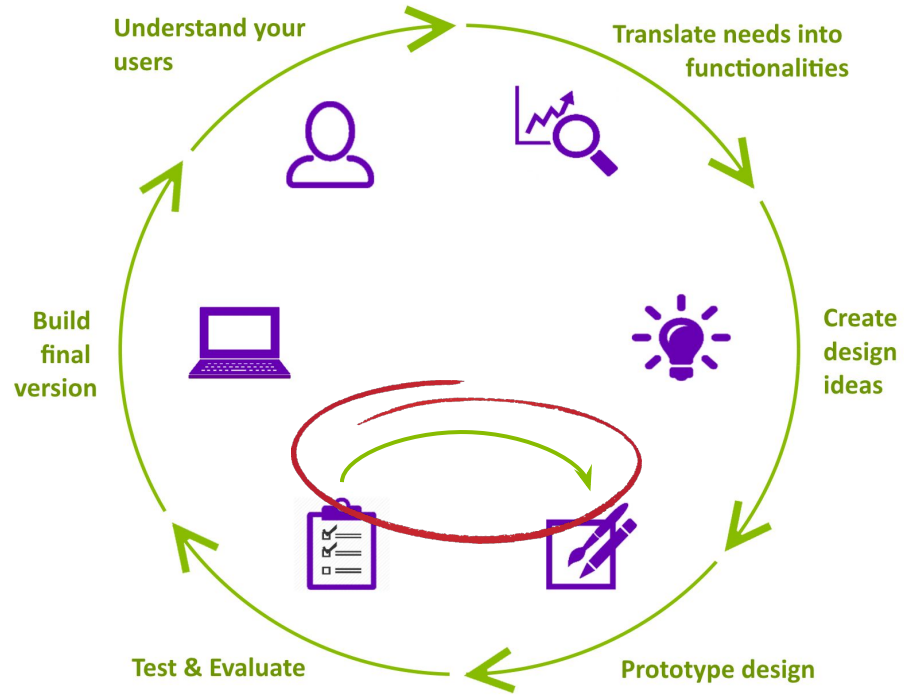


CS449/649: Human-Computer Interaction

Winter 2018

Lecture XI

Anastasia Kuzminykh





Create Design Ideas

Static representations of the product

Sketches

Wireframes

Mockups

Visualization



Prototype Design

Prototypes

- interactive design model of the product

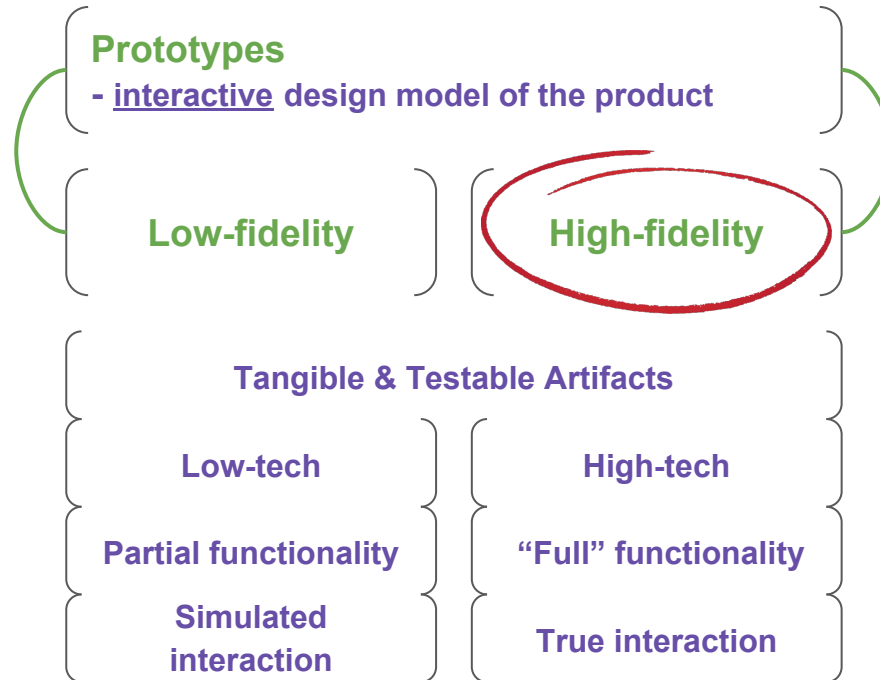
Low-fidelity

High-fidelity

Testing and Evaluation



Prototype Design





Prototype Design

High Fidelity Prototyping Tools

Interactive

**Realistic system
response**

**Content and
workflow details**

**(Almost) Full
fidelities**

**Less human
errors**

**Allows broader
usability testing**



Prototype Design

High Fidelity Prototyping Tools

Implement by hand

Prototyping Software



Prototype Design

High Fidelity Prototyping Tools

Implement by hand

Prototyping Software

Whatever suits your purposes
and platforms:

- jQuery, Bootstrap, AngularJS,
etc.

- Android Studio, Xcode,
IntelliJ IDEA, Apache Cordova,
React Native, etc.

More control

More options

Takes longer

Buggy



Prototype Design

High Fidelity Prototyping Tools

Implement by hand

Whatever suits your purposes and platforms:

- jQuery, Bootstrap, AngularJS, etc.

- Android Studio, Xcode, IntelliJ IDEA, Apache Cordova, React Native, etc.

