Graph Coloring

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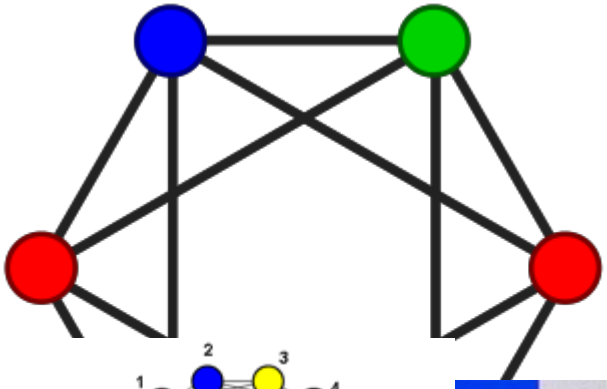
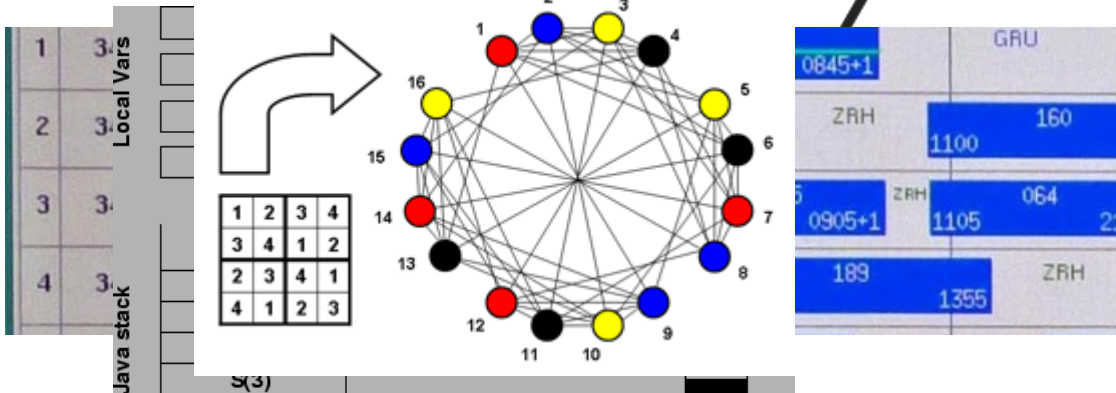
Graph Coloring problem

Graph Coloring problem

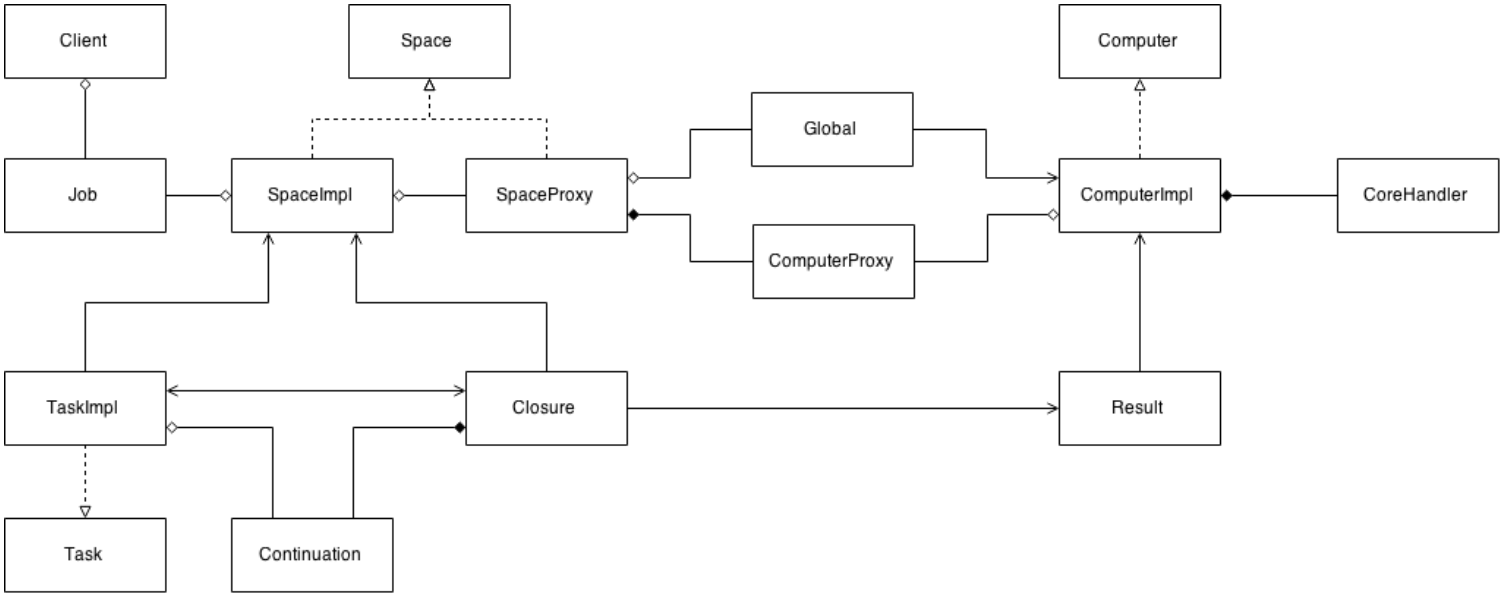
- No adjacent vertices same color
- Chromatic number:
  - NP-hard
  - $O(n\,(\log n)^{-3}(\log\log n)^2)$
- *k*-coloring:
  - NP-complete
  - $O(2^n n)$





API Architecture

- Proxies
- Global (Shared-object)

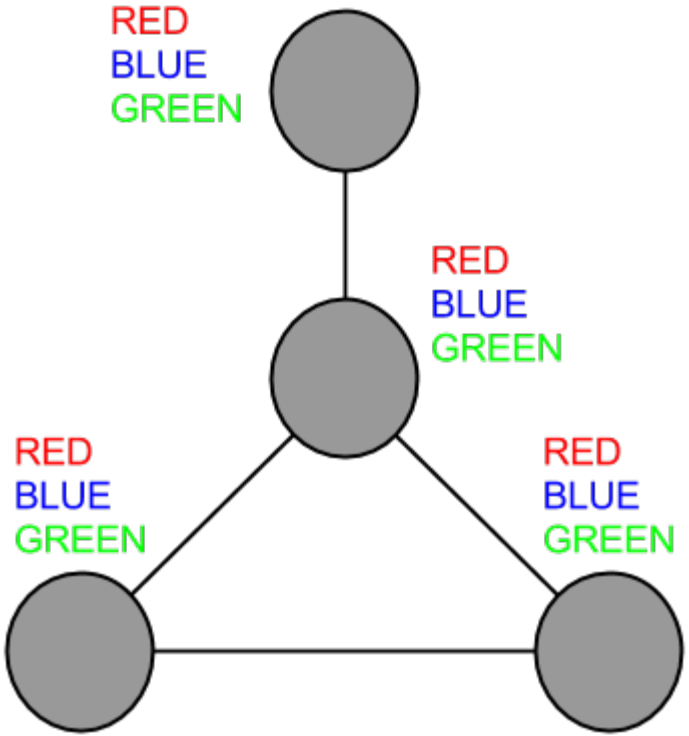


Event Listening

- More complete partial solution found
- “Global” shared-object updated
- Notify client through “partial results”
- update graphics

Implementing Graph Coloring

- Initial assumption
- Reduce domains
- Choose vertex for assumption
- Generate children



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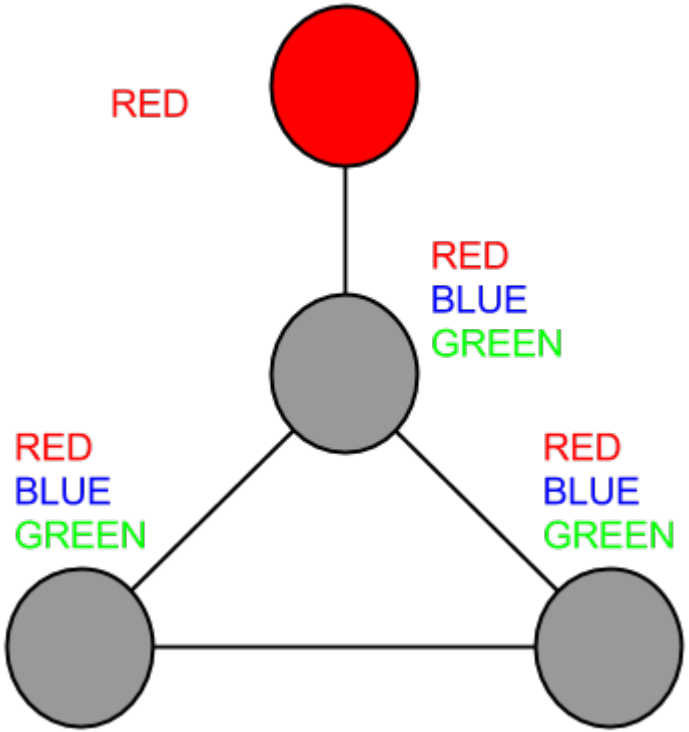

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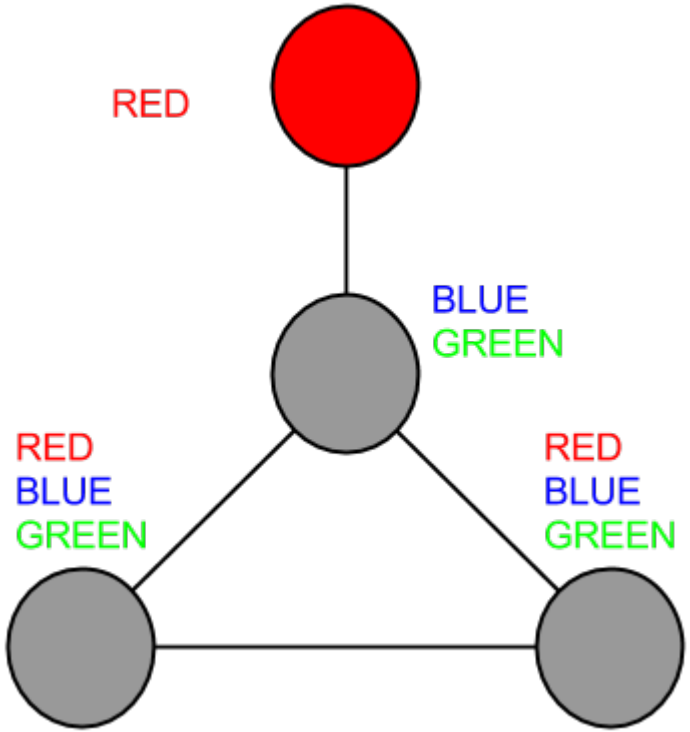
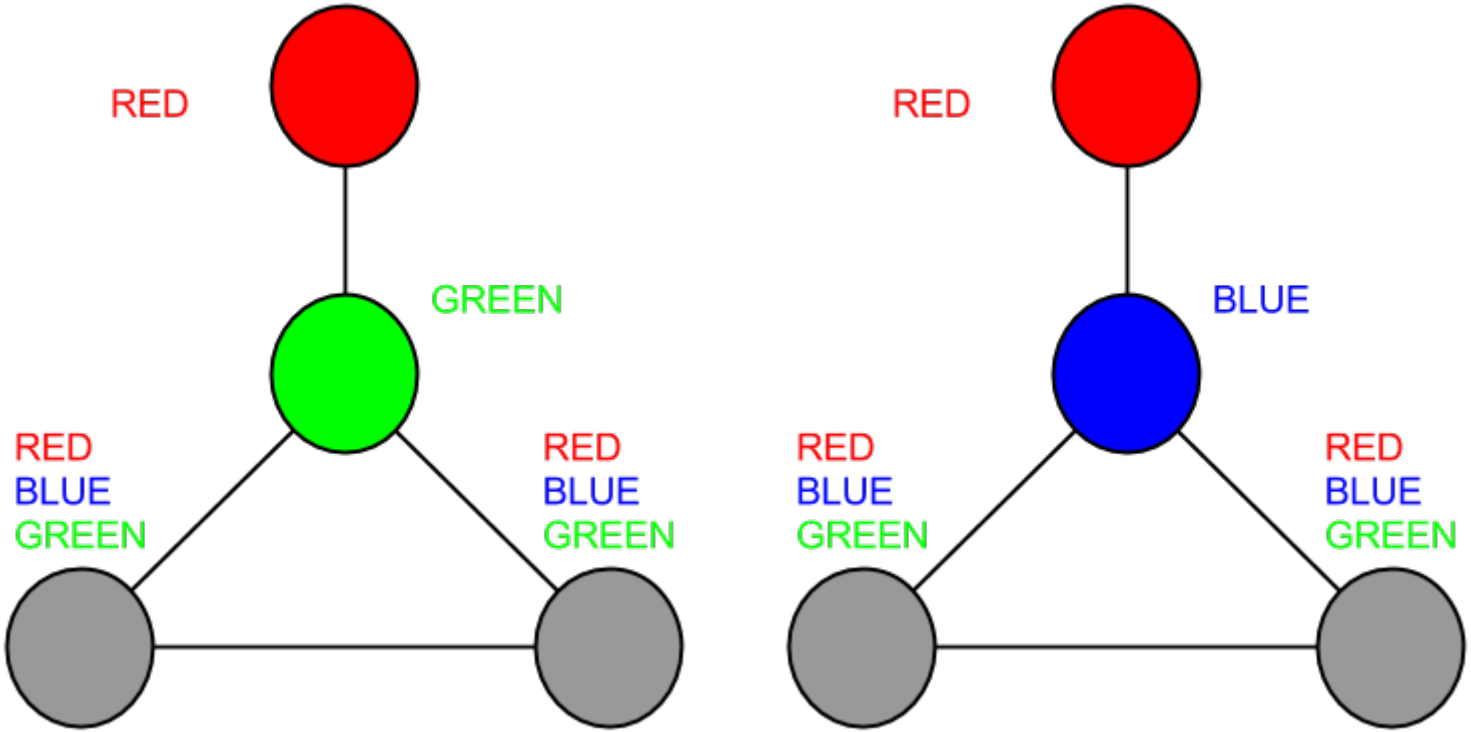
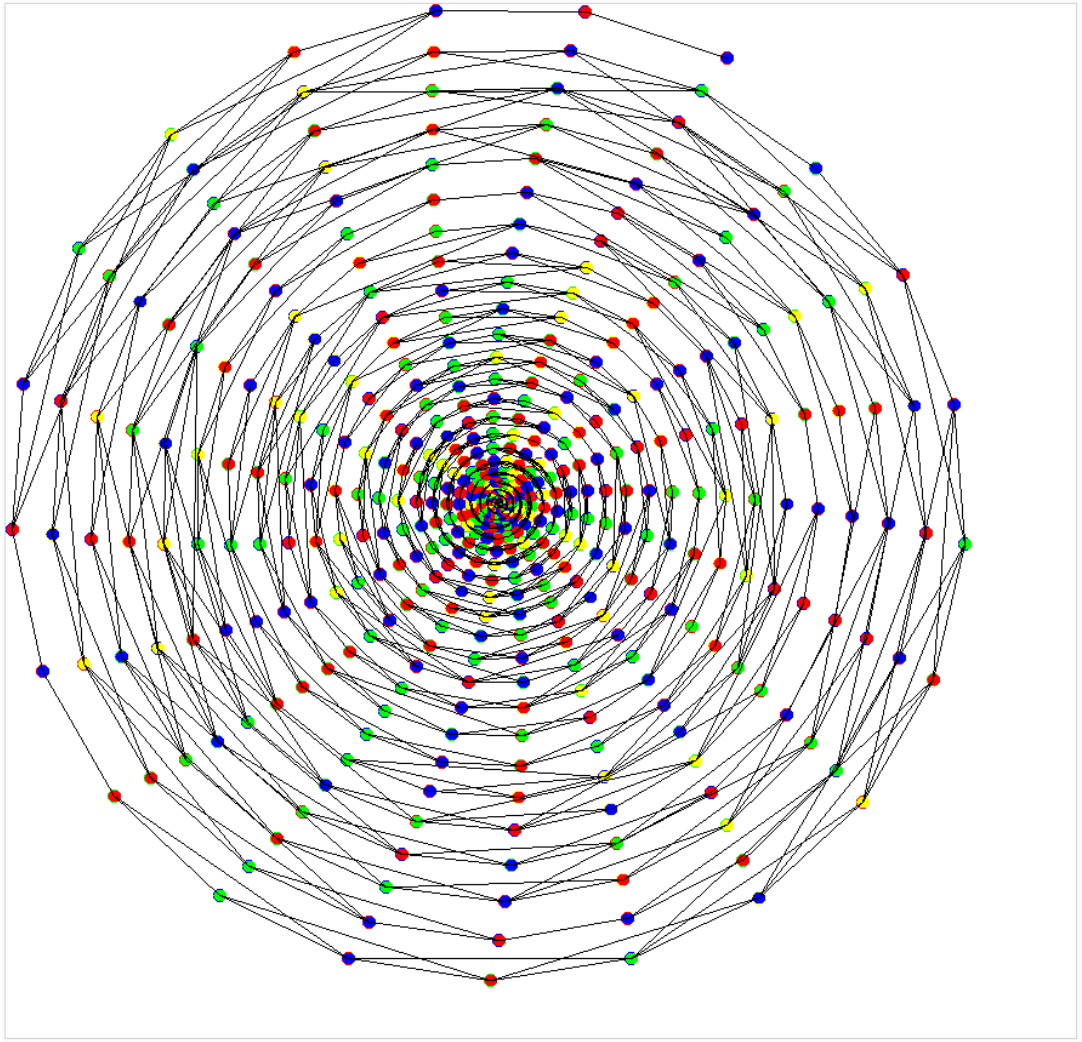


Implementing Graph Coloring





Best first search

- Explores most promising node is search tree
- Heuristic
  - Estimate the likelihood of current state to have a valid solution

Challenges

- Find optimal heuristic
- Pruning beyond BFS
- Load balancing

Results

Nothing to see here, move along

Road ahead

- Get the system running
- Solve challenges
- GUI
  - Event listening
- Refining the code
- Improve performance

Thank you

Q&A