Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 10, Issue, 06, pp.70216-70218, June, 2018

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

ISSN: 0975-833X

RESEARCH ARTICLE

HISTORY OF INFORMATICS: THE BEGINNING OF COMMERCIAL COMPUTERS

***Pedro Ramos Brandão**

Interdisciplinary Center for History, Cultures and Societies - Évora University

ARTICLE INFO

Article History:
Received 14th March, 2018
Received in revised form
29th April, 2018
Accepted 10th May, 2018
Published online 28th June, 2018

Key words:

First Commercial Computers,
UNIVAC, IBM, Eckert,
Mauchly,
ENIAC, IBM 701.

****Corresponding author***

ABSTRACT

The appearance of the first commercial computers available. The first computers with integrated programs. The first computers with integrated storage. The Story of Eckert and UNIVAC, IBM's reaction to UNIVAC.

Citation: Pedro Ramos Brandão, 2018. "History of Informatics: The Beginning of Commercial Computers.", *International Journal of Current Research*, 10, (06), 70216-70218.

INTRODUCTION

A market for millions of digital computers emerged in the 1990's and many of these personal devices were easily stored in a hand-held folder. This would not have happened if solid state physics had not been advanced, a breakthrough that made it possible to put a computer circuit in a few silicon chips. Nonetheless, the almost ubiquitous computers of the 1990's are direct descendants of what Eckert and Mauchly (Cohen, 1962) predicted in the 1940's to bring to market. The path of computers at the time where they served military and academic purposes, to the moment in which they become a retail object that will be analyzed in this research article.

Univac: Eckert and Mauchly's computer: UNIVAC, was a technical masterpiece, though it was eclipsed from the market by computers produced by Remington-Rand's competitor, IBM. Computing after 1945 is a story of people who, at critical moments, redefined the nature of technology itself. By doing so, they opened up computing to new markets, new applications, as well as to a new place in the social order. Eckert and Mauchly were the first of many who carried out this transformation. They picked up an expensive, fragile, cyclotron-like scientific instrument and turned it into a product that could be manufactured and sold, albeit in small quantities.

In the mid-1950's, IBM Corporation developed a line of products that addressed US companies' information-handling needs. UNIVAC was developed by Eckert and Mauchly in 1951, the acronym stands for "Universal Automatic Computer", a name they have chosen very carefully. Universal meant it could solve problems encountered by scientists, engineers and managers. Automatic implied that it could solve complex problems without requiring constant human intervention. One must also understand how the existing calculating machines, which were the result of decades of refinement and use were deficient. It was this deficiency that made room for UNIVAC, which broke with past practices in various ways. During World War II, Eckert and Mauchly designed and built ENIAC at the University of Pennsylvania. ENIAC was an electronic calculator that ushered in the era of digital computing in the United States of America. Its main purpose was to calculate firing tables for the US Army, a task that involved the repeated resolution of complex mathematical expressions. The information used in UNIVAC reflected Eckert and Mauchly's expertise in physics as well as engineering. That is, the flow of data and instructions in UNIVAC, reflected the way human beings, by using mechanical calculators, table books, pencils and paper, performed scientific calculations (Newman, 1989). In order to replace these machines by a computer, companies should also adopt UNIVAC's method of processing information.

Punched cards machines are often referred to as "unit recording equipment". In a typical punched cardboard installation, the same operation was performed on the entire file register, when a card went through a tab or another machine. UNIVAC and its successors could operate this way, but they could also perform a long sequence of operations on a single datum before invoking the next memory record (Campbell-Kelly, 1991). Wallace Eckert was among the first to propose non-traditional practices of punch cards by presenting innovative proposals and moving in a direction that would later lead to solutions applied to digital computers, that would appear later. Despite his recommendation against building specialized equipment, he had a device called a control switch, which he designed in his laboratory. Eckert installed that device between the multiplier, the tabulator and the resume. Its function was to allow sequences of short operations to be performed on a single card before the next card was read (Wallace Eckert, 1940).

