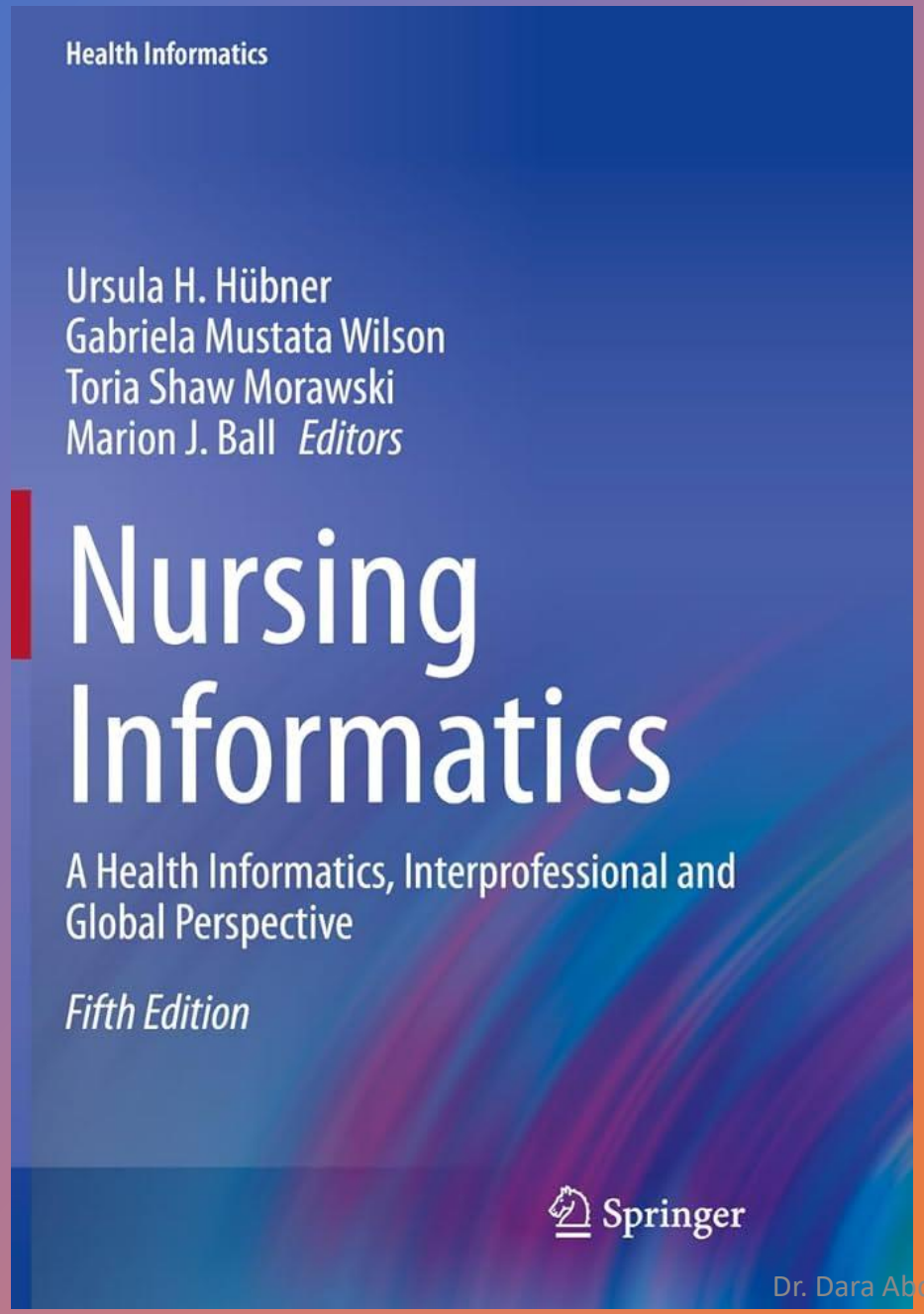

4, 5 & 6. Nursing Informatics Course

Computer Science and the Foundation of Knowledge Model

Dr. Dara Abdulla Al-Banna

Assistant Professor

PhD in Adult Nursing

MSc in Nursing Informatics

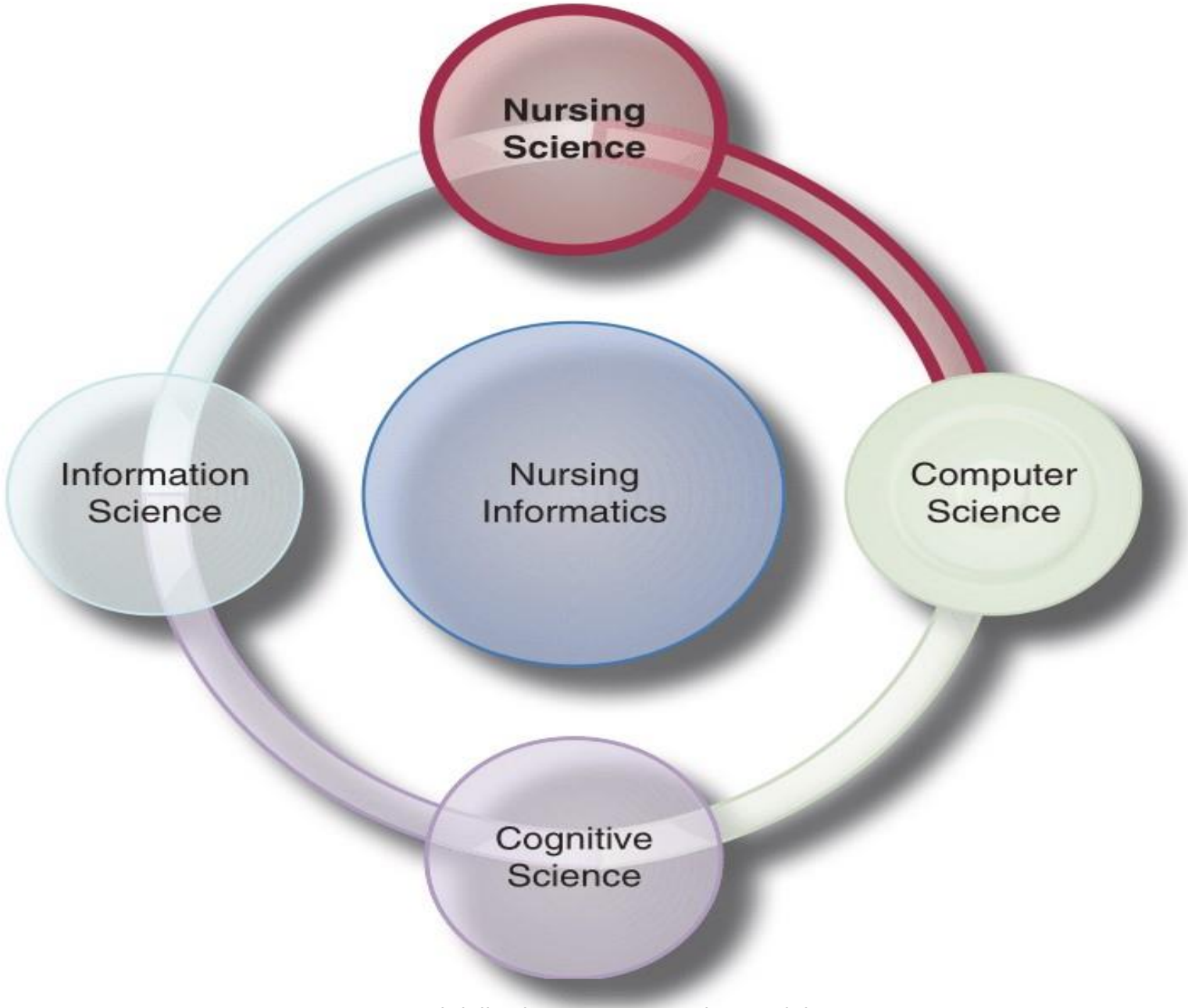

Figure 1-1 Building Blocks of Nursing Informatics

Introduction to Computer Science in Nursing Informatics

Computer science is a fundamental building block of nursing informatics, offering valuable tools for data and information management. This chapter introduces computers, hardware, and software as evolving systems that facilitate the acquisition and manipulation of data by nurses. When used skillfully, these tools enable nurses to synthesize data into knowledge and wisdom, supporting evidence-based practice decisions and advancing the professional knowledge base.

Parts of Computer

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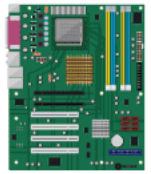
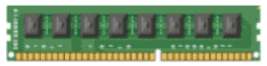
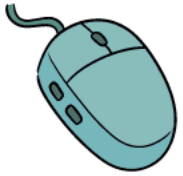
CPU


