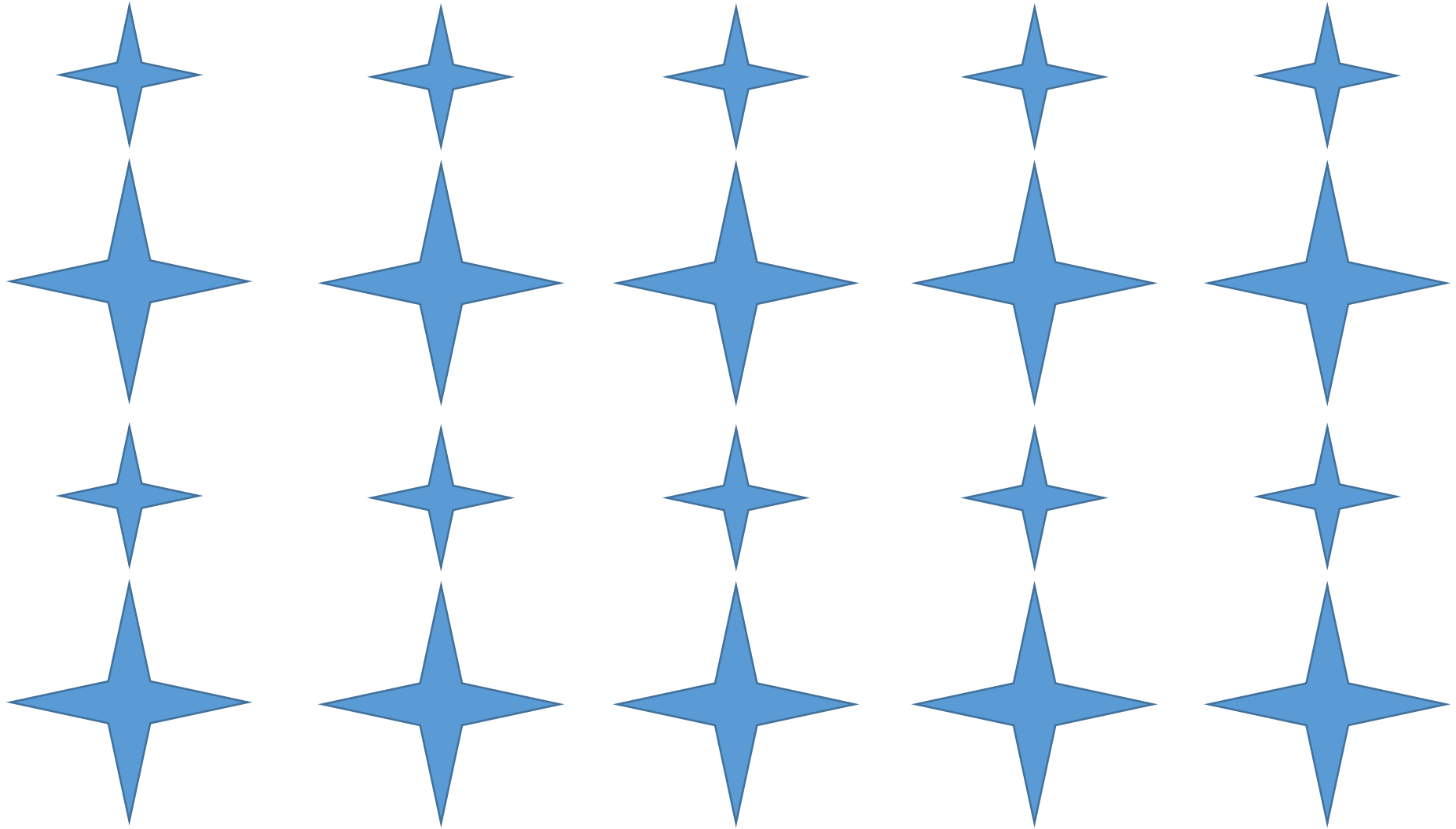


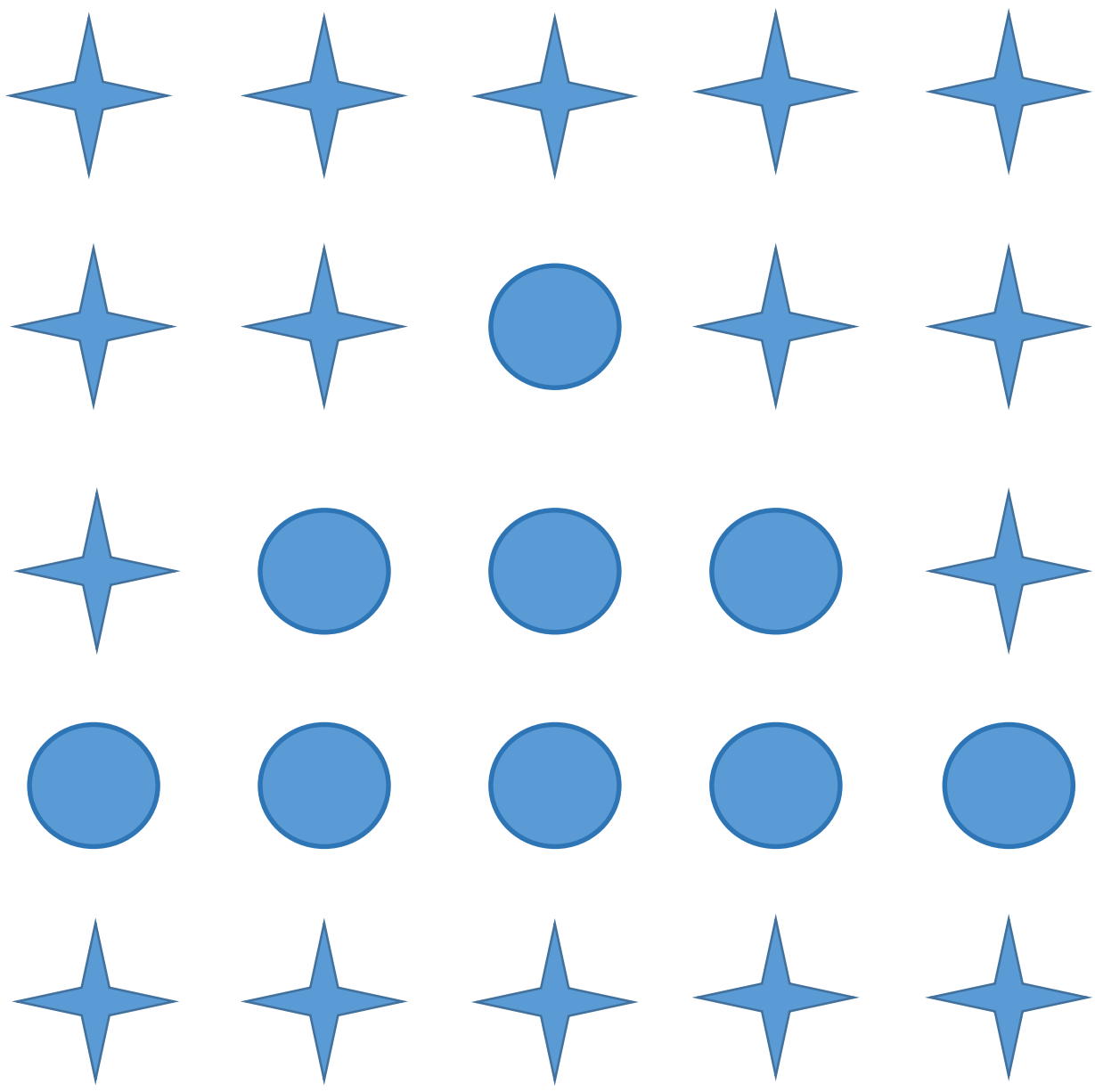
Proximity can be overridden by similarity

