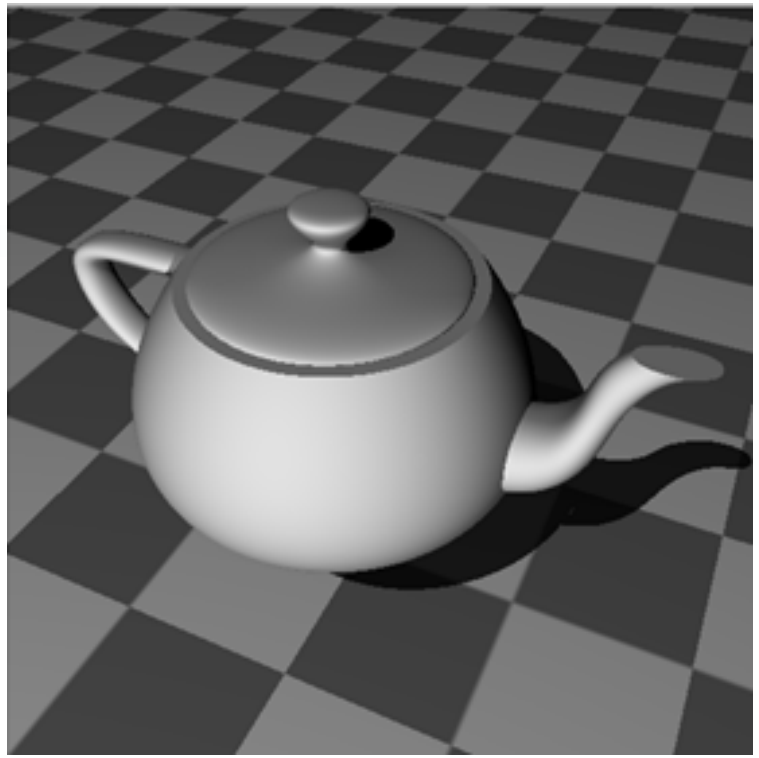
Marching Cubes

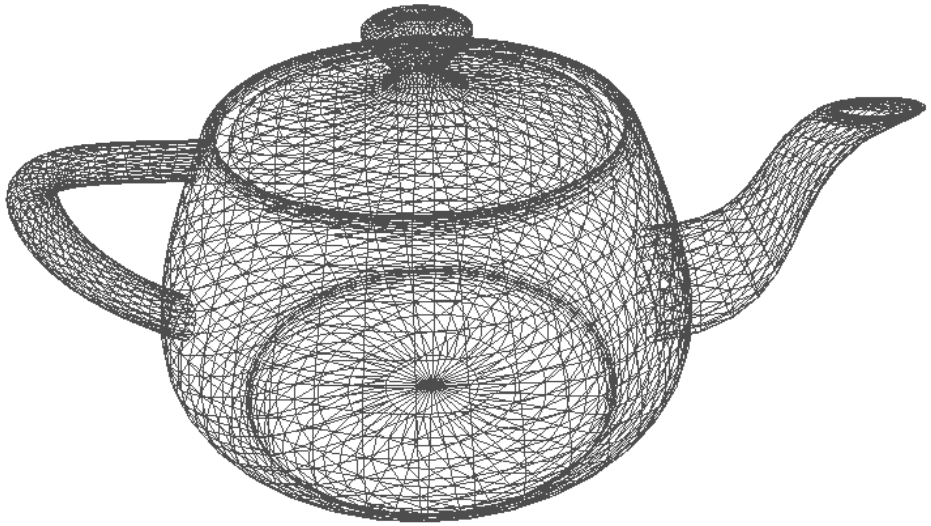
CS418 Computer Graphics

John C. Hart

Why Use Implicits?