Motherboard

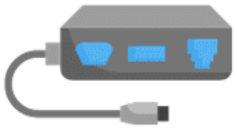

RAM


Hard Disk Drive


Monitor


Mouse

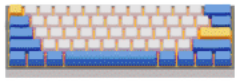

Microphone


USB Ports


Optical Drive

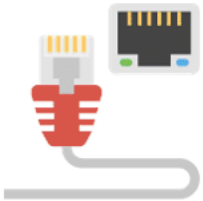
Solid State Drive


GPU


Keyboard


Speakers


Webcam

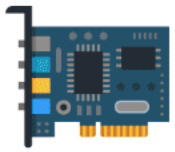

Ethernet Port

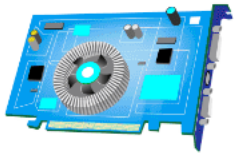

Wi-Fi Modem


USB Hub


Computer Case


Power supply unit


Sound Card

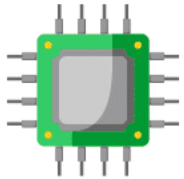

Video Card


Network Card

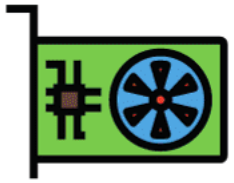

Power Button

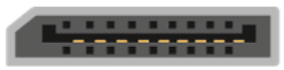

Data Cables

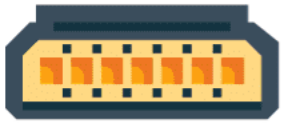

CPU Socket

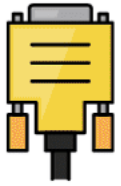

Chipset


Power Connector

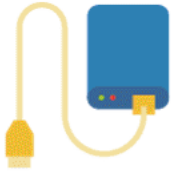

Expansion Card

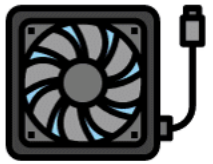

Display Port


HDMI Port

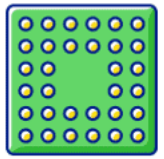

VGA Port

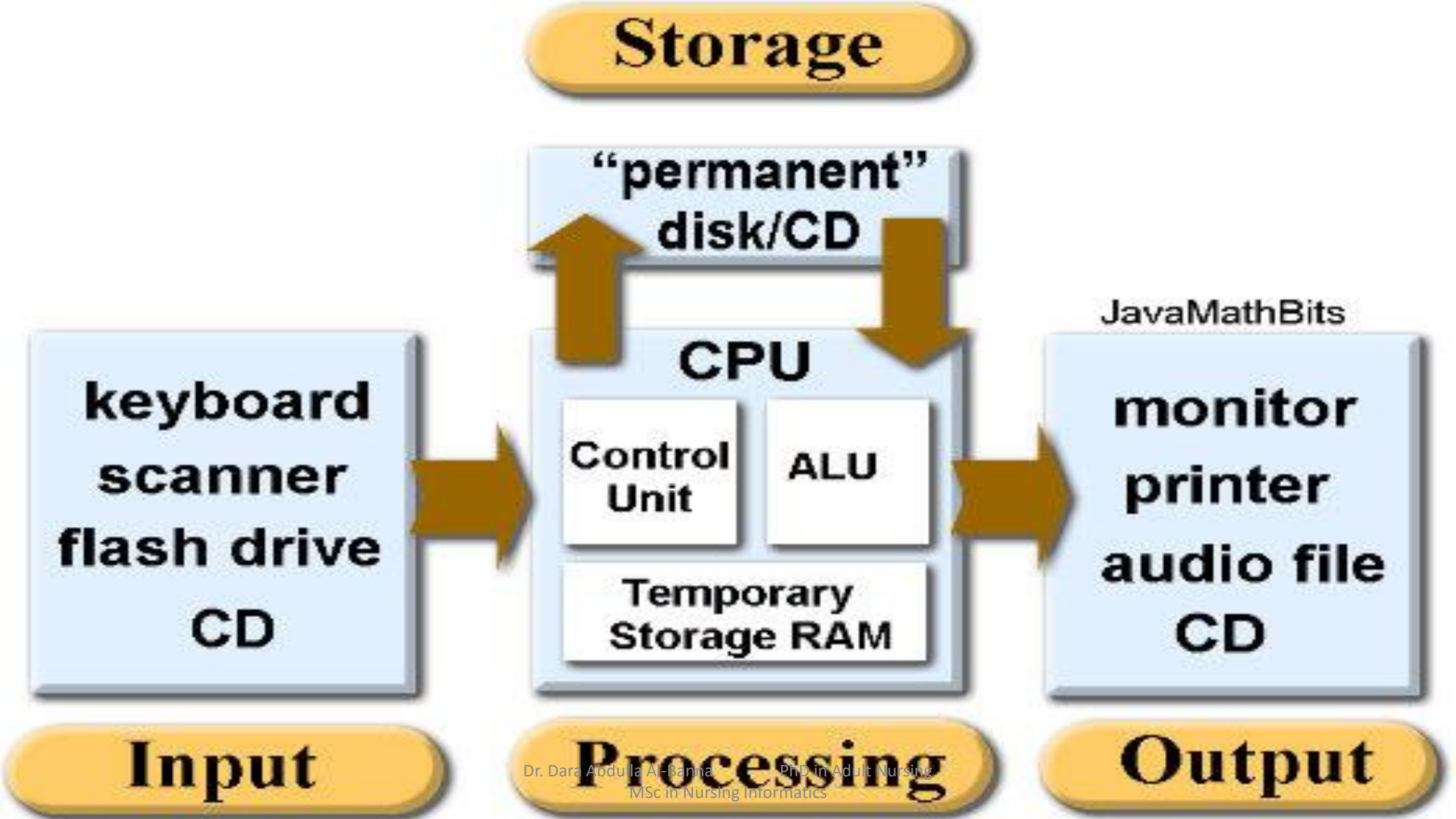

Audio Jacks


External Drive


CPU Cooler


Trackball


CPU Socket Cover


Storage
"permanent"
disk/CD
JavaMathBits
CPU
keyboard
scanner
flash drive
CD
Control
Unit
ALU
Temporary
Storage RAM
monitor
printer
audio file
CD
Input
Processing
Output

The Computer as an Information Management Tool

1. **Input**

   Computers accept data through various input devices.

2. **Processing**

   Data is processed through logical and arithmetic rendering.

3. **Storage**

   Processed data is stored in memory components.

4. **Output**

Evolution of Computer Technology

1

1940s

First electronic computer invented

2

Ongoing Development

Increasing complexity and capabilities

3

Present

User-friendly interfaces masking complexity

4

Future

Continued evolution and innovation

The sophistication of computers is evolving rapidly, focusing on increasing ease of use and user-friendliness. This is achieved by refining hardware and software capabilities to work seamlessly together, ensuring intuitive tools for users at all levels of expertise.

Complexity Masked in Simplicity

Plug-and-Play

Peripherals like iPods or game consoles can be instantly used when plugged in.

Intuitive Interfaces

User-friendly designs hide complex operations.

Seamless Integration

Hardware and software work together smoothly.

Reduced Learning Curve

Easy-to-use systems for all expertise levels.

As computer capabilities evolve, vendors aim to decrease the learning curve for users while enhancing their ability to manipulate the system. This results in complex operations being concealed by ease of use.

Computers as Universal Machines

1 **General-Purpose**

Computers can perform any task represented in specific programs.

2 **Symbol Manipulation**

They can process and manipulate various types of data and symbols.

3 **Versatile Applications**

From drawing images to calculating statistics, writing essays, or recording nursing care data.

4 **Data Management**

Used for storage, retrieval, analysis, generation, and transformation of data and information.

Von Neumann Architecture

Processor

Contains logic and control units

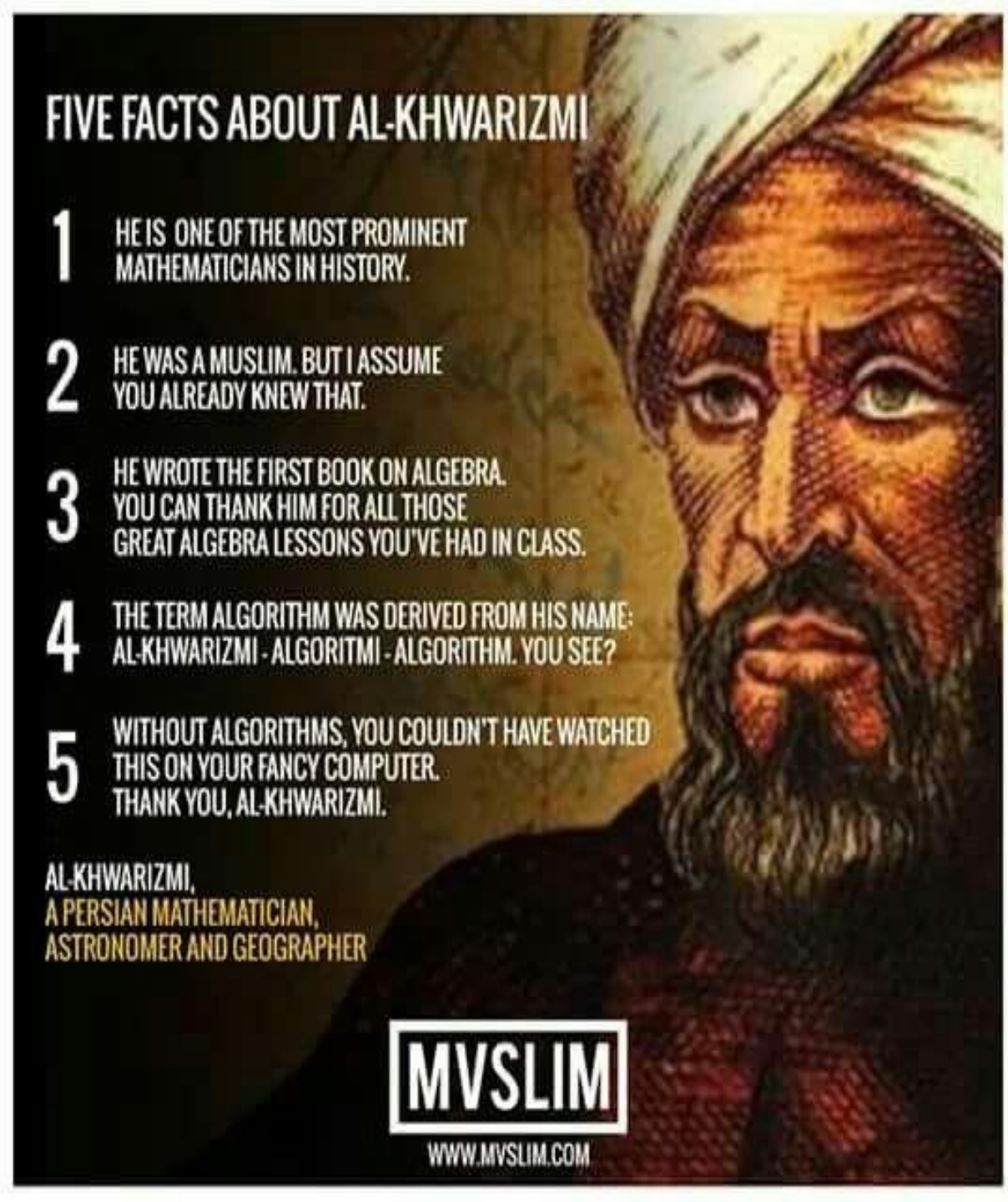
Memory

Serves as the storage region

Input/Output

Includes devices like keyboard, mouse, monitor, and printer

Most computers are based on John von Neumann's model of processor–memory–input–output architecture. This model has been the foundation for computer design, though recent developments have provided alternative configurations, such as parallel computing models.


