Ivan Zaletov

DEVELOPMENT OF IT HISTORY
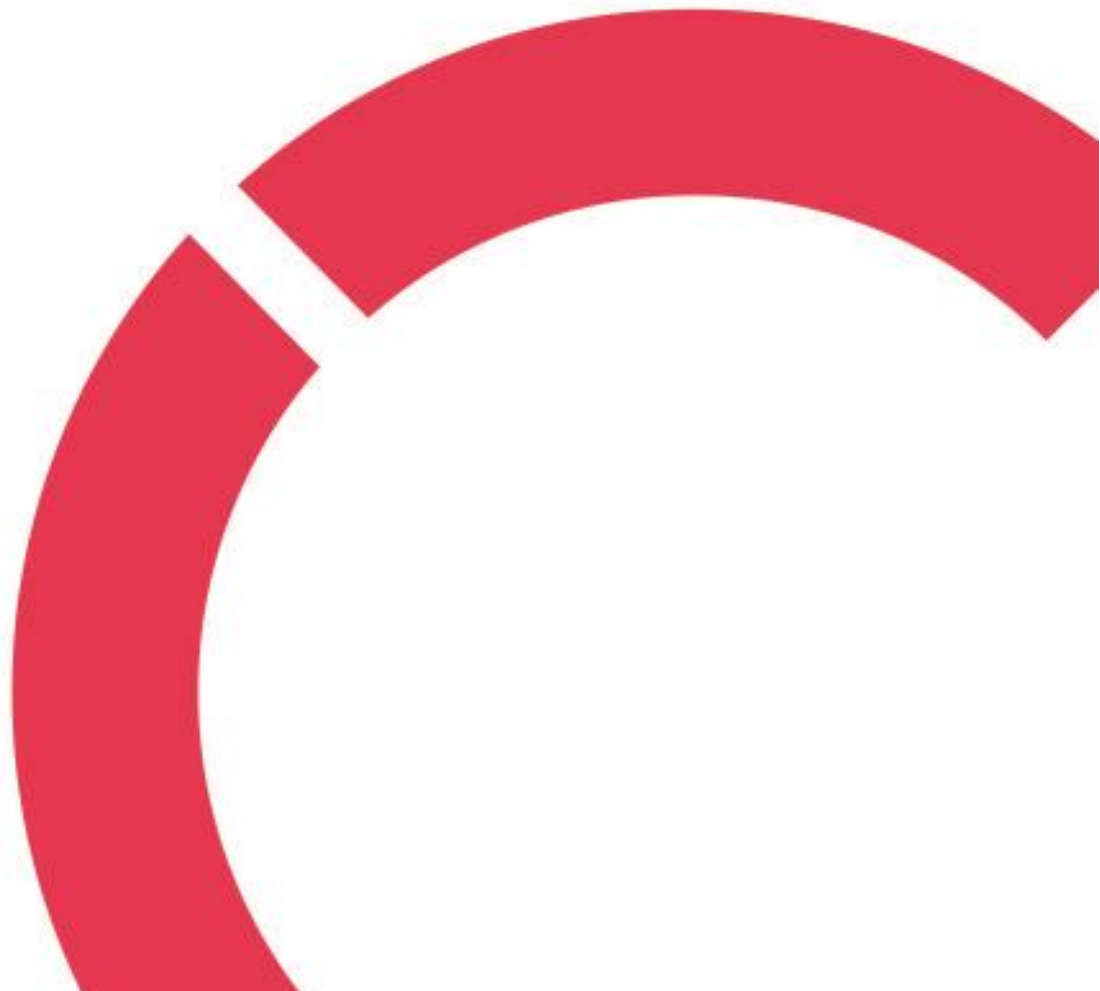
An overview of how things have changed in 80 years

ABSTRACT

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The aim of this thesis was to describe the moving trends in the Information Technology industry from the point of view of history. It is assessed by specialists that the nonstop movement of IT and science has simplified human existence. Works tasks should possibly be made simple through high-tech tools and machines. IT gives less work for people and occupation should be possible quicker. It causes human to feel good and life is simple to live. It additionally assists individuals with getting sorted out their everyday exercises. These days, the PC is the most valuable and famous development for each individual. It is valid in light of the fact that the PC makes life more agreeable and through this people might have the option to find and investigate new horizons.

Information technology (IT) alludes to all that organizations use PCs for. Information technology is building interchanges networks for an organization, defending information and data, making and directing data sets, assisting representatives with investigating issues with their PCs or cell phones, or doing a scope of other work to guarantee the productivity and security of business data frameworks. Interest for experts in this field is high and developing, and individuals entering the field have a wide range of different possibilities.

Key words
Development, IT, Information Technology.

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1 INTRODUCTION

In present worldwide circumstances, various strong technologies have been created to help humanity in general and workplaces. Quicker correspondence is made conceivable through mobile phones and the Internet. New technology influences our day to day routines in each field, from the phones to PCs and organizations and power. Truth be told, people have been enormously impacted all of the time by the advancements in new technology. Be that as it may, today new Information Technology is somewhat perplexing with distributed computing, new techniques for security and information encryption. It's undeniably true that new information technology not just benefits developers, information base supervisors, equipment designers and organization examiners but it additionally helps the normal client.

People have been putting away, recovering, controlling and imparting data since the Sumerians created writing in 3000 BC, however the term information technology in its cutting-edge sense initially showed up in a 1958 article distributed in the Harvard Business Review; where the writers Harold J. Leavitt and Thomas L. Whisler remarked that "the new technology does not yet have a single established name. We shall call it information technology (IT)."

Information technology (IT) is the utilization of PCs to make, process, store, recover, and trade a wide range of electronic information and data. IT is regularly involved inside the setting of business activities instead of individual or amusement advances. IT is viewed as a sub selection of information and communications technology (ICT). An information technology system (IT system) is by and large a data framework, a correspondences framework, or all the more explicitly talking, a PC system - including all equipment, programming, and fringe gear - worked by a restricted gathering of IT clients.

IT tracks down applications in different fields of designing, medication, business, explorations and others. In these modern times, yet in our day by day lives, computers have become fundamental. They are available everywhere, in every one of the gadgets that we utilize day by day like in vehicles, phones, clothes washers, microwaves and so forth and in everyday calculations like banking, reservations, electronic sends, web and some more.

The word computer is gotten from the word compute. To compute means to calculate. The computer was initially characterized as an extremely quick and advanced arithmometer. It had the ability to tackle

complex math and logical issues at extremely high speed. Yet, these days as well as taking care of complicated math calculations, PCs perform numerous different assignments like tolerating, arranging, choosing, moving, looking at different sorts of data. They additionally perform math and coherent procedure on alphabetic, numeric and different kinds of data. This information given by the client to the PC is called data. The data in a single structure which is introduced to the PC is the input data or information. The data in one or more structure is introduced by the PC after performing an interaction on it. This data is the output data or output information.

In this way a PC can now be characterized as a quick and precise information handling framework that acknowledges information, performs different procedures on the information, has the ability to store the information and produce the outcomes based on itemized bit by bit guidelines given to it.

The PCs of today are immeasurably divergent for all intents and purposes and execution when contrasted with the PCs of prior days. To completely comprehend the effect of PCs on the present world and the guarantees they hold for the future, it is vital to comprehend the development of PCs.

2 INFORMATION TECHNOLOGY PROGRESSION IN THE LAST DECADES

First-generation computers were superseded by the transistorized of the last part of the 1950s and mid - 60s, second - generation machines that were more modest, utilized less power, and could play out 1,000,000 calculations each second. And they were supplanted by the third - generation coordinated circuit machines of the mid-1960s and 1970s that were much more modest and were undeniably more solid. The 1970s, 1980s, and 1990s were described by the advancement of the microchip and the development of progressively more modest yet strong computers, like the PC and personal digital assistant, which introduced a time of fast development in the PC business.

2.1 The First Generation 1946-1959: Vacuum tube based

The first generation can be characterized in a few specific aspects. Those aspects are: a vacuum tube, the punched cards, a perforated paper tape, a machine language, the magnetic tapes, and the drums. Vacuum tube innovation presented in figure 1. The essential working concept of a vacuum tube is a peculiarity called thermionic emission. It operates in the following way: you heat up a metal, and the thermal energy thumps a few electrons free. English physicist John Ambrose Fleming exploited this impact to make the primary vacuum tube gadget, which he named an oscillation valve in 1904 (Alba 2018).