- v. polygons
  - smoother
  - compact, fewer higher-level primitives
  - harder to display in real time
- v. parametric patches
  - easier to blend
  - no topology problems
  - lower degree
  - harder to parameterize
  - easier to ray trace
  - well defined interior

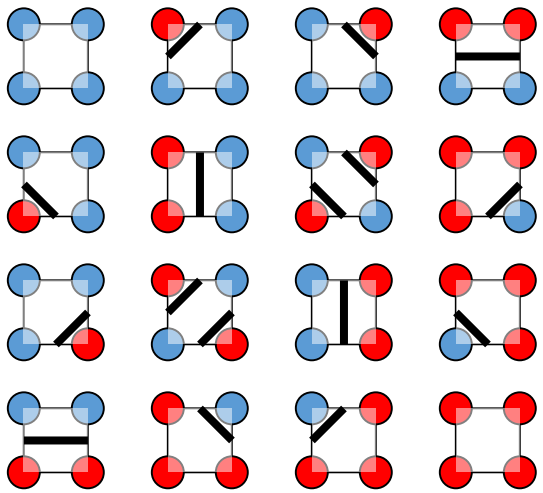


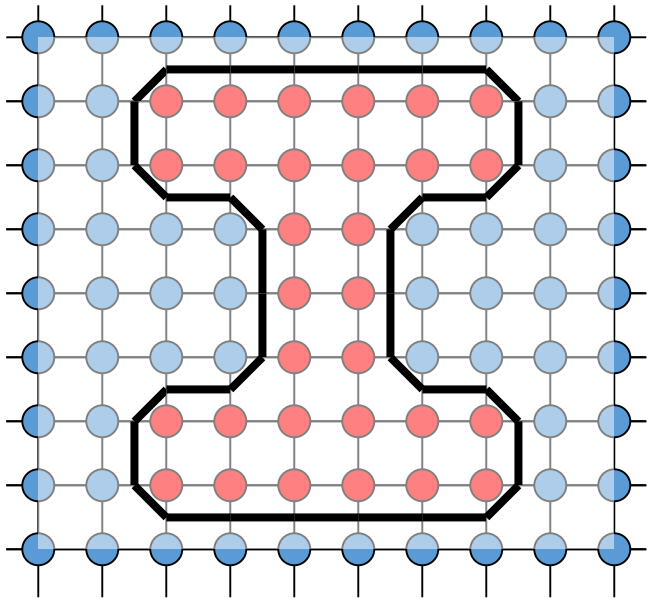


Marching Cubes

For each cubic cell

Compute index
(using bitmask of vertices)