Prototyping Software

- InVision (good with mockups)

- JustInMind (has widgets)

- Axure (not mobile friendly)

- Mockplus (pre-designed interaction components)

More control

More options

Takes longer

Buggy

Faster

Sharing & comments

Outside product

Limited options



Prototype Design

Designing User Interface

Elements &
characteristics

Elements
composition

Spatial
organisation

Information
processing

Interaction



Prototype Design

Designing User Interface

Elements & characteristics

Elements composition

Spatial organisation

Information processing

Interaction

Visual Design

“Cognitive” Design



Prototype Design

Designing User Interface

Elements & characteristics

Elements composition

Spatial organisation

Information processing

Interaction

Color Perception

The Von Restorff effect

Rule of Thirds

Dual-coding theory

Manipulation

Shape Perception

Gestalt Principles

Types of vision

Patterns matching

Locomotion

Visceral Reaction Triggers

Fitts' Law

Free space

Social & Emotional info

Conversation



Prototype Design

Designing User Interface

Elements & characteristics

Elements composition

Spatial organisation

Information processing

Interaction

Color Perception

The Von Restorff effect

Rule of Thirds

Dual-coding theory

Manipulation

Shape Perception

Gestalt Principles

Types of vision

Patterns matching

Locomotion

Visceral Reaction Triggers

Fitts' Law

Free space

Social & Emotional info

Conversation



Elements & characteristics

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Spatial organisation

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Color Perception

Red - bold, contemporary, exciting, passionate, young

Orange - social, friendly, affordable, happy, confident

Yellow - optimistic, clear, logical, lightweight, playful

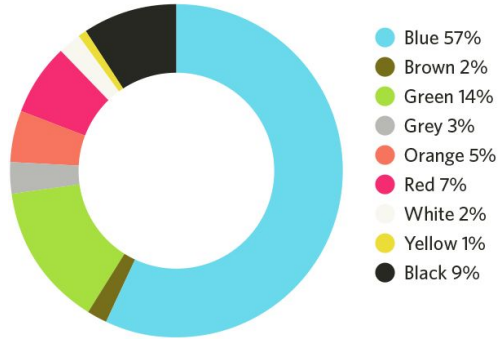
Green - peaceful, growing, caring, fresh, healthy, natural

Blue - trustworthy, secure, strong, honest, stable, calm

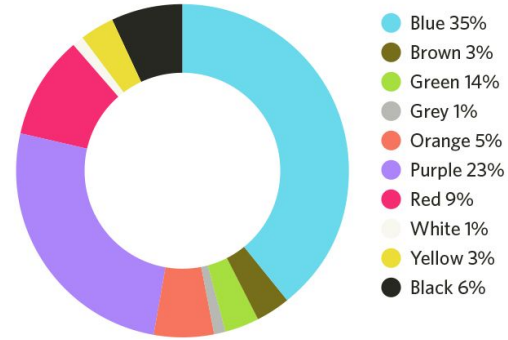
Purple - glamorous, creative, imaginative, nostalgic, feminine

Favorite colors:

Men

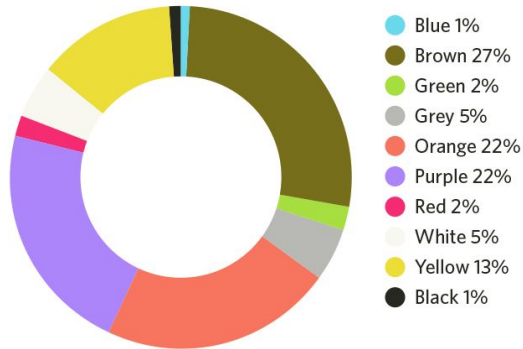


Women

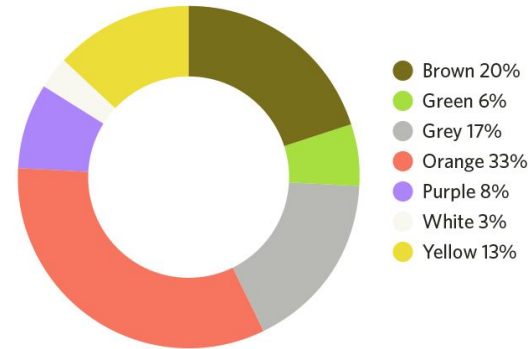


Least favorite colors:

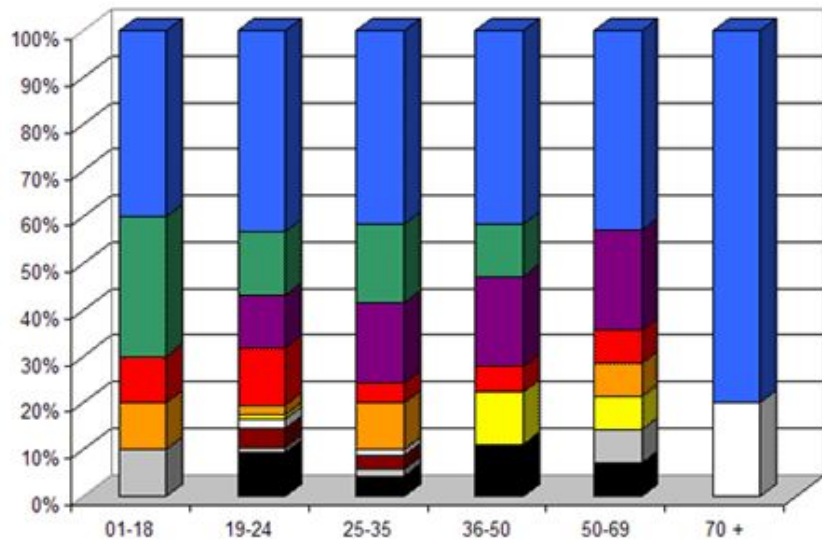
Men



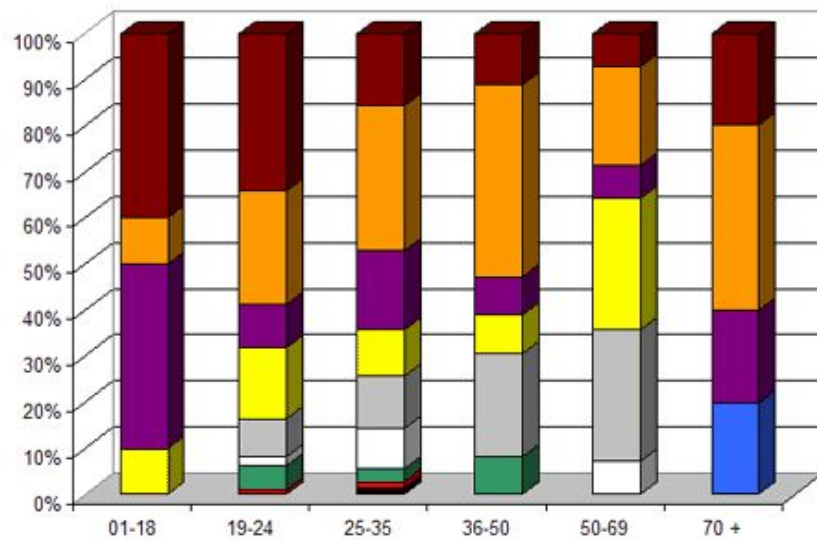
Women



Favorite Color by Age Group



Least Favorite Color by Age Group





Prototype Design

Designing User Interface

Elements & characteristics

Elements composition

Spatial organisation

Information processing

Interaction

Color Perception

The Von Restorff effect

Rule of Thirds

Dual-coding theory

Manipulation

Shape Perception

Gestalt Principles

Types of vision

Patterns matching

Locomotion

Visceral Reaction Triggers

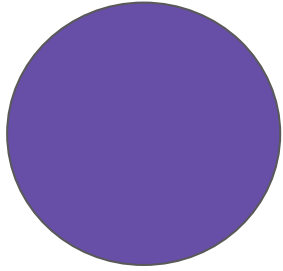
Fitts' Law

Free space

Social & Emotional info

Conversation

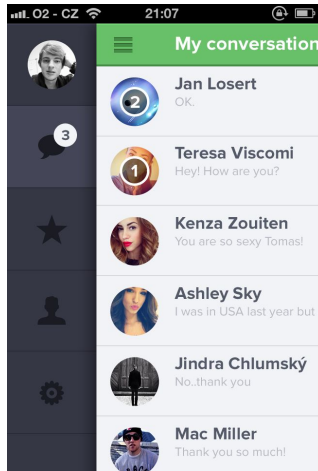




Logo examples:



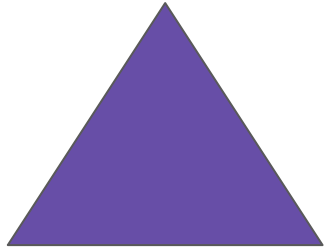
Interface examples:



<https://dribbble.com/>

<https://guardianproject.info/>

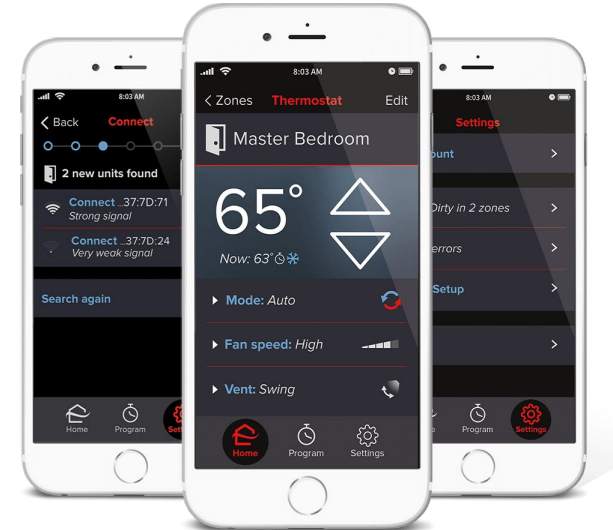
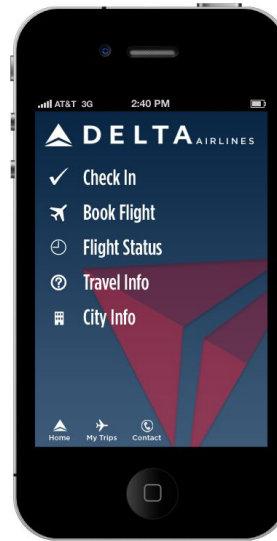
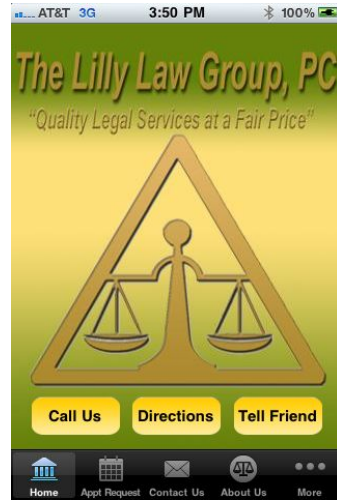
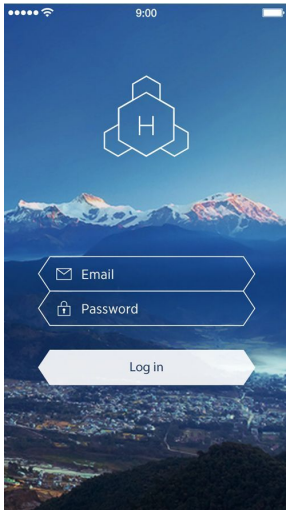
<https://www.slashgear.com/>



