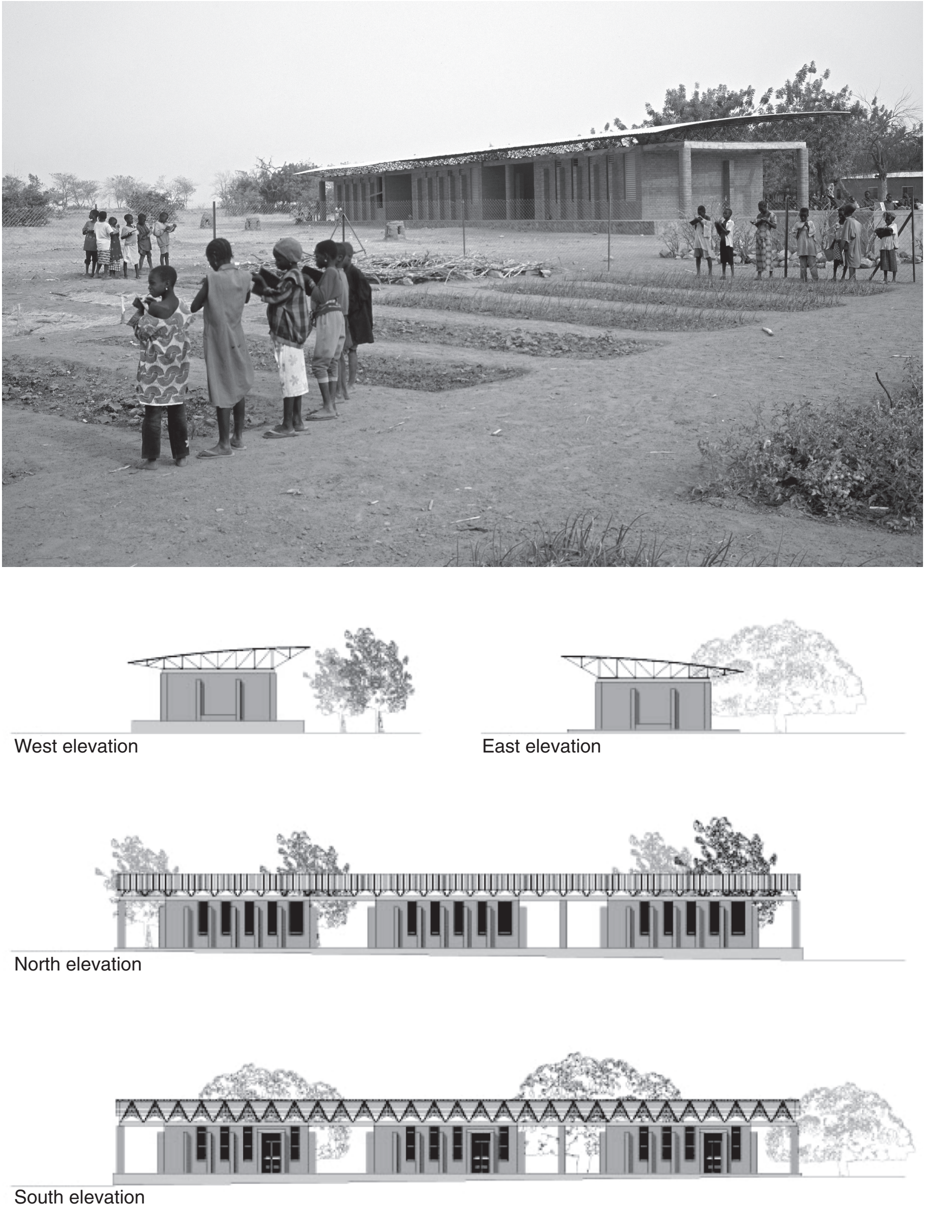


Figure 4.1. Top: a primary school in the town of Gando, in the country of Burkina Faso in West Africa. Bottom: one of several design documents for the school, freely available for download from the Open Architecture Network. Other people may use the design documents, and modify them for their own needs. Credit: Siméon Duchaud / Aga Khan Award for Architecture.