Output polygon(s) stored at index

translated to cell position

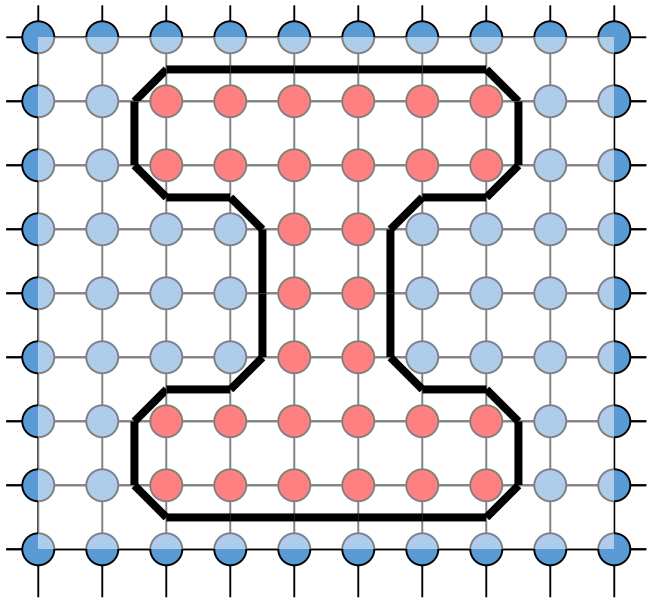
End for

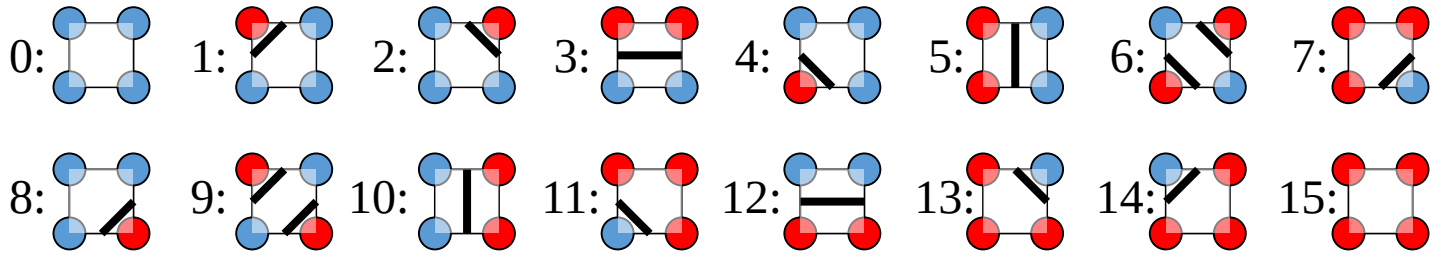
Marching Cubes

For each cubic cell

- Compute index
  (using bitmask of vertices)
- Output polygon(s)
  stored at index
- translated to cell position