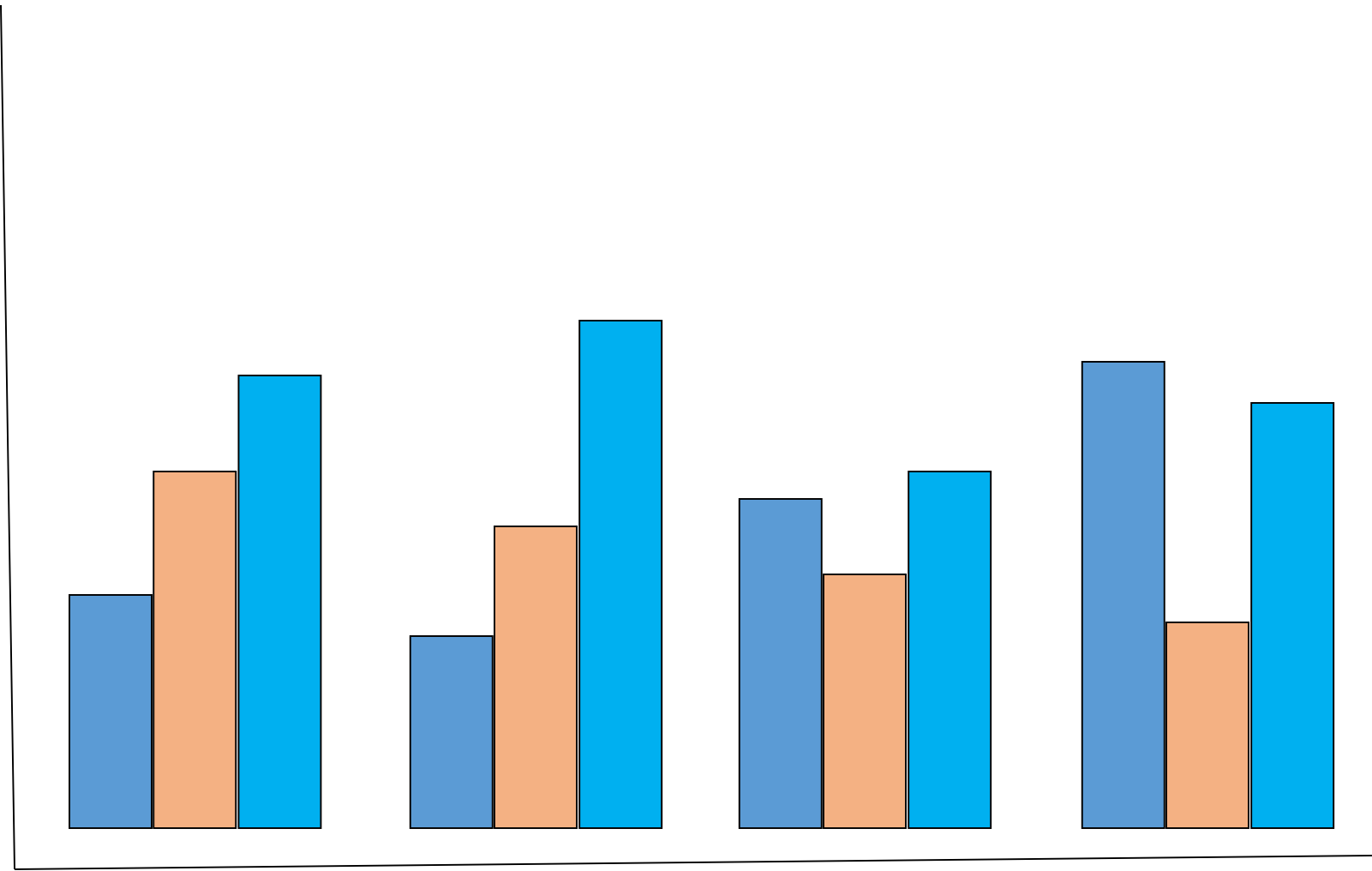
- Similar objects are unconsciously grouped together
- Various attributes can be used to make objects similar
 - Color
 - Shape
 - Size