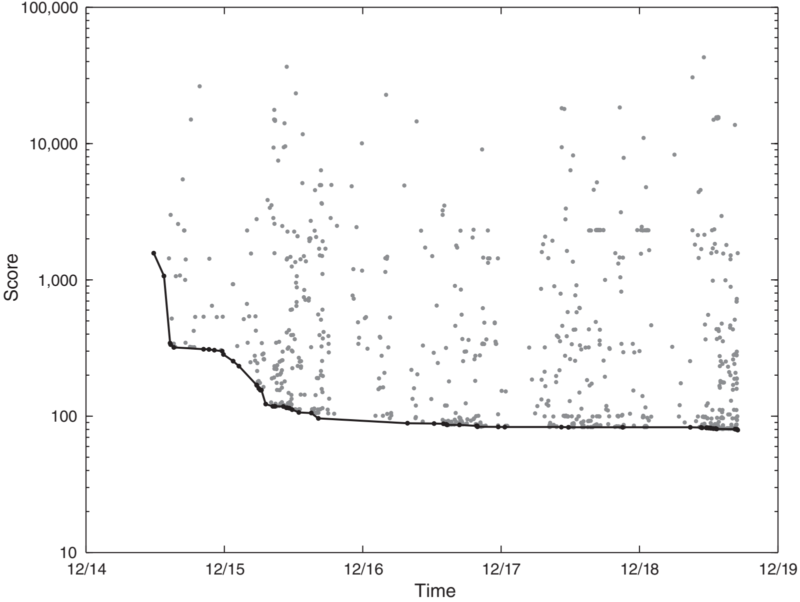


Figure 4.2. The progress of scores in the MathWorks programming competition. Lower scores are better. Credit: Copyright 2011 The MathWorks, Inc. Used by permission. Thanks to Ned Gulley for providing the figure.

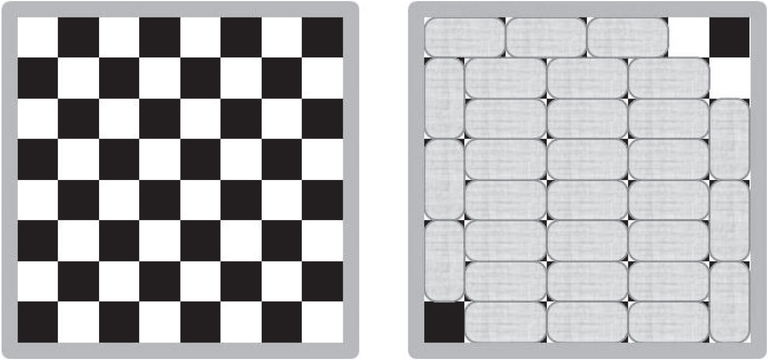


Figure 5.1. The puzzle starts with an empty eight-by-eight chessboard, as shown on the left. You're asked if it's possible to cover the chessboard with one-by-two dominoes, so that only the bottom left and top right squares remain uncovered. On the right, I've shown a failed attempt to do this, which leaves two extra squares in the top right corner uncovered.

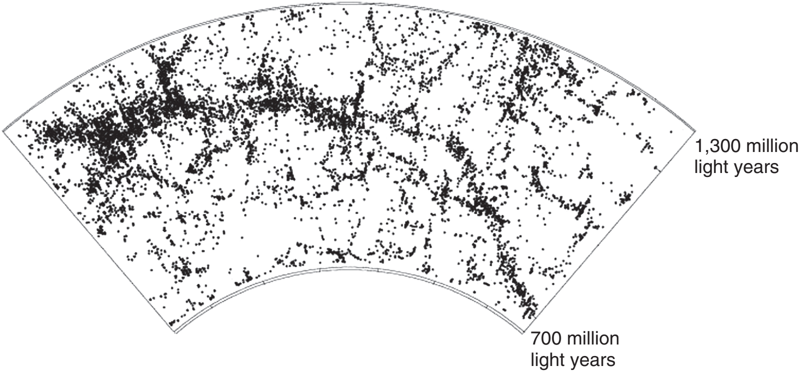
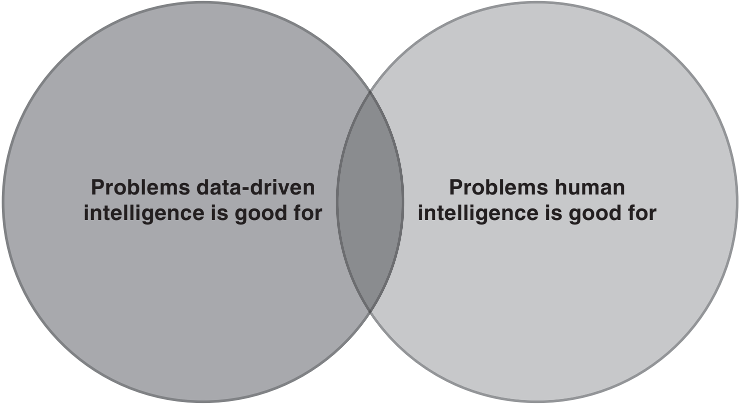


Figure 6.1. A blown-up piece of one of the maps of the universe made by Gott and collaborators. You'll notice that the map resembles a piece of pie. You should imagine yourself on the Earth, right at the center of the pie, looking out at the universe. Each point on the map represents a single galaxy from the SDSS. The radial direction indicates the distance to the galaxy, with the closest galaxies in the plot about 700 million light-years away, and the furthest about 1,300 million light-years away (as marked on the right-hand side). All the galaxies shown in the plot are very close to the celestial equator, the great arc going across the sky, directly above the Earth's real equator, and circumnavigating the Earth. What you're seeing here, then, are the galaxies in a thin slice of the sky, all very near the celestial equator. The angular direction in the plot shows where along the celestial equator the galaxy is located. Galaxies on the left-hand side of the map are in the direction of the constellation of Virgo, galaxies in the middle are in the direction of Leo, and galaxies on the right are in the direction of Cancer. The dense chain of galaxies concentrated in the upper left is the Sloan Great Wall. Credit: Reproduced by permission of the American Astronomical Society.