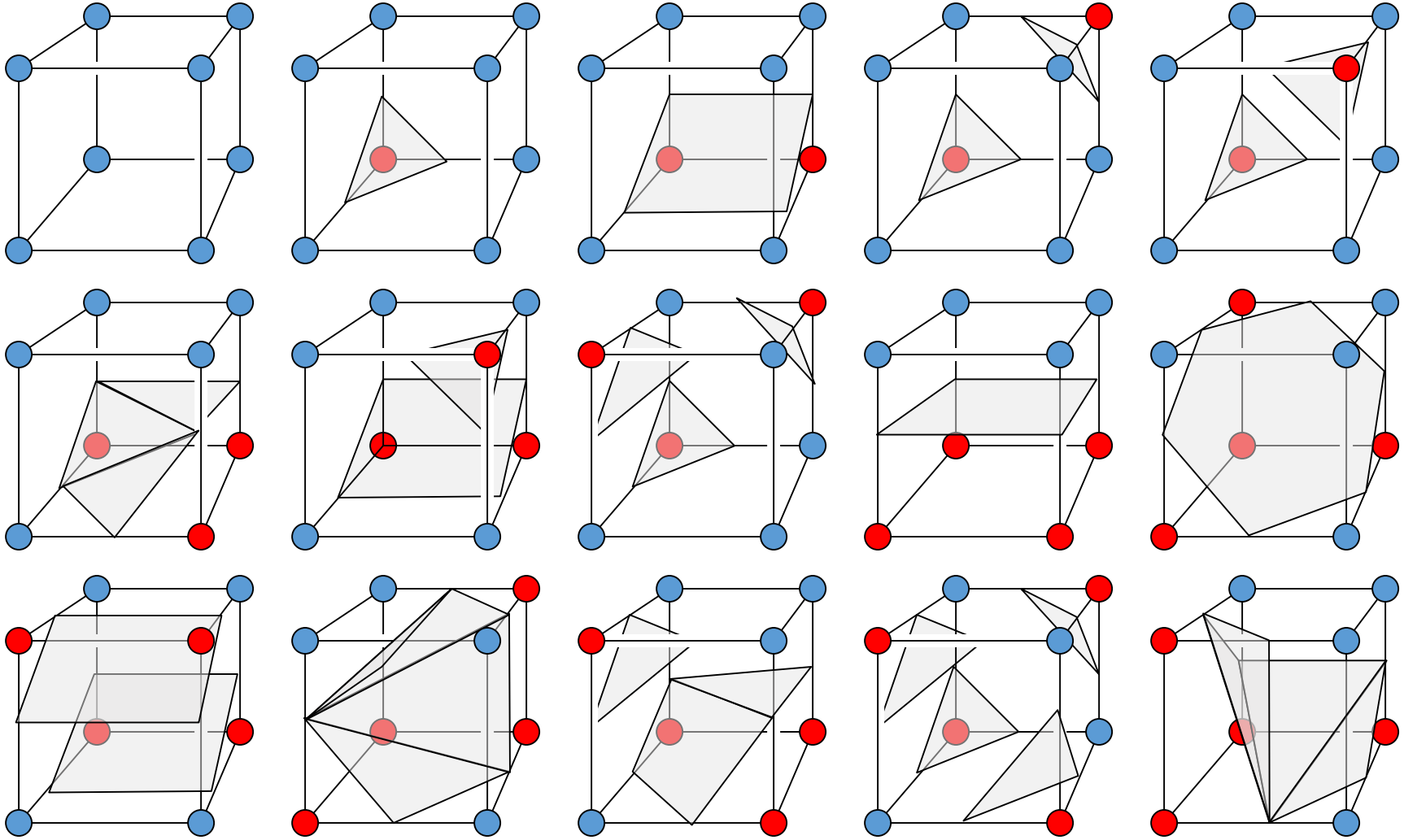
End for



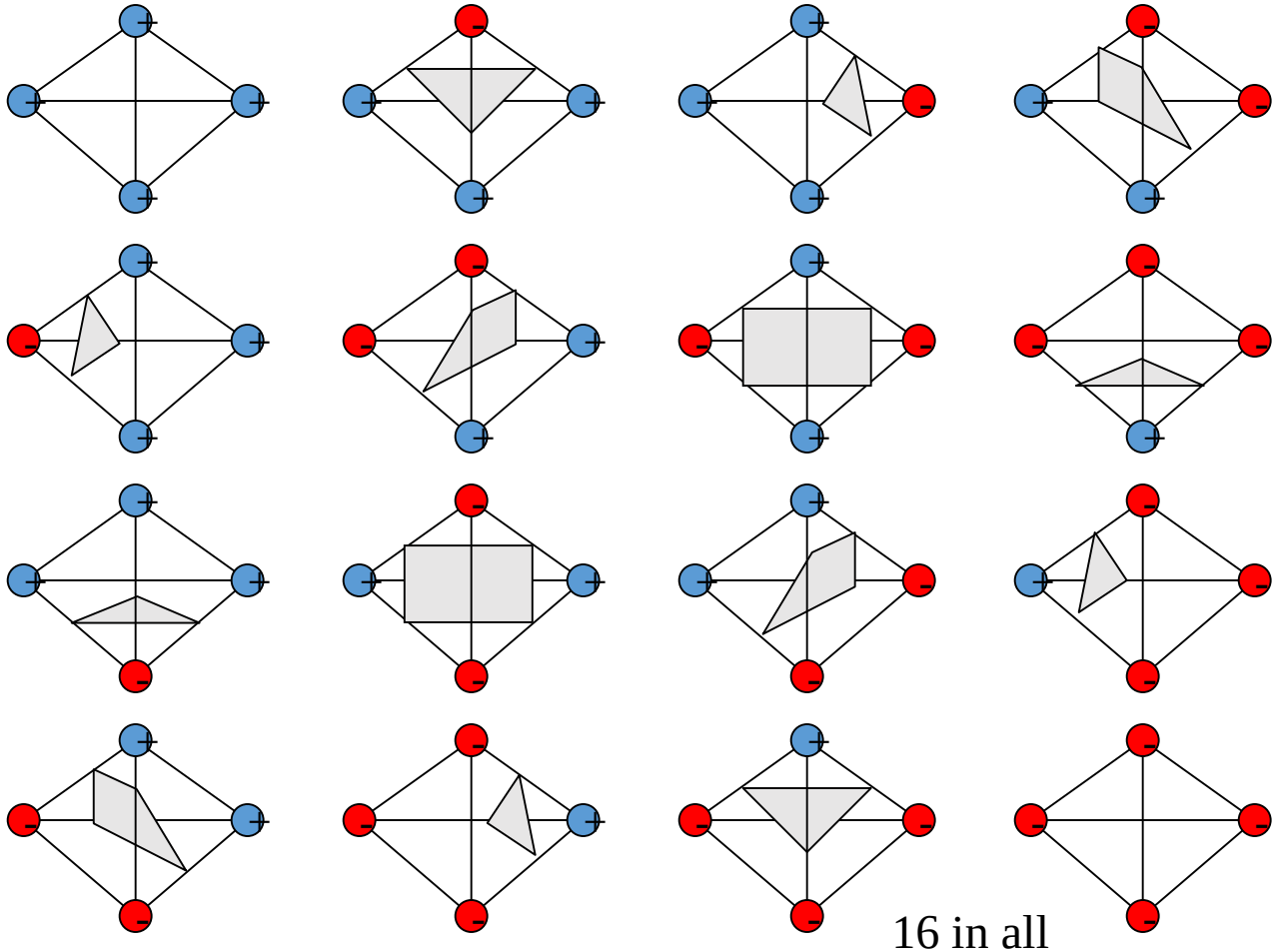


Marching Cube Cases

256 in all
15 modulo symmetry



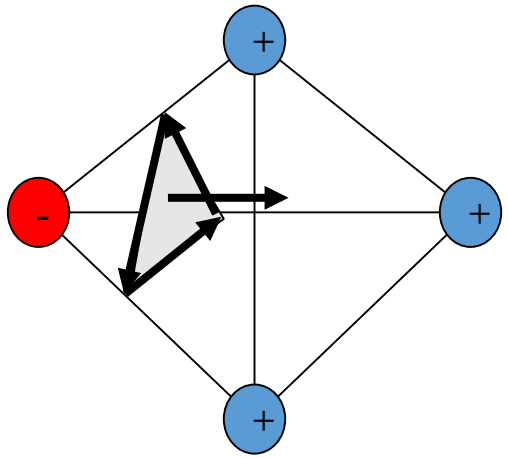
Marching Tet Cases