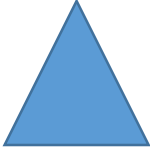


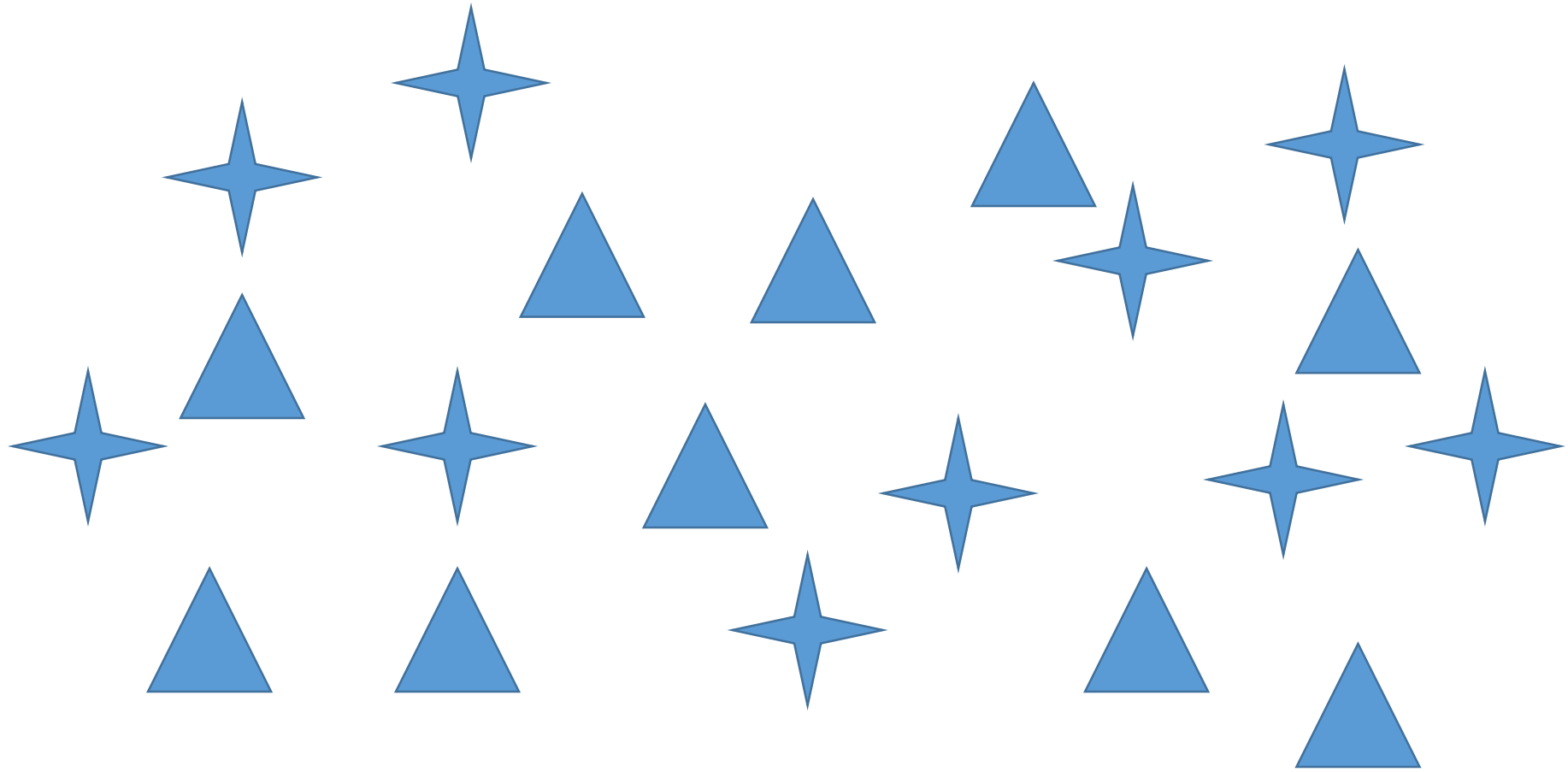




Gestalt: Common fate

- Items that move together are assumed to be grouped
- The most common use in software is a group of outlines representing items to be dragged and dropped