FIVE FACTS ABOUT AL-KHWARIZMI
1 HE IS ONE OF THE MOST PROMINENT MATHEMATICIANS IN HISTORY.
2 HE WAS A MUSLIM. BUT I ASSUME YOU ALREADY KNEW THAT.
3 HE WROTE THE FIRST BOOK ON ALGEBRA. YOU CAN THANK HIM FOR ALL THOSE GREAT ALGEBRA LESSONS YOU'VE HAD IN CLASS.
4 THE TERM ALGORITHM WAS DERIVED FROM HIS NAME: AL-KHWARIZMI - ALGORITMI - ALGORITHM. YOU SEE?
5 WITHOUT ALGORITHMS, YOU COULDN'T HAVE WATCHED THIS ON YOUR FANCY COMPUTER. THANK YOU, AL-KHWARIZMI.
AL-KHWARIZMI,
A PERSIAN MATHEMATICIAN,
ASTRONOMER AND GEOGRAPHER
MVSLIM
WWW.MVSLIM.COM

Computer Hardware Overview

Casing

Protects internal components

CPU

Executes and processes code

Memory

Stores data and instructions

Storage

Long-term data retention

Computer Casing Types

Type	Description	Typical Use
Desktop	Horizontal case	Office environments
Tower	Vertical case	Home and office
Laptop	Flat, rectangular	Portable computing
Smartphone	Compact, handheld	Mobile computing

The outer case is the most noticeable component of any computer. It protects the internal components and often includes a case fan for cooling. Different form factors suit various use cases and environments.

Central Processing Unit (CPU)

1 **Brain of the Computer**

Executes, calculates, and processes binary computer code.

2 **Command Center**

Directs actions of all other computer components.

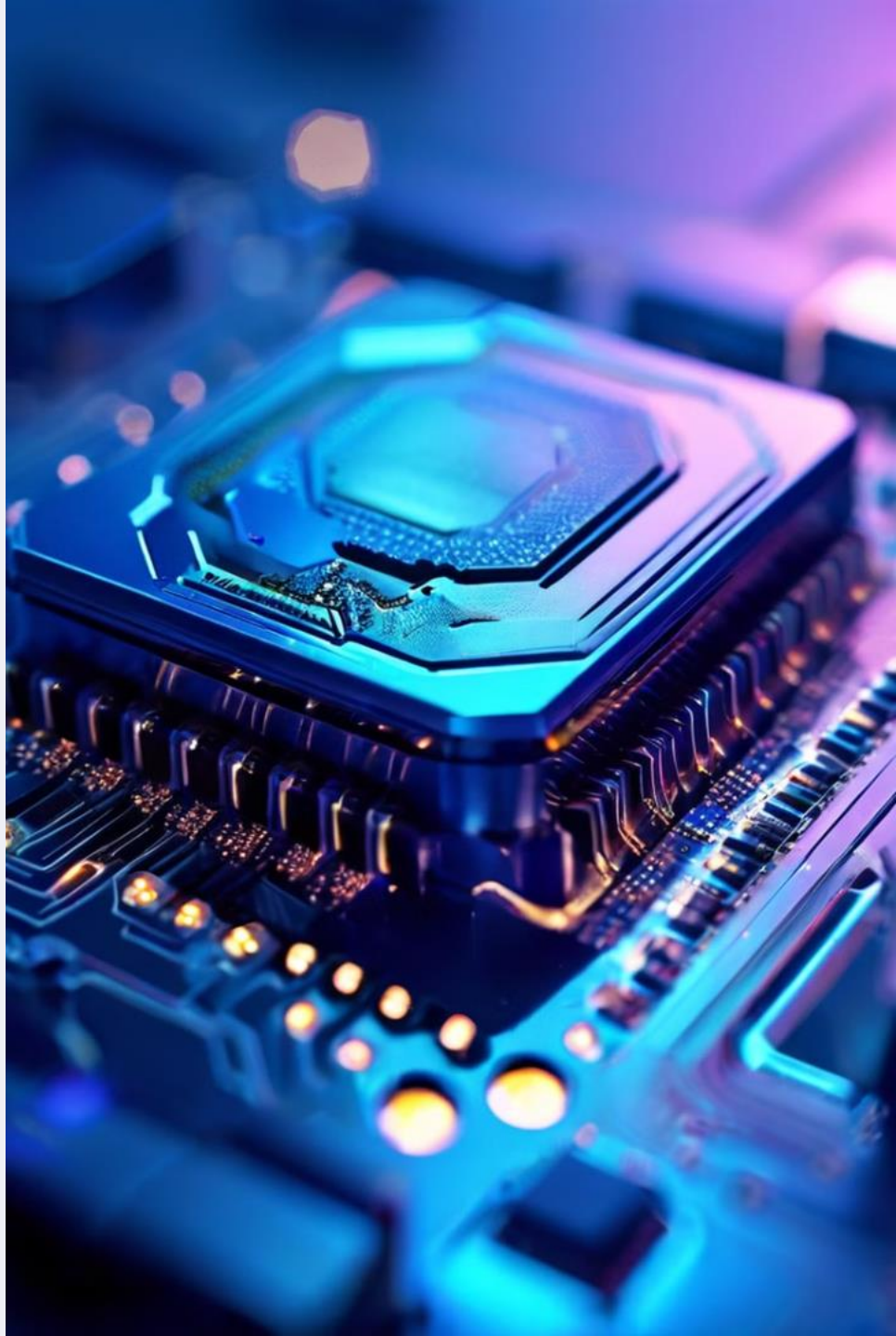
3 **Data Management**

Manages incoming and outgoing data across components.

4 **High Performance**

Top processors include AMD Ryzen and Intel Core series.

The CPU, or processor, is the core component that drives computer operations. It contains various mechanical units that work together to process data and execute instructions.



CPU Components

Registers

Data-storing circuits for immediate processing

Arithmetic Logic Units

Perform mathematical and logical operations

Floating Point Unit

Handles complex mathematical calculations

The processor contains specific mechanical units that form the computer's central processor. These components work together to execute instructions and process data efficiently.

Cache Memory

1

Data Storage

Holds currently used data and code

2

Quick Retrieval

Allows for fast access to in-process data

3

Efficiency

Improves overall system performance

Cache memory is an extremely quick form of memory that stores data and code currently in use. The processor uses the cache to store in-process data for rapid retrieval, enhancing overall system performance.

Processor Cooling

Heat Sink

Copper or aluminum metal block that dissipates heat from the processor

Fan

Often used in conjunction with the heat sink to improve cooling efficiency

Overheating Prevention

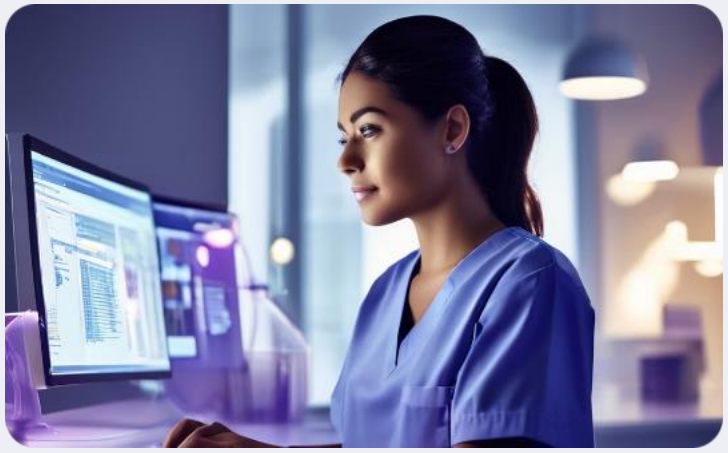
Crucial for maintaining optimal processor performance and longevity

Processor cooling is essential to prevent overheating and ensure optimal performance. The heat sink, often combined with a fan, helps dissipate heat generated by the processor during operation.

Computer Science in Nursing Practice

Data Entry

Nurses use computers to input and access patient information efficiently.



Data Analysis

Computer tools help nurses analyze patient data and trends.

Knowledge Sharing

Computers facilitate the dissemination of evidence-based practices among healthcare professionals.

Computer science offers valuable tools for nurses to manage information and generate knowledge. These tools support professional development and evidence-based practice decisions in nursing care.

Future of Computing in Nursing

1

Advanced Data Processing

Improved algorithms for analyzing complex health data

2

AI Integration

Artificial intelligence supporting clinical decision-making

3

Wearable Technology

Continuous patient monitoring through smart devices

4

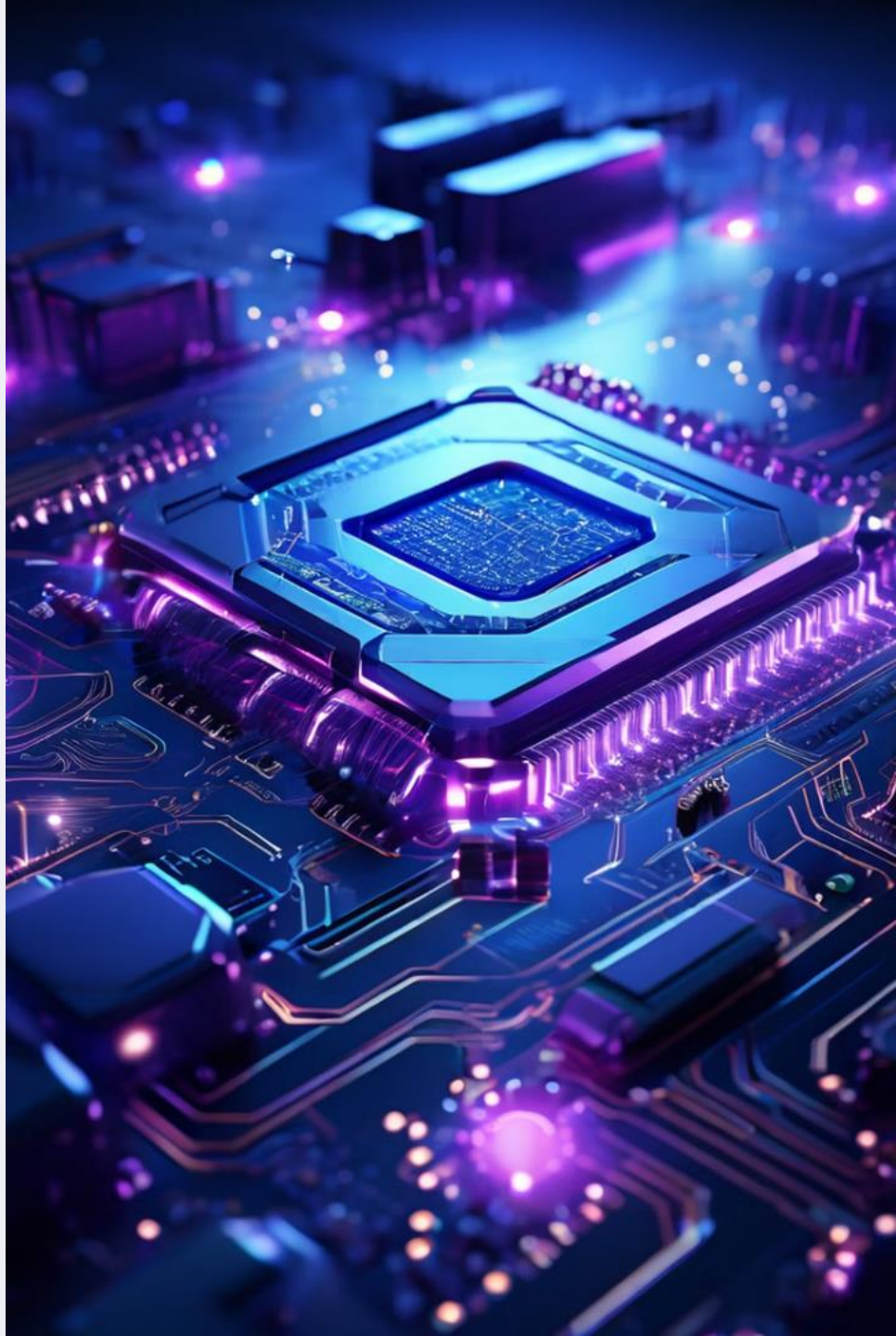
Virtual Reality Training

Immersive learning experiences for nursing education

The future of computing in nursing holds great potential. As technology continues to evolve, nurses will have access to more sophisticated tools for patient care, data analysis, and professional development.

