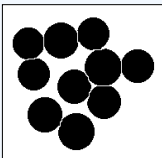


Lect 4: General Principles of Design

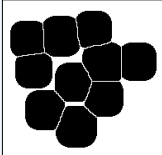
Info Visualization: What have we discussed so far?

1. **Data Visualization: discipline-specific criteria**
2. **Organization & Classification of Data**
3. **Structural Planning the Design Process**
4. **Today: Design Principles**
 - a. Various development & design methods
 - b. How to formally organize information
 - c. Some conceptual approaches
 - d. Graphic and formal methods

Development Cycle (4 Stages in the Design Process)



- **Requirements:** Market Research, customer feedback, focus groups, usability testing, also defined based on direct knowledge and experience
- **Design:** Requirements given a form
- **Development:** Design specifications transformed into actual product
- **Testing:** Does it meet design requirements, specifications, addresses target audience, etc.



Design Considerations & Strategies



- **Flexibility-Usability Tradeoff:** Flexible designs do more but they perform the functions less efficiently
- **Design Iterations:** Occurs when exploring, testing, and refining design concepts. Each cycle narrows down the possibilities. Value in failure for lessons learned.
- **Outcome:** Detailed and well tested specification to be developed into a product
- **Development Iteration:** Unexpected iteration when building a product - it is rework. So undesirable and costly!

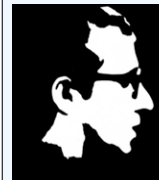
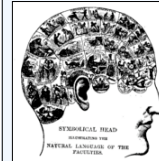
Organizational Conceptual Methods



- **Mental Models:** Interaction with systems based on mental representations from experience.
- **Mnemonic Device:** Used to make information simpler and more meaningful (keyword, rhyme, feature name, first letter)
- **Cognitive Dissonance:** Tendency to seek consistency even though there may be conflict
- **Recognition over Recall:** Recognition memory is much easier to develop than memory for recalling things.

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Organizational Rules



- **Modularity:** Technique of combining units of information into a limited set of units to aid processing
- **Hierarchy:** Simplest structure for visualizing complexity (tree, stairs, nest structures, etc: shows relationships, i.e, email folders)
- **Layering:** 2D layering separating info, only 1 layer visible at a time. 3D layering: multiple layers visible (weather map, building floor structure)
- **Consistency:** Similar parts expressed in similar ways in style, meaning, procedure, action, etc.
- **Closure:** Set of individual elements when clustered seen as an integrated recognizable pattern

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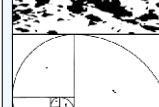
Form & Function



- **Entry Point:** Initial impressions of a system such as book covers, first web screens, etc. influence perception and subsequent evaluation.
- **Form Follows Function:** "Let the data speak for itself": Functional aspects of a design present a clearer, more objective criteria for quality judgement.
- **Signal-To-Noise:** Unwanted information clutters the message. Many times noise becomes an interesting element.
- **Feedback Loop:** Output is returned to its input. Positive Fdbk amplifies system output creating growth or decline. Negative Fdbk dampens output, and are effective for resisting change.

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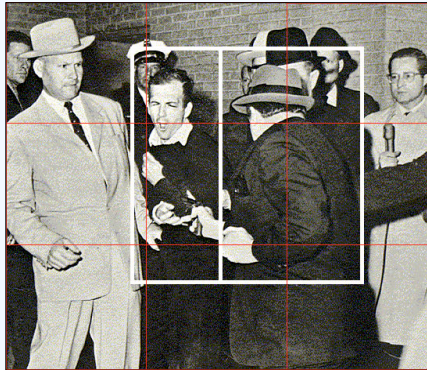
Visual Form & Proportions



- **Golden Ratio:** A classical ratio within the elements of form height to width appx 0.618
- **Figure-Ground:** Visual direction - elements seen as either objects of focus, or ground (the background perceptual field)
- **Rule of Thirds:** Composition technique - divide space into thirds, creates aesthetic focus, hierarchy
- **Fibonacci:** 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233
- **Alignment:** Creates unity, cohesion, guides understanding (invisible grid structure)

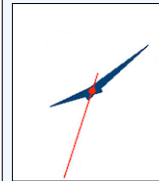
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Golden Ratio, Rules of Thirds, and....

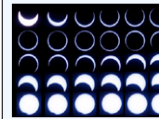


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Orientation Sensitivity & Commonalities



- **Oblique:** Easier to judge horizontal, vertical easier than oblique.
- **Pop-up:** Certain elements stand out over others
- **Direction :** Elements that move in same direction are perceived to be more related
- **Proximity:** Elements close together are perceived to be more related than those farther apart
- **Uniform Visual Properties:** (such as color) are perceived to be more connected



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StoryTelling & Visibility



- **Story Telling:** A method of creating imagery, emotions, understanding of events.
Key elements: Setting, Characters, Plot, Invisibility, Mood, Movement
- **Visibility:** Usability is improved when status and method of a system are visible
- **Serial Position:** Items at beginning and end are best remembered
- **Von Restorff Effect:** Noticeably different things are better recalled than common things (list item in **different** color)

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Bibliography



- [Universal Principles of Design](#) (100 Ways to Enhance Usability, Influence Perception, Make better design decisions, etc.) W. Lidwell, K. Holden, J. Butler
- [Information Design Source Book](#), Birkhauser
- [Wikipedia](#)
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