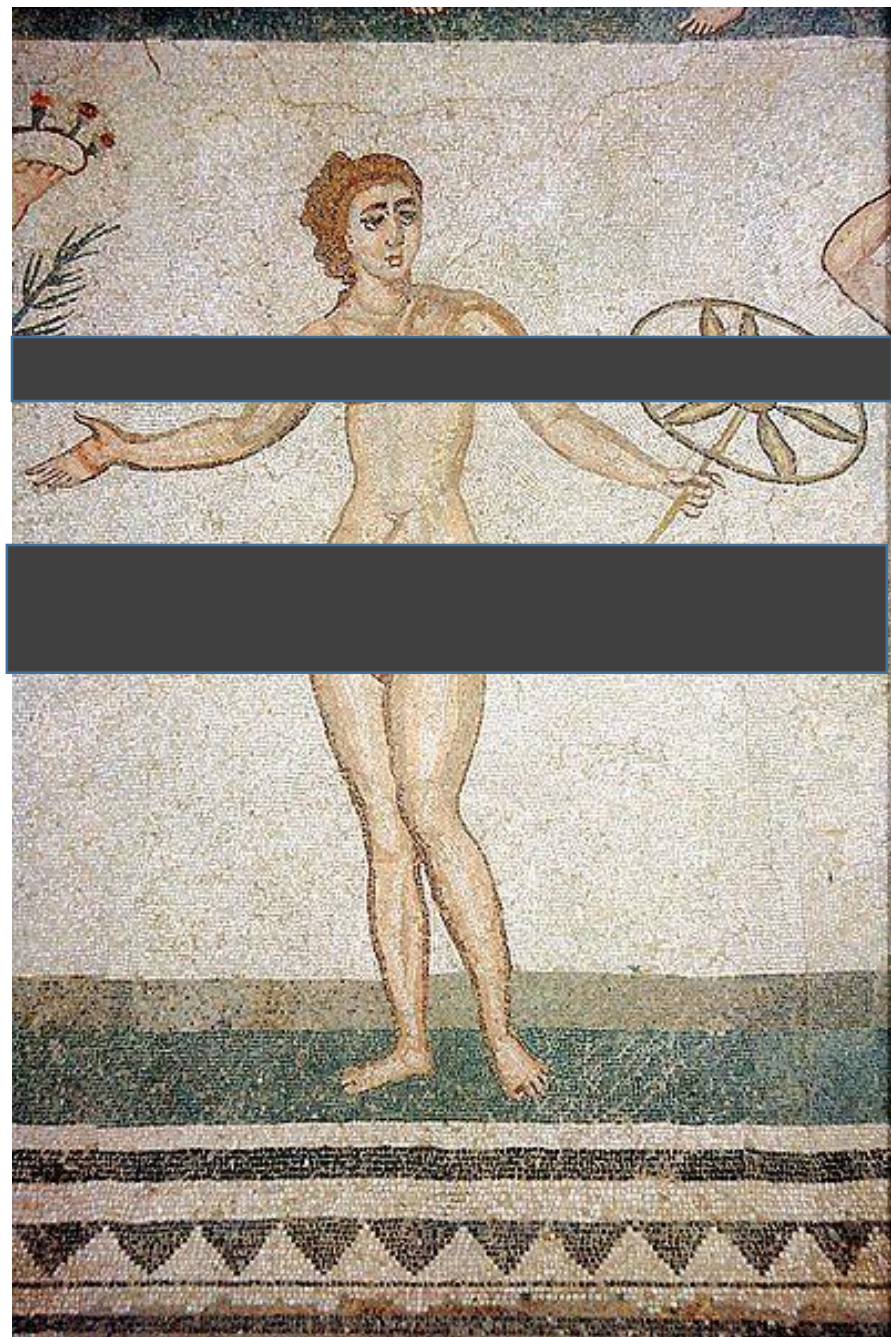


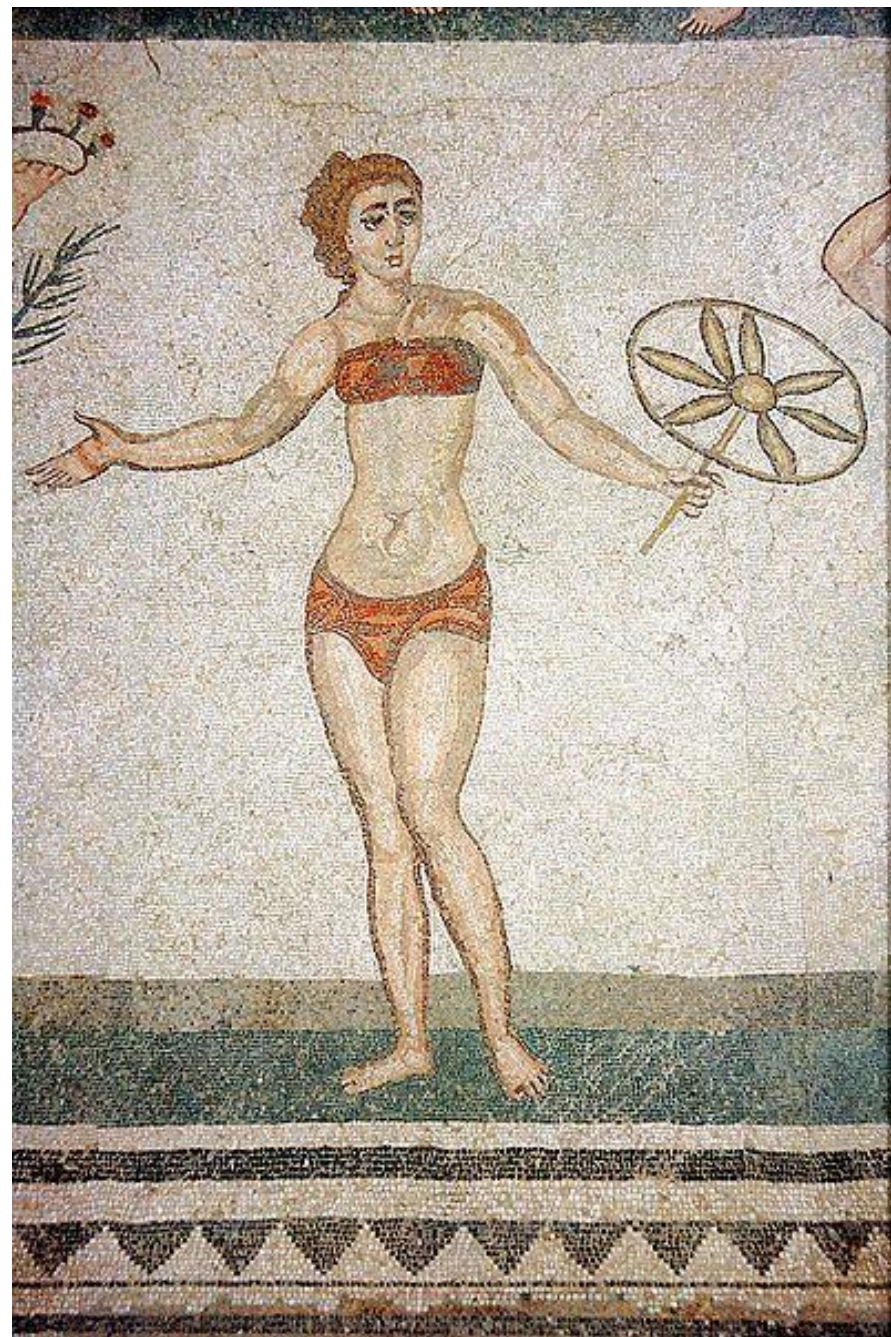


Gestalt: continuity and closure

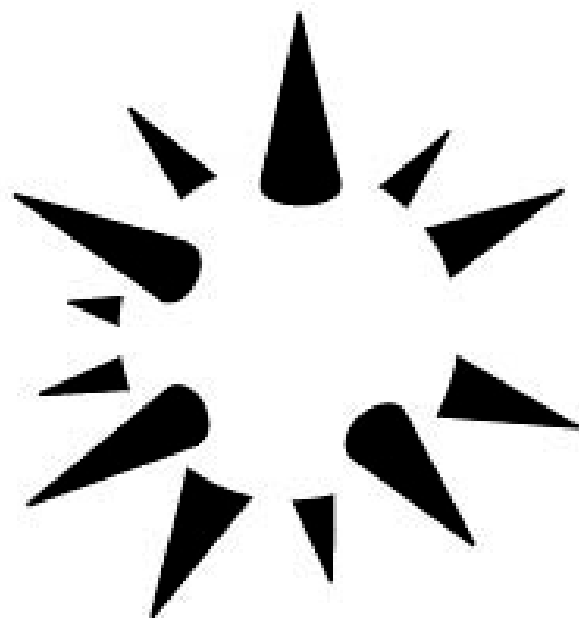
- The pre-processing in the visual system automatically fills in gaps
 - This is an evolutionary response to the need to recognize threats quickly