Computer Components: The Building Blocks of Modern Computing

Computer components have evolved rapidly over the years, with processors becoming faster, memory expanding, and storage capacities growing exponentially. This presentation will explore the key components that make up modern computers, from the central processing unit to the power supply. We'll examine how these parts work together to create powerful computing systems capable of handling complex tasks and processing vast amounts of data.



Processor Speed and Moore's Law

1

Past: Megahertz Era

Processor speeds were measured in megahertz (MHz), with 400 MHz processors executing 400 million cycles per second.

2

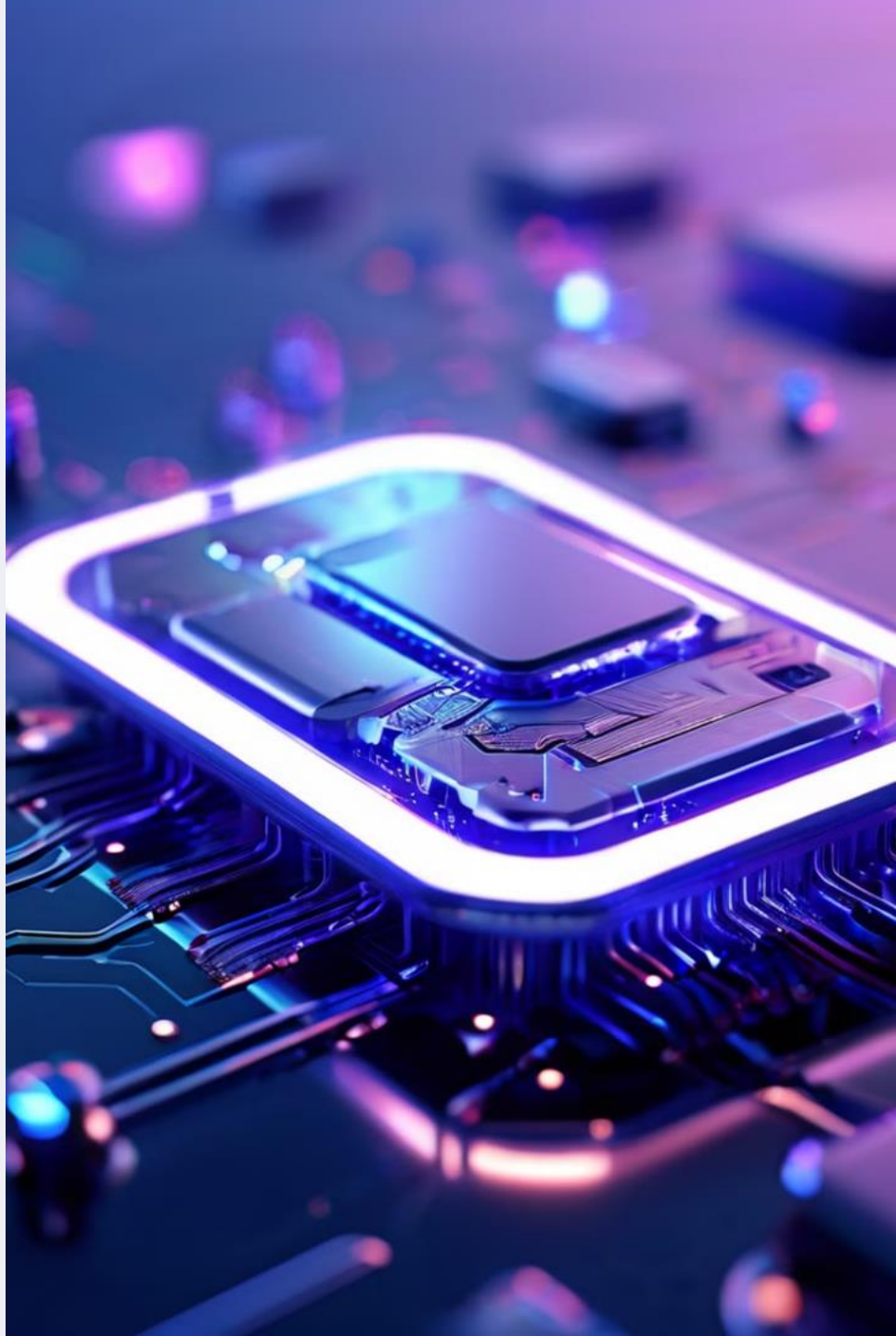
Present: Gigahertz Era

Modern processors are measured in gigahertz (GHz), with 1 GHz equal to 1,000 MHz. A 4 GHz processor is 1,000 times faster than a 4 MHz processor.

3

Future: Moore's Law

Formulated in 1965, Moore's Law states that transistor density doubles every two years, leading to a doubling of speed.



Multicore Processors and Mainframes

Multicore Processors

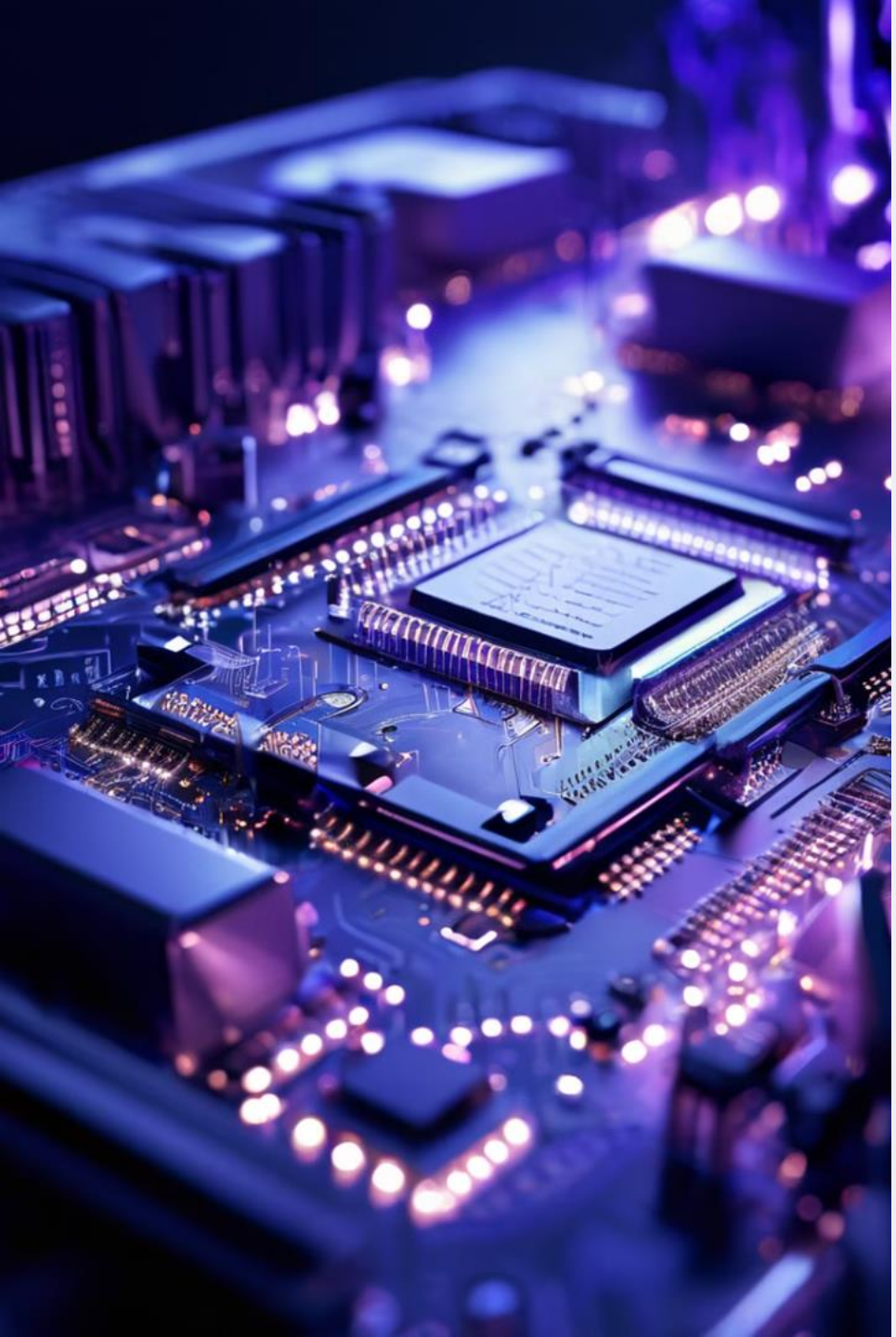
Processor manufacturers have moved to multicore microprocessors, combining two or more processors on a single chip. This has become standard in both personal and professional computers.

Mainframes

Despite the rise of mobile devices, mainframe computers remain crucial for transaction security and business analytics. IBM continues to build mainframes for these purposes.

Supercomputers

Powerful supercomputers use collections of microprocessors to achieve incredible computing power for complex tasks.



The Motherboard: Central Nervous System

1 **Communication Hub**

The motherboard facilitates communication among all computer components, acting as the central nervous system of the computer.

2 **Key Components**

Essential structures include the major chipset, super input/output chip, BIOS ROM, bus communications pathways, and various sockets.

3 **Connectivity**

The motherboard connects to USB, Ethernet network, and integrated graphics controllers, among other components.

Power Supply: The Energy Source

Voltage Conversion

The power supply unit converts 120-volt AC main power into low-voltage DC power required for computer operation.

Power Range

Power supplies typically range from 160 to 700 watts, with an average of 300 to 400 watts.

Cooling System

Most modern power supply units include at least one fan to cool the unit during heavy use.