Logo examples:



Interface examples:



<https://www.pinterest.com/>

<http://zoominapps.com/law-app/>

<http://www.flightswatcher.com/>

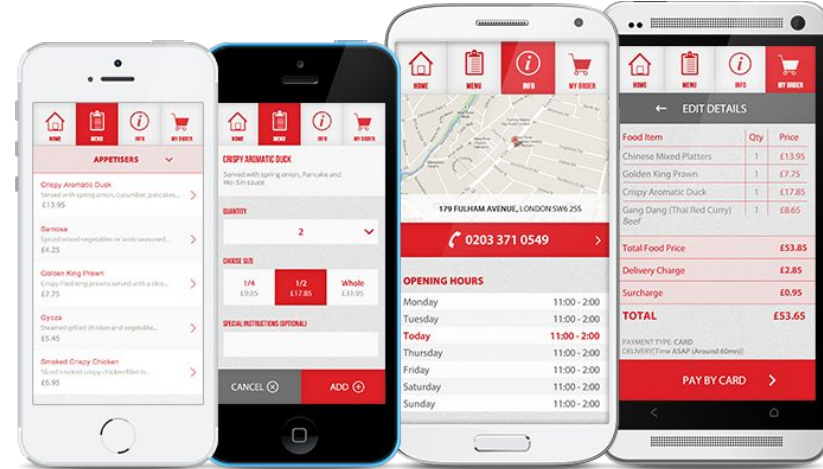
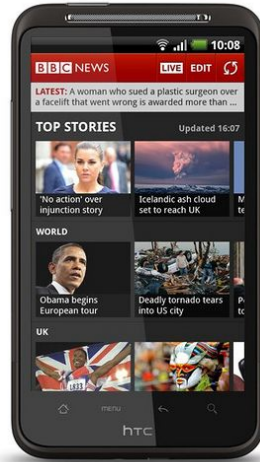
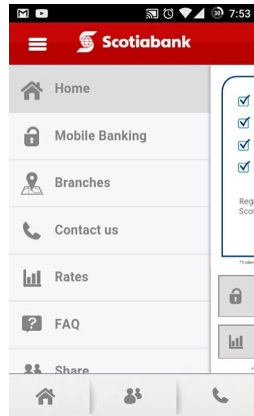
<http://www.mitsubishicomfort.com/>



Logo examples:



Interface examples:



<http://www.geeky-gadgets.com/>

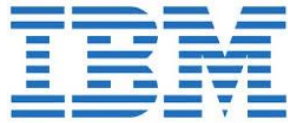
<http://www.addictotech.com/>

<http://www.bbc.co.uk/>

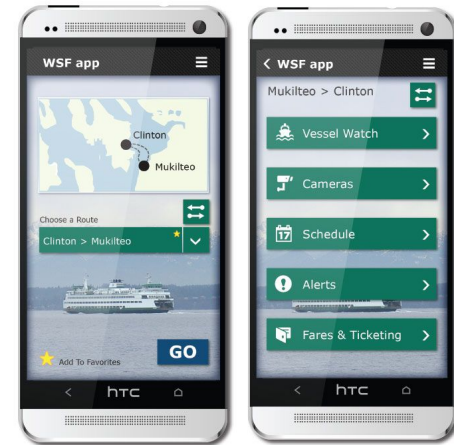
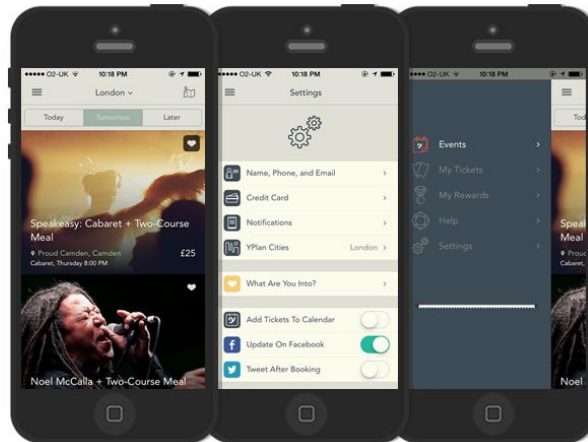
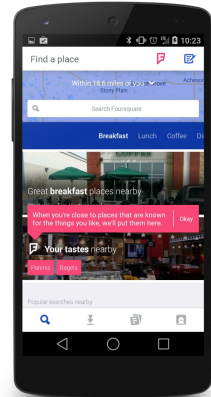
<http://www.blueplustechnologies.com/>



Logo examples:



Interface examples:

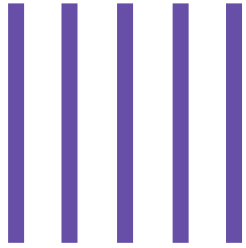


<https://designmodo.com/weather-mobile-apps/>

<http://techaeris.com/>

<https://jessteesang.wordpress.com/2014/09/17/app-review-yplan/>

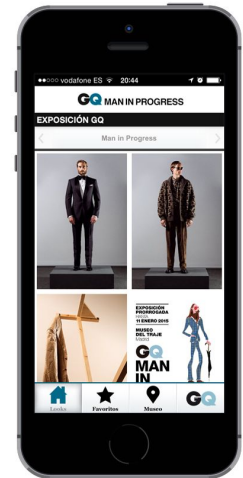
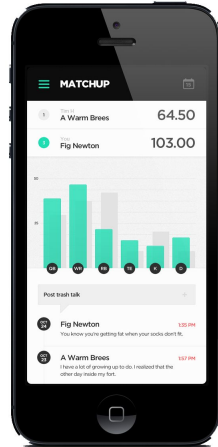
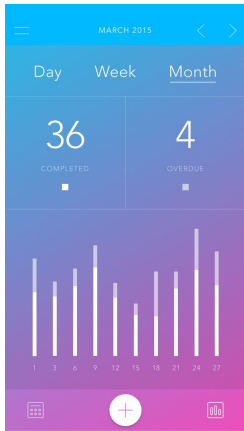
<http://www.tressarandolph.com/portfolio/project05.php>



Logo examples:



Interface examples:



<https://www.pinterest.com/>

<https://www.behance.net/gallery/>

<https://menshealth2011.wordpress.com/>

<http://www.alejandro-castro.com/>

Elements & characteristics

Elements composition

Spatial organisation

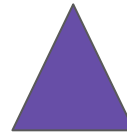
Information processing

Interaction

Shape Perception



Circles - community, friendship, relationship, unity, trust



Triangles - power, science, law, stability, strength



Squares - stability, strength, power, professionalism, efficiency



Horizontal lines - community, tranquility, flow, continuity



Vertical lines - power, masculinity, ambition, aggression, strength



Prototype Design

Designing User Interface

Elements & characteristics

Elements composition

Spatial organisation

Information processing

Interaction

Color Perception

The Von Restorff effect

Rule of Thirds

Dual-coding theory

Manipulation

Shape Perception

Gestalt Principles

Types of vision

Patterns matching

Locomotion

Visceral Reaction Triggers

Fitts' Law

Free space

Social & Emotional info

Conversation



Elements & characteristics

Elements composition

Spatial organisation

Information processing

Interaction

Visceral Reaction Triggers

Stimuli that cause instinctive and emotion-based, subconscious, bodily response

Food

Survival

Pleasure

Opportunities

Images, colors, texts, shapes, etc.



Prototype Design

Designing User Interface

Elements & characteristics

Elements composition

Spatial organisation

Information processing

Interaction

Color Perception

The Von Restorff effect

Rule of Thirds

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Manipulation

Shape Perception

Gestalt Principles

Types of vision

Patterns matching

Locomotion

Visceral Reaction Triggers

Fitts' Law

Free space

Social & Emotional info

Conversation



Prototype Design

Designing User Interface

Elements & characteristics

Elements composition

Spatial organisation

Information processing

Interaction

Color Perception

The Von Restorff effect

Rule of Thirds

Dual-coding theory

Manipulation

Shape Perception

Gestalt Principles

Types of vision

Patterns matching

Locomotion

Visceral Reaction Triggers

Fitts' Law

Free space

Social & Emotional info

Conversation



Elements & characteristics

Elements composition

Spatial organisation

Information processing

Interaction

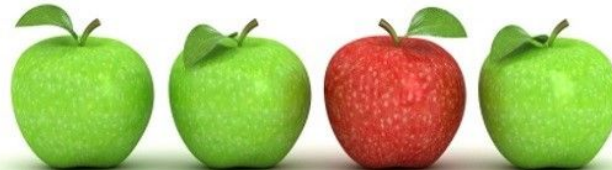
The Von Restorff Effect

== Isolation Effect. Items that stand out from their peers are more memorable

Use meaningful and helpful contrasts

Use color, shape, position and texture for accents

Be consistent with accents and accentuated content





Prototype Design

Designing User Interface

Elements & characteristics

Elements composition

Spatial organisation

Information processing

Interaction

Color Perception

The Von Restorff effect

Rule of Thirds

Dual-coding theory

Manipulation

Shape Perception

Gestalt Principles

Types of vision

Patterns matching

Locomotion

Visceral Reaction Triggers

Fitts' Law

Free space

Social & Emotional info

Conversation



Elements & characteristics

Elements composition

Spatial organisation

Information processing

Interaction

Gestalt Principles

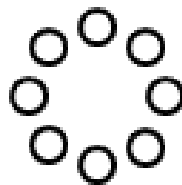
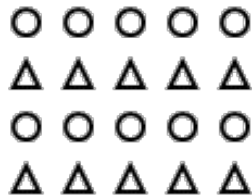
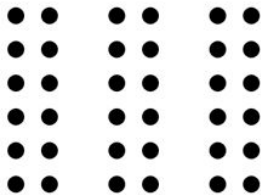
Proximity