FIGURE 1. First Generation Computers: Vacuum Tubes (Facebook 2015)

Punched cards for data input as are showed in figure 2. Punch cards are paper cards where openings might be punched the hard way or machine to address to a device the information and directions (Hope 2021).
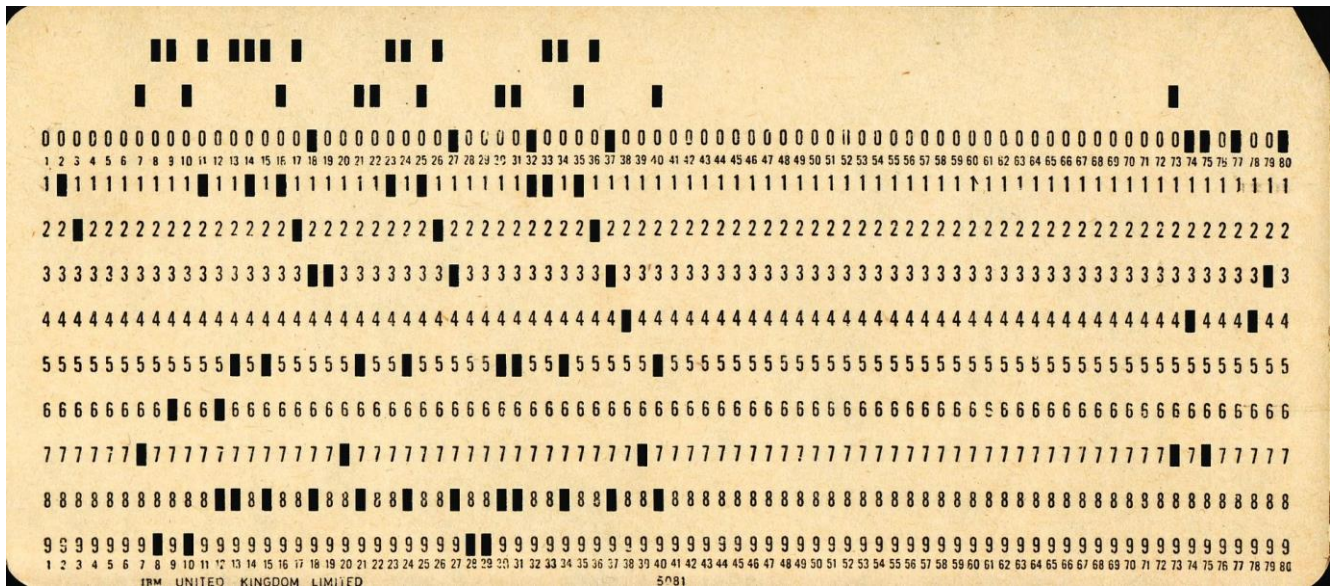
FIGURE 2. A 12-row/80-column IBM punched card from the mid-twentieth century (Gitkraken 2022)

Magnetic tapes can be found in figure 3. They were produced for sound holding and in this manner, broadly adjusted for radio and the recording business in 1928. The engineers turned magnetic tape to supply and memory store for UNIVAC in 1951 (Ironmountain).

FIGURE 3. Univac Computer - First to use Magnetic Tape for data storage 1951 (Chipsetc 2022)

Drums for outer capacity are introduced in figure 4. Magnetic drum memory was a magnetic information storage gadget. Since its establishing in 1932, the drum turned into the foundation of numerous early computer device. It shaped the essential working memory of the device and time to time filled in as the optional storage (History Computer Staff 2022)
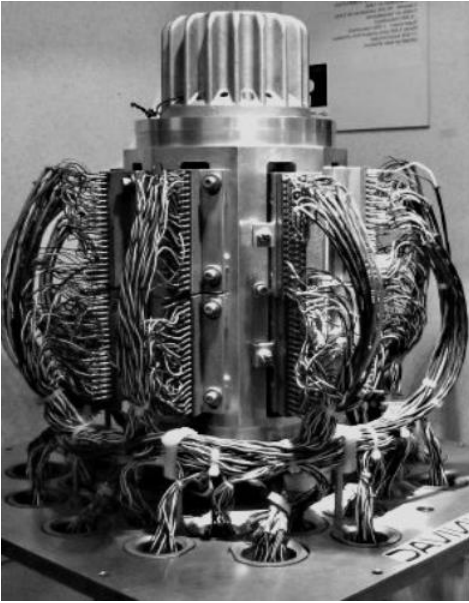
FIGURE 4. The Magnetic drum (The Magnetic drum 2008)

A perforated paper tape for output can be found in figure 5. Punched paper tape was utilized as a media store from the 1950s forward, most likely hitting its prime in the main portion of the 1970s. It utilized long reels of paper tape that had openings punched in them, commonly with five or eight openings across the width of the tape.

FIGURE 5. Paper tape reader on the Harwell computer (Bad Germ 2009)

The computers of the first generation were exceptionally massive and transmitted huge measure of heat which required cooling. They were enormous in size and bulky to deal with. They must be physically collected and had were restricted for business use. The idea of working frameworks was not known

around then. Every PC had its own unique and distinct binary coded program called a machine language that told it how to work.

The Abacus was one of the fist calculations tools, which arose around 5000 years prior in different parts of the world and is yet being used today, and it permits clients to make calculations utilizing a procedure for sliding dots organized on a rack. Early users utilized Abacus to continue to deal with trading transactions. However, Abacus is currently supplanted by electronic mini-computers, calculators, phones and PCs. It can be used for mechanical progression as well as is still extremely valuable and significant for blind individuals. (Cuemath 2020).

Blaise Pascal, a French mathematician designed the first calculator or adding machine, a rectangular brass box, named Pascaline which one could perform expansion and deduction and also addition and subtraction on entire numbers. Current calculators are relatives of an arithmetic machine formulated by Blaise Pascal in 1642. It happened in the 17th century. Colmar, a Frenchman created a machine that could play out the four fundamental math elements of expansion, deduction, duplication and division. Colmar's calculator, "Arithmometer", introduced a more reasonable way to dealing with computing. With its upgraded flexibility, the "Arithmometer" was broadly utilized for ninety years, albeit later engineers refined Colmar's minicomputer, along with individual creators, Pascal and Leibniz and Thomas, characterized the period of mechanical calculation. (Freiberger and Swaine 2017).

Charles Babbage a British mathematician at Cambridge University created the mechanical computer, the first of its type - "Difference Engine" is illustrated by the later version in figure 6. Through a decade of work, Charles Babbage constructed the "Analytical Engine". This computer as it can be programmed by guidelines coded on punch cards and had mechanical memory to store the outcomes. For his commitments in this field Charles Babbage is known as the "father of the computer". (CHM).
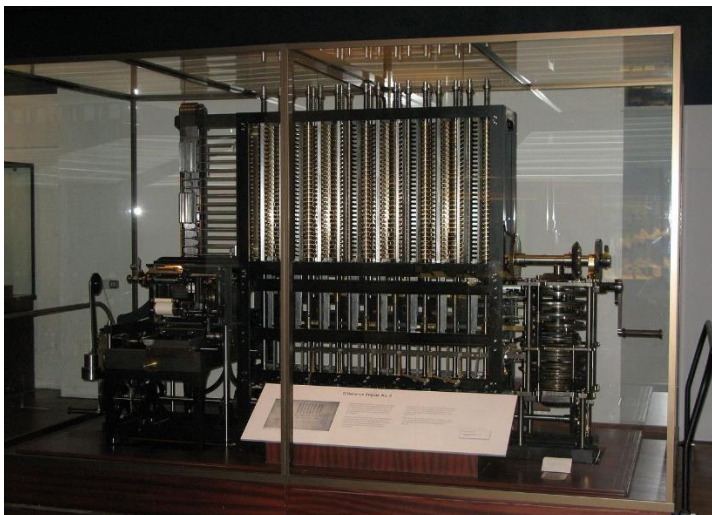
FIGURE 6. Babbage Difference Engine in Computer History Museum, California (Trashbox 2022)

Mark I was the principal completely programmed ascertaining machine which one be seen in figure 7. It was created by Howard Aiken of Harvard University in a joint effort with IBM. This machine was an electronic transfer computer. Electromagnetic signs were utilized for the development of mechanical parts. Mark I could play out the fundamental number juggling and complex conditions. Albeit this machine was incredibly solid, it was exceptionally sluggish (around 3-5 seconds for every computation) and was mind boggling in plan and enormous in size. (IBM)

FIGURE 7. IBM's Harvard Mark I Automatic Sequence Controlled Calculator (ASCC) (Mark I 1944)

2.2 The Second Generation 1959-1965: Transistor based

Changes in the second generation of computers started to move in direction of what computer look like in our days. Size of the PCs began decreasing. Low-level programming language began being utilized instead of machine language. Idea and concept of stored programs started to appear. And high level languages were emerged.

The second generation was the period of Transistorized Computers. Vacuum tubes were supplanted by transistors and some we can see in figure 8. Subsequently, the size of the computers began contracting. These PCs were more modest, quicker, more solid and more energy proficient. The initially transistor-ized PC was TX-0. The principal enormous scope machines that took benefit of the transistor innovation were the early supercomputers, Stretch by IBM and LARC by Sperry Rand. These computers were pre-dominantly created for nuclear energy research facilities. The run of the mill PCs of the that time were the IBM 1400, 7000 series, Honeywell 200 and General Electric.
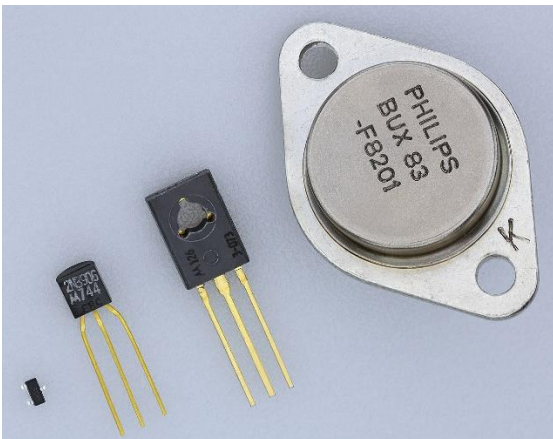
FIGURE 8. Transistors (Mister rf 2021)

IBM 1401 was generally acknowledged all through the business and most huge organizations regularly handled monetary data utilizing second gen PCs as one shown below in figure 9. The machine language was supplanted by low level computing construct. Along these lines the long and troublesome binary code was supplanted with truncated programming code which was moderately straightforward. (Dag Spicer 2009).

FIGURE 9. IBM 1401 (Ken Shirriff's blog 2022)

The ideas and concepts of the stored programs and programming languages let the computer adaptability to at last be practical and useful for business purposes. The stored application idea and concept suggested that the guidelines to run a PC for a particular undertaking were held inside the PC's memory and could rapidly be changed or supplanted by an alternate arrangement of directions for an alternate capacity. The concept was designed by John von Neumann in 1945. And later on, high level languages like FORTRAN, AL- GOL and COBOL were created. Computer worlds are faced with huge upcoming changes and new application appeared because of new high level languages in that time. The whole programming industry started with the second era PCs. (Tuyetsuong 2021)

COBOL (from COmmon Business-Oriented Language) is one of the oldest programming languages developed primarily for writing programs for the economic sphere. The language specification was created in 1959. The creators of the language aimed to make it machine-independent and as close as possible to natural English. Both goals were successfully achieved; programs in COBOL are considered understandable even to non-specialists, since texts in this programming language do not need any special comments (self-documenting programs). (Washington 1969, 14).

COBOL is a very old language and was used very actively at one a time, so there are many implementations and dialects. Albeit many have anticipated it will one day go be terminated, even in the following 60 years the COBOL programming language is still generally utilized. More up to date programming dialects, for example, C and Java have supplanted a portion of the functionalities that organizations once involved COBOL for, however numerous associations actually utilize COBOL till today. (Rob Singer 2021).

Fortran is the one of the first implemented high-level programming language. It was created in the period from 1954 to 1957 by a group of programmers led by John Backus at IBM Corporation. A couple of years later, its commercial deliveries began. Prior to that, programming was carried out either directly in machine codes or in symbolic assemblers. The name Fortran is an abbreviation of FORmula TRANslator. (John Backus).

Fortran is widely used primarily for scientific and engineering computing. One of the advantages of modern Fortran is a large number of programs and subroutine libraries written in it. Among scientists, for example, there is such a saying that any mathematical problem already has a solution in Fortran, and, indeed, one can find among thousands of Fortran packages; a package for multiplying matrices, a package for solving complex integral equations, and many, many others. A number of such packages have been created for decades and are popular to this day (mainly in the scientific community). As of August 2021, Fortran was positioned thirteenth in the TIOBE index, which illustrates growing popularity even in our days, if we compare results from August 2020, where it was on 42nd position.

NEC Corporation (NEC) fostered the NEAC-2203 transistor computer in view of the NEAC-2201 determined to accomplish down to earth business handling, the fist Instances were established in May, 1959 like for instance in Figure 10. The NEAC (Nippon Electric Automatic Computer) incorporates a CPU, console, paper tape and punch, printer and magnetic tape. It was available for purchase only in Japan. However around thirty NEACs were purchased. It dealt with Japan's first online, constant reservation framework for Kinki Nippon Railways in 1960. The last one was shut down in 1979. (Zion IT 2015).

FIGURE 10. NEAC-2203 (NEAC 2203 2022)

While concentrating on machine interpretation of languages in Moscow, Tony Hoare created Quicksort, an algorithm that would become one of the most involved arranging techniques on the planet and the algorithm is presented in Figure 11. Afterward, Hoare went to work for the British computer organization Elliott Brothers, where he created the principal business Algol 60 compiler. Elizabeth II knighted Tony Hoare in 2000. (CHM).
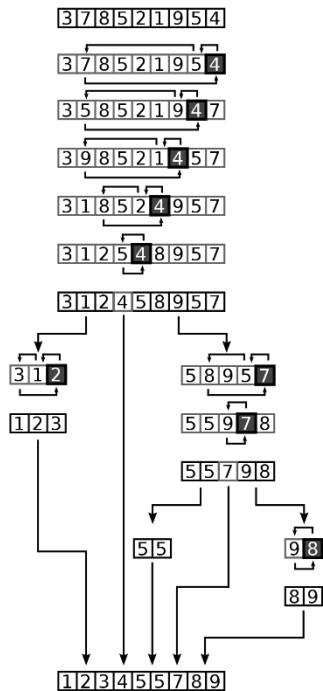
FIGURE 11. Full example of quicksort (Stackoverflow 2017)

The expanding number of clients requiring admittance to computers in the mid-1960s prompts tests in timesharing computer systems. Timesharing systems can uphold numerous clients - here and there hundreds - by imparting the computer to every client. In Figure 12 we can see one exemplar. CTSS was created by the MIT Computation Center under the heading of Fernando Corbato and depended on an altered IBM 7090, afterwards 7094, centralized server computer. Programs made for CTSS included RUNOFF, an early text designing utility, and an early between client informing framework that forecasted email. CTSS worked until 1968. By the mid-1960s many individuals could share a single computer, utilizing terminals to sign in over telephone lines. These timesharing computers resemble focal center points with spokes transmitting to individual clients. Albeit the computers by and large can't interface with one another, these are the principal normal multi-client frameworks, with many individuals

online simultaneously. Subsequently, timesharing pioneers many elements of later organizations, from document sharing to email and visit. Ordinary 1960s clients are a blend of money managers, bank representatives, students and specialists, and military people. (David Walden and Tom Van Vleck 2011, 11-20).

FIGURE 12. The Compatible Time-Sharing System (CTSS 2022)

Unimate was the first efficiently industrial robot, which started working at General Motors at the in Trenton, New Jersey, in 1961 as it is presented in Figure 13. On this side of the lake, General Motors had gotten out in front of its opposition to turn into the most mechanized auto plant on the planet. In 1969, it remade its Lordstown, Ohio plant introducing Unimate spot welding robots. Fit for creation speed until recently never accomplished, the robots fabricated 110 vehicles each hour - over two times the pace of any auto plant in presence at that point. With the assistance of the Unimate, GM altered the auto business. The Europeans rushed to take action accordingly and organizations like BMW, Volvo, Mercedes Benz, British Leyland, and Fiat introduced Unimate automated arms to perform their work. (Automate).

FIGURE 13. Live broadcast from NBC Studios in New York City (UNIMATE 2022)

PDP-8 is the first financially triumphal minicomputer. The PDP-8 sold for $27,000, one-fifth the cost of a little IBM System/360 mainframe computer as we can observed in figure 14. As a result of its speed, small size, and sensible expense, the PDP-8 was sold in large numbers to assembling plants, independent companies, and logical labs all over the planet. (Douglas W. Jones 2014)

FIGURE 14. Photos: The evolution of the PC (Computerweekly 2009)

2.3 The Third Generation 1965-1971: Integrated Circuit based

This period was described by these following most important innovations and movements. And there are the utilization of Integrated circuits, sensational speed up, significant decrease in size and power utilization of the computers, utilization of magnetic tapes and drums for more memory storage, creation of the fist operation systems and new more higher-level languages.

The third generation period was portrayed by the innovation of Integrated Circuits (ICs) and some are shown in Figure 15. The IC consolidated electronic parts onto a little chip which was produced using quartz. Afterward, many more parts were fitted onto a solitary chip, called a semiconductor. This de-

creased the size of the computers much further. The weight and power utilization of computers diminished, and the speed expanded colossally. Weighty accentuation was given to the improvement of programming. Operating systems were developed which permitted the machine to run various programs without a moment's delay at the same time. A focal program checked and co-ordinated the device's memory. Multiprogramming was made conceivable, by which the machine could play out a few positions simultaneously. Computers accomplished velocities of executing a huge number of guidelines each second. Business creation became more straightforward and less expensive. More Higher-level dialects like Pascal and Report Program Generator (RPG) were presented and applications arranged dialects like FORTRAN, COBOL, were evolving much further. (Javatpoint).
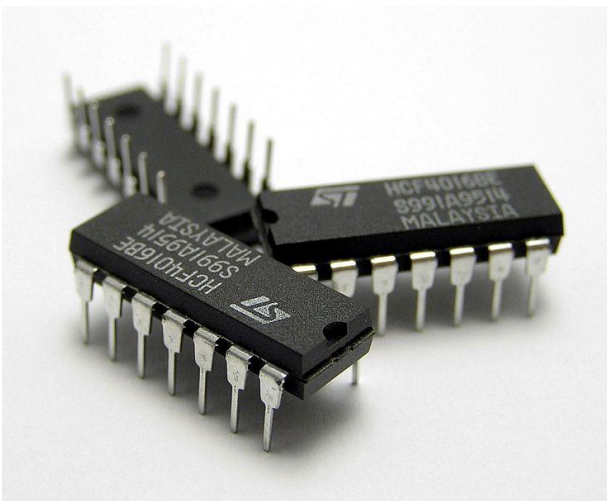

FIGURE 15. IC circuit chips (Kimmo Palosaari 2006)

The Report Program Generator (RPG) is a significant programming language which serves a huge number of business applications and employments. It is an IBM exclusive programming module.

RPG really has a seriously lengthy history. It was created by the tech goliath IBM in 1959 as the Report Program Generator-an instrument that was created to fill in as an option for the punch card handling framework on the IBM 1401. Be that as it may, it was in this way refreshed to the RPG 2 after the advancement of the IBM System/3 during the 1960s. It has since advanced into the high-level language likeness COBOL.

Right up until today, RPG is still an exceptionally famous programming language on the IBM's OP. RPG 4 is the latest build of RPG, and it is an instrument that gives a profoundly empowering programming setting for AS400 RPG Programmers. (Nirmal Khatri 2018).

Created in the last part of the 1960s, Pascal is an objective and procedural programming language that was initially intended for showing programming languages. Today, it's been for the most part supplanted by C, C++ and Java, yet it's actually utilized as a great tool for learning about programming. Utilized for organized programming, which requires a solid scrupulousness, it has turned into a well-known language for studying process and universities - nonetheless, it is less famous in the organizations. (Sarah K. White 2017)

The Olivetti Programma 101 is one of the first full operational financial desktop programmable calculators, however not the first in the world. And one can be seen in Figure 16. This printing programmable device was produced using discrete transistors and a delay-line memory. The Programma 101 could do expansion, deduction, increase, and division, as well as compute square roots. 44,000 were purchased, including some to NASA for use for the Apollo space project. (Curtamania 2020)

FIGURE 16. Olivetti Programma 101: at the origins of the Personal Computer (An Olivetti Programma 101 photo 2019)

The onboard control computer of the Apollo Guidance Computer performed calculations and controlled movement, navigation, and controlled the command and lunar modules during the Apollo program

flights. AGC was developed for the Apollo space project in the early 1960s at the MIT Instrument Laboratory and one is shown in Figure 17. A distinctive feature of the computer's design was the use of microchips, which was done for the first time. (History Computer Staff 2021).
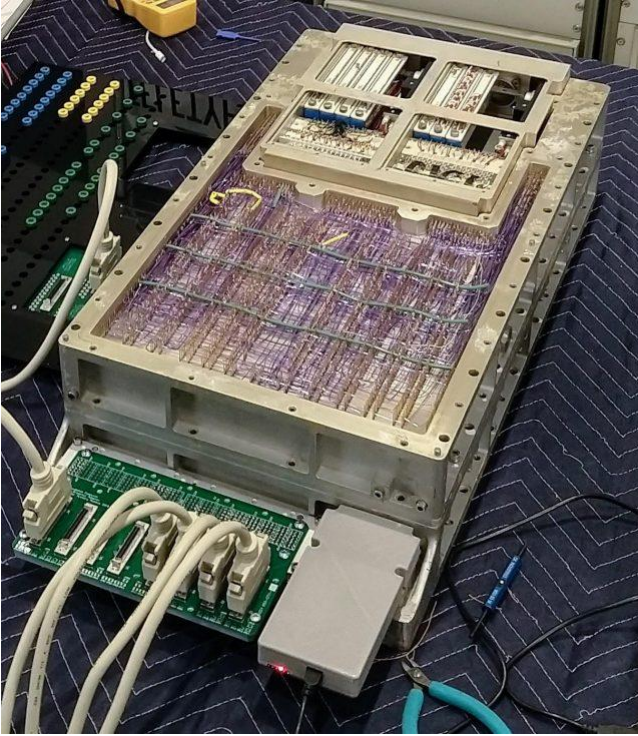

FIGURE 17. Apollo Guidance Computer Restored (Apollo Guidance Computer 2019)

Customer Information Control System is a family of mixed language application servers that provide operational transaction management and connectivity for applications in IBM mainframe systems and was developed in 1968 and it is presented in Figure 18. Before CICS was presented, numerous businesses utilized punched card bunch handling for high-volume client exchanges. As it permitted web-based transaction processing, CICS had the option to supplant this technique and significantly accelerated the way that organizations communicated with their clients. It was first utilized in the public utility industry for admittance to client data and transactions, yet not long after its delivery it was immediately embraced by a wide range of enterprises including banking, oil, protection and, surprisingly, also modest organizations. In spite of the fact that it was initially planned to last just a couple of years, CICS is as yet still being used today. (web.archive.org).

FIGURE 18. Breaking the fourth wall hacking customer information system (Ayoul3_ 2017)

The ATM tracks down its starting points during the 1950s and 1960s, when self-administration corner stores, stores, computerized public-transportation tagging, and candy allocators were becoming a more common thing. One of the fist money machines appears to have been conveyed in Japan during the 1960s, as indicated by a Pacific Stars and Stripes account at that point, yet little has been distributed with regards to it since. The best early arrangements occurred in Europe, where financiers reacted to expanding unionization and rising work costs by requesting designers to foster an answer for late night cash requirements. This brought about three separate outcomes, every one of which entered use in 1967: the Bankomat in Sweden, and the Barclaycash and Chubb MD2 in the U.K. of which one opening cere-mony we can see in figure 19. (Theatlantic, Bernardo Batiz-Lazo 2015).

FIGURE 19. Reg Varney, who played Stan Butler in On the Buses, opens the first cash machine (Thisis-money 2015)

ARPANET (Advanced Research Projects Agency Network) is a computer network created in 1969 in the United States by the US Department of Defense Advanced Research Agency (DARPA - Defense Advanced Research Projects Agency) and was the prototype of the Internet. The specialized and functional outcome of the ARPANET immediately showed the high potential to the world that dynamic allocation, techniques and packet switching specifically could be coordinated to give a productive and exceptionally responsive data information and create high communication organization as we can see in in figure 20. ARPANET ceased to exist in June 1990. (Roberts, Dr. Lawrence 1978)
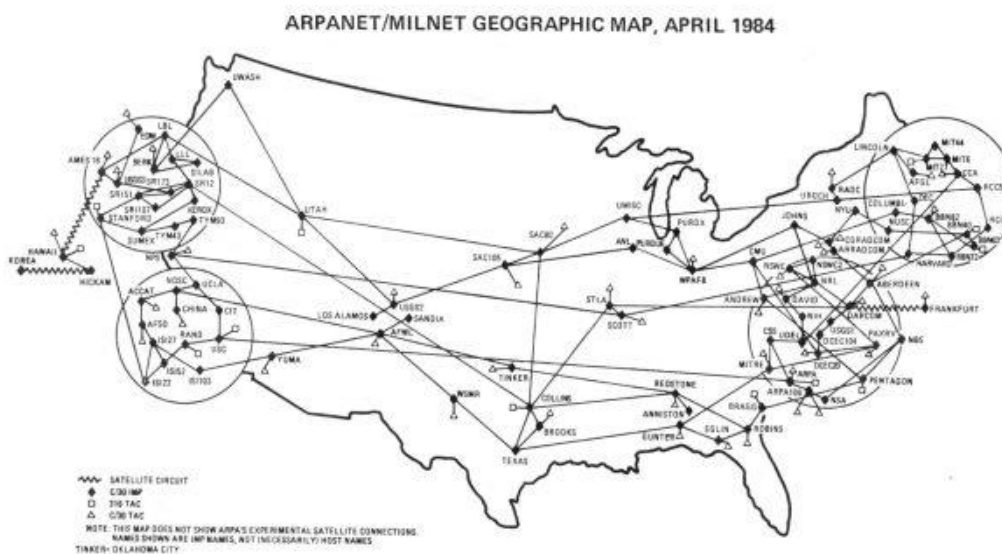

FIGURE 20. ARPANET/MILNET Geographic map in April 1984 (Scihi 2018)

2.4 The Fourth Generation 1971-1980: VLSI microprocessor based

The third gen out of computers utilized Integrated Circuits that had 10-20 parts on each chip, this was Small Scale Integration (SSI). The Fourth Generation acknowledged Large Scale Integration (LSI) which could fit many parts on one chip and Very Large-Scale Integration (VLSI) which pressed thousands of parts on one chip. The Intel 4004 chip found every one of the parts of a PC (focal handling unit, memory, info and result controls) on a solitary chip and microcomputers were presented. Higher limit media storage memory like magnetic disks were created. Fourth gen languages arose, and programming applications became well known. (Tutorialspoint)

As the PCs began turning out to be increasingly strong, they could be connected together or arranged to share information as well as memory space and programming. The organizations could arrive at colossal extent switch neighborhood worldwide trap of PC hardware, the Internet, interfaces the PCs worldwide into a single network of information. And as following, we can observe that the highlights of this generation are the Utilization of Very Large-Scale Integration, creation of microcomputers, appear of personal computers, raising of the internet, and developing at programming languages

The Intel created the first microprocessor a total universally useful CPU on a solitary chip in the world, which was named The Intel 4004 and which one is presented in figure 21. Delivered in March 1971 and utilizing state of the art silicon-door innovation, the 4004 denoted the start of Intel's ascent to worldwide strength in the processor business. Produced for Busicom, a Japanese adding machine producer, the 4004 had 2250 transistors and could perform up to 90,000 activities each second in four-bit pieces. (Stephen Cass 2018)
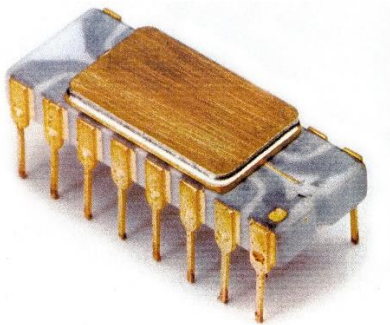

FIGURE 21. Intel 4004 (Spectrum 2018)

Under the bearing of engineer Dr. Paul Friedl, the Special Computer APL Machine Portable (SCAMP) PC model was created at IBM's Los Gatos and Palo Alto, California research centers. IBM's first PC, the framework was intended to run the APL programming language in a smaller, folder case like a walled in area which included a console, CRT srceen, and tape stockpiling. Friedl utilized the SCAMP model to acquire endorsement inside IBM to advance and foster IBM's 5100 group of PCs, including the best, the 5150, otherwise called the IBM Personal Computer (PC), presented in 1981. From idea to completed system, SCAMP required just a half year to create. One exemplar is showed in Figure 22. (Si.edu)
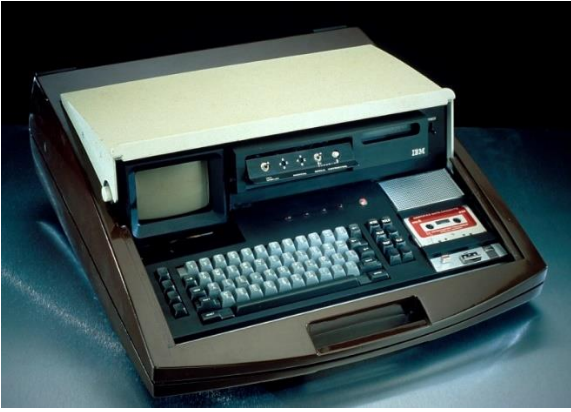
FIGURE 22. IBM SCAMP Microcomputer, Case Open (Si.edu)

Pong is a table tennis arcade game with a top view, highlighting basic two-layered designs, made by Atari and initially delivered in 1972. In figure 23 we catch a glimpse of what it actual looked like. It was one of the fist arcade computer games; it was made by Allan Alcorn as a preparation practice allotted to him by one of Atari's headers Nolan Bushnell, yet Bushnell and Atari prime supporter Ted Dabney were astonished by the nature of Alcorn's work and chosen to move the game in the masses. Bushnell put together the game's idea with respect to an electronic ping-pong game remembered for the Magnavox Odyssey, the main home computer game control center, in other words a game console. Accordingly, Magnavox later sued Atari for patent encroachment.

Pong was the first fanatical success in the video game industry, and it launched out computer game industry alongside the Magnavox Odyssey. Not long after its delivery, a few organizations started creating games that firmly mirrored its ongoing interaction. At last, Atari's rivals delivered new kinds of computer games that strayed from Pong's unique organization to shifting degrees, and this, thusly, drove Atari to urge its staff to move past Pong and produce more imaginative games themselves. (Angela Modany 2012)
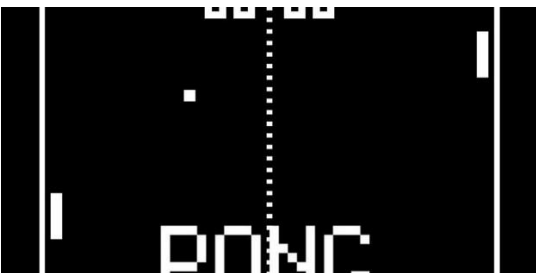

FIGURE 23. From digital society blog (hiig.de 2014)

IBM has been creating progressive, specific reason networks in the last part of the 1950s and for upcoming years. In 1974 it reports Systems Network Architecture (SNA), a bunch of conventions intended for less brought together organizations as we can see on in figure 24. SNA will develop into a web like network of networks, yet one held for those that were SNA agreeable. As it was a popular solution to many organizations for decades, IBM's SNA would discreetly convey the greater part of the world's organizing traffic. (CHM)

FIGURE 24. Systems Network Architecture (Computerhistory 2022)

The Xerox Alto is a computer developed at the Xerox PARC Research Center in 1973 as it is presented in figure 25. This is the first computer in the world to use the "desktop" metaphor and a graphical user interface. The Xerox Alto was the first fully personal computer in the modern sense, although some other, earlier systems (for example, the Kenbak-1 training computer or the Datapoint 2200 programmable terminal) also partially fit this category. Also, the Alto was a research prototype, not a commercial product. It was assumed that the Alto would become a mass-produced machine, but it was never put on stream. Nevertheless, a total of several thousand Altos were produced, most of which were used at Xerox PARC itself and various universities. Xerox at last marketed an intensely adjusted form of the Alto ideas as the Xerox Star, first presented in 1981. (History Computer Staff 2021)

FIGURE 25. Y Combinator's Xerox Alto: restoring the legendary 1970s GUI computer (Michael Hicks 2013)

The plan of the underlying Tandem equipment was finished in 1975 and the primary system was sent to the world in 1976. An example of the Tandem system can be dedicated in figure 26. Customized for online transaction handling, the Tandem solved one of the principal business issues with computers failures. The financial business raced to take on the machine, worked to run during fix or development. The Tandem in the end prompted the "Non-Stop computer" series of frameworks, which were utilized for early ATMs and to screen stock exchanges. (Fundinguniverse)

FIGURE 26. Tandem Nonstop II System (N0ty 2010)

Atari established on a market its Video Computer System (VCS) in September 1977, which was later renamed the Atari 2600 as we can see in figure 27. The VCS was the primary broadly effective computer game console, selling in excess of twenty million units all through the 1980s. The VCS utilized the 8-digit MOS 6507 microprocessor and was intended to be associated with a home TV. At the point when the remainder of Atari's 8-bit game control center were made in 1990, in an excess of 900 game titles had been delivered. (Jonathon Keats 2019)

FIGURE 27. Atari 2600 (Kelsey McClellan 2019)

2.5 The Fifth Generation 1980-onwards: ULSI microprocessor based

The time of fifth gen is 1980-till date. In the current period, VLSI innovation became ULSI (Ultra Large-Scale Integration) innovation, bringing about the creation of microchip chips having ten million electronic parts. Main features of current gen are ULSI technology, movement to true artificial intelligence, creation of natural language processing, parallel processing, development in superconductor technology, developing a friendly OS.

This time depended on parallel processing hardware and AI (Artificial Intelligence) programming. AI is an arising branch in software engineering, which deciphers the means and technique for making PCs think like people. Every one of the high-level languages like C and C++, Java, .Net are utilized at this time. (Generalnote)

The strong characterization of the current gen is a powerful raise in internet technology. Since the last part of the 1960s the internet has developed from a solitary test network serving to some locales in the United States to a network of networks connecting a huge number of PCs around the world. The establishment of the internet relates on the certain members and innovations that are permitted the Internet to grow; yet fundamental spotlight is consistently on the social and social factors that affected on internet's plan and use. The history unfurls is a frequently bending story of cooperation and struggle among a momentous assortment of players, including government and military offices, computer researchers

in the scholarly world and industry, graduate understudies, media communications organizations, principles associations, and organization clients.

The history begins with the early networking breakthroughs forward leaps figured out in Cold War think tanks and acknowledged in the Defense Department's making of the ARPANET. It closes with the rise of the Internet and its fast and apparently tumultuous development. It takes a gander at how scholarly and military impacts and mentalities formed the two organizations; how the standard lines among maker and client of an innovation were crossed with intriguing and exceptional outcomes; and how later clients designed their own extremely truthful applications, like electronic mail and the World Wide Web. It reasons that such applications proceed with the pattern of decentralized, client driven advancement that has described the Internet's whole history and that the way into the Internet's prosperity has been a pledge to adaptability and variety, both on a specialized plan and in the organized culture. (Janet Abbate 2000)

The ST-506 was a new innovation in the storage memory sector, which one was a 5.25-inch hard drive. One drive is presented in figure 28. The ST-506 was the main 5.25-inch hard drive. Presented in 1980 via Seagate Technology, the plate drive had a limit of 5 MB. The ST506 PC framework was reached utilizing the SA1000 interface, which utilized a hard plate regulator. The ST506 interface, created by Shugart Associates, thus, was the reason for the improvement of the floppy disk drive interface, consequently compelling the plan of the hard disk regulator to be somewhat straightforward. After delivering its first offer, Seagate immediately drew such enormous name clients as Apple Computer and IBM. (Kyle VanHemert 2010)

FIGURE 28. ST506 (Priceblaze 2022)

Commodore 64 is a home computer with 64 KB of RAM. It was launched by Commodore International in 1982 at a price of $595. During the entire time of the Commodore 64 release (1982-1994), more than 15 million computers were sold. According to the Guinness Book of Records, the Commodore 64 has become the sales leader among computer models. The C64 could be connected directly to a TV and to play games, in the same manner as it was done with game consoles such as the Atari 2600. Unlike other computers distributed only through authorized dealers, the Commodore also targeted large stores and toy stores. It is believed that the pricing policy of the Commodore 64 was one of the main reasons for the decline in the market of video game consoles in 1983. An image of C64 can be found in figure 29.

A huge number of programming titles were delivered over the life expectancy of the C64 and when it was suspended in 1993, it had sold in excess of 17 million exemplars. It is perceived by the Guinness Book of World Records as the best-selling single PC ever. (Brandon Griggs 2011)

FIGURE 29. Commodore 64 (Catawiki 2017)

MIDI is an abbreviation for Musical Instrument Digital Interface, which one was presented by Dave Smith of Sequential Circuits. It's an electronic standard utilized for the transmission of carefully coded music, and it joins PCs with electronic instruments. A scheme is presented on MIDI in figure 30. (Hosatech)
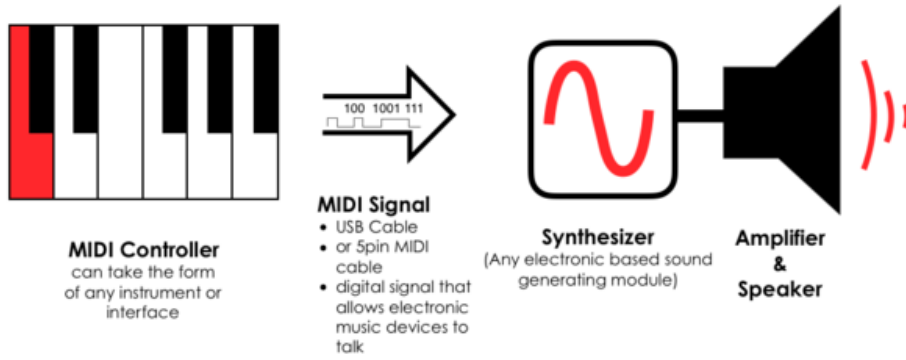
FIGURE 30. MIDI (Hosatech)

Microsoft Word is a word processor designed for creating, viewing, editing and formatting texts of articles, business papers, as well as other documents, with the local application of the simplest forms of tabular matrix algorithms. It was released by Microsoft Corporation as part of the Microsoft Office package. The first version was written by Charles Simonyi and Richard Brodie in 1983. The image of the first versions can be seen in figure 31. (Lucy Wright)
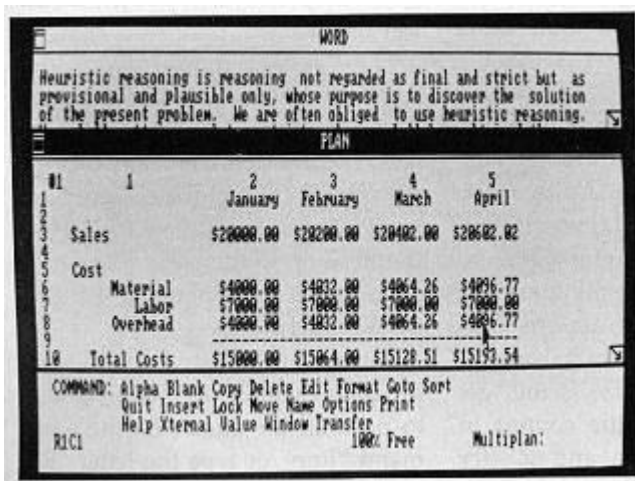

FIGURE 31. Word 1983 (Toastytech 2022)

The flash memory is an informational medium storage utilized with PCs and other electronic gadgets. Dissimilar to past types of memory, flash memory is an EEPROM (electronically erasable programmable read-only memory) type of PC memory and consequently doesn't need a power source to hold the information.

The flash memory was invented in the mid-1980s by Japanese specialist Masuoka Fujio, who was an employee at the Toshiba Corporation and who was looking for an innovation that would supplant existing information memory media like magnetic tapes, floppy disks, and DRAM (dynamic random-access memory) chips. One of those chips is presented in figure 32. (Gregersen, Erik 2019)
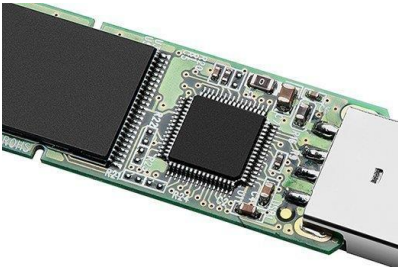

FIGURE 32. Flash memory consists of a transistor and a floating gate that stores the electric current. (Techtarget 2019)

C++ is a compiled, statically typed general purpose programming language, which was created by Bjarne Stroustrup. A representation of it can be recognized in figure 33. C++ Supports programming paradigms such as procedural programming, object-oriented programming, and generalized programming. The language has a rich standard library that includes common containers and algorithms, Input - Output, regular expressions, multithreading support, and other features. C++ combines the properties of both high-level and low-level languages. In comparison with its predecessor, the C language, the greatest attention is paid to the support of object—oriented and generalized programming.

C++ is widely used for software development, being one of the most popular programming languages. The scope of its application includes the creation of operating systems, various application programs, device drivers, applications for embedded systems, high-performance servers, as well as games. There are many implementations of the C++ language, both free and commercial and for various platforms. (Albatross)

FIGURE 33. C++ (Worldkings 2020)

Robert T. Morris sent a nondestructive worm through the Internet leading to significant issues for a really long time for around 6,000 of the 60,000 hosts connected to the organization in 1988. The outcome were broad blackouts. This is the primary worm to majorly affect genuine PC frameworks and exposed the significance of computer and internet security. There is a representation on how it works. (Fbi.gov 2018)

FIGURE 34. Morris's worm (Vjkosmos 2022)

Deep Blue was an AI (artificial intelligence) which focused on chess, and it was constructed and launched on the IBM supercomputer. It was the principal PC to dominate a match, and the first to dominate a game, against the prevailing best chess player on the planet under normal time controls. Improvement started in 1985 at Carnegie Mellon University under the name ChipTest. It then, at that point,

moved to IBM, where it was first specified Deep Thought, of course in 1989 was named to Deep Blue at last. It initially played best on the planet Garry Kasparov in a six-game match in 1996, where it lost two games to four as we can see in figure 35. In 1997 it was updated, and, in a six-game re-match, it crushed Kasparov winning three and drawing one. Deep Blue's triumph was viewed as an achievement throughout the entire existence of AI and has been the issue of a few books and movies. (IBM)

FIGURE 35. Kasparov and Deep Blue (Businessinsider 2020)

Adobe Photoshop is a multifunctional graphic editor developed and distributed by Adobe Systems. It mainly works with bitmap images, but it has some vector tools. The product is the market leader in the field of commercial bitmap editing tools and the most well-known developer program. The first version appeared in 1987. It was created by Thomas Knoll and John Knoll. They called it Display, but in 1988 they renamed it ImagePro. In 1988, Adobe Systems bought the rights to the program, leaving Thomas Noll as the developer, and in 1989 the program was renamed Photoshop. In 1990, Photoshop 1.0 appeared. From that point forward, the product has turned into the business standard in raster designs altering, however in computerized craftsmanship all in all. The fist version of AP is presented in figure 36. (Derrick Story 2000)
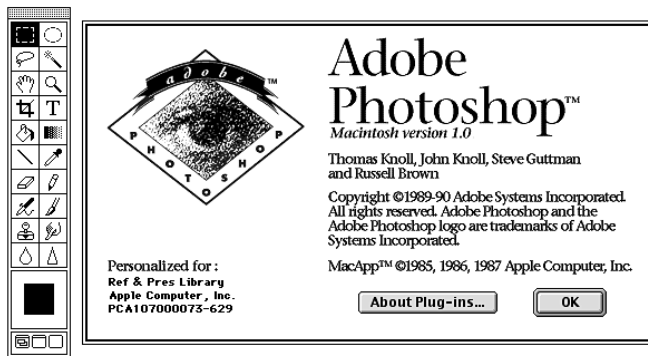
FIGURE 36. Adobe Photoshop (Webdesignmuseum 2006)

The Joint Group of Photographic Experts (JPEG) is one of the popular raster graphic formats used to store photos and similar images. Files containing JPEG data usually have extensions .jpg,. jfif, .jpe or .jpeg. However .jpg is the most popular of them on all platforms. The first JPEG was distributed in 1992 executing processes from different prior research papers and licenses referred to by Consultative Committee on International Telephone & Telegraph (CCITT) presently International Telecommunication Union Telecommunication Standardization Sector (ITU-T) and Joint Photographic Experts Group. Since its presentation in 1992, JPEG has been the most broadly involved picture pressure standard on the planet, and the most generally utilized computerized picture design, with a few billion JPEG pictures delivered each day. In figure 37 we can catch an idea on the how quality of the JPEG has been involved on a time frame. (Graham Hudson, Alain Leger, Birger Niss, Istvan Sebestyen, Jorgen Vaaben 2018)

FIGURE 37. A photo of a European wildcat with the compression rate decreasing and hence quality increasing, from left to right (AzaToth 2011)

SanDisk is a corporation founded in 1988 in Sunnyvale, California. It specializes in the development and production of flash-based storage media as the one we can find in figure 38. In 1991 SanDisk created the main Solid-State Drive (SSD) in a 2.5-inch hard plate drive structure factor for IBM with a 20 MB limit evaluated at about $ 1,000. The organization perceived that handheld gadgets and PCs were becoming lighter and more modest, and that flash memory, as was utilized in the SSD module, offered strong benefits over hard disk drive (HDD). For video game consoles SSD had become a standard only at ninth generation of consoles in 2020. (Lucas Mearian 2017)

FIGURE 38. SSD (Instructables 2022)

Microsoft Windows 1.0 is a graphical interface developed by Microsoft Corporation for MicroSoft Disk Operating System (MS-DOS), using the principle of a frame window manager. The interface was created to facilitate work with MS-DOS, unify the appearance of applications and optimize work with peripheral devices. The program was officially announced by Bill Gates but released only two years later in 1985. Most graphical user interfaces of the 1980s focused on the implementation of Xerox Alto, the first computer with a similar type of interface. It allowed the user to launch programs with one click of the mouse, open files without entering the location of his directory in the system. A representation on Windows 1.0 can be seen in figure 39. (Vangie Beal 2012)

FIGURE 39. A Tour of Windows 1.0 - Software Showcase (Computer Clan 2013)

GeForce 256 is the first line of NVIDIA's GeForce brand GPUs. It was released on October 11, 1999 and one we can be seen in figure 40. Geforce 256 acted as the successor to Real-time Interactive Video and Animation accelerator (RIVA TNT2), improved by offloading vertex processing from the CPU to the hardware transform and lighting (T&L) engine, increasing the number of pixel and adding a hardware motion compensation calculation unit for MPEG-2 video. GeForce provided a noticeable leap in the performance of 3D games on the PC and became the first 3D accelerator fully compatible with the DirectX 7.0 specifications. The chip was manufactured by Taiwan Semiconductor Manufacturing Company (TSMC) using 220 nm Complementary metal-oxide-semiconductor (CMOS) technology. (Graham Singer 2020)

FIGURE 40. NVIDIA GeForce 256 (Techpowerup 2022)

The primary mobile phone with an inherent camera was made by Samsung and delivered in South Korea in June of 2000. The SCH-V200 flipped open to uncover a 1.5-inch Thin-film-transistor liquid-crystal display (TFT-LCD), and the underlying computerized camera was fit for taking 20 photographs at 350,000-pixel goal, which is 0.35-megapixels, yet you needed to connect it to a PC to get your images. The camera and the telephone parts were basically isolated gadgets housed in the very body. There is a solid contention that the primary genuine camera telephone was delivered by Sharp and delivered in Japan by J-Phone in November of 2000. The J-SH04 could take photographs at 110,000-pixel or 0.11-megapixels which one showed in figure 41. The genuine contrast among it and the Samsung SCH-V200 was the way that the J-SH04 permitted you to transfer your photographs electronically. This is the way the BBC gave an account of it back in 2001, the remarks are beyond value. (Simon Hill 2013)

FIGURE 41. J-SH04 (Mobilephonemuseum 2022)

An advanced step in innovative mobility (ASIMO) is an android robot. It was created at the Wako Center for Fundamental Technical Research (Japan) by Honda Corporation and was opening exhibited to people in general in 2000. The most up to date form of the robot, delivered in 2014, has a stature of 130 cm, a load of 50 kg and can move at speeds up to 7 km/h.

Honda started creating android robots during the 1980s, including a few models that went before ASIMO. It was the organization's objective to make a mobile robot. E0 was the initiative bipedal (two-limbs) model delivered as a component of the Honda E series, which was an early exploratory line of an automatic, humanoid strolling robot with remote developments made somewhere in the range of 1986 and 1993. This was trailed by the Honda P series of robots created from 1993 through to 1997. The exploration made on the E-and P-series prompted the production of ASIMO. Advancement started at

Honda's Wako Fundamental Technical Research Center in Japan in 1999 and ASIMO was divulged in October 2000. ASIMO is an abbreviation which represents Advanced Step in Innovative Mobility. The Japanese word Asi additionally means 'leg' and Mo for 'portability'. ASIMO is articulated as 'ashimo' and signifies 'additionally legs'. The most recent form ASIMO turns out to be a more independent fit for consistent conduct without human activity. With a significantly improved circumstance versatile limit both wisely and genuinely, ASIMO draws one stage nearer to functional use in jam-packed public spaces and office conditions. In figure 42 we can observe a different generation of ASIMO. (Honda)

FIGURE 42. Honda Robotics (Global.Honda 2022)

BitTorrent is a peer-to-peer (P2P) network protocol for cooperative file sharing over the Internet. Files are transferred in parts, each torrent client receiving (downloading) these parts, at the same time giving (uploads) to other clients, which reduces the load and dependence on each source client and ensures data redundancy. The protocol was created by Bram Cohen, who wrote the first BitTorrent torrent client in Python, on April 4, 2001. The launch of the first version took place on July 2, 2001. There are many client programs for file exchange over the BitTorrent protocol. BitTorrent ver. 1.8.4 can be seen in figure 43 (History Computer Staff 2021)
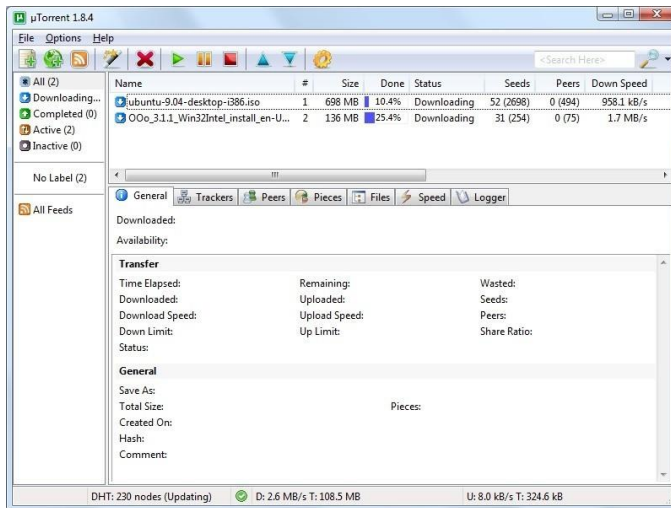
FIGURE 43. µTorrent ver. 1.8.4 (Portalprogramas 2022)

Google is the world's biggest Internet web search engine by Google Inc. and was established in 1998 by Larry Page and Sergey Brin. The principal most famous framework (92%), processes billions demands each month, it records more than exactly billions website pages search. The Google search engine was created as an educational project of Stanford University students Larry Page and Sergey Brin. They worked on the BackRub search engine in 1996, and in 1998 they created a new Google search engine based on it. From the very first year of its existence, Google began to apply the method of transparent management of Objects and Key Results (OKR), which determined the approach to planning the development of the company and the way of corporate governance. The corporation was founded on September 2, 1998. For additional information, it is a presentation on what main page of Google looks like in present in figure 44. (Verge Staff 2018)

FIGURE 44. Search engine (Smarterhomeguide 2020)

Amazon Web Services (AWS) is a commercial public cloud maintained and developed by Amazon since 2006 and some servers of it can be detected in Figure 45. AWS Provide subscribers with both infrastructure model services (virtual servers, storage resources) and platform-level services (cloud databases, cloud binding software, cloud serverless computing, development tools). AWS influenced to a large extent on the formation of the concept of cloud computing in general, and determined the main directions of development of the public deployment model. For a long time it was the world's largest public cloud by revenue. AWS was first to advertise with an advanced cloud foundation administration when it sent off Amazon Elastic Compute Cloud in August, 2006. Shockingly, it required quite a long while before a contender reacted. All things considered, they control an immense measure of portion of the overall industry, basically for the time being. (Ron Miller 2016)

FIGURE 45. Managed Amazon Cloud Hosting (Temok 2022)

Apple dispatches the iPhone - a mix of internet browser, music player and mobile phone - which could download new useful programs as "applications" (app) from the web-based Apple store and a picture of it can be seen in figure 46. The touchscreen empowered cell phone likewise had implicit GPS route, superior quality camera, messaging, schedule, voice transcription, and climate projections. It defined how future phones would be developing. (Stuart Miles 2022)

FIGURE 46. The original Apple iPhone in 2007 (Justin Sullivan 2007)

3 ARTIFICIAL INTELLIGENCE TREND

At the present stage, computer information technologies are distinguished – it is a system of methods and methods of collecting, storing, accumulating, searching, processing and issuing information on user requests using computer technology.

The following interactions are characteristic of information technologies of our days; user operation in data manipulation mode, no need to "remember and know", but just select from the "suggested menu"; paperless document processing (only the final version of the document is recorded on paper); dialog mode for solving problems with wide possibilities for users; the possibility of collective use of documents based on a group of computers, combined means of communication; the possibility of adaptive restructuring of the form and method of presenting information in the process of solving problems. Management information system (MIS) are used to process information.

A management information system (MIS) is a complex system of hardware and software, as well as personnel, designed to manage various processes within the technological process, production, enterprise. Automated control systems are used in various industries, energy, and transport. Some manufacturing companies still require individuals to perform certain functions, either of a more general, goal-setting nature, or not amenable to automation. (Texas A&M University's Mays Business School 2015)

The main direction of improving the management system on all levels in modern conditions has become the mass use of the latest computer and telecommunications equipment, the formation of highly effective information and management technologies on its basis. New information technologies based on computer technology require radical changes in the organizational structures of management, its regulations, human resources, documentation systems, recording and transmission of information. Of particular importance is the introduction of information management, which significantly expands the possibilities of using information resources. The development of information management is associated with the organization of a knowledge and data processing system, its consistent development to the level of integrated automated control systems, covering vertically and horizontally on all levels and links of the organization's activities.

In recent decades, management systems in highly developed countries, in particular, in the USA and Japan, have been guided by creative information technologies of the so-called third level. They cover the full information cycle – the development of information (new knowledge), their transfer, processing, use for the transformation of a new object, the achievement of new higher goals.

Information technologies of the current gen are meaning the highest stage of computerization of the control system, allow you to use a PC in the creative process, combine the power of the human mind and the power of electronic technology. Full integrated informatization of the management system involves the coverage of the following information and management processes: communication, collection, storage and access to necessary information, information analysis, support for individual activities, programming and solving special tasks.

Thus, modern information technologies have come a long way in their development and much more needs to be improved. In the future, it is planned to attract artificial intelligence technologies for decision-making and wider use of multimedia. It is believed that the Internet as a kind of information technology will become the basis of the 21st century as the century of information technology.

3.1 Artificial Intelligence

Artificial intelligence was once just a buzzword, but today its impact on our daily lives is much greater than ever before. Whether we read our emails or the seraphim of Netflix, artificial intelligence makes decisions to improve our user experience based on our preferences, our trends and our behavior. The capabilities of artificial intelligence are used to improve the user experience and expand the capabilities of brands and retailers to display hyper-relevant advertising. Artificial intelligence has a huge impact on many other industries.

In the fields of medicine, search, languages, cars and, of course, advertising, artificial intelligence has contributed to the introduction of innovations. This is how artificial intelligence has an impact on our lives.

3.2 Transport

Artificial intelligence has significantly influenced the future of driving and cars, this is a well-known fact. Cars with autopilot are now able to operate in an infinite variety of possible scenarios, which makes roads safer and trips more comfortable. These smart cars reduce the likelihood of accidents due to human errors and can also automatically adjust parameters depending on the likes and dislikes of their owners, for example, turn on heated seats on a cold winter night. The most striking phenomenon is Tesla and its cars, founded by Elan Musk.

3.3 Navigation

Many applications take into account traffic intensity and road works to find the fastest route to the destination, and all this is based on artificial intelligence. Navigation services make such adjustments based on these types of elements every time they are given a command, which is also the case when it comes to shared-ride services. Like for instance, Google Maps utilizes artificial intelligence to assist with pointing individuals in the correct direction.

3.4 Banking business

Financial institutions are slower to innovate, but artificial intelligence is no stranger to them, because today's audience expects individualization, especially when it comes to their investment plans. Artificial intelligence is used by many banks to personalize communication with customers and in their own mobile applications. For example, the Wells Fargo (Eric hal Schwartz 2021) app looks closely at customer data to analyze recurring payments and user behavior in order to provide personalized alerts such as bill payment reminders, overdraft activation alerts, and money transfer requests.

3.5 Medicine

Machine learning, one of the aspects of artificial intelligence technologies, has had a huge impact on how the medical field treats and communicates with patients at every stage of interaction with them.

Machine learning is used to study medical images and identify tumors, as well as to make a diagnosis based on research results. Artificial intelligence has played a huge role in identifying potential symptoms, which is more effective than the manual processes that existed before. The facial recognition program in combination with deep learning models allows you to diagnose rare genetic diseases.

3.6 Email

Like with research, email has been revolutionized by machine learning and artificial intelligence. Google uses artificial intelligence to provide a variety of features, such as spam detection, to ensure the authenticity of all incoming email messages. Their filters try to sort emails by main, social, promotions, updates, spam and other categories. Artificial intelligence is also behind Gmail's smart answers and smart reminders. It is expected that all mailers will be able to help you find important messages as easily as possible.

Instead of typing an email manually, users will be able to reply to incoming messages in one click, using an auto filled response from the email service. Currently, users can also afford smart reminders, in which the service tries to determine which emails require attention but have not yet been viewed.

3.7 Languages

Speech has become the main topic of communication with devices, regardless of whether we are talking to our home assistants or even to our cars. Machine learning systems are increasingly able to recognize human speech and respond accordingly. Human speech recognition technologies (Natural Language Processing, NLP) include machine translation, real-time speech recognition and speech tone analysis.

Artificial intelligence has already become the basis for speech-activated devices, and it will continue to evolve into a way of interaction that we use in other areas of everyday life. In addition, we see how automated telephone systems have replaced call centers to simplify customer service.

3.8 Advertising

Artificial intelligence technologies allow companies to analyze huge amounts of their customers' data and create hyper-relevant content for each based on their behavior, order history and customer preferences. For example, by studying how a recent home buyer makes purchases and browses websites on the Internet, artificial intelligence can create such useful ads that actually help a person to equip an empty house, rent a truck to move and purchase all the other things that he will need as a new homeowner.

Artificial intelligence is prominent in many areas of our daily lives, and as the technology continues to improve, we will see even more of its impact on how we make decisions and interact with brands.

3.9 Problematic aspect

Microsoft's head Bill Gates joins various conspicuous tech masters and researchers in uncovering his contemplations on the possibly perilous impacts and unseen side-effects of artificial intelligence on human progress. Beforehand, Elon Musk, Stephen Hawking, and others had communicated comparable opinions. Those on the opposite side of the discussion felt artificial intelligence would introduce a time of remarkable human accomplishment, helped by the "personalities" of humankind's fake brethren. While Gates and others felt that in the transient shrewd machines would help humankind, they anticipated a future where further developed hyper-genius machines could represent a grave danger to human life. (Michael Sainato 2015)

4 CONCLUSION

Information technology has firmly entered our lives. The use of a PC has become commonplace, although quite recently a workplace equipped with a computer was a rarity. Information technologies have opened up new opportunities for work and leisure, have made it possible to facilitate human labor in many ways.

Modern society can hardly be imagined without information technology. It is difficult to imagine the prospects for the development of computer technology today, even for specialists. However, it is clear that something grandiose awaits us in the future. And if the pace of information technology development does not decrease (and there are no signs for that), then it will happen very soon.

With the development of information technologies, the transparency of the world is growing, the speed and volume of information transfer between the elements of the world system, another integrating world factor appears. This means that the role of local traditions contributing to the self-sufficient inertial development of individual elements is weakening. At the same time, the reaction of elements to signals with positive feedback increases. Integration could only be welcomed if it did not result in the erosion of regional and cultural-historical features of development.

Information technologies have absorbed the avalanche-like achievements of electronics, as well as mathematics, philosophy, psychology and economics. The resulting viable hybrid marked a revolutionary leap in the history of information technology, which dates back hundreds of thousands of years.

Modern society is filled and permeated with streams of information that need to be processed. Therefore, without information technology, as well as without energy, transport and chemical technologies, it cannot function normally.

Socio-economic planning and management, production and transport, banks and exchanges, mass media and publishing houses, defense systems, social and law enforcement databases, service and healthcare, educational processes, offices for processing scientific and business information, and finally, the Internet - IT is everywhere. Information saturation not only changed the world, but also created new problems that were not foreseen.

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