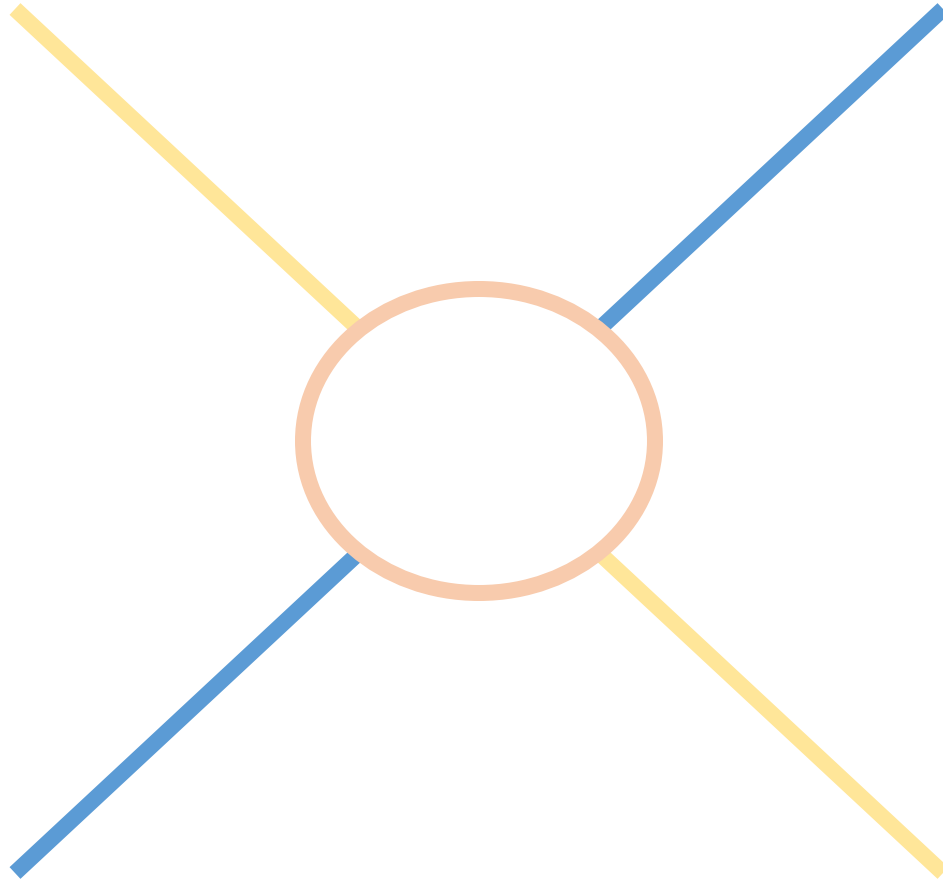




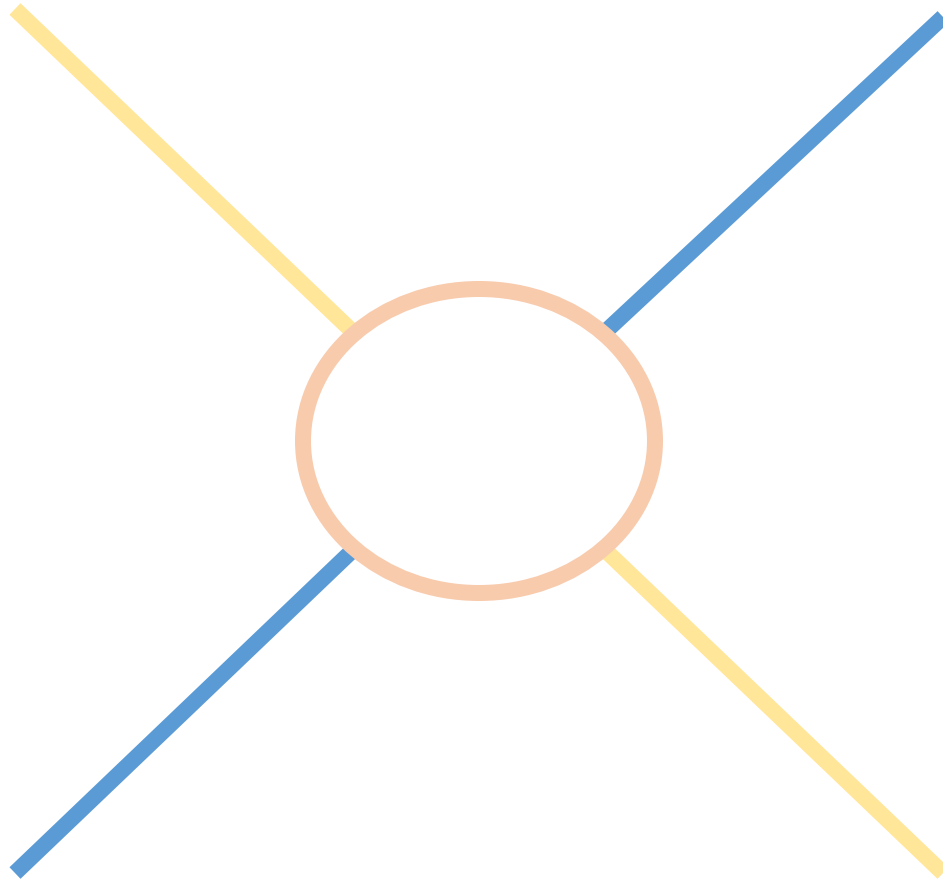




Continuity and Wholeness



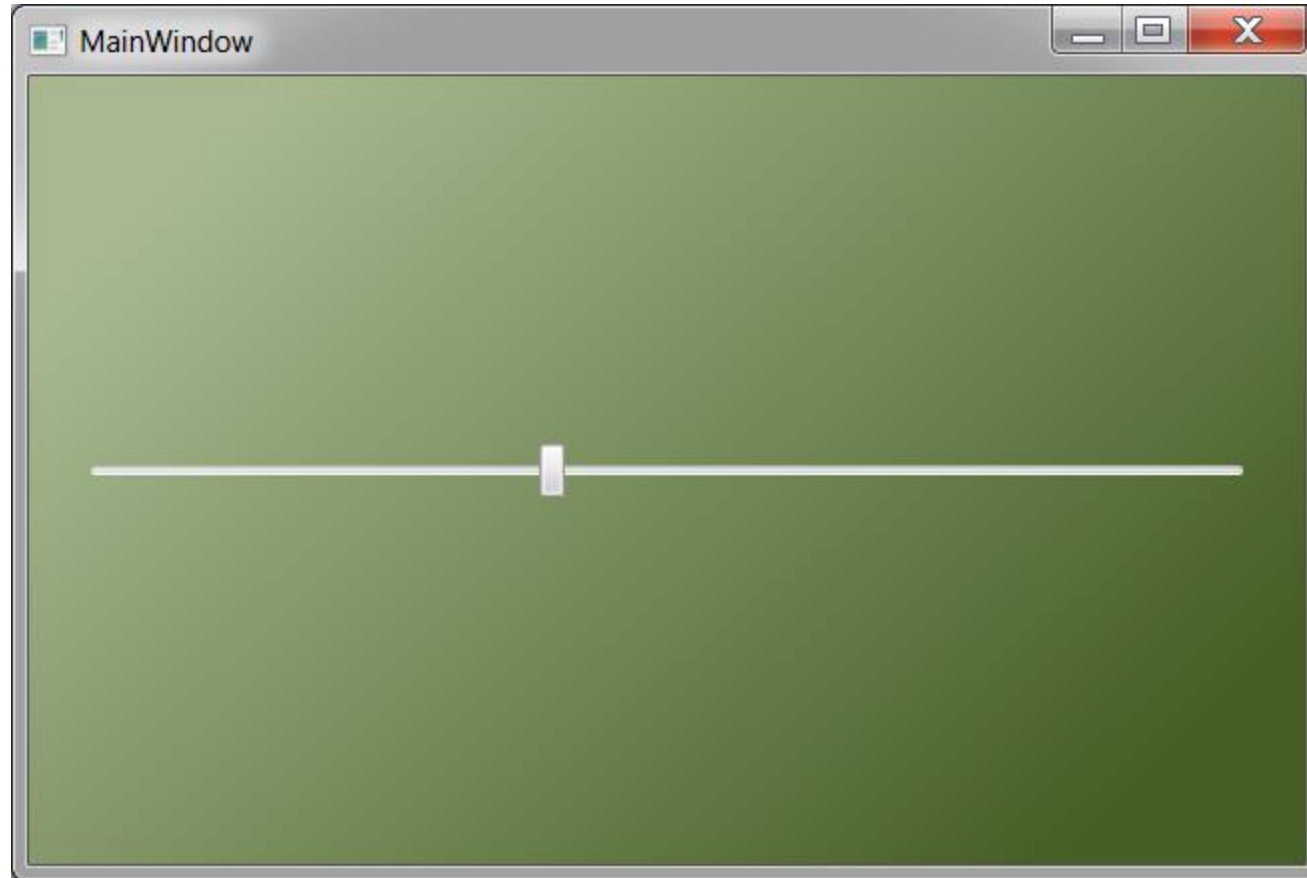
Continuity and Wholeness



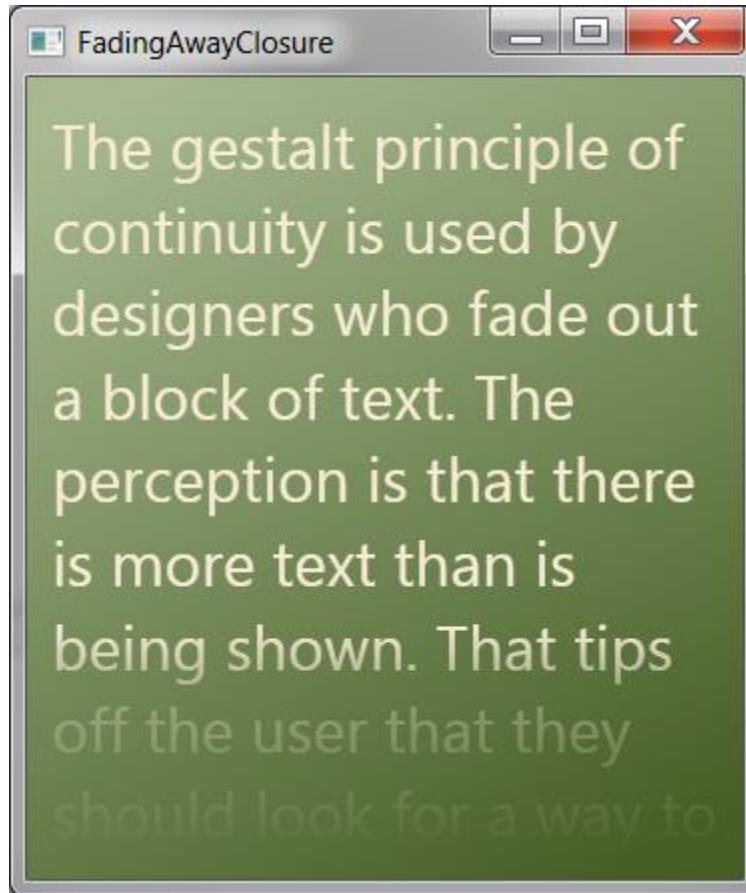
Application: minimalist icons



Software example - slider

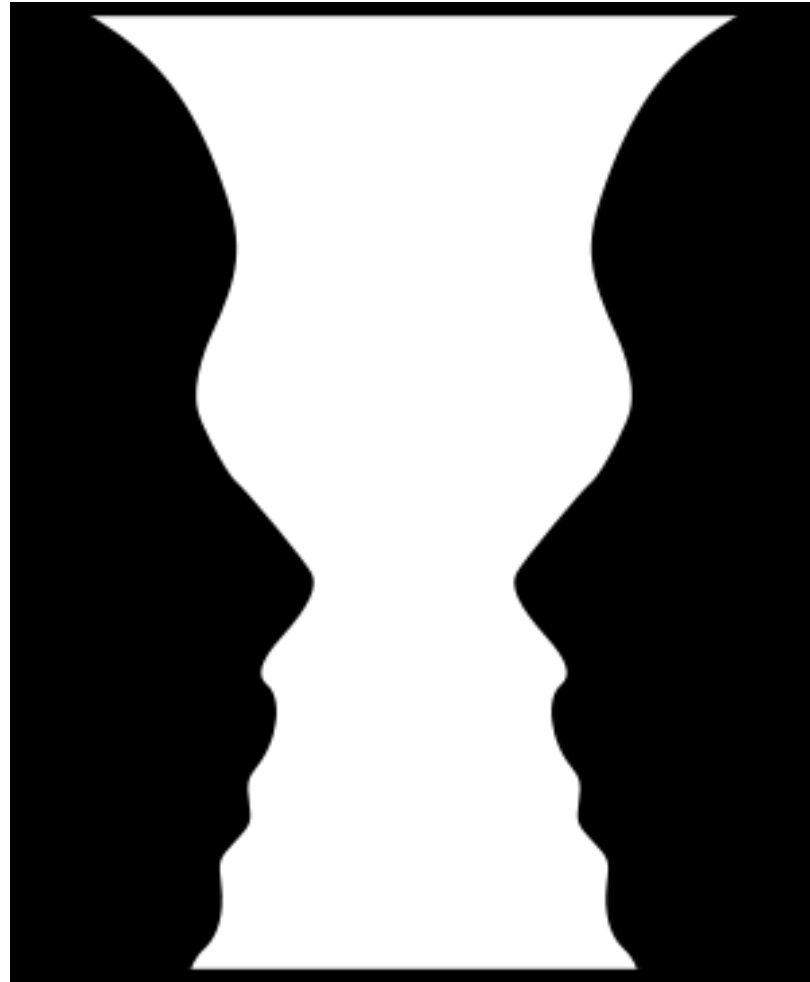






The gestalt principle of continuity is used by designers who fade out a block of text. The perception is that there is more text than is being shown. That tips off the user that they should look for a way to

Figure / ground



Assessment of “figure” and “ground” can change

- A figure can change into a ground, and vice versa
- To some degree, this is under conscious control
- This can also be used to maintain context in software



Green Lake Company



Profile

- CRM
- Billing
- Order Defaults
- Exclusions
- Notes

Profile

Customer Name

Business Type

Status

Type

Active Date

Main Phone

Dress Code

Address

Main 2342 Peachwillow Denver, CO 80203	Billing 123 East Lake Nashville, TN 37076
---	--

Add Edit Delete



Contacts

Jim Morrision (HR Assistan
 Home 615 791 1234
 Email jim@yahoo.com

Add Edit Delete

Save Close



Home



Orders



Employees



Customers



Timesheets



Payroll



Billing



Reports



Settings



Green Lake Company



Profile

CRM

Billing

Order Defaults

Exclusions

Notes

Profile

Customer Name

Business Type

Status

Type

Active Date

Main Phone

Dress Code

Address

Billing

23 East Lake
Nashville, TN 37076

Jun 10
May 22

Edit customer address

Address

Address Type:

Address Lines:

City, State, ZIP:

Save

Close

Save

Close



Home



Orders



Employees



Customers



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Payroll



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Reports



Settings



Green Lake Company



Profile

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Home

Orders

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Timesheets