Portable Power

Laptops and other portable devices use rechargeable batteries in addition to standard plug-in power supplies.

Hard Disk: Permanent Data Storage

1

Structure

Hard disks consist of rigid disks mounted on a spindle, spun by a motor when in use.

2

Data Writing

Drive heads produce a magnetic field to magnetize the disk surface, writing binary data by magnetizing small areas.

3

Storage Capacity

Modern hard disks can hold gigabytes (GB) or even terabytes (TB) of data, information, documents, and programs.

4

Management

A disk controller manages the hard drive, controlling the motor and actuator arm assembly.

Random-Access Memory (RAM): Volatile Storage

Chip-Based

RAM is situated on small chip boards with rows of pins, plugged into the motherboard.

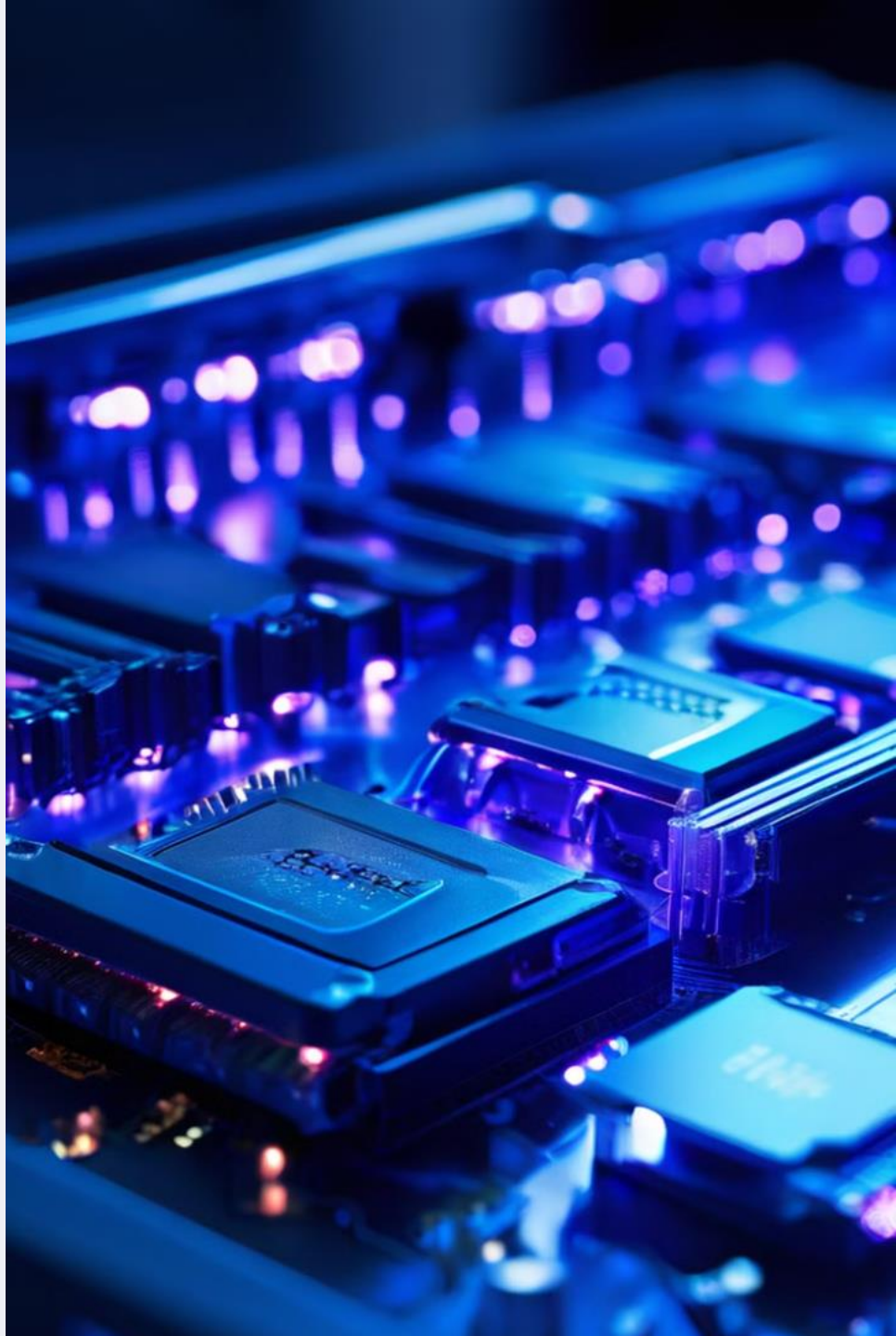
Binary Storage

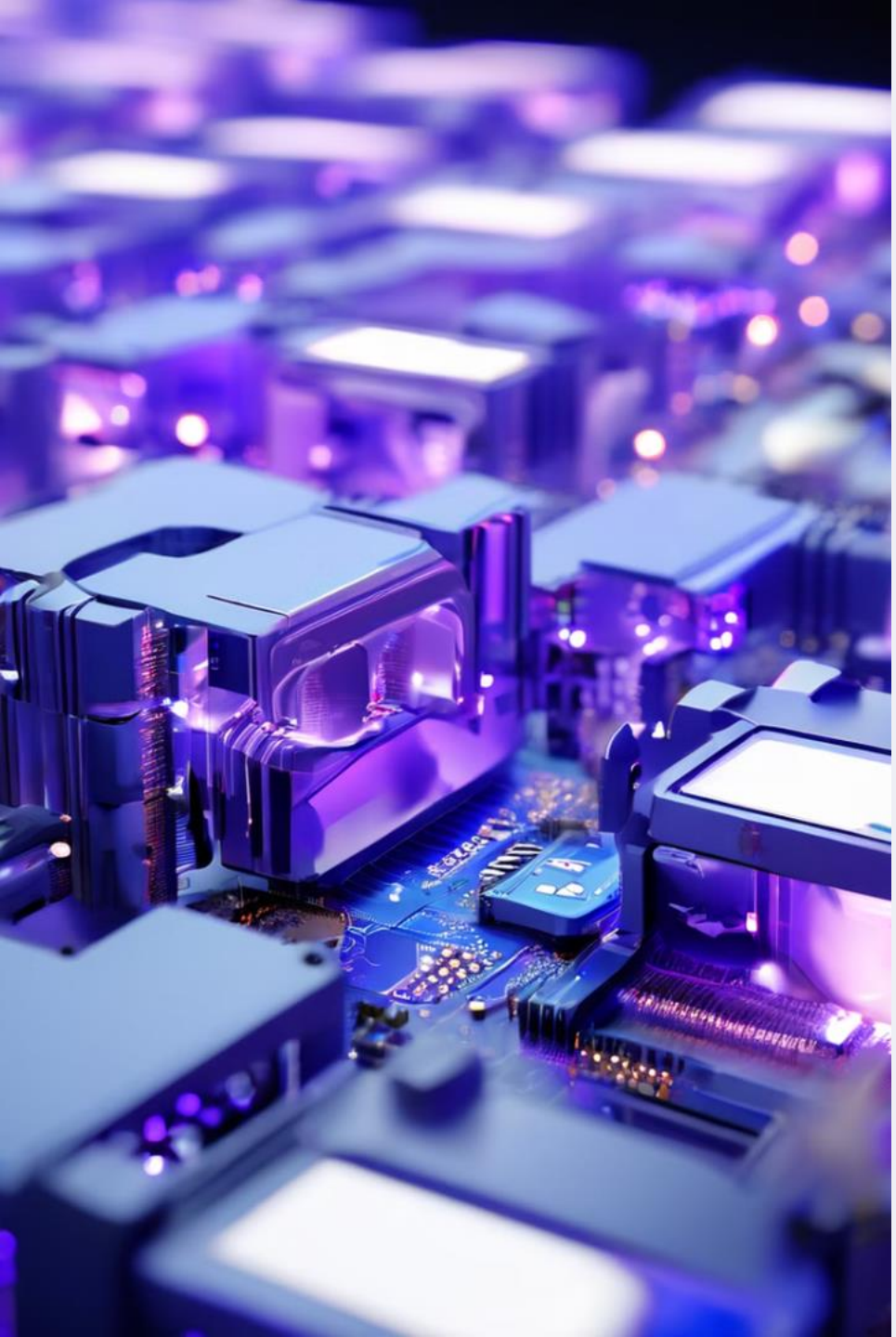
RAM stores data in binary form as either a low (0) or high (1) voltage stage.

Temporary Storage

RAM is volatile memory, losing its contents when the system is rebooted or shut off.

Capacity





Types of RAM

Type	Description
DRAM	Dynamic random-access memory, provides main memory
SDRAM	Synchronous dynamic RAM, also known as static dynamic RAM
DDR SDRAM	Double data rate synchronous dynamic RAM, allows for greater bandwidth

Processor Evolution: From MHz to GHz

1

Megahertz Era

Early processors measured in MHz, such as 400 MHz models executing 400 million cycles per second.

2

Transition to Gigahertz

Shift to measuring processor speed in GHz, with 1 GHz equal to 1,000 MHz.

3

Modern GHz Processors

Current processors operate at multiple GHz, significantly faster than their MHz predecessors.

Moore's Law and Processor Advancement

Transistor Density Growth

Moore's Law predicts the doubling of transistor density every two years, driving processor advancement.

Size and Efficiency

Modern processors are more efficient at lower speeds due to increased transistor density and improved architecture.

Future Processors

Continued adherence to Moore's Law promises even more powerful and efficient processors in the future.

Multicore Processors and Parallel Computing

Multicore Architecture

Multicore processors combine two or more processors on a single chip, enabling parallel processing of tasks.

Performance Benefits

Multiple cores allow for improved performance in multitasking and complex computations by distributing workloads.

Industry Standard

Multicore processors have become the norm in both personal and professional computing environments.

The Enduring Role of Mainframes

1 **Transaction Security**

Mainframes continue to play a crucial role in providing security for transactions, especially in financial sectors.

2 **Business Analytics**

These powerful computers offer the analytics capabilities necessary for organizations to improve their business processes.

3 **Mobile Integration**

Mainframes support the backbone of mobile transactions, processing vast amounts of data from mobile devices.

Supercomputers: The Pinnacle of Processing Power

Microprocessor Collections

Supercomputers utilize collections of microprocessors to achieve unprecedented computing power.

Complex Problem Solving

These machines are designed to tackle the most complex computational problems in science, engineering, and data analysis.

Parallel Processing

Supercomputers excel at parallel processing, breaking down large tasks into smaller, simultaneous computations.

Continuous Advancement

The field of supercomputing continues to evolve, with new machines regularly setting records for processing speed and capability.