Similarity

Closure

Continuity

Symmetry



Objects in close proximity are seen as a group

Objects that look the same are seen as a group

Shape is seen as a whole even if not fully closed

Line is seen as a whole - natural eye movement

Objects are seen as symmetrical and formed around center

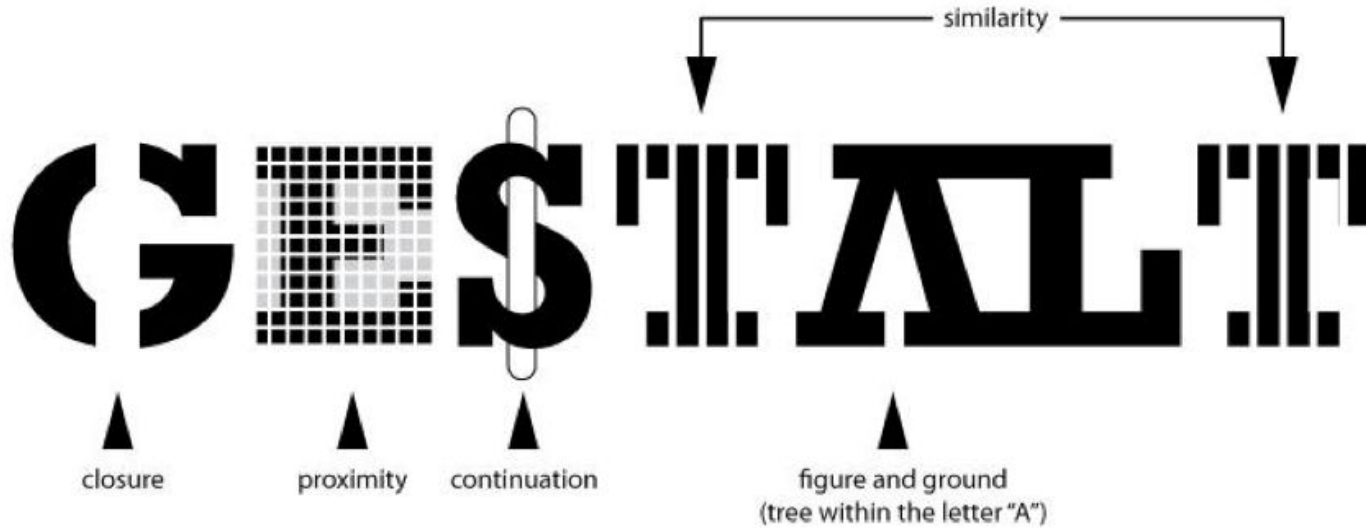
Elements & characteristics

Elements composition

Spatial organisation

Information processing

Interaction



Gestalt Principles for Information Design



Prototype Design

Designing User Interface

Elements & characteristics

Elements composition

Spatial organisation

Information processing

Interaction

Color Perception

The Von Restorff effect

Rule of Thirds

Dual-coding theory

Manipulation

Shape Perception

Gestalt Principles

Types of vision

Patterns matching

Locomotion

Visceral Reaction Triggers

Fitts' Law

Free space

Social & Emotional info

Conversation



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Elements composition

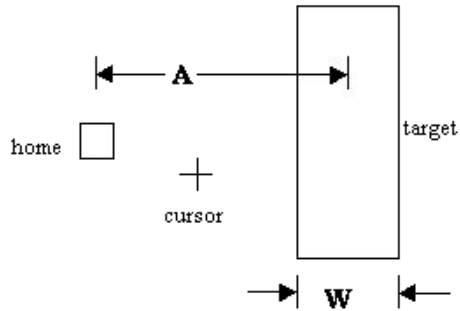
Spatial organisation

Information processing

Interaction

Fitts' Law

$$MT = a + b \log_2(2A/W)$$



- **MT** - movement time
- **a** and **b** - empirically determined constants, device dependent.
- **A** - the distance of movement from start to target center
- **W** - the width of the target
- $\log_2(2A/W)$ is called the index of difficulty (ID)

Big targets at close distance are acquired faster than small targets at long distance

ID provides a single combined measure of two main physical properties of movement tasks

Provides information only through an experiment - a comparative tool for devices, tasks, interaction techniques, etc.



Prototype Design

Designing User Interface

Elements & characteristics

Elements composition

Spatial organisation

Information processing

Interaction

Color Perception

The Von Restorff effect

Rule of Thirds

Dual-coding theory

Manipulation

Shape Perception

Gestalt Principles

Types of vision

Patterns matching

Locomotion

Visceral Reaction Triggers

Fitts' Law

Free space

Social & Emotional info

Conversation



Prototype Design

Designing User Interface

Elements & characteristics

Elements composition

Spatial organisation

Information processing

Interaction

Color Perception

The Von Restorff effect

Rule of Thirds

Encoding theory

Manipulation

Shape Perception

Gestalt Principles

Types of vision

Patterns matching

Locomotion

Visceral Reaction Triggers

Fitts' Law

Free space

Social & Emotional info

Conversation





Image: <http://www.nationalgeographicexpeditions.com/expeditions/yosemite-sequoia-tour/detail>



Image: <http://www.nationalgeographicexpeditions.com/expeditions/yosemite-sequoia-tour/detail>

Elements &
characteristics

Elements
composition

Spatial
organisation

Information
processing

Interaction

Rule of Thirds



Image: <http://www.nationalgeographicexpeditions.com/expeditions/yoosemite-sequoia-tour/detail>