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Billing

Reports

Settings

The ground can also be used for grouping

- Elements with a common ground are considered grouped by the eye



You can observe design principles all around you in the real world



Studying gestalt principles: remote controls



Applying principles to modern business apps – better visualization

The screenshot shows a window titled 'MainWindow' containing a list of business entries. Each entry includes a status indicator (a sequence of colored triangles), the business name, transport provider, and ship ID. The entries are:

Status	Business Name	Transport by	Ship ID	Additional Info
▲●●▲	Daffy Duck Storage	Across the Ocean Blue	Z47204460 QX-309169	
▲●●▲	Everywhere Transportation	Hollis Worldwide	Z47206441 QX-300524	
▲●●▲▲	Krispy Kreme	Ozark Transportation	Z47202495 QX-305920	
▲●●▲▲	Krispy Kreme	Speedy Transit	Z47203228 QX-307124	3 Open issues
▲●●▲▲	Foghorn Leghorn Farms	Federal Worldwide	Z47200881 QX-304281	
▲●●▲▲	Ryman Auditorium	Across the Ocean Blue	Z47202184 QX-303844	
▲●●▲▲	East Mill Food		Z47200100	

The image shows a vertical list of four user profile cards. Each card features a circular status indicator (a smiley face with a person icon or a sad face), the user's name, company, email, phone number, and a bio snippet.











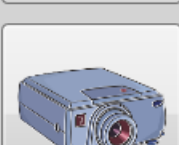
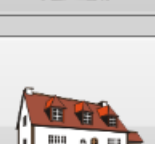
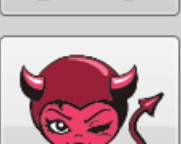


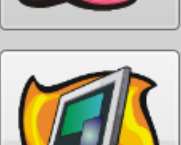

- Irene Adler**
Daffy Duck Dry Cleaning
adleire@somewhere.com 612-435-9988
Don't be ashamed of your code ...
- Elizabeth Bennett**
Cyberdyne Systems
benneli@somewhere.com 612-435-9988
Plumbing has no business value...
- Romeo Montegue**
Eastern Airlines
montrom@somewhere.com 612-435-9988
If you can spend five years ho...
- Charlotte Lucas**
Cyberdyne Systems
lucacha@somewhere.com 612-435-9988
My favorite password is "incor...

