THE LAST REPRESENTATIVE OF GREAT MATHEMATICIANS

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Abstract: *Theory of Games and Economic Behaviour is the classic work upon which modern-day game theory is based. The common elements of economic behaviour and such factors as strategy in games are presented, and the interrelated concepts are analysed around the more or less central problem of utility. John von Neumann and Oskar Morgenstern are two gifted mathematicians that by working together succeeded in writing and estimating amazing and breakthrough formulas that are used in solving of problems till our days. Von Neumann, as a scientist, affected the whole world of computer science and mathematics simultaneously and he, literally allowed the future generations to develop and study the potential of computers finally obtaining that PC(Personal Computer) that we all are using today.*

Keywords: *theory, Neuman's machine, genius, contribution, mathematics.*

Introduction

John von Neumann was one of the most brilliant minds of the 20th century. Von Neumann was a child prodigy and a genius. The term genius is not a strictly defined label, but John was without a doubt a genius, who, only at his 8th birthday already was known for his incredible memory skills. Less than ¼ of 1 percentage of our population are considered true geniuses. Most of the time not even this small quantity can perform their gift. Of course, being a genius is not enough , and John von Neumann is an example how hard-working is always paid off. In the introduction of its both anniversary commemorative edition from the Princeton University Press, the book is described as "the classic work upon which modern day game theory is based" [1]. Mathematician John von Neumann undertook a study of computation that demonstrated that a computer could have a simple, fixed structure, yet be able to execute any kind of computation given properly programmed control without the need for hardware modification. He created a new understanding of how practical fast computers should be organized and built.

Life and contribution

Beside the fact that he was a great mathematician, physicist, he was also a polymath and polyglot. He was born in Budapest and his real name was Neumann János Lajos. Being a son of a wealthy Jewish banker, his father was elevated to nobility for his service to the then Austro-Hungarian Empire. Thus, his name became Margittai Neumann János which he later changed for a more German name John von Neumann. At the age of 8, he was already familiar with differential and integral calculus, but his attention was focused on history. He studied in Fasori Evangélikus Gimnázium [2], where most of the students were Jewish. This school finished some of the brightest talents like Edward Teller, Leo Szilard, Eugene Wigner. By 1927, he published 2 mathematical newspapers, one of which was about the ordinal numbers. Later, he was awarded Eotvos Prize, Hungary's highest prize for mathematics. By 1927 he was recognized as a genius with incredible memorizing skills. John held a lifelong passion for ancient history, being renowned for his historical knowledge. A world known professor of Byzantine history at Princeton once said that von Neumann had greater expertise in Byzantine history than he did. He loved working in noisy chaotic environments, and often used to play German music at full volume on his gramophone.

Neumann simultaneously studied chemistry and mathematics, because his father Miksa Neumann discouraged him from pursuing a career in mathematics, reasoning it that there was not enough money in the field. He earned a degree in chemical engineering in (1925) from the prestigious ETH Zurich [3] and a doctorate in mathematics (1926) from the University of Budapest. He started his lectures as a Privatdozent at the University of Berlin in 1928, being the youngest person ever elected Privatdozent in the university's history in any subject. By the end of 1929 he published 32 major pages in mathematics, at a rate of nearly one major page per month. His incredible powers of memorization allowed him to quickly memorize the pages of telephone directories, and recite the names, addresses and numbers. In 1929, he briefly became a Privatdozent at the University of Hamburg, where the prospects of becoming a tenured professor were better, but in October of that year a better offer presented itself when he was invited to Princeton University in Princeton, New Jersey. He remained a mathematics professor there until his death, although he had announced his intention to resign and become a professor at large at the University of California, Los Angeles.

