Prieto-Diaz & Freeman: Classifying Software

- If you want to find software for reuse, you should classify it
- Classification groups like things together
  - Classification displays relationships, produces systematic order
- Classification schedule
  - Based on structured index vocabulary
  - Names classes, shows relationships
- Relationships: hierarchical or syntactic
- Presentation: enumerative (a priori) or faceted (evolving)

Classification and Taxonomy

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http://spoke.compose.cs.cmu.edu/ser01/

Classification structures

- Aristotelian classifications
  - Principled, based on hierarchical taxonomies
  - Partition the space of things being classified
  - Don’t account for all the details of the real world
  - Often subverted by people charged with doing the classification
- Prototype-based classifications
  - Try to distinguish among a number of common cases
  - Often ad hoc, may not evolve gracefully
- Often have organizational or political significance
- Criteria
  - There are consistent, unique classificatory principles in operation
  - The categories are mutually exclusive
  - The system is complete

Classifications are Context-Sensitive

- Consistent finding of history of science: no such thing as natural or universal classification system. What appears natural in a given context may appear forced elsewhere
- According to a Chinese emperor,
  Animals are divided into:
  - Belonging to the emperor
  - Included in the present classification
  - Embalmed
  - Frenzied
  - Tame
  - Innumerable
  - Sucking pigs brush
  - Drawn with a very fine camelhair brush
  - Sirens
  - Et cetera
  - Fabulous
  - Having just broken the water pitcher
  - Stray dogs
  - That from a long way off look like
## Hierarchy vs Design Spaces

<table>
<thead>
<tr>
<th>Life</th>
<th>Graphic compression</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; Plants</td>
<td>&gt; amount of compression</td>
</tr>
<tr>
<td>&gt; Animals</td>
<td>&gt; time to compress/uncompress</td>
</tr>
<tr>
<td>&gt; Invertebrates</td>
<td>&gt; lossiness</td>
</tr>
<tr>
<td>• Molluscs</td>
<td>&gt; assumed structure of data</td>
</tr>
<tr>
<td>» Arthropods (jointed legs)</td>
<td></td>
</tr>
<tr>
<td>– Crustaceans</td>
<td></td>
</tr>
<tr>
<td>– Insects</td>
<td></td>
</tr>
<tr>
<td>&gt; Vertebrates</td>
<td></td>
</tr>
<tr>
<td>• Reptiles</td>
<td></td>
</tr>
<tr>
<td>• Mammals</td>
<td></td>
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<tr>
<td>– Ungulates</td>
<td></td>
</tr>
<tr>
<td>– Primates</td>
<td></td>
</tr>
<tr>
<td>&gt; Birds</td>
<td></td>
</tr>
</tbody>
</table>

Different substructure, distinctions along different branches

Global structure, distinctions; unconstrained combinations

## Implications for Research Strategies

- Question, Result, and Validation are three dimensions of a design space (cf “facets”)
- Some items are hierarchically structured
- Need principle for generating the items in each dimension