

Chapter 1: Emerging Technology in Information Communication Technology (ICT)

Innovating Solutions



Objectives

- Explain the meaning of Information Technology (IT)?
- Explain the history of ICT
- Explain the current trend in ICT
- Job in IT



What is information Technology (IT)

Activity Introduction (15 minutes):

- Discuss with your friends
- Share their personal experiences with IT.
- What devices do they use daily?
- How do they communicate, learn, or entertain themselves using technology?
- Discussing the importance of information technology in today's world.
- share with your friend how technology has influenced their lives.

What is computer?

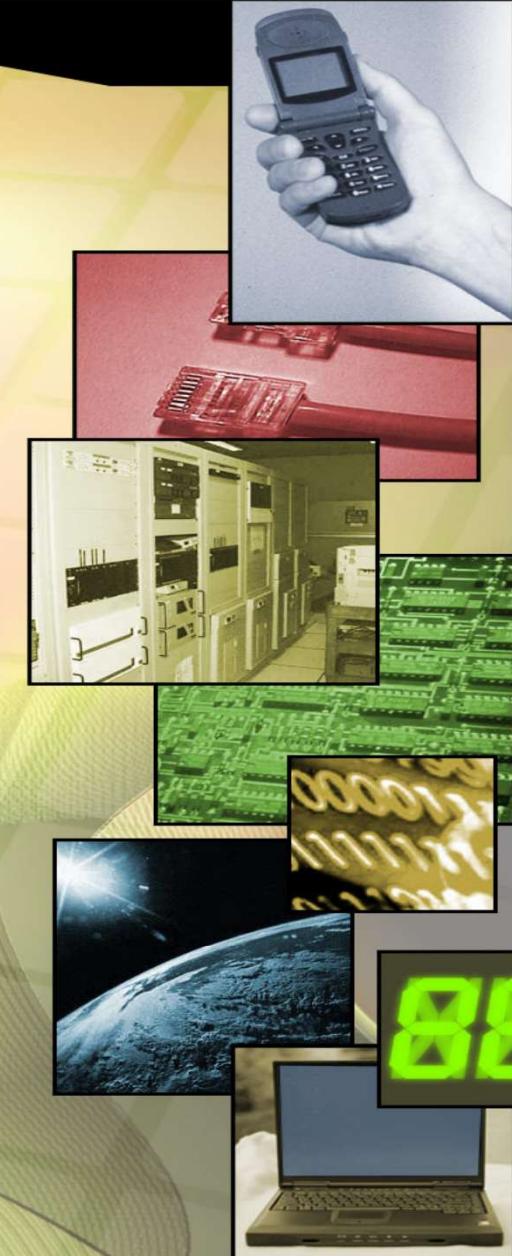
- COMPUTER :- A computer is a programmable electronic device. It takes data through input devices. It processes the data according to a sequence of instructions provided in the form of a program. The result is called the output and given through some output device.



ICT Overview

Information and Communication Technology (ICT) is the backbone of modern-day technological advancements. It covers a wide range of applications, from telecommunication to computer networking. ICT relies on a combination of hardware, software, and data to deliver efficient communication.

History of ICT Development



Ages of Basic Information Technology

Pre-Mechanical	Mechanical	Electromechanical	Electronic
<p>between 3000B.C. and 1450A.D</p> <ul style="list-style-type: none"> -alphabet -petroglyph -abacus 	<p>between 1450 and 1840</p> <p>lots of different machines created but have not yet gotten to a machine that can do more than one type of calculation in one</p> <ul style="list-style-type: none"> -Pascaline -Slide rule -Difference Engine 	<p>between 1840 and 1940</p> <p>beginnings of telecommunicatio n</p> <ul style="list-style-type: none"> -telegraph -telephone -Mark I 	<p>between 1940 and right now</p> <p>Generations:</p> <ul style="list-style-type: none"> 1st – vacuum tube, punch cards 2nd – transistors, magnetic tape, FORTRAN, COBOL 3rd – integrated circuit, metal oxide 4th – CPU, GUI

ELECTRONIC

First Generation (Vacuum Tubes)

information is sent by electric current (electron movement) whose speed is close to light velocity (300,000 km/second)

Was programmed with 6000 multiposition electric switches
programs and data were stored in separate memories, so that data entry and alteration were not a boring job



Second Generation Computer (Transistor): 1955-1965

- The transistor era was marked by the innovation on hardware and some program design methodology (software technology).
- It used transistor as vacuum tubes substitute.
- “High level” programming language did not depend on independent machine such as ALGOL, COBOL, FORTRAN.
- Some of the computers were PDP, IBM, and CDC.



Third Generation Computer (Integrated Circuit): 1965-1980

In this era some of the development were:

- IC was used as transistor substitute, so the size was smaller.
- Semiconductor memory was used as main memory.
- *Microprogramming* technique, makes CPU design simpler and more flexible.
- Parallel processing was used, so counting was faster.
- *Operating system* was used.

Some types of third generation computer from IBM (Mainframe) were:

- IBM System/360
- IBM System/4300

IBM System/370

IBM System/3900

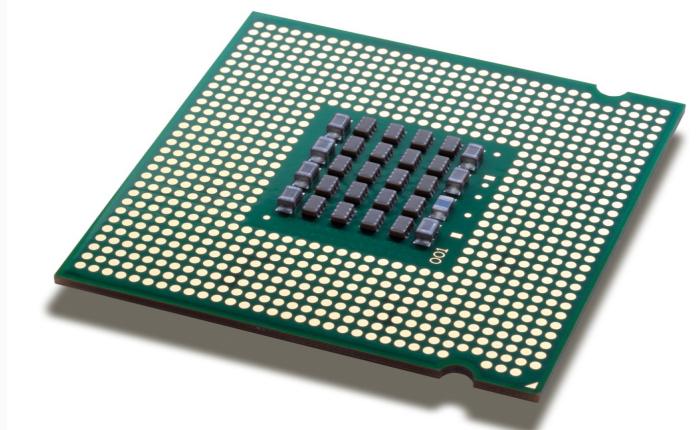


Fourth Generation Computer (VLSI): 1980 to now

In 1980, technology of VLSI (*very large scale integration*) has enabled the use of hundreds and finally millions of transistors in one *chip or micro processor*.

This technology enables the creation of CPU, memory and other components in a single chip which can be produced massively in a cheap price.

At last, it can produce smaller, faster, and cheaper computers, that everyone can afford. This technology starts the era of Personal Computer (PC).



Fifth Generation Computer

The term fifth generation computer is created by a Japanese to describe a “smart” computer which was built in the mid 1990s.

The development involves artificial intelligence, expert system, and natural programming language.

The focus of the fifth generation is connectivity, by connecting a computer to other computers, to form parallel computation.

Six Eras of IT

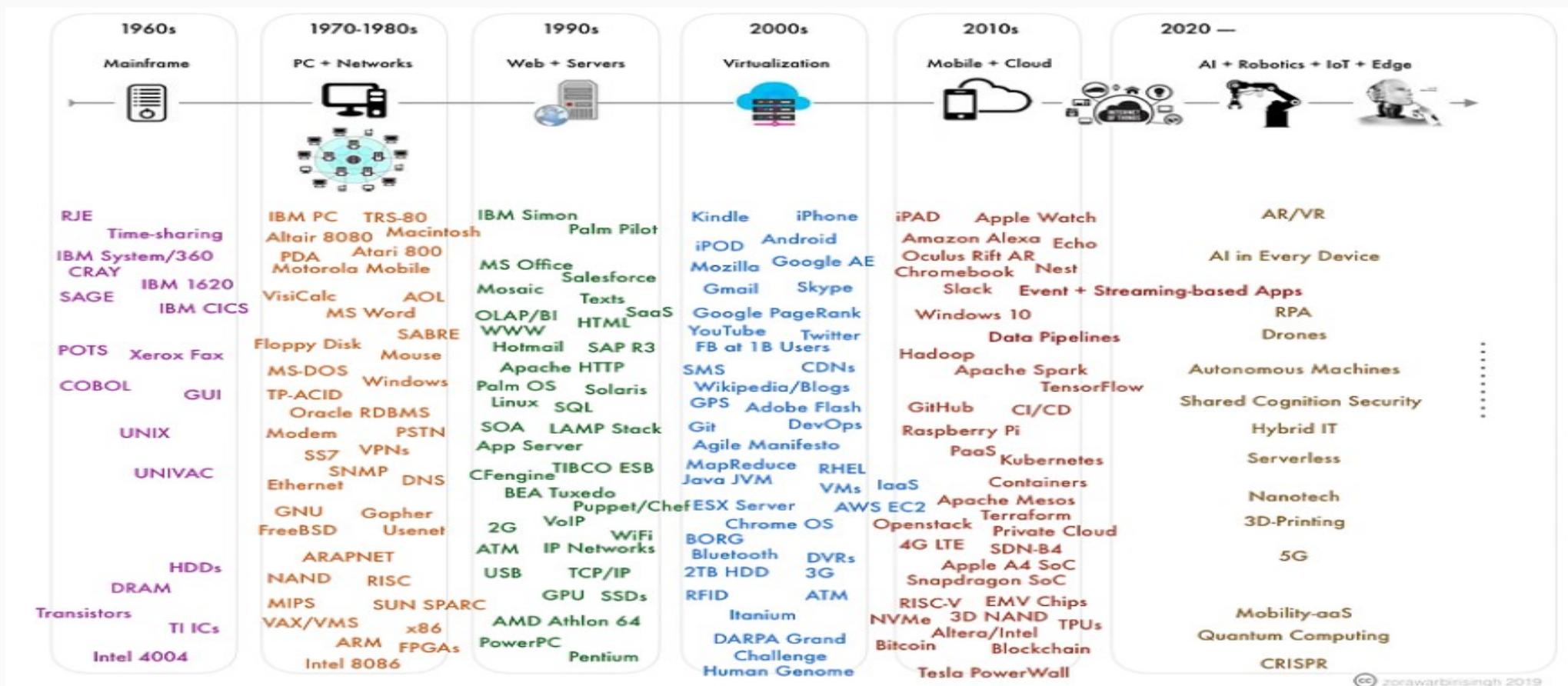


Figure 1: The Six Eras of IT

Mainframe

- The introduction of the IBM 1401 and 7090 transistorized machines in 1959 marked the beginning of widespread commercial use of mainframe computers. In 1965, the mainframe computer truly came into its own with the introduction of the IBM 360 series. Mainframe computers became powerful enough to support thousands of online remote terminals connected to the centralized mainframe using proprietary communication protocols and proprietary data lines.



Personal Computer & Networking

- Proliferation of PCs in the 1980s and early 1990s launched a spate of personal desktop productivity software tools—word processors, spreadsheets, electronic presentation software, and small data management programs—that were very valuable to both home and corporate users. These PCs were stand-alone systems until PC operating system software in the 1990s made it possible to link them into networks.



Networking is the exchange of information and ideas among people with a common profession or other interest, usually in an informal social setting.



Web

What is WWW?

WWW, which stands for World Wide Web, is a subset of the internet. It is also known as W3 or web. WWW refers to all the web pages or online content that is available on the internet in HTML formatted manner. The web pages and documents available on the internet are connected via hyperlinks.

The information available on the web pages can be of various formats consisting of text, image, audio, and video. The WWW or World Wide Web was developed by Tim Berners-Lee at CERN (European library for Nuclear Research) in 1989.



The World Wide Web

World's First Website Goes Online

The first-ever URL was created on December 20, 1990, and brought the world the first website. It only had plain text and basic HTML format weighing in at only 2.7KB.

Netscape's Navigator

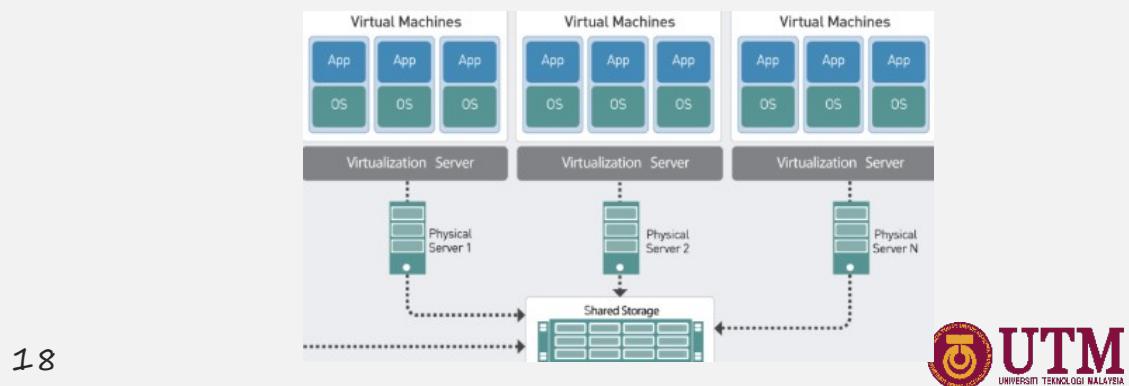
In 1994, Netscape Communications developed the Navigator browser that incorporated graphics and text. The development of the web browser marked a change in the way people experienced the internet.

Google Smart Search Algorithm

Launched in 1998, Google's search engine had a straightforward interface, making it work a lot faster than its competitors. It was also the first search engine that used PageRank algorithm.

Virtualization

Virtualization enables the hardware resources of a single computer—processors, memory, storage and more—to be divided into multiple virtual computers, called virtual machines (VMs).



Mobile Computing

Mobile Computing is the technology used for transmitting voice and data through small, portable devices using wireless enabled networks.

Mobile Computing System is a distributed system, which is connected via a wireless network for communication. The clients or the nodes possess mobility and the ability to provide computing at anytime, anywhere.

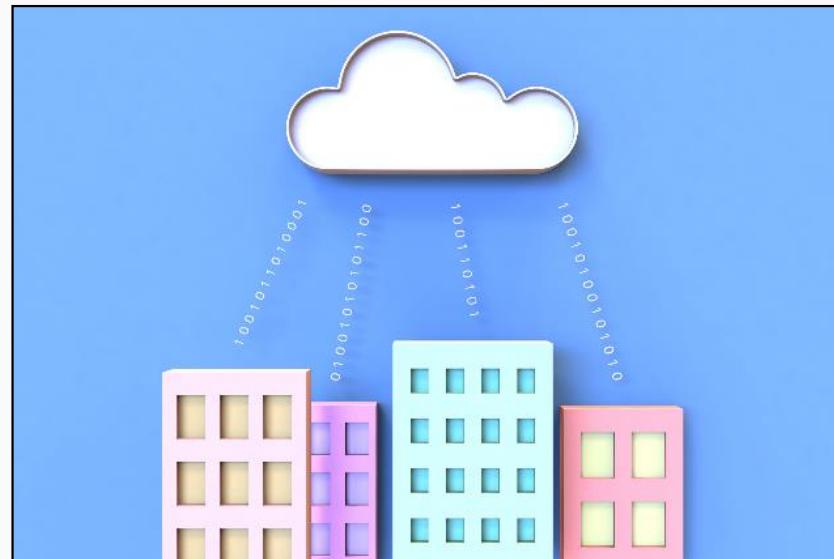


The Rise of Mobile Technology

- 1 First Cell Phone Call
In 1973, Motorola researcher Martin Cooper made the first-ever cellular phone call to his rival research head at Bell Labs, Joel Engel.
- 2 Introduction of iPhone
On June 29, 2007, Steve Jobs unveiled the first iPhone, altering the way people access the internet, take photos, and make phone calls.
- 3 Mobile Payments
Launched in 2011 as Google Wallet, mobile payments have transformed the payment industry by allowing people to make payments with a mobile app and avoid carrying cash and cards.
- 4 Virtual Assistants
Virtual assistants like Siri, Alexa, and Google Assistant emerged in 2011 and quickly gained popularity. They have revolutionized the way people interact with their technology devices.

Cloud Computing

Cloud computing is the **on-demand** delivery of compute power, database, storage, applications, and other IT resources **via the internet** with **pay-as-you-go** pricing.



Artificial Intelligence

Artificial intelligence is the simulation of human intelligence processes by machines, especially computer systems.

WHAT IS ARTIFICIAL INTELLIGENCE?

Machine Learning

Using sample data to train computer programs to recognize patterns based on algorithms.



Neural Networks

Computer systems designed to imitate the neurons in a brain.



Natural Language Processing

The ability to understand speech, as well as understand and analyze documents.



Robotics

Machines that can assist people without actual human involvement.



Artificial Intelligence

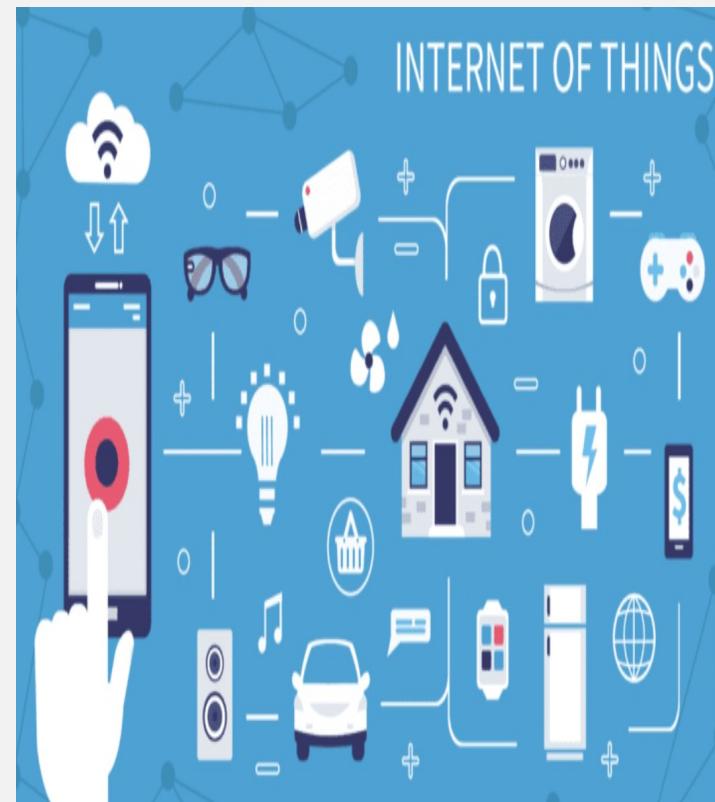
[är-tə-'fi-shəl in-'te-lə-jən(t)s]

The simulation of human intelligence by software-coded heuristics.



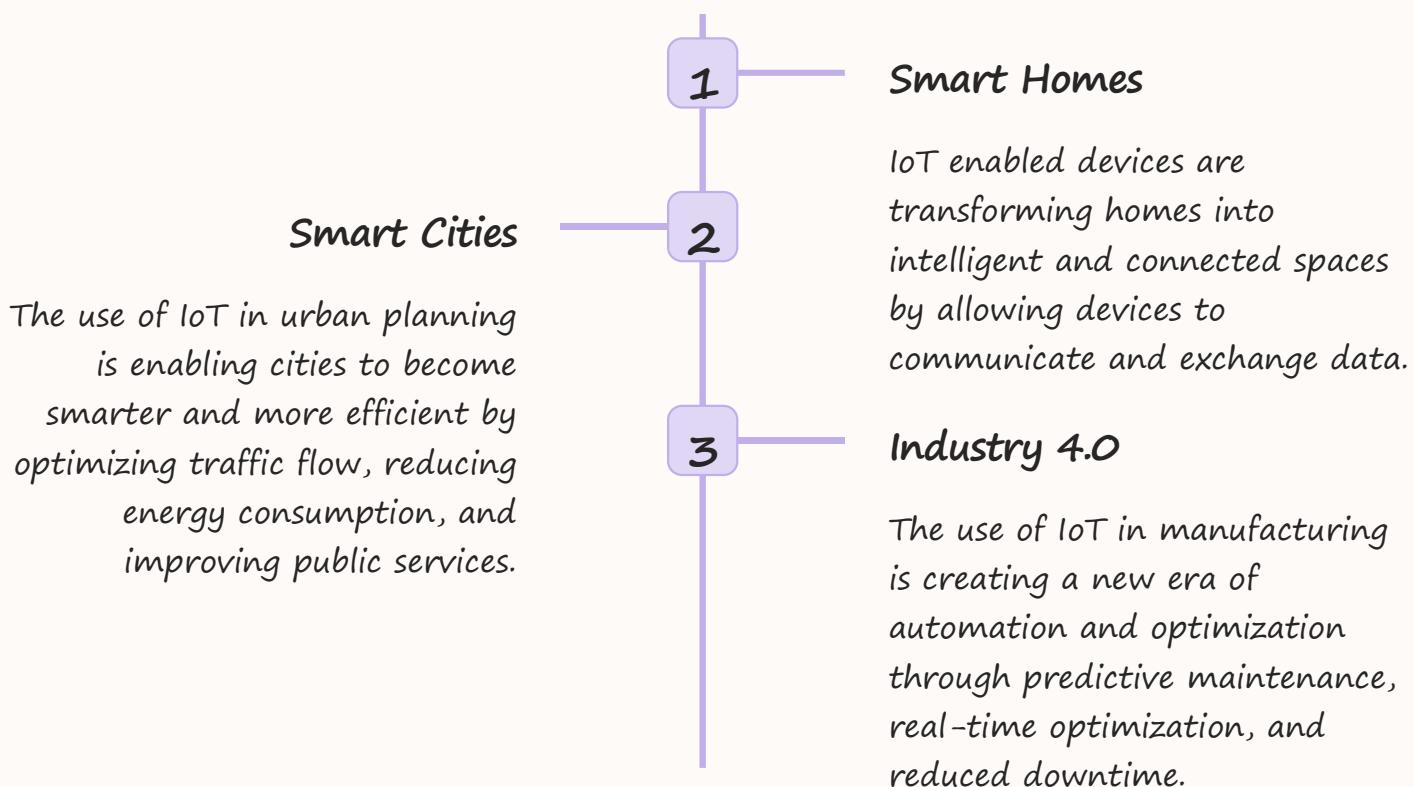
Internet of Things (IoT)

The Internet of Things (IoT) primarily refers to any device, appliance, instrument, or machine that can connect to the internet. They contain sensors, software, and other technologies used to link and exchange data between systems and devices over the Internet.



Internet of Things (IoT)

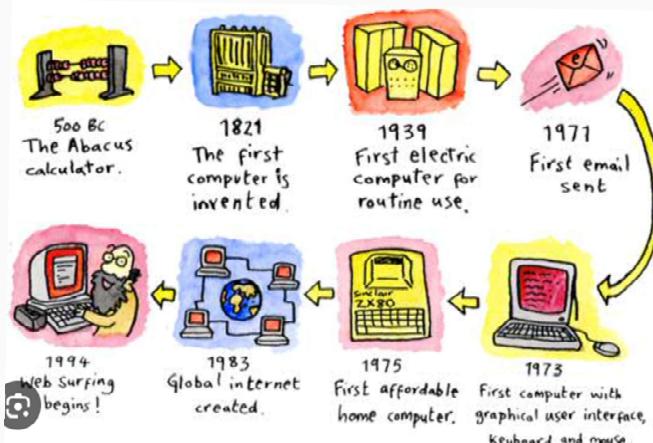
The Internet of Things (IoT) is a network of interconnected devices that are embedded with sensors, software, and other technologies that enable them to exchange data and interact with other devices and systems.