Problems data-driven intelligence is good for
Problems human intelligence is good for

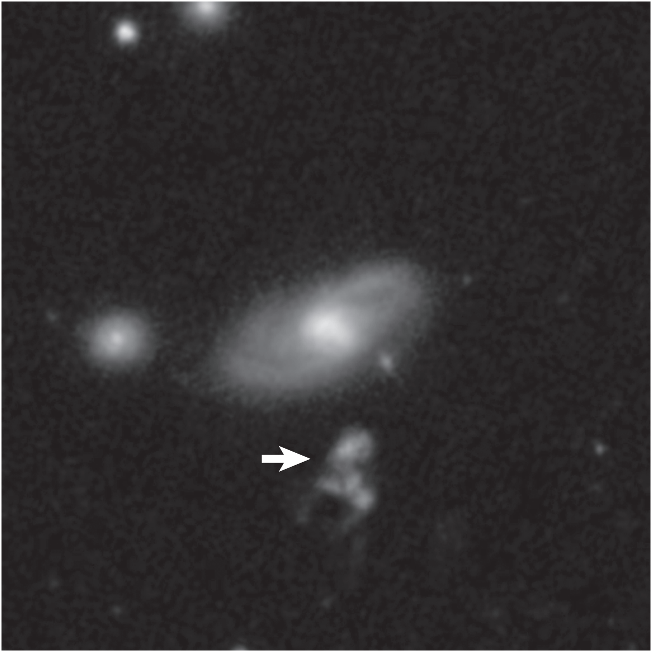


Figure 7.1. A black and white reproduction showing the strange blob first noticed by Hanny van Arkel. In the original color image the blob was a striking blue, and contrasted vividly with the galaxy above. Credit: Sloan Digital Sky Survey.

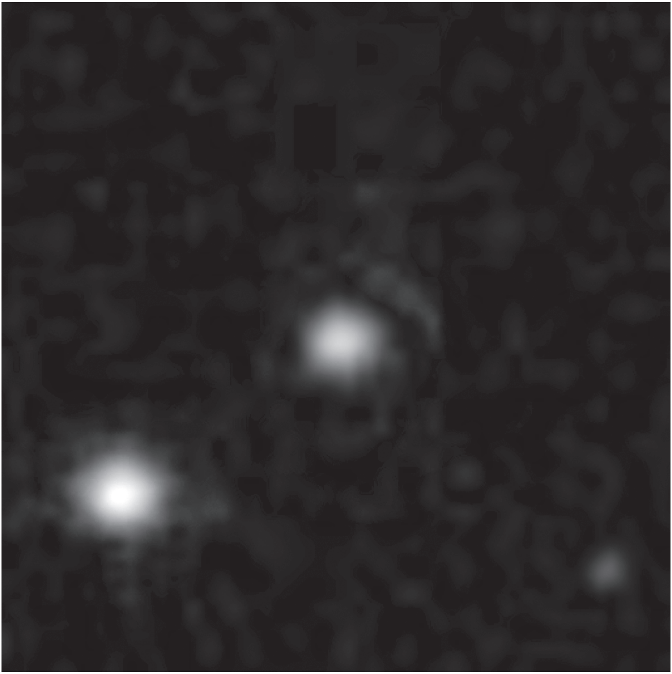
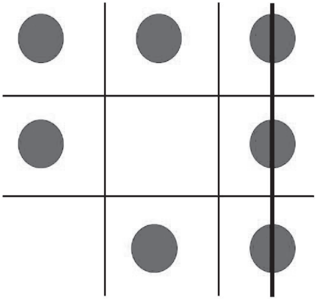


Figure 7.2. The first of the green pea galaxies, found by Galaxy Zoo forum member Nightblizzard in July, 2007. The green pea is in the center. Like all of the peas, it looks quite nondescript, and if you're not familiar with galaxies, it's tempting to think it's just another elliptical galaxy, or maybe a star. But many of the Zooites became quite expert at analyzing galaxy images, and it wasn't long before they realized the peas were unusual. Credit: Sloan Digital Sky Survey.

Figure 7.3. Two merging spiral galaxies (known jointly as UGC 8335). Credit: NASA, ESA, the Hubble Heritage (STScl/AURA)–ESA/Hubble Collaboration, and A. Evans (University of Virginia, Charlottesville/NRAO/Stony Brook University).

The Polymath Project aimed to prove a mathematical result known as the density Hales-Jewett (DHJ) theorem. Although the proof of DHJ is complex, the basic statement can be understood by anyone. Take a look at the following three-by-three grid:



I've marked seven of the squares on the grid with a dot; as you can see, it's possible to draw a line through three of those dots. By contrast, the configuration in the following picture is *line-free*—you can't draw a line through any three of the dots: