Crystals and partitions

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Crystals are certain labelled graphs which give a combinatorial understanding for certain representations of simple Lie algebras. Although crystals are known to exist for certain important representations, understanding what they look like is tricky, and an important theme in combinatorial representation theory is constructing models of crystals, where the vertices are given by simple combinatorial objects, with combinatorial rules for determining the edges.

I'll try to give a brief but comprehensible overview to motivate, and then concentrate on one particular crystal, for which there is a family of models based on partitions.