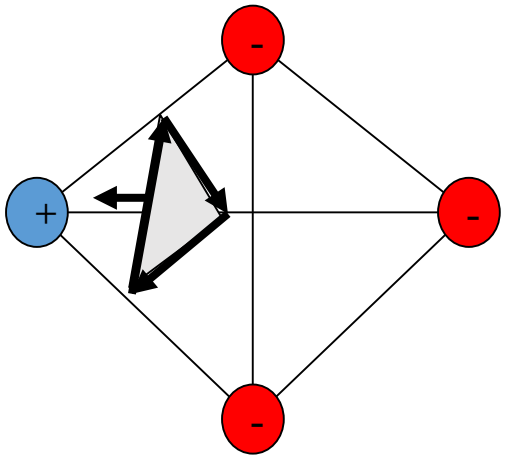


16 in all
3 modulo symmetry

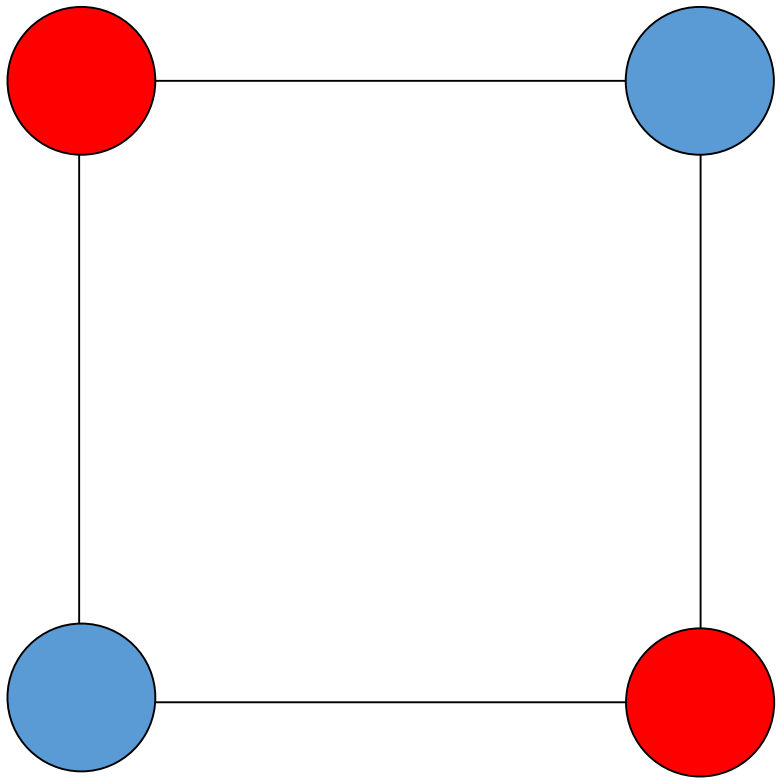
Orientation

- Consistency allows polygons to be drawn with correct orientation
- Supports backface culling





