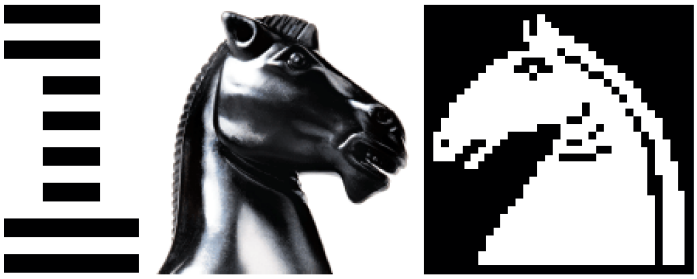
Deep Blue



On May 11, 1997, an IBM computer called IBM ® Deep Blue ® beat the world chess champion after a six-game match: two wins for IBM, one for the champion and three draws. The match lasted several days and received massive media coverage around the world. It was the classic plot line of man vs. machine. Behind the contest, however, was important computer science, pushing forward the ability of computers to handle the kinds of complex calculations needed to help discover new medical drugs; do the broad financial modeling needed to identify trends and do risk analysis; handle large database searches; and perform massive calculations needed in many fields of science.

Since the emergence of artificial intelligence and the first computers in the late 1940s, computer scientists compared the performance of these “giant brains” with human minds, and gravitated to chess as a way of testing the calculating abilities of computers. The game is a collection of challenging problems for minds and machines, but has simple rules, and so is perfect for such experiments.

Over the years, many computers took on many chess masters, and the computers lost.

IBM computer scientists had been interested in chess computing since the early 1950s. In 1985, a graduate student at Carnegie Mellon University, Feng-hsiung Hsu, began working on his dissertation project: a chess playing machine he called ChipTest. A classmate of his, Murray Campbell, worked on the project, too, and in 1989, both were hired to work at IBM Research. There, they continued their work with the help of other computer scientists, including Joe Hoane, Jerry Brody and C. J. Tan. The team named the project Deep Blue. The human chess champion won in 1996 against an earlier version of Deep Blue; the 1997 match was billed as a “rematch.”

The champion and computer met at the Equitable Center in New York, with cameras running, press in attendance and millions watching the outcome. The odds of Deep Blue winning were not certain, but the science was solid. The

IBMers knew their machine could explore up to 200 million possible chess positions per second. The chess grandmaster won the first game, Deep Blue took the next one, and the two players drew the three following games. Game 6 ended the match with a crushing defeat of the champion by Deep Blue.

The match's outcome made headlines worldwide, and helped a broad audience better understand high-powered computing. The 1997 match took place not on a standard stage, but rather in a small television studio. The audience watched the match on television screens in a basement theater in the building, several floors below where the match was actually held. The theater seated about 500 people, and was sold out for each of the six games. The media attention given to Deep Blue resulted in more than three billion impressions around the world.

Deep Blue had an impact on computing in many different industries. It was programmed to solve the complex, strategic game of chess, so it enabled researchers to explore and understand the limits of massively parallel processing. This research gave developers insight into ways they could design a computer to tackle complex problems in other fields, using deep knowledge to analyze a higher number of possible solutions. The architecture used in Deep Blue was applied to financial modeling, including marketplace trends and risk analysis; data mining—uncovering hidden relationships and patterns in large databases; and molecular dynamics, a valuable tool for helping to discover and develop new drugs.

Ultimately, Deep Blue was retired to the Smithsonian Museum in Washington, DC, but IBM went on to build new kinds of massively parallel computers such as IBM Blue Gene ®. [Read more about this Icon of Progress.]

The Deep Blue project inspired a more recent grand challenge at IBM: building a computer that could beat the champions at a more complicated game, *Jeopardy!*.

Over three nights in February 2011, this machine—named Watson—took on two of the all-time most successful human players of the game and beat them in front of millions of television viewers. The technology in Watson was a substantial step forward from Deep Blue and earlier machines because it had software that could process and reason about natural language, then rely on the massive supply of information poured into it in the months before the competition. Watson demonstrated that a whole new generation of human - machine interactions will be possible.

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