Design Principle Families (examples)

<p><i>Visual System</i></p> <p>Inattentional Blindness Gestalt Principles (proximity, similarity, etc.)</p>	<p><i>Cognitive</i></p> <p>Hick's Law Forgiveness Gutenberg Diagram</p>
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MainWindow

File Edit A bunch of confusing Options Go Here Window Help


			Name
			Address
			More
			Data
			Details
			Are Entered




In This Area Of The Screen

Over there is a random data grid

MainWindow

File Edit A bunch of confusing Options Go Here Window Help

 **Diagnosis**

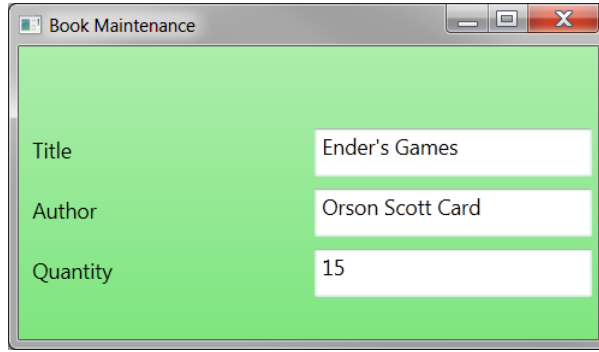
			Name
			Address
			More
			Data
			Details
			Are Entered
			In This
			Area Of
			The Screen

Over there is a random data grid

Confirmation



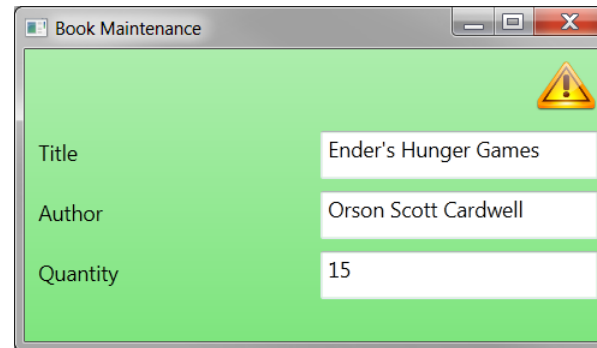
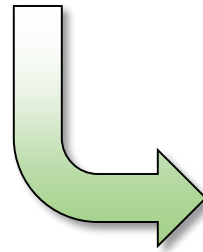
Forgiveness



Book Maintenance

Title	Ender's Games
Author	Orson Scott Card
Quantity	15

User
edits

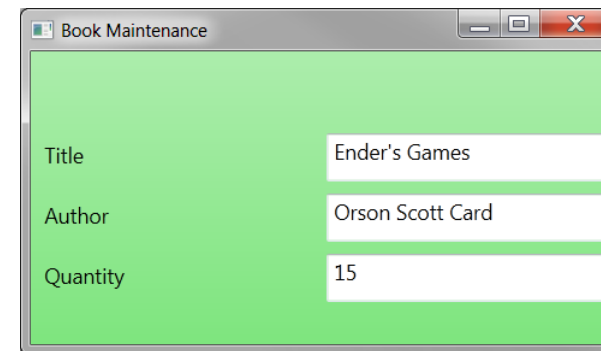
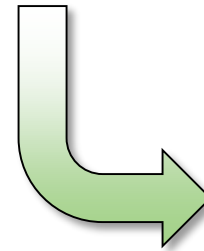


Book Maintenance

Title	Ender's Hunger Games
Author	Orson Scott Cardwell
Quantity	15

Warning icon

Undo



Book Maintenance

Title	Ender's Games
Author	Orson Scott Card
Quantity	15

Approve Prescription

Patient: Sherlock Holmes

Prescription: Ibuprofen 100mg

Instructions: 2 BID

Interactions: None

Approve Reject

Approval Holding Area

John Watson
Acyclovir Ointment
Apply as needed 3 times per day
18

Elizabeth Bennet
Erythromycin 250mg
One three times a day
7

Approve Prescription

Patient: Sherlock Holmes

Prescription: Ibuprofen 100mg

Instructions: 2 BID

Interactions: None

Approve Reject

Approval Holding Area

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White space

- Layouts on a computer screen make a user more comfortable and less stressed if they are open and not too crowded



Ansel Studios

QUICK LINKS ▾

Profile

- CRM
- Billing Information
- Job Templates
- Sub Items
- Exclusions
- Notes

Profile

Customer Name: Ansel Studios

Office: East Coast

Workers Comp Category: Construction

Worksite State: Mississippi

Status: Active

Active Date: 4/14/2010

Main Phone: 615-333-9666

Dress Code: extremely casual

Address

Main
750 Elysian Fields Road
Nashville, TN 37204

Billing
P.O. Box 37215-3312
Nashville, TN 37215

Add Edit Delete

Contacts

Ansel Hollis (Head honch
Cell 615-555-1234
Email ansel@somedomainsorr

Add Edit Delete

Apr 14
No cameras the week of June 13.

Make sticky

Apr 14
Apr 14

Save Close



Hobbieist

This comment has been reported. [Click here](#) to view it anyway.



MorganLaFey

I don't see why this comment was reported.

56 minutes ago

[Reply](#)



Like (0)

[Report Abuse](#)

[Link To Comment](#)



Casey M

Because Report Abuse is near Like. Move it to the end of the line in the style sheet and problem solved. But no.

52 minutes ago

[Reply](#)



Like (1)

[Report Abuse](#)

[Link To Comment](#)

Horror vacui

Fear of empty spaces



Fresh crops.
Versatile with
a capital V.

BANANA REPUBLIC



Most people intuit that the first shop was selling expensive goods and the second was selling cheaper goods.











Text F21
Text F21
Text F21



Customer Add/Edit

Customer Name: Green Lake Company

Business Type: Healthcare

Status: Active

Active Date: Monday, May 09, 2011

Main Phone: 615-555-1234

Billing Phone: 615-555-9876

Main Address

Street Address: 221B Baker St.

Line 2: Suite 2B

City, State, Zip: London TN 37124

Billing Address

Street Address: 157 Demonbreun St.

Line 2:

City, State, Zip: Nashville TN 37203

Shipping Address

Street Address:

Line 2:

City, State, Zip:

Main contact

Name (First, Last): Sherlock Holmes

Phone: 615-555-5869

Email: sherlockh@conan.com

Billing contact

Name (First, Last): John Watson

Phone: 615-555-4859

Email: sidekick@conan.com

Indicators

Sales Rep: Elizabeth Bennet

Last contacted: Monday, April

Marketing source: Direct mail

Notes: If these people would pay their bills on time, they would be a great customer. But Sherlock is apparently a cocaine addict and thus somewhat erratic.

Some more: 8754253412

Really: BAJHEKLT

Important:

Data goes: 844-15433-21

Over here: ABF-3-DRGT-34982

Cram a bunch of options in here

Probably don't really

Need most of these

Options most of the time

But we're terrified

To put them anywhere else

Hey there's so let's put

Some room something

Here

in the space

Oh, gosh, we've: Kelly's Heroes

Got a few more: Being There

Things to cram in: Hopscotch

Inactive Obnoxious Wish they would die

Delete Save Cancel Clone

MS CUI Patient Journey Demonstrator - Primary Care - Windows Internet Explorer
 http://www.mscai.net/PatientJourneyDemonstrator/PrimaryCare.aspx

2. Patient record View and explore Brian Johnson's clinical record

Doctor: COX, Oliver (Mr) Inbox (12) Pending (6) Patients Today (96)

JOHNSON, Brian (Mr) Born 24-Jul-1945 (62y) Gender Male NHS No. 012 345 6789

Address 25 Rochester Road, Linthor... Phone and email 0116 123 4567 Known allergies

Most Recent Activities

Group by: None Detail: [Slider]

- 2007
 - 02-Dec-2007 Chest Pain
 - 12-Oct-2007 Essential Hypertension
 - 06-Jun-2007 Bilateral Cataracts
- 2006
 - 01-Jun-2007 Moderate Depressive Episode
 - 01-Jun-2007 Essential Hypertension
 - 13-Apr-2007 Moderate Depressive Episode
 - 13-Apr-2007 Essential Hypertension
 - 01-Mar-2007 Moderate Depressive Episode

Allergies

- 01-Jan-1975 Adverse Reaction to Penicillins - rash and breathless

Lifestyle

Lifestyle (Cardiovascular Disease)

Current Risk: 24% Target Risk: 10% Projected Risk: 2%

Cholesterol Level: 6.8 mmol/L
Target < 5mmol

BMI: 32
Target 20

Medications

Current Past Group by: None Lev

Start Date	Drug Det	Reason	Status	Review Date
02-Dec-2007	glyceryl trinitrate	Chest Pain	Start	Jul-2008
26-Nov-2006	fluoxetine	Moderate Depressive illness	Start	Jun-2009
07-May-2006	aMLODipine	Essential Hypertension	Start	Dec-2008
19-Apr-2006	lisinopril	Essential Hypertension	Start	Dec-2008

3 more • simvastatin • lisinopril

Patient Charts

01-Jan-2004 - 01-Jan-2008

Current Care

Registered Doctor
HARRIS, Phyllis (Dr)
 Anytown Surgery, Chest Pain Clinic

Active Care Pathways (2) Essential Hypertension NICE Guidelines - Step 2 Moderate Depression Stage 4 / 6 - Maintenance Treatment... Search Care Pathway Library

Done Internet | Protected Mode: Off 100%



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QUICK LINKS ▾

► Profile

- CRM
- Billing Information
- Job Templates
- Sub Items
- Exclusions
- Notes

Profile

Customer Name:

Office:

Workers Comp Category:

Worksite State:

Status:

Active Date:

Main Phone:

Dress Code:

Address

Main 750 Elysian Fields Road Nashville, TN 37204	Billing P.O. Box 37215-3312 Nashville, TN 37215
<input type="button" value="Add"/> <input type="button" value="Edit"/> <input type="button" value="Delete"/>	

Contacts

Ansel Hollis (Head honch
Cell 615-555-1234
Email ansel@somedomainsorr

Apr
14

No cameras the week of June 13.

Make sticky

Apr
14

Apr
14



Home



Employees



Customers



Orders



Timesheets



Payroll



Billing and A/R



Reports

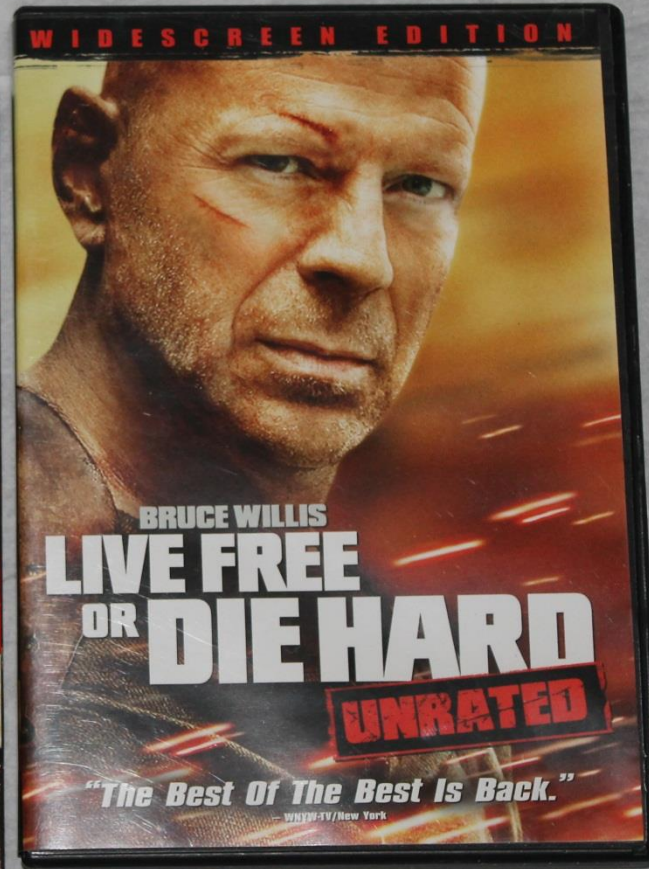


Settings



Contour bias

- Curved things are perceived as safe; sharp things are perceived as dangerous (i.e. “edgy”)
- Use curves to reduce excitement and stress, sharp edges to heighten them



First impressions

- Often formed in less than five seconds
- Based on them, we form expectations
 - Attractive people get more chances, and benefit of the doubt more often



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Nashville, TN 37204

Billing
P.O. Box 37215-3312
Nashville, TN 37215

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Apr 14
No cameras the week of June 13.

Make sticky

Apr 14
Apr 14

Customer Add/Edit

Customer Name	Green Lake Company	Main contact	Name (First, Last)	Sherlock Holmes	Some more	8754253412
Business Type	Healthcare	Name (First, Last)	John Watson	Really	BAJHEKLT	
Status	Active	Phone	615-555-4859	Important		
Active Date	Monday, May 09, 2011	Email	sidekick@conan.com	Data goes	844-15433-21	
Main Phone	615-555-1234	Billing contact	Name (First, Last)	Over here	ABF-3-DRGT-34982	
Billing Phone	615-555-9876	Name (First, Last)	John Watson	Cram a bunch of options in here <input type="checkbox"/> Probably don't really Hey there's <input checked="" type="checkbox"/> Need most of these so let's put <input checked="" type="checkbox"/> Options most of the time Some room <input type="checkbox"/> But we're terrified something <input type="checkbox"/> To put them anywhere else Here in the space		
Main Address Street Address 221B Baker St. Line 2 Suite 2B City, State, Zip London TN 37124		Phone	615-555-4859	Oh, gosh, we've Kelly's Heroes Got a few more Being There Things to cram in Hopscotch		
Billing Address Street Address 157 Demonbreun St. Line 2 City, State, Zip Nashville TN 37203		Email	sidekick@conan.com	<input type="checkbox"/> Inactive <input checked="" type="checkbox"/> Obnoxious <input checked="" type="checkbox"/> Wish they would die		
Shipping Address Street Address Line 2 City, State, Zip		Indicators 		Delete Save Cancel Clone		
		Sales Rep	Elizabeth Bennet	Notes If these people would pay their bills on time, they would be a great customer. But Sherlock is apparently a cocaine addict and thus somewhat erratic.		
		Last contacted	Monday, April			
		Marketing source	Direct mail			



Design Principle Families (examples)

<p><i>Visual System</i></p> <p>Inattentional Blindness Gestalt Principles (proximity, similarity, etc.)</p>	<p><i>Cognitive</i></p> <p>Hick's Law Forgiveness Gutenberg Diagram</p>
<p><i>Intuitive</i></p> <p>Whitespace Horror Vacui Contour Bias Aesthetics</p>	<p><i>Psychological</i></p> <p>Status Quo Bias Expectation Effects Unconscious Influence</p>

Contacting Billy

billyhollis@live.com

billyhollis.com

- Training in UX design
- Training in XAML (WPF and Windows 10)
- UX consulting and prototyping

