Algorithm: Stretch and Squish Navigation
• guaranteed visibility of semantically important marks even when squished small
  – T-J scalability to 500K nodes
  – all preprocessing subquadratic
  – all realtime rendering sublinear
• guaranteed visibility
  – marks always visible
    – easy with small datasets

Distortion costs and benefits
• benefits
  – combine focus and context information in single view
• costs
  – length comparisons impaired
  – network tree topology comparisons unaltered
  – connect component
  – effects of distortion unclear if original structure unfamiliar
  – object constancy/trackability impaired

Further reading
  – Drop 14: Embed Focus+Context

Idiom: Stretch and Squish Navigation
• distort geometry
  – shape: rectilinear
  – foci: multiple
  – impact: global
  – metaphor: stretch and squish navigation
• reason a mark could be invisible
  – marked are undrawn, interior nodes inferred
  – task: compare topological structure
  – larger query spaces require more explicit tool support
  – compare several is more difficult than identify/inspect one
  – even similar variance of derived data:
  – structural differences
  – best corresponding node in other tree

Idiom: Fisheye Lens
• distort geometry
  – shape: radial
  – focus: single extent
  – extent: local
  – metaphor: draggable lens

Idiom: DOITrees Revisited
• embed focus+context in single view
  – reduce with complex combination of filtering and aggregation
  – distort geometry
    – metaphor: stretch and squash navigation
    – shape: rectilinear
    – foci: multiple
    – impact: global

Idiom: Embed Focus+Context
• embed
  – Elide Data
  – Superimpose Layer
  – Distort Geometry
• benefits
  – combine focus and context information in single view
• costs
  – length comparisons impaired
  – network tree topology comparisons unaltered
  – connection component
  – effects of distortion unclear if original structure unfamiliar
  – object constancy/trackability impaired

How: Idiom design decisions
• embed focus+context in single view
  – reduce with complex combination of filtering and aggregation
  – distort geometry
  – metaphor: stretch and squash navigation
  – shape: rectilinear
  – foci: multiple
  – impact: global

What and why: Data and task abstraction
• data: trees
  – phylogenetic tree reconstruction
  – siblings unmerged, interior nodes inferred
• task: compare topological structure
  – larger query spaces require more explicit tool support
  – compare several is more difficult than identify/inspect one
  – even similar variance of derived data:
  – structural differences
  – best corresponding node in other tree

How: Idiom design decisions
• embed focus+context in single view
  – reduce with complex combination of filtering and aggregation
  – distort geometry
  – metaphor: stretch and squash navigation
  – shape: rectilinear
  – foci: multiple
  – impact: global

Guaranteed visibility challenges
• hard with larger datasets
  – reasons a mark could be invisible
  – outside the window
    – AD solution: constrained navigation
  – underneath other marks
    – AD solution: avoid 3D
  – smaller than a pixel
    – AD solution: smart culling

Guaranteed visibility
• guaranteed visibility of marks even when squished small

TreeJuxtaposer video
Structural comparison

Matching leaf nodes

Matching interior nodes

Similarity score: $S(m,n)$

Best Corresponding Node

Marking structural differences

Next Time

* proposals: by 5pm Mon
  * Thu Nov 5, to read
    - VAD Ch. 15: Analysis Case Studies