Quantum computation: A simple example to illustrate the power of quantum algorithms.

A "quantum computer" is a (still only theoretical) computer that registers strings of 0's and 1's by using the states of a quantum object (for instance the plus and minus spin states of an electron). The behavior of such a computer is governed, not by the deterministic laws that govern a traditional digital computer, but by the laws of quantum mechanics. A quantum algorithm utilizes this special behavior of a quantum computer to, for instance, solve problems in polynomial time that require exponential time on a traditional computer. In this talk I will present the Deutsch-Jozsa quantum algorithm, as well as a generalization of it (my joint work with Frederic Texier), and through this simple example, convey, hopefully, a sense of how the dramatic time savings of a quantum algorithm over a traditional algorithm is effected.