Information and communication technologies

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Coefficients: 1

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Recommended prior knowledge: General computer knowledge.

Content of the material:

Chapter I: ICT: tools and applications

a. Definition

b. ICT tools

- i. Computers

- ii. Softwares

- iii. Communications networks

- iv. Ssmart chips

c. ICT applications

- i. Communications spaces: Internet, Intranet, Extranet

- ii. Databases

- iii. Multimedia: Audioconferencing, videoconferencing

- iv. Electronic data interchange (EDI)

- v. Workflows

Chapter II: Introduction to web technology

1. Presentation of the Internet

- Definition

- Applications

- Terminologies

2. Searching the web

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  – Search tools Searching the web

  – Search engines

  – Directories

  – Automatic indexing

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- Search refinement

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- Field queries, advanced search

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Chapter III: The contributions of NICTs to external communication

- Internet advertising

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- Interstitials

- The Windows

- Online site promotion

  - Sponsorship

  - The electronic community

  - Emailing

- The security of an online payment system

  - Encryption

  - Website data protection

Evaluation method: Exam (100%).

The author has prepared this work by collecting a wide range of different scientific sources for educational purposes. The use of these courses is authorized as part of university training with mention of the author.

Rferences

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Dan Gookin, Greg Harvey, Word et Excel 2016 pour les nuls, First, Collection : Pour les nuls Poche (informatique), 2016.

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Contents

Chapter 1

ICT: tools and applications

1. Definitions: Interaction, Interactivity, ...

2. ICT tools

3. ICT applications

Introduction

ICT, or Information and Communications Technology, is a broad field that includes a wide range of tools and applications. These tools include hardware such as computers, smartphones, and other devices that are used to access and process information. Software applications such as word processing programs, email clients, and video conferencing tools are also important parts of ICT.

Other tools and applications include networks, databases, and security systems

1.1 Definitions

The term ICT stands for Information and Communication Technology. It encompasses a wide range of technologies, including computers, mobile devices, telecommunications, and software systems, that enable individuals and organizations to sort, process, store, and communicate information.

These technologies have revolutionized virtually all aspects of our lives, from the way we work and learn to how we communicate and entertain ourselves.
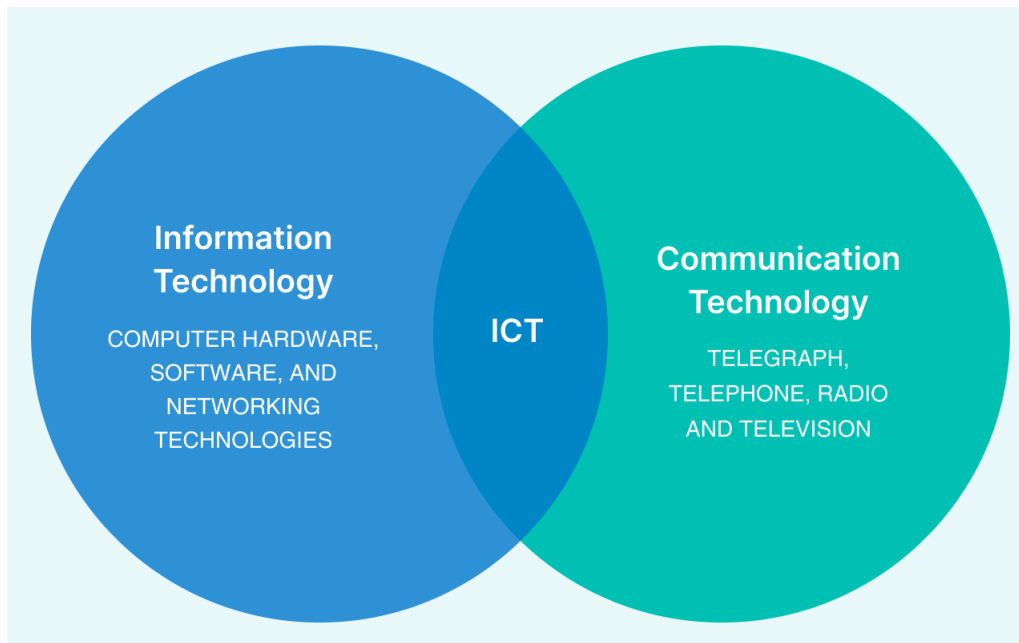
In recent years, the focus on ICT has shifted more towards cloud computing and the use of big data and the Internet of Things (IoT) for connectivity and automation.

1.2   ICT Tools

The ICT tools are the latest technology or devices and concepts used in Information and Communication Technology among students to students, students to teacher interaction (e.g., flipped classroom, mobile apps, and clickers devices).

- **Computers:** Computers are the physical devices that form the backbone of ICT infrastructure. This includes desktop computers, laptops, servers, and specialized hardware like routers and switches that enable communication between devices.

Examples and types of computers

- **Softwares:** Operating systems (e.g., Windows, macOS, Linux) and applications (e.g., word processors, spreadsheets, graphic design software) run on computers, facilitating tasks ranging from basic office work to complex data analysis and software development.

Types of System Software
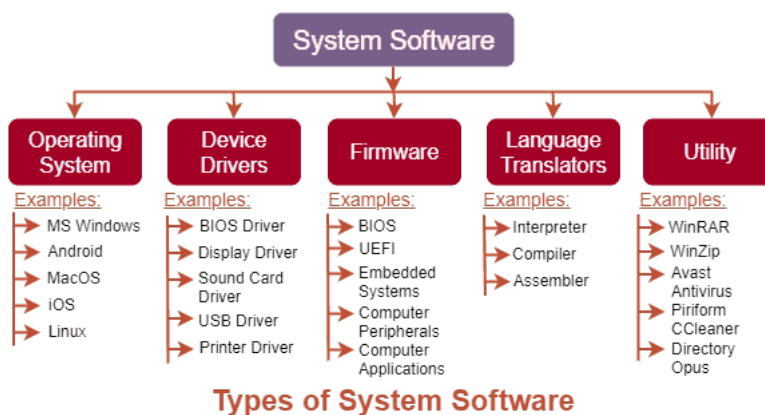
- **Communications networks:** Computers are interconnected through networks, allowing for communication and data sharing. This includes local area networks (LANs), wide area networks (WANs), and the internet itself, which relies on vast networks of computers for global connectivity.

- **Smart chips:** Smart chips are integrated circuits that are capable of processing data and instructions on their own, without the need for external control from a central processor. This technology is commonly used in IoT devices, wearables, and other small electronic devices.

1.3 ICT Appliations

Information and Communication Technology (ICT) applications encompass a broad range of technologies and software used to manage, process, communicate, and store information.

1.3.1 Communications spaces

Communication spaces means the environments, physical or digital, where individuals interact, exchange messages, and coordinate activities. They refer to different types of networks or platforms that facilitate communication within and between organizations.

There are three main types of communication spaces: Internet, Extranet, and Intranet.
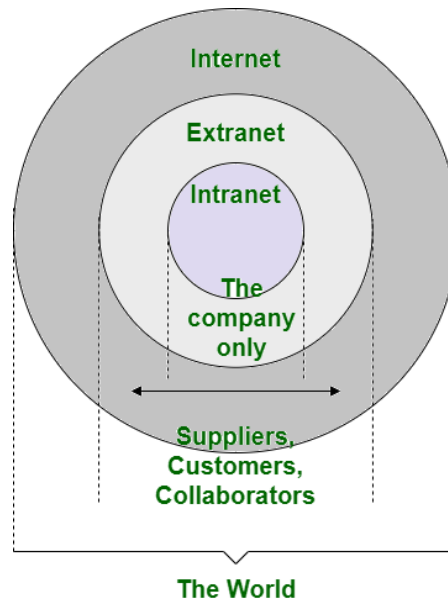
- **Internet:** The internet is a global network that connects millions of computers and other devices worldwide. It allows for communication, sharing of information, and access to resources through various services such as email, websites, social media, and more. The internet is public and accessible to anyone with an internet connection.
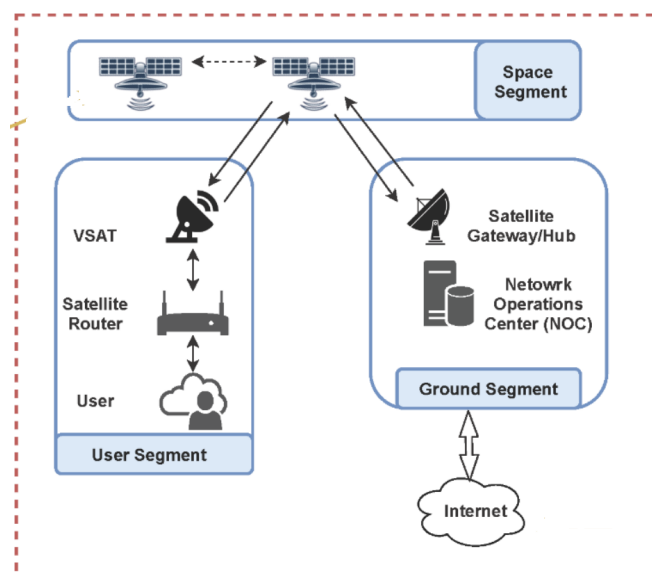
- **Extranet**: An extranet is an extension of an intranet that allows limited access to authorized external users such as suppliers, partners, or customers. It provides a secure platform for collaboration and communication between the organization and its external stakeholders. Extranets typically require authentication for access and may offer functionalities such as shared project spaces, document sharing, and communication tools tailored to external partners.
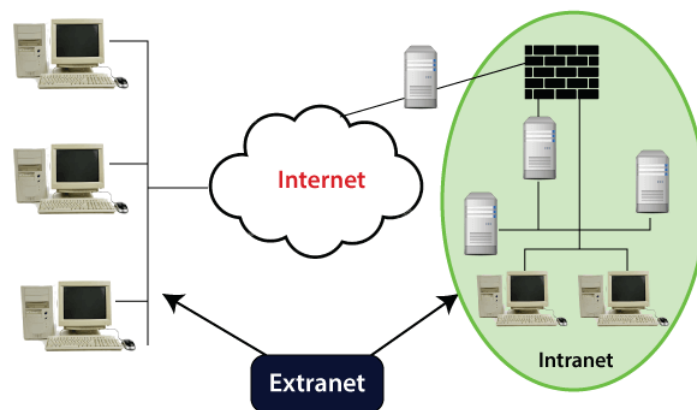
- **Intranet:** is a private network that is confined within an organization. It enables internal communication, collaboration, and sharing of resources among employees or members of the organization. Intranets are often used to disseminate company news, documents, policies, and other information securely within the organization's boundaries.
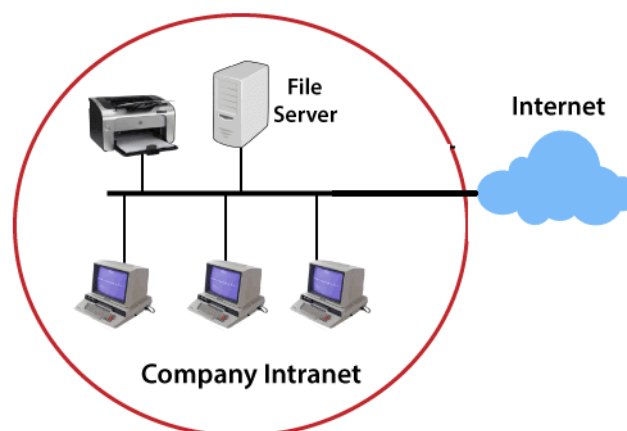
1.3.2   Databases

Databases in ICT refer to structured collections of data that enable quick searching, sorting, filtering, and analysis. They can have various structures like flat files or relational databases, employing relationships, primary keys.

A database application can be used for storing or retrieving data, processing transactions, or various machine learning calculations. There are many types of database, such as:

Relational Databases: These are the most common type, organizing data into tables with rows and columns, and using SQL (Structured Query Language) for querying and manipulation. Examples include MySQL.

Hierarchical Databases: the hierarchical database looks similar to a family tree. A single object (the "parent") has one or more objects beneath it (the "child"). No child can have more than one parent.

Non-Relational Databases: Non-relational management systems are commonly referred to as NoSQL databases. This type of database matured due to increasingly complex modern web applications. Examples include MongoDB and Redis.

Object oriented databases: Object oriented databases are unique because associations between objects can persist. This means that object oriented programming and the querying of data across complex relationships is fast and powerful. One example of an object oriented database is MongoDB.

All types of databases store vast amounts of structured or unstructured data. It allow for the manipulation and modification of stored data, and implementing access controls and encryption to protect sensitive information with ensuring data remains accurate, consistent, and reliable.. In addition, users can efficiently retrieve specific information using queries.

1.3.3 Multimedia

The term "multimedia" is used here to refer to the extensive use of images, photographs, sound and video files, as well as text. In other words, we are concerned here with a variety of formats in which we can access, understand, process and express knowledge

1. **Audioconferencing:** Audio conferencing is where two or more people in different locations use technology like a conference bridge to hold an audio call. Audio conferencing is different from a traditional phone in that all participants dial into a central system that connects them instead of directly dialing each other.

2. **Videoconferencing:** Video conferencing is live, visual connection between two or more remote parties over the internet that simulates a face-to-face meeting. It is an online technology that allows users in different locations to hold face-to-face meetings without having to move to a single location together. Videoconferencing tools allow users to conduct meetings, discussions, or presentations remotely via voice communication. Here are some popular audio conferencing tools: Zoom, Microsoft Teams, Cisco Webex, GoToMeeting, Google Meet, and Skype,

1.3.4 Electronic data interchange (EDI)

Electronic Data Interchange (EDI) is a standardized method for exchanging business documents electronically between trading partners. It allows companies to transfer documents such as purchase orders, invoices, shipping notices, and more, in a structured format, directly from one computer system to another, without the need for human intervention. There are some popular EDI software solutions: IBM Sterling B2B Integrator, MuleSoft Anypoint Platform, SAP S/4HANA and TrueCommerce.
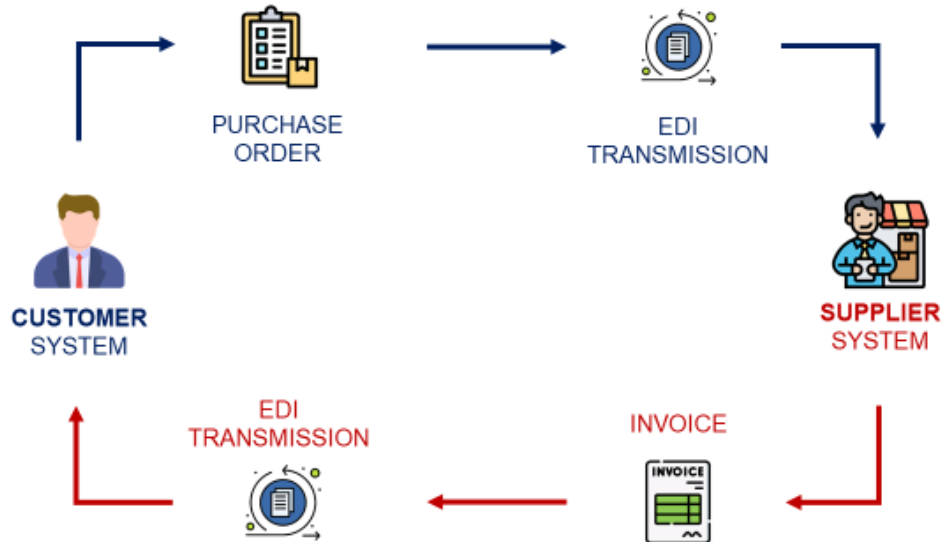
When selecting EDI software, businesses should consider factors such as scalability, compatibility with existing systems, ease of use, security features, and compliance with industry standards.

1.3.5   Workflows

The sequence of tasks, processes, or actions that need to be executed to achieve a particular goal or outcome within an organization or system. They are commonly used in various fields such as business, technology, project management, and manufacturing to streamline operations, improve efficiency, and ensure consistency in the way work is carried out.

This term is mainly used in an ICT context. So-called workflow systems, software, or machines in which business processes are recorded, regulate the course of an order, complaint, or other task within a company by splitting it into subtasks that are handled and approved in the correct order by the respective departments. The status and trajectory of a task can be queried.

Simple FileHold Workflow Process
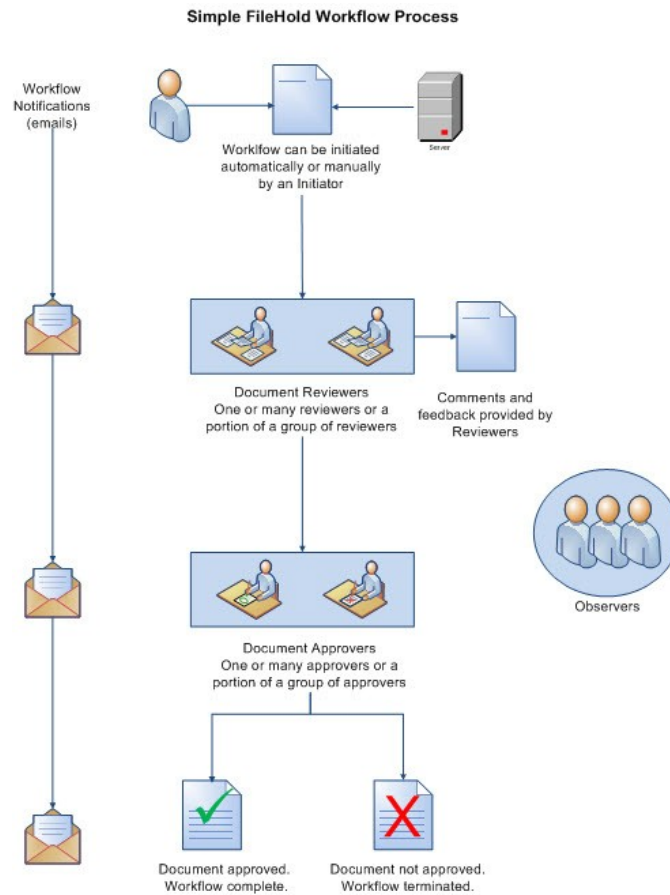
The steps may vary depending on the nature of the task or process, but here are some common workflow steps that can be applied across different contexts:

1. **Initiation:** This is the first step where the workflow is initiated. It involves defining the purpose, objectives, and scope of the task or process.

2. **Planning:** In this step, detailed planning is done to outline the activities, resources, timelines, and dependencies required to execute the workflow successfully.

3. **Assignment**: Tasks are assigned to individuals or teams responsible

for carrying them out. Clear responsibilities and expectations are communicated during this step.

4. **Execution:** This is the main phase where the actual work is performed according to the plan. Each task is completed following the established guidelines and standards.

5. **Monitoring:** Progress is continuously monitored to track the status of tasks, identify any issues or bottlenecks, and ensure that the workflow is progressing as planned.

6. **Review and Approval:** Completed tasks or milestones are reviewed for quality, accuracy, and compliance with requirements. Approvals may be sought at various stages to proceed to the next steps.

7. **Adjustment or Correction:** If any deviations, errors, or changes are identified during the review process, adjustments or corrections are made accordingly to ensure that the workflow stays on track.

8. **Integration:** Different components or outputs of the workflow are integrated or consolidated to create a cohesive result or deliverable.

9. **Documentation:** Documentation of the workflow steps, decisions, and outcomes is essential for future reference, analysis, and improvement. This step involves recording important information and insights gathered throughout the process.

10. **Closure:** The final step involves formally closing the workflow once all tasks have been completed, deliverables have been produced, and objectives have been achieved. Lessons learned are often documented during this stage for future improvement.

There are some popular workflow management software:Asana, Trello, Microsoft SharePoint, WorkflowMax , and Smartsheet.

Chapter 2

Introduction to web technology

1. Presentation of the Internet

2. Searching the web

Introduction

Web technology is the tools, software, protocols, and standards used to create and communicate information on the World Wide Web. It encompasses a wide range of technologies and disciplines, including web development, web design, networking, and internet protocols. The evolution of web technology has revolutionized how information is accessed, shared, and interacted with online.

2.1 Presentation of the Internet

The Internet, often referred to as the "information superhighway," is a global network of interconnected computer networks that enables communication and the exchange of data worldwide. It has become an integral part of modern society, revolutionizing the way we access information, communicate with others, conduct business, and interact with the world around us.

2.1.1 Definition

The origins of the Internet can be traced back to the late 1960s with the development of ARPANET, a research project funded by the U.S. Department of Defense. Over the decades, the Internet evolved from a limited academic and military network into a global infrastructure that connects billions of people worldwide.

The Internet is a vast network of computers, servers, and devices that are connected through a complex system of cables, routers, and switches. It facilitates the transmission of data in various forms, including text, images, audio, and video, across vast distances and different geographical locations.

2.1.2 Applications

The Internet has become an integral part of modern life, with numerous applications across various sectors. Some common applications of the Internet include:

- **Communication:** The Internet enables instant communication through email, instant messaging, and social media platforms. It facilitates real-time interactions between individuals, businesses, and organizations, regardless of geographical location.

- **Information Retrieval:** The Internet provides access to vast amounts of information on virtually any topic through search engines, online databases, and digital libraries. Users can quickly find and retrieve information for research, education, or personal interests.

- **E-commerce:** The Internet has revolutionized commerce by enabling online buying and selling of goods and services. E-commerce platforms allow businesses to reach a global audience, conduct transactions securely, and offer personalized shopping experiences to customers.

- **Education:** The Internet has transformed education by providing access to online courses, educational resources, and virtual classrooms. E-learning platforms offer flexible learning opportunities for students of all ages, allowing them to pursue education remotely.