Prototype Design

Designing User Interface

Elements & characteristics

Elements composition

Spatial organisation

Information processing

Interaction

Color Perception

The Von Restorff effect

Rule of Thirds

Dual-coding theory

Manipulation

Shape Perception

Gestalt Principles

Types of vision

Schemas matching

Locomotion

Visceral Reaction Triggers

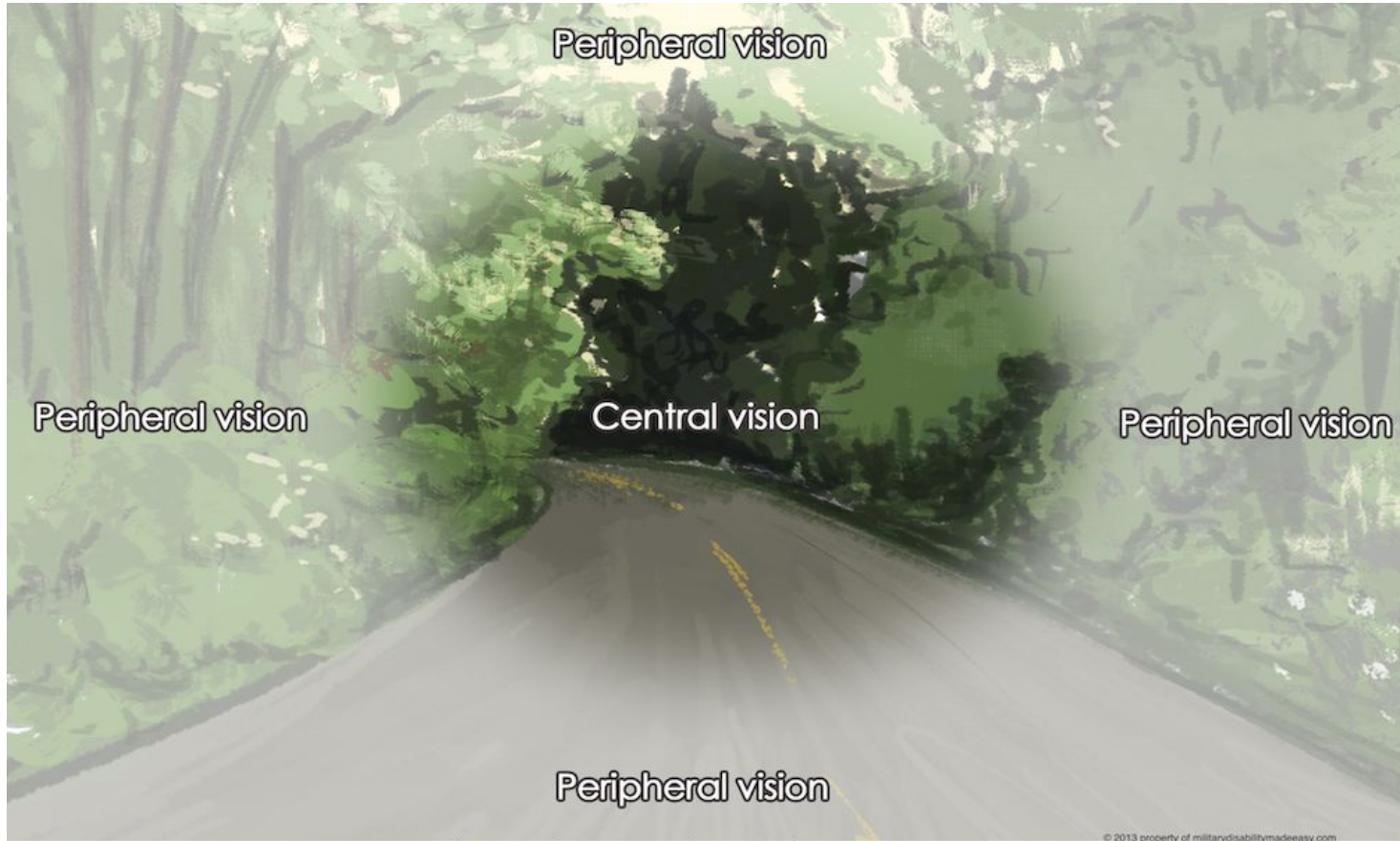
Fitts' Law

Free space

Social & Emotional info

Conversation





© 2013 property of militarydisabilitymadeeasy.com

Image: <http://www.militarydisabilitymadeeasy.com/theeyes.html>

Scene conditions with differing radii in degrees of visual angle

1° 5° 10.8° 13.6°



Equal viewable scene area (40%)

Window

Scotoma



Larson, Adam M., and Lester C. Loschky.

"The contributions of central versus peripheral vision to scene gist recognition."

Journal of Vision 9.10 (2009): 6-6.

Elements & characteristics

Elements composition

Spatial organisation

Information processing

Interaction

Types of Vision

What

Central

- Object recognition
- Element identification
- "Details" attention

Peripheral

- Scene recognition
- Context identification
- "Danger" attention

Where



Prototype Design

Designing User Interface

Elements & characteristics

Elements composition

Spatial organisation

Information processing

Interaction

Color Perception

The Von Restorff effect

Rule of Thirds

Dual-coding theory

Manipulation

Shape Perception

Gestalt Principles

Types of vision

Patterns matching

Locomotion

Visceral Reaction Triggers

Fitts' Law

Free space

Social & Emotional info

Conversation



Elements & characteristics

Elements composition

Spatial organisation

Information processing

Interaction

Free space

Visual - space around graphics, icons, images

Layout - margins, paddings

Text - spacing between lines and letters

Content - spacing between content groups

Elements & characteristics

Elements composition

Spatial organisation

Information processing

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Visual - space around graphics, icons, images

