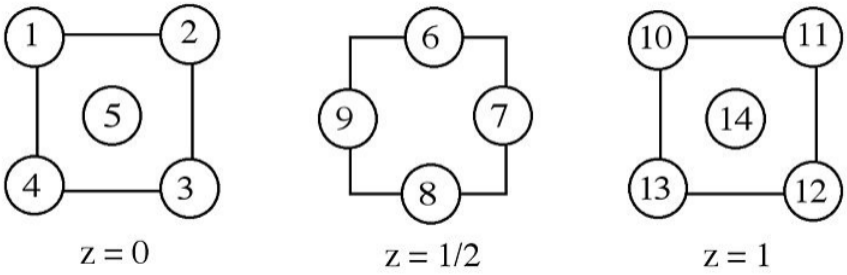
7.7: Problems

1. Show in a drawing how a planar dislocation moves through a solid under stress.

2. Why is a metal sample that has been annealed more malleable than one that has been work hardened? Explain which state of the metal has smaller crystal grains and why.

3. Explain (on the basis of structure) why alloys such as bronze make better structural materials than the constituent metals (copper and tin). How did the discovery of these alloys change civilization?

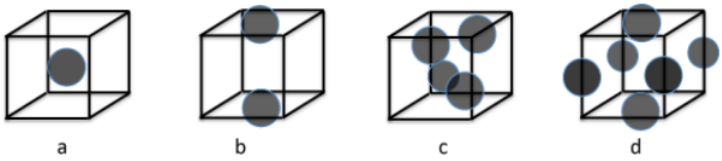
4. A layer sequence for an FCC = CCP metal is shown below. A body diagonal passes through the centers of atoms numbered 1 and 12. A close-packed plane perpendicular to this diagonal contains the centers of atoms numbered 3, 7, 8, 11, 13, and 14.



(a) Other close-packed planes of atoms parallel to this one pass through the cell. Segregate the remaining eight numbered atoms (not contained by this plane) into groups by the parallel plane that contains the center of the atom.

(b) Identify the other body diagonals by the numbered atoms that the diagonals pass through, and also identify one representative face diagonal by numbered atoms.

5. Identify the Bravais lattices that go with cubic unit cells (a) - (d). Remember that the origin of the unit cell is arbitrary.



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