The Future of Computer Components

1

Quantum Computing

Research into quantum computing promises to revolutionize processing capabilities, potentially solving problems impossible for classical computers.

2

Neuromorphic Hardware

Brain-inspired computing architectures may lead to more efficient and adaptable systems, particularly for AI applications.

3

Advanced Materials

New materials like graphene could enable faster, more efficient, and potentially flexible computer components.

4

3D Chip Stacking

Vertical integration of chip components may lead to more compact and powerful processors and memory units.

Computer Components and Memory

This presentation covers essential computer hardware components and memory types. We'll explore ROM, BIOS, virtual memory, storage devices, connection ports, and more.

Read-Only Memory (ROM)

Permanent

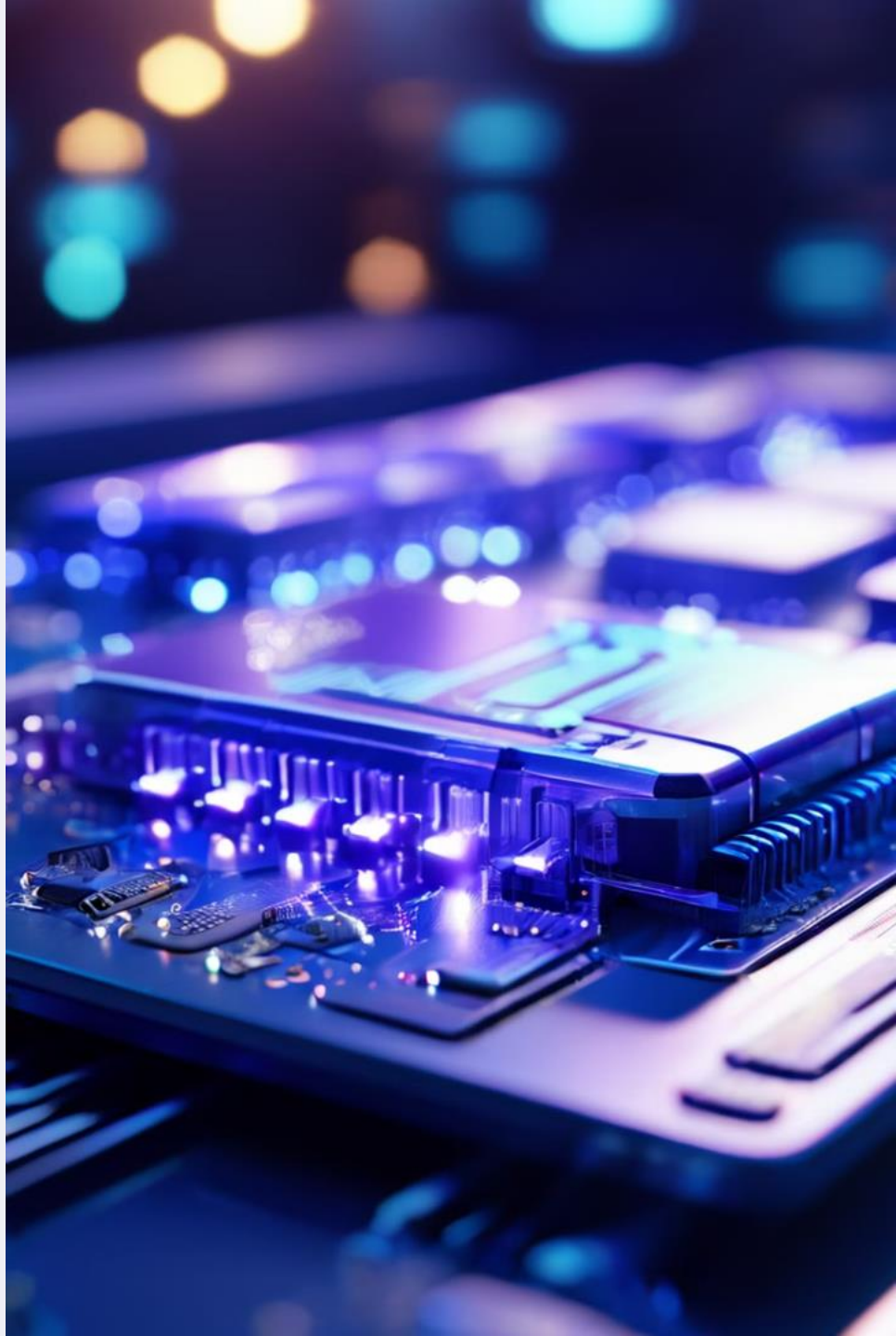
ROM is nonvolatile memory that stores critical data for the computer's OS and other activities.

Location

Primarily stored on the motherboard, but also available through other components.

Types

Includes PROM, EEPROM, and flash memory.



Basic Input/Output System (BIOS)

1

Boot Up

BIOS is used when the computer first starts.

2

Initialization

It establishes communication between components.

3

Handover

BIOS controls the computer until the primary OS takes over.

Virtual Memory

1 **Hard Disk Storage**

Virtual memory is stored on the hard disk.

2 **Temporary Data**

It provides temporary storage for data swapping with RAM.

3 **Large Programs**

Useful for data-intensive programs like games and multimedia.

Storage Controllers

IDE Controller

Primary interface for hard drive, CD-ROM, DVD, and floppy disk drives.

SCSI

Allows attachment of additional devices like scanners and extra hard drives.

Peripheral Component Interconnection (PCI) Bus

1

Slots

Uses slots on the motherboard.

2

Plug-ins

Allows connection of additional components.

3

Expansion

Enables computer functionality expansion.

Optical Drives

1

CD-ROM

Reads and records data to CDs.

2

DVD

Plays and records DVDs in addition to CD capabilities.

3

Recordable

CD-R, CD-RW, DVD-R, and DVD-RW options available.

Flash Memory

Portable

USB flash drives are small and easily transportable.

Durable

Flash memory is dependable and resistant to physical damage.

Powered

Obtains power from the connected USB port.

Modems and Network Connectivity

Internal Modem

Located inside the computer.

External Modem

Connected externally to the computer.

Network Adapters

Enable internet connectivity via cable connections.

Connection Ports

USB

Connects various devices with plug-and-play functionality.

Ethernet

Connects networking apparatus like internet and modem cables.

HDMI

Transfers audio/video data to compatible devices.

Graphics and Sound

Graphics Card

Processes image data and outputs to the monitor.

Video Adapter

Provides video memory and processing for high-quality images.

Sound Card

Converts digital data to analog signals for audio output.

Binary Data: Bits and Bytes

Bit	Smallest data unit (0 or 1)
Byte	8 bits
Megabyte (MB)	1 million bytes
Gigabyte (GB)	1 billion bytes

Large-Scale Data Storage

1. **Terabyte (TB)**

   1,000 GB

2. **Petabyte (PB)**

   1,000 TB

3. **Exabyte (EB)**

   1,000 PB

4. **Zettabyte (ZB)**

   1,000 EB

Data Capacity Examples

2 KB

A typewritten page

10 MB

A digital chest X-ray

1 TB

All X-ray films in a large, advanced hospital

Software Overview

Software comprises application programs for various user functions. It includes operating systems, productivity tools, creativity apps, and communication software. User-friendliness is critical for adoption.

Types of Software

OS Software

Manages hardware and software. Provides interface for applications.

Productivity Software

Office suites with word processing, spreadsheets, and more.

Creativity Software

Programs for drawing, music, and multimedia creation.

Commercial Software

1 **Market Leaders**

Apple, Microsoft, IBM, and Adobe dominate the market.

2 **Version History**

Licensed software has evolved over time.

3 **Cost Barrier**

Expensive packages create a "digital divide" in access.

Open Source Software

1

Late 1990s

Open source initiative begins as a powerful movement.

2

Community Development

Developers offer creations for free, encouraging contributions.

3

Modern Examples

Apache OpenOffice, Google Docs, and NeoOffice emerge.

Operating System Basics

First to Load

OS is the first program to start upon computer boot-up.

Hardware Management

Manages both hardware and software components.

Multitasking

Handles multiple users and tasks simultaneously.

OS Tasks

Memory Management

Allocates and manages computer memory.

Device Management

Controls hardware devices connected to the computer.

Processor Management

Schedules and executes processes efficiently.

Storage Management

Organizes and maintains file systems.

Graphical User Interface (GUI)

1

Visual Elements

Displays graphics, text, icons, and menus.

2

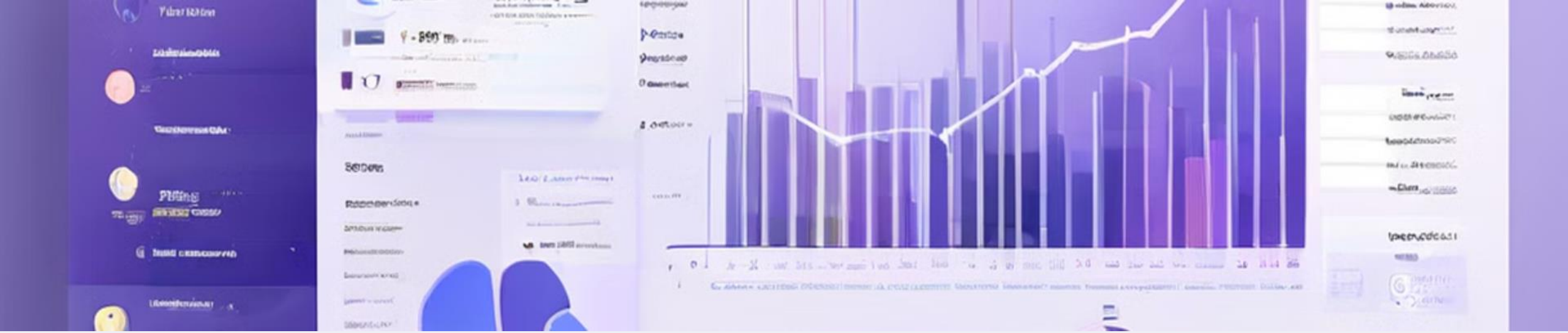
User Interaction

Allows use of input devices and icon manipulation.

3

Representation

Icons represent files, programs, and processes.



Productivity Software

Word Processing	Spreadsheets	Presentations
Database	Web Development	Email

Office suites bundle these programs for compatibility and ease of use.

Input Devices

Keyboard

Primary input device for typing text and commands.

Mouse

Used for pointing, clicking, and moving objects on screen.

Touch Pad

Senses finger pressure and movement for input control.

Keyboard Features

1 **QWERTY Layout**

Standard layout for Latin-based languages.

