Spatial Concepts
in GIS and Design

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Panel: Tuesday, 3/24/09, 3:10 PM - 4:50 PM, Capri 107, Riviera Hotel
Three points:

1. **GIS** and Spatial **Design** stem from contrasting though **symmetric** perspectives.
2. This suggests both strong **connections** and critical **differences**.
3. For discussion:
   - The spatial **concepts** are the **same** for both.
   - The **differences** lie in the **value** and **use** of these concepts.
Contrast the dominant positive stance of GIS with the normative stance of the design sciences:

**GIS & TRADITIONAL SCIENCES**
- Analysis
  - From instances to principles
  - Causal
  - Descriptive
  - Positive
  
**THE DESIGN SCIENCES**
- Synthesis
  - From principles to instances
  - Purpose-oriented (telic)
  - Prescriptive
  - Normative (deontic)

*IS* *OUGHT*
Can we enumerate some ‘fundamental spatial concepts’ [in design]?

**Fundamental Spatial Concepts**
- symmetry / pattern / shape / motif / clustering / scale / rhythm / proportion / texture / axiality / form / concentricity / repetition / sequence, et al. (Lynch *Good City Form*, e.g.)

**Spatial Prepositions**
- are important in design and **spatial reasoning**: west-of, uphill, beside, along, surrounded-by, half-inside, in the lee of, …

**What about:**
- ‘formal’ / ‘grand’ / ‘clear’ / ‘confusing’ / ‘serpentine’ / ‘human scale’

*Are these spatial? Computable?*

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To what extent can the fundamental cognitive operations of design be addressed with GIS?

- ‘Design’ : carries a lot of baggage
  - is it Art? Science? Problem-Solving?

- What are its essential skills?
  - Do material, scale, and subject/discipline matter?

- What constitutes design education?
Do you notice any difference between slide #1 and slide #2?

- Slide #1: design as **noun** (product)
- Slide #2: design as **verb** (process)

**Two different challenges for us:**

#1: understanding with GIS the **products** of design
   e.g., any landscape organized for human purposes
   -> interpreting the **application** of spatial concepts on the landscape
   -> **a problem of inferring** design-oriented thinking

#2: supporting with GIS the **process** of design
   e.g., urban or ecological planning
   -> supporting synthetic **operations** on spatial concepts
   -> **a problem of facilitating** design-oriented thinking

For now: let’s focus on **Challenge #1**
Spatial concepts

- They are the same in analytic and synthetic thinking
- ...but what you do with spatial concepts is different in the analytic and synthetic mode:
  - In analytic mode
    - you describe them; you investigate their properties
  - In design mode
    - you use these concepts and their properties to solve constraint satisfaction problems
The differences

- There are differences in **emphasis:**
  - Some concepts are more important in analysis or design
    - **Analysis:** pattern
    - **Design:** configuration, arrangement, structure, composition, design, motif, form, shape, etc. etc.

- There are differences in **qualifiers:**
  - Key objectives are different in analysis and design
    - **Analysis** objective: Correct representation
      - Qualifiers: data quality, accuracy, precision, fuzziness,…
    - **Design** objective: **Fitness-for-use** (practical, aesthetic)
      - Qualifiers: efficient, functional, harmonious, pleasant, symmetric, human-scale, ‘good’
  - See **Steve Ervin’s slide #1**
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Implications for GIS?

Understand the Yin-Yang of Analysis and Design