Layout - margins, paddings

Text - spacing between lines and letters

Content - spacing between content groups

Makes important elements stand out

Improves comprehension

Clarifies relationship through proximity



Prototype Design

Designing User Interface

Elements & characteristics

Elements composition

Spatial organisation

Information processing

Interaction

Color Perception

The Von Restorff effect

Rule of Thirds

Dual-coding theory

Manipulation

Shape Perception

Gestalt Principles

Types of vision

Patterns matching

Locomotion

Visceral Reaction Triggers

Fitts' Law

Free space

Social & Emotional info

Conversation



Prototype Design

Designing User Interface

Elements & characteristics

Elements composition

Spatial organisation

Information processing

Interaction

Color Perception

The Von Restorff effect

Rule of Thirds

Dual-coding theory

Manipulation

Shape Perception

Gestalt Principles

Types of vision

Patterns matching

Locomotion

Visceral Reaction Triggers

Fitts' Law

Free space

Social & Emotional info

Conversation



Elements & characteristics

Elements composition

Spatial organisation

Information processing

Interaction

Dual Coding Theory - human memory operates both with verbal representations and mental images, when both potentiate recall of each other

Allan Paivio, University of Western Ontario, 1971

Text

VS

Images

- Slower
- Verbal message

- Faster
- Illustrating idea

Combine.

Use not just images and diagrams, but infographics, visual cues, framing, etc.

Plan Heading Structure Early

Ensure all content and design fits into a logical heading structure.

Consider Reading Order

The reading order should be the same as the visual order.

Provide Good Contrast

Be especially careful with light shades of gray, orange, and yellow. Check your contrast levels with our color contrast checker.

Use True Text Whenever Possible

True text enlarges better, loads faster, and is easier to translate. Use CSS to add visual style.



Plan Heading Structure Early

Ensure all content and design fits into a logical heading structure.



Consider Reading Order

The reading order should be the same as the visual order.

Good
Bad

Provide Good Contrast

Be especially careful with light shades of gray, orange, and yellow.

Abc

Use True Text Whenever Possible

True text enlarges better, loads faster, and is easier to translate. Use CSS to add visual style.

Image:

<http://3.7designs.co/blog/2012/05/design-copy-and-mental-processing/>



Prototype Design

Designing User Interface

Elements & characteristics

Elements composition

Spatial organisation

Information processing

Interaction

Color Perception

The Von Restorff effect

Rule of Thirds

Dual-coding theory

Manipulation

Shape Perception

Gestalt Principles

Types of vision

Patterns matching

Emotion

Visceral Reaction Triggers

Fitts' Law

Free space

Social & Emotional info

Conversation



Elements &
characteristics

Elements
composition

Spatial
organisation

Information
processing

Interaction

Patterns Matching - the way of
processing incoming information



- Based on previous experience
- Assesses familiarity
- Stimuli that are difficult to match can be more memorable, but also frustrating



Prototype Design

Designing User Interface

Elements & characteristics

Elements composition

Spatial organisation

Information processing

Interaction

Color Perception

The Von Restorff effect

Rule of Thirds

Dual-coding theory

Manipulation

Shape Perception

Gestalt Principles

Types of vision

Patterns matching

Locomotion

Visceral Reaction Triggers

Fitts' Law

Free space

Social & Emotional info

Conversation



Elements &
characteristics

Elements
composition

Spatial
organisation

Information
processing

Interaction

Social & Emotional Information

Facial Recognition

- We are instinctively drawn to human faces
- Aggressive and unhappy faces draw more attention
- Expression on the face will influence user's feelings about the product



Elements & characteristics

Elements composition

Spatial organisation

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Facial Recognition

- We are instinctively drawn to human faces
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- Expression on the face will influence user's feelings about the product

Authority

- We trust experts and those who have power

Scarcity

- The less available the resource, the more we want it

Reciprocation & Favoritism

- We recognize favors and try to return them
- The more we like people, the more we want to say yes

Social Proof Seeking

Robert B. Cialdini, The Science of Compliance



Prototype Design

Designing User Interface

Elements & characteristics

Elements composition

Spatial organisation

Information processing

Interaction

Color Perception

The Von Restorff effect

Rule of Thirds

Dual-coding theory

Manipulation

Shape Perception

Gestalt Principles

Types of vision

Patterns matching

Locomotion

Visceral Reaction Triggers

Fitts' Law

Free space

Social & Emotional info

Conversation



Prototype Design

Designing User Interface

Elements & characteristics

Elements composition

Spatial organisation

Information processing

Interaction

Color Perception

The Von Restorff effect

Rule of Thirds

Dual-coding theory

Manipulation

Shape Perception

Gestalt Principles

Types of vision

Patterns matching

Locomotion

Visceral Reaction Triggers

Fitts' Law

Free space

Social & Emotional info

Conversation

Elements & characteristics

Elements composition

Spatial organisation

Information processing

Interaction

Types of Interaction

Terry Winograd

Manipulation

Locomotion

Conversation

“Back-end”

Mental Model

Technology based

Metaphorical

Often hidden mechanisms

Reflected in vocabulary

Dependent on embodiment



Prototype Design

Designing User Interface

Elements & characteristics

Elements composition

Spatial organisation

Information processing

Interaction

Color Perception

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Rule of Thirds

Dual-coding theory

Manipulation

Shape Perception

Gestalt Principles

Types of vision

Patterns matching

Locomotion

Visceral Reaction Triggers

Fitts' Law

Free space

Social & Emotional info

Conversation