Edge Computing

A decentralized computing infrastructure that brings compute resources closer to the end-user. This technology reduces latency and increases computation efficiency.

Historical Timeline



- **Activity Historical Timeline (15 minutes):**
- Display a chronological timeline on a whiteboard, screen, or distribute printed handouts that illustrate key milestones in the history of information technology.
- Briefly explain each milestone, highlighting its significance:
 - Early computing machines (e.g., Charles Babbage's Analytical Engine)
 - Invention of the first electronic computer (e.g., ENIAC)
 - Development of the internet and the World Wide Web
 - Emergence of personal computers and smartphones
- Open the floor for questions and encourage students to express their curiosity about any of the milestones.

The top technology trends of 2023

- 1 Applied AI
- 2 Industrializing Machine Learning
- 3 Generative AI
- 4 Web3
- 5 Next-generation software development
- 6 Trust architecture & digital identity
- 7 Advanced connectivity
- 8 Immersive reality technologies
- 9 Cloud and edge computing
- 10 Quantum technologies
- 11 Future of mobility
- 12 Future of bioengineering
- 13 Space technologies
- 14 Electrification and renewables
- 15 Climate technologies beyond electrification and renewables

McKinsey
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Top Strategic Technology Trends 2023

- 1 Digital Immune System
- 2 Applied Observability
- 3 AI TRiSM
- 4 Industry Cloud Platforms
- 5 Platform Engineering
- 6 Wireless-Value Realization
- 7 Superapps
- 8 Adaptive AI
- 9 Metaverse
- 10 Sustainable Technology

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Top 10 New Technology Trends for this Year

01 Artificial Intelligence (AI)

02 Robotic Process Automation (RPA)

03 Hyper-Automation

04 Virtual Reality and Augmented Reality

05 Blockchain Technology

06 3D Printing

07 Edge Computing

08 Internet of Things (IoT)

09 Drones

10 5G Technology

<https://www.founderjar.com/new-technology-trends/>



Technology in Everyday Life

Activity Technology in Everyday Life (15 minutes):

- Conduct a whole-class discussion to explore the pervasive role of IT in various aspects of daily life:
 - Communication (e.g., email, social media, video calls)
 - Education (e-learning, online research, digital textbooks)
 - Healthcare (telemedicine, electronic health records)
 - Entertainment (streaming services, gaming)
- Students to share and present their own experiences and anecdotes related to these areas.

Implications for the Future

As emerging technologies continue to evolve and transform industries, the future holds many possibilities.



Architecture and Construction

The use of emerging technologies such as AR, VR, and AI in architecture and construction is revolutionizing how buildings are designed, constructed and maintained.

Transportation

The use of autonomous vehicles, smart traffic management systems, and hyperloop technology is transforming transportation systems and reducing congestion while improving safety and efficiency.

Healthcare

The use of personalized medicine, gene editing, and bioengineering technologies is accelerating treatments for chronic and genetic diseases and transforming the healthcare industry.

Jobs in 2025

Fastest Growing Occupation



Software Developer
Computer System Analyst
Marketing Researcher



Medical Technicians
Physical Therapists
Workplace Ergonomic Experts



Sales & Marketing Specialist
Customer Service Representative



Education and Training Jobs



Accountant
Auditor

EVER-GROWING JOBS



Software developer
jobs will grow by 18.8%

Computer system analyst
jobs will grow by

20.9%

Top 8 Skills Needed



Creativity



Critical Thinking



Complex Problem
Solving



People
Management



Coordination
with Others



Emotional
Intelligence



Judgment and
Decision Making



Service
Orientation

Questions

- What is information technology (IT)?
- Describe the different types of computer trends.
- What is emerging technology in IT?

THANK YOU



In the Name of God for Mankind



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