Someone who had seen a UNIVAC immediately realized how much it differed from existing calculators as well as of punch card equipment. He used vacuum tubes - thousands of them. Data storage was done on a tape, not on cards. It was a large and expensive system, not a collection of different devices. The main difference was its internal design, not visible to the casual observer. UNIVAC was a "*stored program*" computer, one of the first. The origins of the internal storage notion of a program on a computer were obscured by the secrecy of the Cold War. The concept of storing data and instructions on a common storage unit would become one of the basic UNIVAC features and of all the computers that followed. The "*stored-program*" principle was the key to UNIVAC's success (Michael Williams, 1993). Before supplying a description of UNIVAC, it's worth taking a brief look at the essential aspects of the architecture von Neumann describes in his 1945 report, especially those aspects that remained stable during the last half century of computer design. In addition to internal program storage, an important feature of a von Neumann computer is that units that process information are separated from those that store them. Usually, there's only a single channel between these two units, through which all data transfers must be made. This feature came primarily for engineering reasons: it was easier to design storage cells that didn't need to perform arithmetic on its contents. Its main feature is that instructions and data are stored on the same memory device, from which any data can be recovered as quickly as any other. This concept arose when considering that a computer's processing unit should not be inactive waiting for the next instruction to be delivered. That design implies that you can treat an instruction encoded as a data and perform an operation by putting it into another instruction. The basic cycle of a von Newman computer is to transfer an instruction from storage to the processor, decoding it and executing it, using data retrieved from the same storage or already on the processor. Once the processor has carried out an instruction and decoded it, it immediately carries out another one from the next memory location, unless it is set to another storage location. Having a fast storage device meant that the processor could branch to another instruction stream quickly when needed. UNIVAC could carry out this sequence and add two numbers in about half a millisecond. The first UNIVAC has left the factory in 1952, having been installed in Pentagon, to service United States of America Air Force. By 1954, twenty units had already been sold, each unit costing about one million Dollars at that time (Eckert, 1976). UNIVAC's clock speed was of 2.25MHz, and it could carry out about 465 multiplications per second. Many of the computational specifications on later computers were initially implemented in UNIVAC, namely alphanumeric calculation, use of extra bits for verification, magnetic tapes for memory and storage, circuits referred to as "buffers" to allow high-speed transfers between fast lines and slower storage (Roddy Osborn, 1954)

IBM: When UNIVAC was announced, IBM wasn't focused on electronic computing, hence it was vigorously engaged in calculator's market. But after they realized UNIVAC's capabilities, they came to consider it as a threat. In May 1952, IBM announced the 701, a "*stored-program*" computer, of the same class as UNIVAC. It wasn't an exact copy, its architecture followed John von Neumann computation and the tests he had carried out at Princeton University. This meant that memory devices immediately returned all the digits of a word, in contrast to UNIVAC's delay lines, which retrieved bits, one at a time. IBM named the 701 of "*electronic data processing machine*". He deliberately avoided the word computer, which seemed to be closely identified with UNIVAC as well as with exotic war projects that seemed to have little relevance to IBM's business. For main storage, the 701 made use of 3 inches diameter vacuum tubes from IBM, similar to those used in television sets. Each tube has been designed to storage 1024 bits. An array of 72 tubes could contain 2048 36-bit words as well as transfer one word at a time by reading one bit from each of the 36 tubes. Plastic tape coated with magnetic oxide was used for volume memory, with a drum for intermediate storage. Its processor could perform about 2000 multiplications per second, which was about four times faster than UNIVAC (Bashe, 1969)

Inside IBM, the 701 was known as the Defense Calculator after its perceived market. Unlike UNIVAC, 701's central processor directly controlled slow input/ output (I / O) installations. All data transfers had to pass through a single record in the machine's processor, which led to a slow operation, requiring the use of I / O. However, 701's lightweight plastic tape could start and stop much faster than UNIVAC's metal tape and thus speed up these operations. The 701 became IBM's market response to UNIVAC. In 1953 IBM decided to market a computer with additional capabilities, also based on magnetic tapes, it was model 702, it was similar to 701 though with more storage.

Conclusion

UNIVAC and IBM 701 ushered in the age of commercial "*stored-program*" computers. Both had disadvantages, but in the end, both met the expectations of who bought them. UNIVAC's memory was reliable but slow, IBM 701 had a less reliable however faster memory. Both machines performed well enough to make viable a large computer market. The many benefits promised in the 1940's by the "stored-program" electronic computing architecture, required high-capacity and high-speed memory to match electronic processing. With the advent of ferrite cores - as well as of techniques to manufacture them on a large scale - the memory problem that characterized the first generation was effectively solved. And the era of large computers mass-advertising began.

REFERENCES

Bashe, 1969. *IBM's Early Computers*, 1969.

Campbell-Kelly, 1991. In Aspray, *Computing Before Computers; in Annals of History of Computing*, 1991.

Cohen, Bernard, 1962. Life and Work Howard Aiken, Sperry Rand papers, Series III.

Eckert, J. 1976. "Thoughts on the History of Computation", *IEEE Computer*, December.

Michael Williams, 1993. "The Origins, Uses, and Fate of the UNIVAC", *Annales of the History of Computing*.

Newman, 1989. In the Mathematical Computing Advisor Panel of the U.S. Navy, May 1946, in Annals of the History of Computing.

Roddy Osborn, 1954. "GE and UNIVAC: Harnessing the High-Speed Computer", *Harvard Business Review* (July).

Wallace Eckert, 1940. *Punched Card Methods in Scientific Computation*, Columbia University.