Command Languages

- One of earliest computer IO metaphors after cables/toggle switches/meters
- User must
  - recall notation
  - initiate actions
- Unlike other UI approaches before and after, added functionality doesn’t modify UI appearance
- Possibility for excess, baroque complexity
  - !?str?:s/ls/rmdir:p
  - Does the language have too much functionality?
    Or does the user have too little training?
Command Languages

- Still relevant because of
  - Prevalence of textual programming languages
  - “Little languages”
    - *Awk, sed, ideal, pic*, but also…
    - *Google*
      - sin 89 degrees
      - 3.29 USD per gallon in INR per litre
      - 0x3a4 + 0xfe3 in roman numerals
  - “Need for speed” in interactive systems
    - Text editing, with hands already on kbd (avoid *T* to mouse)
    - Keyboard shortcuts
    - Regular expressions
      - `mv a"D*.c ~/proj/src`

Organization

- Single command
  - `^f ^b ^d del delete …`
- Command plus args
  - Prefix, postfix, infix
- Command plus args (with options)
  - Optional trailing args
  - Use of option indicator (e.g., “-”)
  - Use of keyword args in arbitrary order (e.g., “<html lang="en-US">”)
Structure

- Consistent argument order
  - strcpy, strcat,…
    - dest=arg1, src=arg2
  - bcopy
    - dest=arg2, src=arg1
- Consistent, hierarchical naming

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<thead>
<tr>
<th>L</th>
<th>RRA</th>
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<tbody>
<tr>
<td>ST</td>
<td>RAR</td>
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<td>vs.</td>
<td>RAA</td>
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Remember: We’re trying to minimize the number of rules

Hierarchy and Congruence

J. Carroll 1982

- Hierarchical structure
  - E.g., “Verb object qualifier”
- Congruent (symmetrical) names
  - Meaningful opposites
- Experiment using paper-and-pencil task for small cmd set
  - {congruent, noncongruent} × {hierarchica, nonhierarchical} cmd sets
- Users
  - liked / performed best with both congruent forms
  - had lowest error rates on hierarchical congruent
- Hierarchical / Congruent
  - Move robot forward
  - Move robot backward
- Nonhierarchical / Congruent
  - Advance
  - Retreat
- Hierarchical / Noncongruent
  - Move robot forward
  - Change robot backward
- Nonhierarchical / Noncongruent
  - Go
  - Back
**Interactive Documentation/Completion**

- Addresses problem of recall

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**Assorted command line shells**

Flash Builder

Google

-myBalsamiq

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