2 **Command Keys**

CTRL, Alt, Del, and Shift activate useful commands.

3 **Function Keys**

F1 through F12 used for program-specific functions.

Mouse Technology

1

Mechanical Trackball

Early mouse design using a rolling ball mechanism.

2

Optical Mouse

Uses LED or laser for more precise tracking.

3

Gaming Mouse

High-performance parts and customizable features for gamers.

Computer Monitors

Types

CRT, LCD, and touch screen options available.

Features

Vary in size, refresh rate, and dot pitch.

Function

Visual display for user-machine interaction.

Output Devices

Printers

Produce hard copies of documents. Inkjet and laser types available.

Speakers

Provide audio output. Can be internal or external.

Portable Drives

Allow data storage and transfer. Include CDs, DVDs, and flash drives.

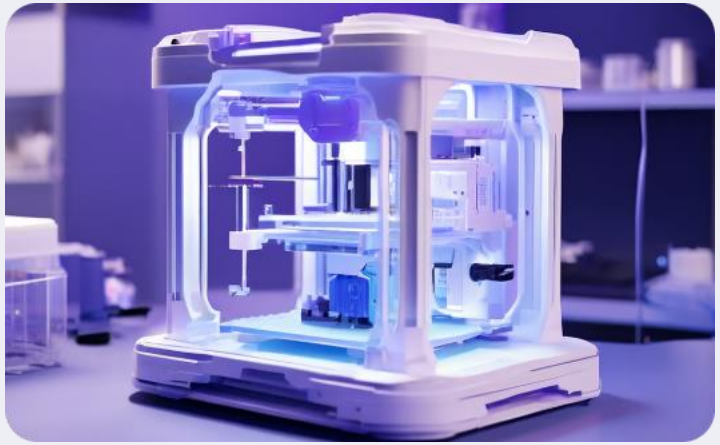
Printer Types

Inkjet Printers

Economical and good quality. Use jet-spray mechanism.

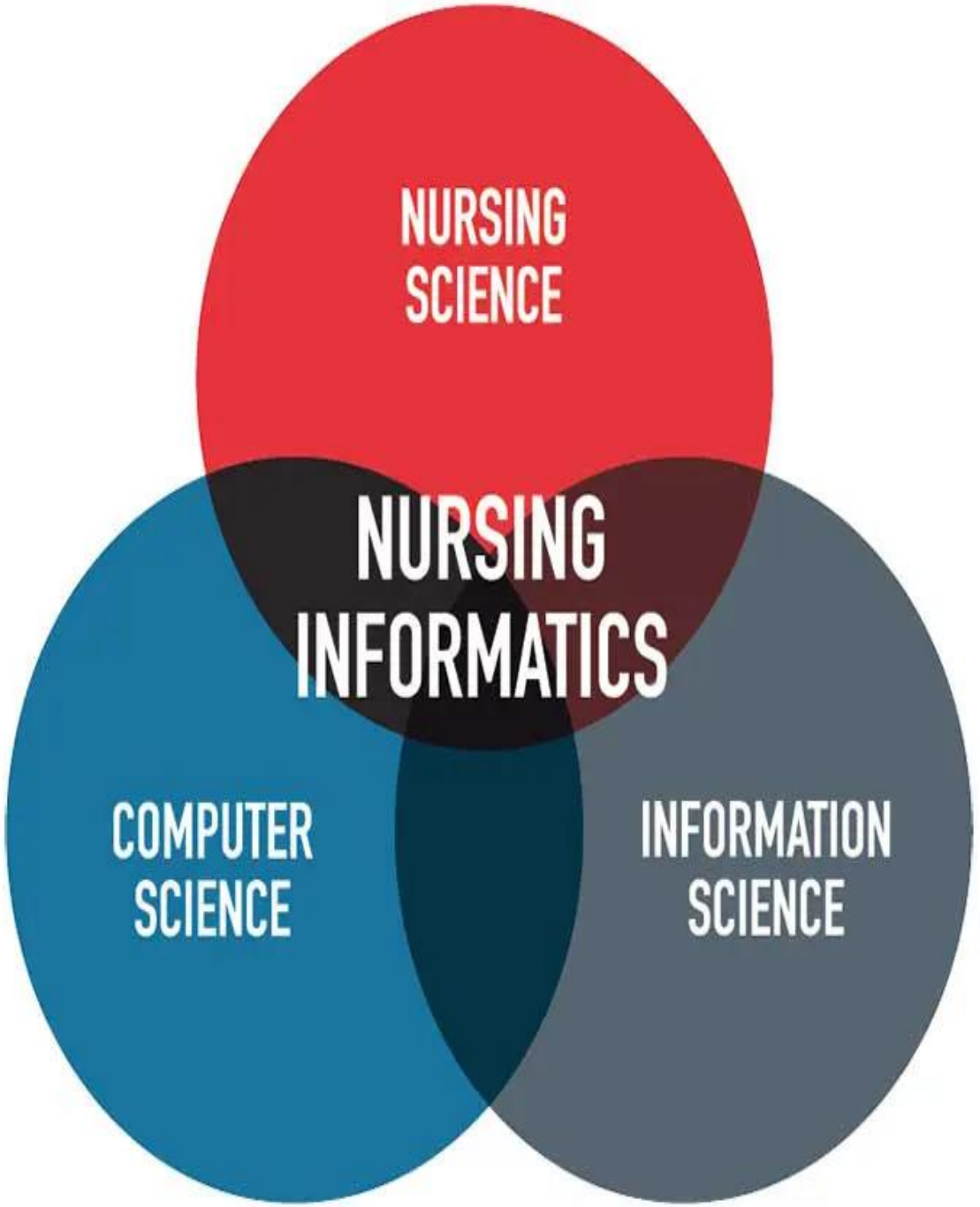
Laser Printers

Publisher-ready quality. More expensive supplies.



3D Printers

Create solid objects from digital files.



Computer Science and Knowledge in Nursing

Computer science has revolutionized knowledge acquisition and development in nursing. Modern technology provides unprecedented access to information and collaboration tools.

Access to Information

1 **Library Collections**

Entire library collections are now accessible online. Many documents are available in full printable form.

2 **Contribution Tools**

Users can contribute to knowledge development through productivity and creativity software.

3 **Global Dissemination**

The World Wide Web allows users to share knowledge on a grand scale.

Information Management

1

Mastery

Users must master and organize the deluge of available information.

2

Discernment

The ability to critique and filter information is crucial.

3

Wisdom Development

Proper information management facilitates the development of wisdom.

Computer Science in Nursing

Understanding Principles

Nurses must understand computer science principles as they apply to nursing technology.

Optimal Usage

This understanding facilitates optimal usage of technology for knowledge development.

Adaptation

Nurses can shape, refine, and apply technologies in new ways.

Empowerment

Skillful use of computers empowers nurses with knowledge.

Computer Networks in Healthcare

1

Local Area Networks

Computers joined together within an organization.

2

Metropolitan Area Networks

Networks organized on a wider area scope, like a city.

3

Wide Area Networks

Networks encompassing computers at an even greater distance.

Types of Healthcare Networks

Client-Focused Networks

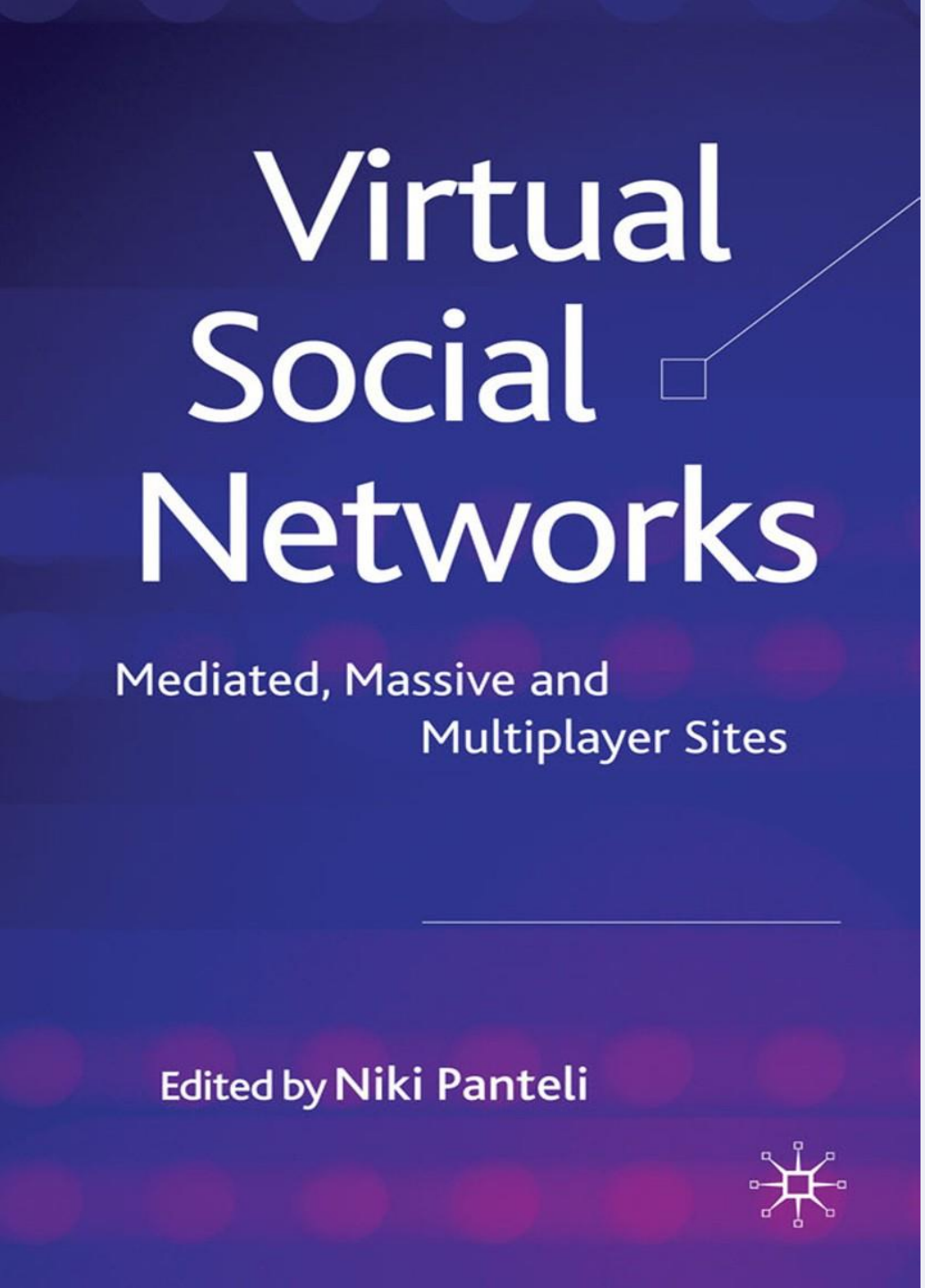
Includes telenursing, e-health, and client support networks.

Work-Related Networks

Encompasses virtual work and virtual social networks.

Learning and Research Networks

Includes communities of practice for knowledge sharing.



Virtual Social Networks in Nursing

1 **Professional Connections**

Provide a cyberspace for nurses to make contacts and share ideas.

2 **24/7 Availability**

Offer round-the-clock connection, beneficial for shift workers.

3 **Practice Improvement**

Facilitate exchange of ideas on practice issues and best practices.

4 **Knowledge Sharing**

Enable sharing of new trends, research, and innovations in healthcare.

Information Sharing Technologies

Portable Disk Devices

Flash drives, CDs, and DVDs for sharing files.

Cloud Spaces

Web-based storage for collaborative file sharing.

Email

For sharing ideas on a smaller scale.

Webinars

For interactive online seminars and presentations.

Mobile Computing in Healthcare

Portability

Allows human-computer interaction anywhere, whether moving or stationary.

Wireless Transmission

Enables transmission of data, voice, and video without wires.

Mobile Operating Systems

Designed specifically for mobile devices like smartphones and tablets.

Wireless Networks

Provide access to distributed networks for mobile devices.

Wireless Technologies in Healthcare

1

Wi-Fi

Allows devices to exchange data over the internet using radio waves.

2

Wi-Fi Hotspots

Provide wireless access in public locations like cafes and libraries.

3

Near-Field Communication

Enables contactless data transfer between compatible devices.

NFC Technology in Healthcare

1 **Contactless Communication**

Allows information transfer by waving devices near each other.

2 **NFC Tags**

Passive devices that store and transfer various types of data.

3 **RFID Evolution**

NFC tags evolved from radio-frequency identification technology.

4 **Healthcare Applications**

Used for patient identification, medication tracking, and equipment management.

Bandwidth and Broadband

Bandwidth	Measurement of data transfer capacity
Broadband	Minimum speed of information transfer
Analogy	Bandwidth is speed limit, broadband is highway

Mobile vs Wireless Broadband

Mobile Broadband

Allows internet access while on the move. Uses technologies like 3G, 4G, and 5G.

Wireless Broadband

Provides internet access without wires. Limited to specific locations.

Key Difference

Mobile broadband offers flexibility to move while connected. Wireless may restrict movement.

Future of Mobile Computing in Healthcare

1

Continued Evolution

Mobile computing applications will continue to develop.

2

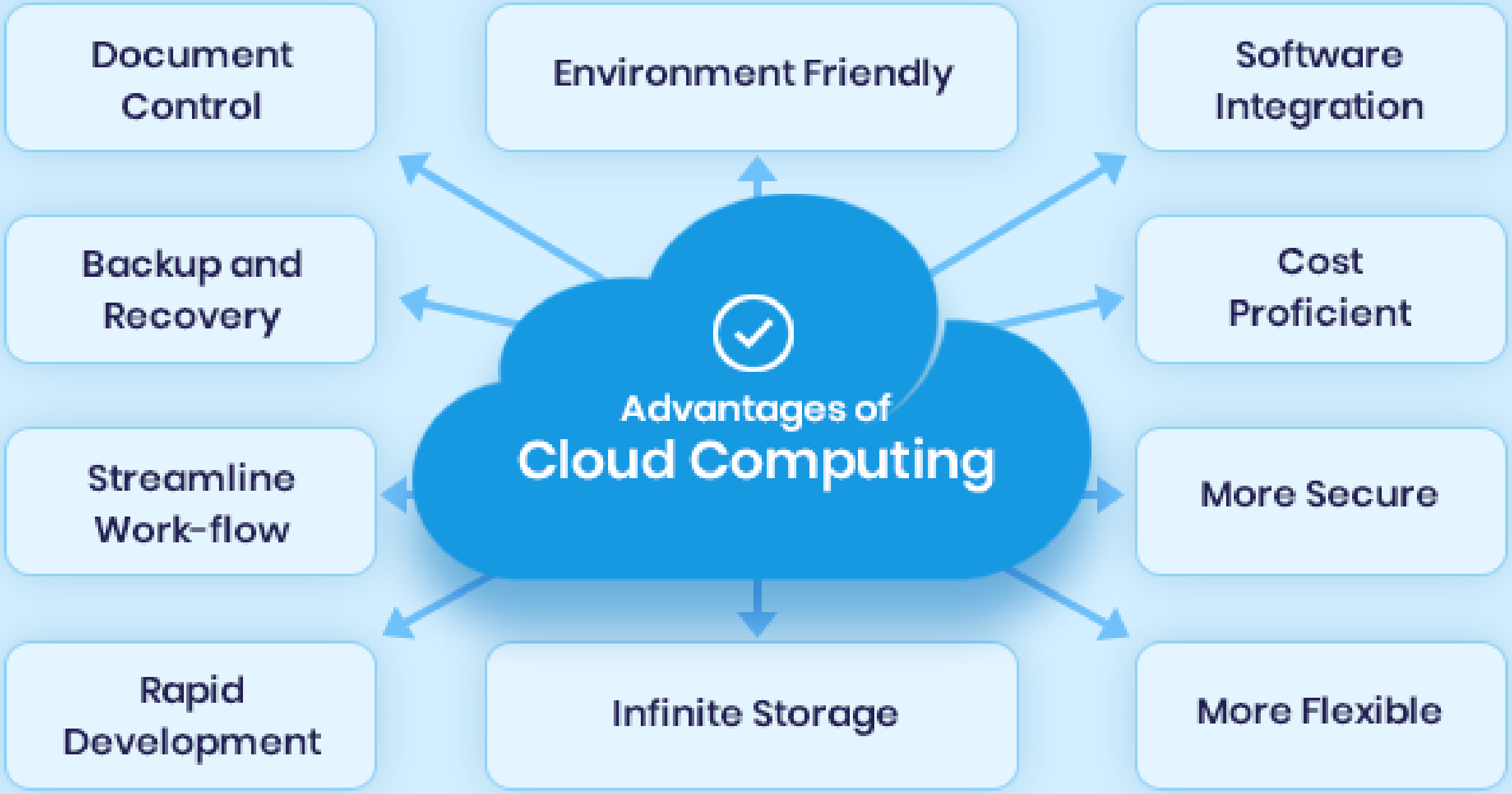
Enterprise Solutions

Healthcare organizations will manage mobile devices as part of strategic plans.

3

Enhanced Patient Care

Mobile technologies will improve healthcare delivery and patient outcomes.


Document Control
Environment Friendly
Software Integration
Backup and Recovery
Cost Proficient
Advantages of
Cloud Computing
Streamline Work-flow
More Secure
Rapid Development
Infinite Storage
More Flexible

Cloud Computing: The Future of Technology

Cloud computing allows access to data, software, and hardware via web browsers. It links systems and reduces costs through internet-based storage and programs.

What is Cloud Computing?

1 **Internet-Based**

Storing and accessing data and programs over the internet instead of a computer's hard drive.

2 **Pay-as-You-Go**

Users are billed based on the resources they use.

3 **Enhanced Security**

Utilizes robust technologies like AI and blockchain to improve security.

Key Features of Cloud Services

Elastic Resources

Scalable to meet consumer needs.

Metered Services

Pay only for what you use.

Self-Service Access

Users can access IT resources as needed.

Types of Cloud Services

Public Cloud

Owned by companies offering public access to computing resources. More affordable and economically sound.

Private Cloud

Operated for a single organization. Provides added control and avoids multitenancy.

Hybrid Cloud

Combination of public and private cloud services.

Common Cloud Computing Examples

Storage Services

Google Drive, Microsoft OneDrive, Apple iCloud, Amazon Cloud Drive, Dropbox

Productivity Tools

Microsoft Office Online

Cloud-Centric Devices

Chromebooks - laptops running Chrome OS

Cloud Computing Models

1

Software as a Service (SaaS)

Cloud-based applications like Salesforce.com. Quick to start, scalable, and accessible from any connected computer.

2

Platform as a Service (PaaS)

Supports building and delivering cloud applications. Enables rapid development of web applications.

3

Infrastructure as a Service (IaaS)

Rentable backbone for companies. Scalable, on-demand infrastructure from providers like Amazon, Microsoft, Google, and Rackspace.

Benefits and Challenges of Cloud Computing

Benefits

- Environmentally friendly
- Efficient resource sharing
- Affordable and scalable

Challenges

- Reliability concerns
- Safety and security issues
- Dependence on internet connectivity

Cloud Computing in Healthcare

Device-as-a-Service (DaaS)

Flexible provision of IT equipment for medical teams.

Big Data Analytics

Blending with evidence-based practice to improve patient care.

Enhanced Patient Care

Nurses interact with computer technologies to benefit patients.

Future Trends in Computing

1

Wearable Technology

Small, portable computer systems and voice-activated inventions.

2

Mobile Health Technology

Supporting client-oriented healthcare systems.

3

Telenursing

Remote nursing care and consultation.

4

Advanced EHRs

Sophisticated electronic health records.

Quantum Computing

1 **Quantum Bits (Qubits)**

Three-dimensional arrays of atoms in quantum states.

2 **Superposition**

Qubits exist in more than one state simultaneously.

3 **Processing Power**

Potential to execute millions of instructions per second.

Voice-Activated Communicators

Vocera B3000n

Wearable, two-way, voice-controlled communication device.

Hands-Free

Allows nurses to communicate wirelessly while working.

Intuitive Commands

Uses simple commands to facilitate responses and communication.

Game and Simulation Technology in Healthcare

Educational Interfaces

Dynamic tools for teaching healthcare concepts and skills.

Patient Education

Interactive applications for health promotion and illness management.

Professional Development

Serious games for training and policy exploration.

Virtual Reality in Healthcare

1

Immersive Experiences

Three-dimensional, computer-generated worlds for interactive learning.

2

Specialized Equipment

Head-mounted displays, data gloves, and other tools for full sensory immersion.

3

Widespread Adoption

VR becoming accessible in homes and healthcare settings.

Mobile Devices in Nursing

Point of Care

Access to patient information and resources at bedside.

Documentation

Efficient recording of patient data and care plans.

Wearable Tech

Nano-based diagnostic sensors for personal and patient use.

Collaboration

Enhanced communication with interprofessional healthcare team.

- **Thank you for Listening**

- Any Questions???
- Any Comments!!!