In 1932 Von Neumann published his book 'The Mathematical Foundations of Quantum Mechanics' which established a strong mathematical framework for quantum physics. He created the field of cellular automata without the aid of computers, constructing the first self-replicating automata with pencil and graph paper. His interest in meteorological prediction led him to propose manipulating the environment by spreading colorants on the polar ice caps to enhance absorption of solar radiation, thereby raising global temperatures. Von Neumann's principal contribution to the Manhattan Project and the atomic bomb was in the concept and design of the explosive lenses needed to compress the plutonium core of the Trinity test device. Von Neumann's hydrogen bomb work was also played out in the realm of computing, where he and fellow physicist Stanislaw Ulam [4] developed simulations on von Neumann's digital computers for the hydrodynamic computations. He contributed to the development of game theory as a mathematical discipline and together with Stanislaw Ulam devised the Monte Carlo statistical sampling method, which allowed complicated problems to be approximated using random numbers. Von Neumann's significant contribution to mathematical economics was the minimax theorem of 1928. This theorem establishes that in certain zero-sum games with perfect information, there exist a strategy for each player which allow both players to minimize their maximum losses. John von Neumann has played an important role in post-war economic theory. He published 'Theory of Games and Economic Behaviour' in 1944.

Von Neuman theory of games

John von Neumann and Oskar Morgenstern conceived a ground-breaking mathematical theory of economic and social organization, based on a theory of games of strategy. Not only would this revolutionize economics, but the entirely new field of scientific inquiry it yielded, game theory, has since been widely used to analyse a host of real-world phenomena from arms races to optimal policy choices of presidential candidates, from vaccination policy to major league baseball salary negotiations. And it is today established throughout both the social sciences and a wide range of other sciences. For Von Neumann, the inspiration for game theory was poker, a game he played occasionally and not terribly well.

Von Neumann realized that poker was not guided by probability theory alone, as an unfortunate player who would use only probability theory would find out. Von Neumann wanted to formalize the idea of "bluffing," [5] a strategy that is meant to deceive the other players and hide information from them. In his 1928 article, "Theory of Parlor Games," Von Neumann first approached the discussion of game theory and proved the famous Minimax theorem. From the outset, Von Neumann knew that game theory would prove invaluable to economists. He teamed up with Oskar Morgenstern, an Austrian economist at Princeton, to develop his theory [6].

Von Neumann Machine

The modern computers are based on a stored-program concept introduced by John Von Neumann. In this stored-program concept, programs and data are stored in a separate storage unit called memories and are treated the same. This novel idea meant that a computer built with this architecture would be much easier to reprogram. The modern computers are based on a stored-program concept introduced by John Von Neumann. In this stored-program concept, programs and data are stored in a separate storage unit called memories and are treated the same. This novel idea meant that a computer built with this architecture would be much easier to reprogram.

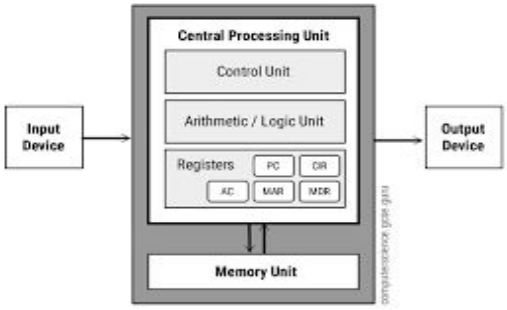

Fig. 1

Von Neumann architecture was first published by John von Neumann in 1945 (Figure 1). His computer architecture design consists of a Control Unit, Memory Unit, Registers and Inputs/Outputs. Von Neumann architecture is based on the stored-program computer concept, where instruction data and program data are stored in the same memory. This design is still used in most computers produced today [10]. Arithmetic and Logic Unit, Memory Unit, Registers and Inputs/Outputs. Von Neumann architecture is based on the stored-program computer concept, where instruction data and program data are stored in the same memory. This design is still used in most computers produced today [7].

Conclusion

John von Neumann was an impossibly talented and charismatic uncle to computing. He is said to be "the last representative of the great mathematicians", who integrated pure and applied science [8]. The book Theory of Games and Economic Behavior published in 1944 by Princeton University and written by John von Neumann is considered to be a ground-breaking text and a remarquable step in the researching field game theories. It influenced the beginning of a chain of events in the domain, in fact representing the first of this kind. There can be no doubt that John von Neumann founded the field of Game Theory as a mathematical discipline. He died at age 53 on February 8, 1957, at the Walter Reed Army Medical Center in Washington, D.C., under military security lest he reveal military secrets while heavily medicated. He was buried at Princeton Cemetery in Princeton, Mercer County, New Jersey.

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