Problem: Ambiguity



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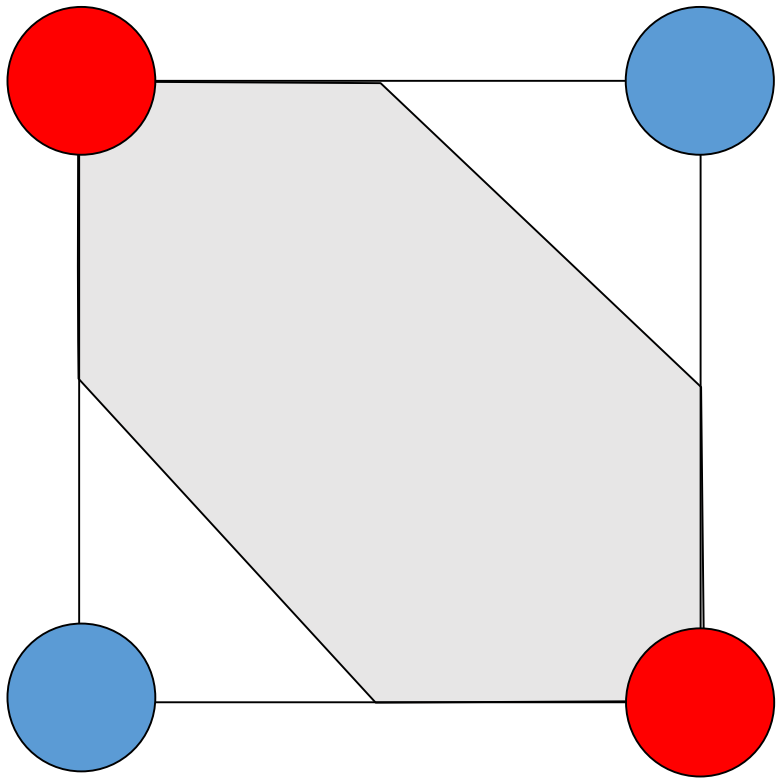

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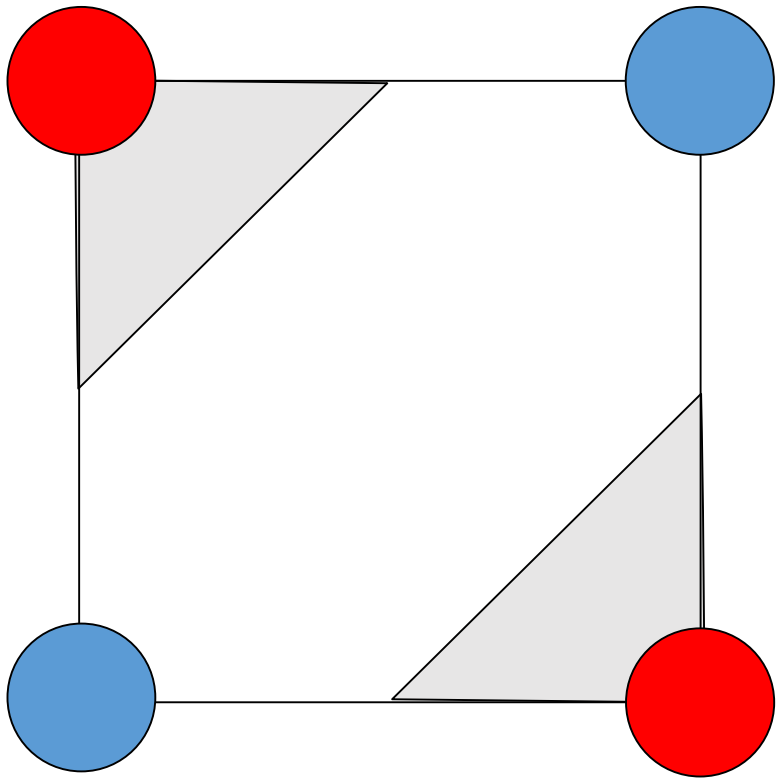

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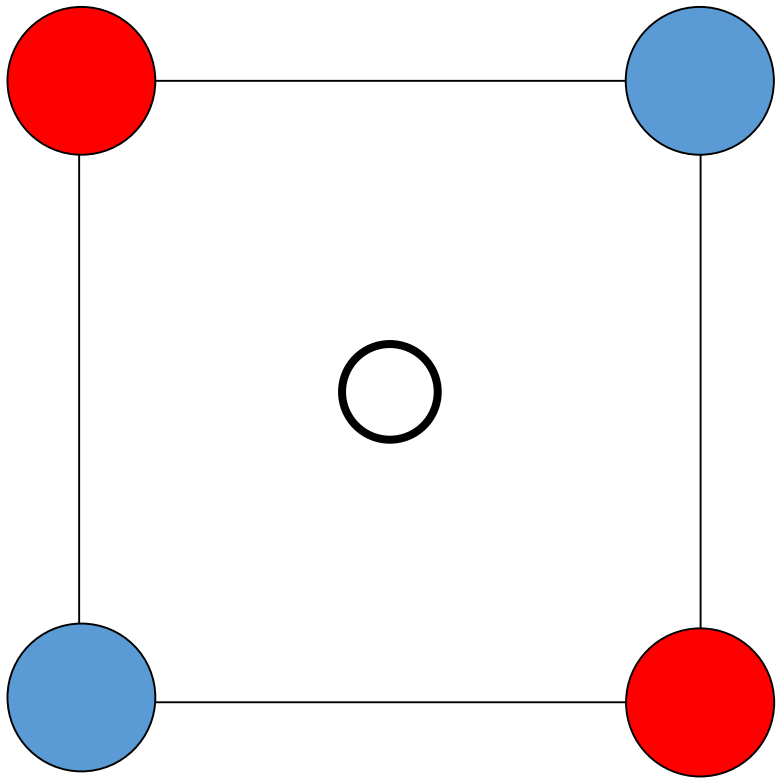
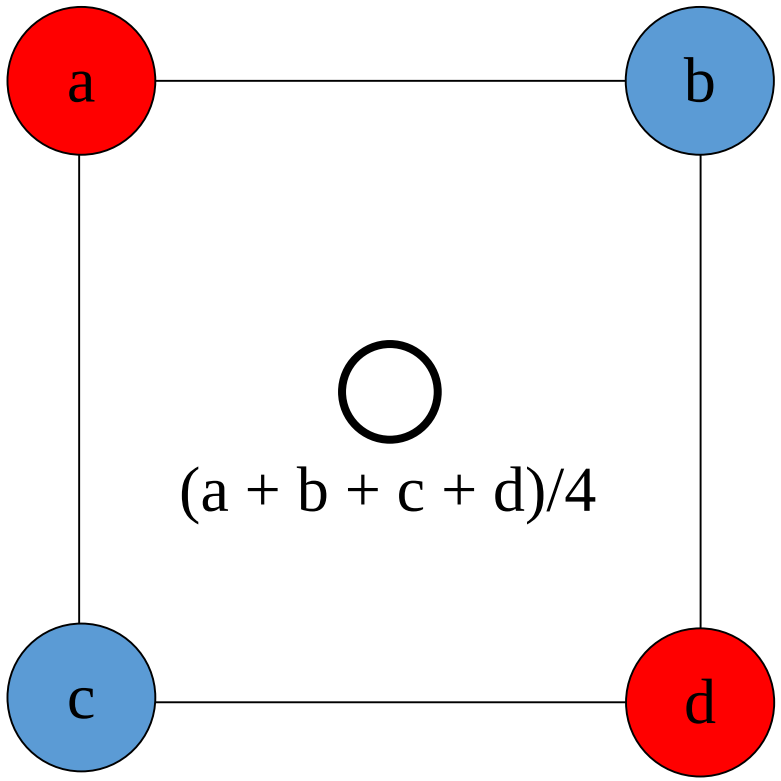
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