- **Entertainment:** The Internet offers a plethora of entertainment options, including streaming services for movies, music, and TV shows, online gaming platforms, and social networking sites for sharing photos, videos, and other multimedia content.

- **Social Networking:** Social media platforms such as Facebook, Twitter, Instagram, and LinkedIn facilitate social networking and online communities. Users can connect with friends, family, colleagues, and like-minded individuals, share updates, and engage in discussions.

- **Research and Development:** The Internet supports research and development efforts across various fields by providing access to scientific journals, research publications, and collaborative tools. Researchers can collaborate globally, share findings, and access cutting-edge resources and expertise.

- **Business Operations:** The Internet plays a essential role in business operations, enabling tasks such as online marketing, customer relationship management (CRM), supply chain management, and remote collaboration among employees.

- **Telecommuting:** The Internet enables telecommuting or remote work, allowing employees to work from home or any location with an internet connection. This flexibility improves work-life balance, reduces commuting time, and enhances productivity.

- **Healthcare:** The Internet has applications in healthcare, including telemedicine, remote patient monitoring, health information exchange, and online medical consultations. It enhances access to healthcare services, improves patient outcomes, and supports medical research and education

2.1.3 Terminologies

The Internet is a vast network of interconnected computers and devices that communicate with each other using standardized protocols and technologies. There are some common terminologies associated with the Internet:

- **URL (Uniform Resource Locator):** A URL is a web address that specifies the location of a resource on the Internet. It typically consists of a protocol (e.g., http:// or https://), domain name (e.g., www.example.com), and optional path to the specific resource.

- **HTTP (Hypertext Transfer Protocol):** HTTP is the protocol used for transmitting and receiving web pages and other resources on the World Wide Web. It defines how web browsers and web servers communicate with each other.

- **HTML (Hypertext Markup Language):** HTML is the standard markup language used to create and structure web pages. It defines the structure and layout of web content using tags and attributes.

- **IP Address (Internet Protocol Address):** An IP address is a unique numerical identifier assigned to each device connected to a net-

work. It enables devices to communicate with each other over the Internet.

- **DNS (Domain Name System):** DNS is a decentralized naming system that translates domain names (e.g., www.example.com) into IP addresses. It allows users to access websites using human-readable domain names instead of numerical IP addresses.

- **ISP (Internet Service Provider):** An ISP is a company that provides access to the Internet to individuals and organizations. ISPs typically offer various types of Internet connectivity, including dial-up, broadband, and wireless connections.

- **Router:** A router is a networking device that forwards data packets between computer networks. It acts as a gateway between a local network (e.g., home or office network) and the Internet, enabling devices to connect to the Internet.

- **Modem (Modulator-Demodulator):** A modem is a device that modulates and demodulates digital data to enable communication over a telephone line, cable network, or other communication channels. It converts digital signals from a computer into analog signals for transmission and vice versa.

- **Firewall:** A firewall is a network security device that monitors and controls incoming and outgoing network traffic based on predetermined security rules. It helps protect a network from unauthorized access, malware, and other cyber threats.

- **VPN (Virtual Private Network):** A VPN is a secure network connection that allows users to access the Internet privately and securely. It encrypts data transmitted between the user's device and the VPN server, protecting it from eavesdropping and interception.

- **Cookie:** A cookie is a small piece of data stored on a user's device by a website. It is used to remember user preferences, login information, and other browsing activities, enabling personalized web experiences.

- **TCP/IP (Transmission Control Protocol/Internet Protocol):** TCP/IP is the suite of protocols used for transmitting data over the Internet. It defines how data is packaged, addressed, transmitted, routed, and received between devices on a network.

- **Bandwidth:** Bandwidth refers to the maximum rate at which data can be transmitted over a network connection. It is typically measured in bits per second (bps), kilobits per second (kbps), megabits per second (Mbps), or gigabits per second (Gbps).

- **Latency:** Latency, also known as ping, is the time it takes for a data packet to travel from the source to the destination and back again. It is measured in milliseconds (ms) and can affect the responsiveness of network applications and services.

- **Packet:** A packet is a unit of data that is transmitted over a network. It consists of a header containing routing information and a payload containing the actual data being transmitted.

- **Switch:** A switch is a networking device that connects multiple devices within a LAN and forwards data packets between them. It operates at the data link layer of the OSI model and uses MAC addresses to identify devices on the network.

- **Gateway:** A gateway is a networking device that connects two different types of networks, such as a LAN and the Internet. It acts as an interface between the two networks, translating protocols and facilitating communication.

- **FTP (File Transfer Protocol):** FTP is a protocol used for transferring files between a client and a server on a network. It allows users to

upload, download, and manage files on remote servers, typically used for website maintenance and file sharing.

- **VoIP (Voice over Internet Protocol):** VoIP is a technology that allows voice communication over the Internet using IP networks. It enables users to make phone calls, video calls, and multimedia conferences over the Internet, typically at lower costs than traditional telephone services.

- **Cloud Computing**: Cloud computing is a technology that enables the delivery of computing services, such as storage, processing, and software applications, over the Internet. It allows users to access resources on-demand from remote data centers, providing scalability, flexibility, and cost-efficiency.

2.2 Searching the web

When searching the web on Information and Communication Technology (ICT), it's essential to utilize reliable sources that provide accurate and up-to-date information on various aspects of ICT.

These some recommended steps for conducting a successful search:

Define Your Search Query: Clearly define what aspect of ICT you are interested in researching. This could include topics such as cybersecurity, artificial intelligence, data analytics, cloud computing, internet of things (IoT), digital transformation, etc.

Use Relevant Keywords: Use specific keywords related to your topic of interest. For example, if you're researching cybersecurity, you might use keywords like "cybersecurity trends," "cybersecurity best practices," "cybersecurity threats," etc.

Choose Reliable Sources: Look for reputable websites and online resources that are known for providing accurate and trustworthy information on ICT topics. These may include academic journals, government publications, industry reports, and websites of established organizations in the field.

Check the Authority of the Source: Verify the credibility and authority of the sources you find by checking the author's credentials, the publication date, and whether the information is supported by evidence and references.

Explore Different Types of Content: ICT-related information can be found in various formats, including articles, whitepapers, case studies, videos, webinars, and podcasts. Explore different types of content to gain a comprehensive understanding of your topic.

Utilize Advanced Search Techniques: Use advanced search techniques and operators to refine your search results. This may include using quotation marks for exact phrases, using the minus sign (-) to exclude certain keywords, or using site-specific searches to limit results to a particular domain.

Stay Updated: ICT is a rapidly evolving field, so it's important to stay updated with the latest news, trends, and developments. Follow reputable sources, subscribe to industry newsletters, and participate in online forums and communities to stay informed.

2.2.1 Search engines

Search engines are specialized software systems designed to help users find information on the internet. They work by indexing vast amounts of web pages and then retrieving relevant results based on a user's query:

Google: Google [1] is the most widely used search engine globally, known for its fast and accurate search results. It offers various features like Google Search, Google Images, Google Maps, Google News, and more.

Bing: Bing [2] is Microsoft's search engine and provides similar functionality to Google. It offers web search, image search, video search, and maps.

Yahoo: Yahoo [3] Search is another popular search engine that provides web search, news, images, videos, and more. It's known for its curated content and categories.

DuckDuckGo: DuckDuckGo [4] prioritizes user privacy and does not track user activities or personalize search results. It offers anonymous web search, image search, and news aggregation.

Baidu: Baidu [5] is the dominant search engine in China and offers web search, image search, video search, and other services. It's known for its focus on Chinese language and content.

Yandex: Yandex [6] is the leading search engine in Russia and offers web search, image search, video search, maps, and other services. It's known for its advanced search algorithms and localization features.

Ask: Ask [7] allows users to ask questions in natural language and provides relevant answers. It offers web search, image search, and other features.

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[1] https://www.google.com
[2] https://www.bing.com
[3] https://www.yahoo.com
[4] https://www.duckduckgo.com
[5] https://www.baidu.com
[6] https://www.yandex.com
[7] https://www.ask.com

2.2.2 Directories

Directories are structured lists of websites organized by categories and sub-categories. Unlike search engines, which use algorithms to crawl and index web pages based on keywords, directories rely on human editors who review and categorize websites manually. Directories are often used as a complementary tool to search engines for finding specific types of websites or resources within a particular niche:

1. **Yahoo Directory:** was one of the earliest web directories and provided categorized listings of websites. However, Yahoo discontinued its directory service in 2014.

2. **DMOZ (Open Directory Project):** DMOZ was a volunteer-edited directory that aimed to catalog the entire internet. It was one of the largest and most comprehensive directories but ceased operations in 2017.

3. **Best of the Web (BOTW):** BOTW is a curated directory that features high-quality websites across various categories, including business, arts, health, and more.

4. **Business:** is focused on business-related websites, services, and resources. It provides listings for various industries (marketing, finance,...)

5. **Yelp:** While primarily known for its user-generated reviews of businesses, Yelp also serves as a directory for local businesses, restaurants, and services. Users can search for businesses by category, location, and ratings.

6. **TripAdvisor:** TripAdvisor is a popular directory for travel-related businesses, including hotels, restaurants, attractions, and tours. It offers user reviews, ratings, and recommendations for travelers worldwide.

Directories can be valuable resources for finding niche websites, local businesses, or specific types of information. However, their relevance has declined with the rise of search engines like Google.

2.2.3 Automatic indexing

Automatic indexing, also known as web crawling or web spidering, is the process by which search engines systematically browse and collect information from web pages to build their index. This index is then used to provide relevant search results to users when they enter a query. This is how automatic indexing works:

1. **Discovery:** Search engines use a process called crawling to discover new web pages. They start by identifying a set of seed URLs. From these seed URLs, the crawler follows links to other pages on the web, gradually expanding its reach to include more and more websites.

2. **Crawling:** Once the crawler reaches a web page, it parses the page's HTML code to extract text content, links, metadata, and other relevant information. The crawler follows each link on the page to visit additional pages, continuing the process recursively.

3. **Indexing:** As the crawler collects data from web pages, it organizes this information into a structured index. This index contains key information about each web page, such as its URL, title, content, and metadata. The index allows the search engine to quickly retrieve relevant pages when a user enters a search query.

4. **Ranking:** When a user submits a search query, the search engine retrieves relevant pages from its index and ranks them based on various factors, such as keyword relevance, page authority, and user engagement metrics. The most relevant pages are then displayed to the user in the search results.

Automatic indexing enables search engines to continuously update their indexes with new web pages and changes to existing pages, ensuring that search results remain fresh and relevant over time.

2.2.4 Browsers

Browsers are software applications used to access and navigate the internet. They interpret HTML code and render web pages, allowing users to view text, images, videos, and other online content. Browsers also provide features such as bookmarks, history, tabs, and extensions to enhance the browsing experience. The popular web browsers are:

1. **Google Chrome:** [8] Developed by Google, Chrome is one of the most widely used browsers globally. It offers fast performance, a clean interface, and seamless integration with Google services.

2. **Mozilla Firefox:** [9]Firefox is an open-source browser known for its privacy features, customizable interface, and support for extensions. It emphasizes user control and data protection.

3. **Microsoft Edge:**[10] Edge is Microsoft's modern browser that comes pre-installed with Windows 10 and later versions. It offers fast performance, built-in security features, and integration with Microsoft services.

4. **Apple Safari:** [11] Safari is the default browser on Apple devices such as Mac computers, iPhones, and iPads. It is known for its speed, energy efficiency, and seamless integration with macOS and iOS.

5. **Opera:**[12] Opera is a feature-rich browser that offers built-in ad blocking, VPN, and other privacy-enhancing features.

6. **Brave:** [13] Brave is a privacy-focused browser that blocks ads and trackers by default, offering a faster and more secure browsing experience. It also features a built-in cryptocurrency wallet.

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[8]https://www.google.com/chrome/

[9]https://www.mozilla.org/en-US/firefox/new/

[10]https://www.microsoft.com/en-us/edge?ep=313&form=MA13MO&es=40

[11]https://www.apple.com/safari/

[12]https://www.opera.com/

[13]https://brave.com/

2.2.5 Search refinement

Typically refers to the process of improving the effectiveness and precision of online searches by using various techniques and tools. This can include refining search queries, using advanced search operators, filtering search results, and utilizing specialized search engines:

- **Choice of keywords**: Choosing the right keywords is essential for effective web searching:

  1. Be specific: Use keywords that accurately describe the information you're looking for. Avoid using broad terms that may yield too many irrelevant results. For example, instead of searching for "cars," try "electric cars" or "hybrid cars" if that's what you're interested in.

  2. Use synonyms: This can help you capture a broader range of relevant results. For instance, if you're searching for information about "climate change," you might also try "global warming" or "environmental crisis."

  3. Include key phrases: If you're looking for information about a specific topic or concept, consider using key phrases or phrases that are commonly associated with that topic. For example, instead of searching for "diabetes," you might try "diabetes symptoms," "diabetes treatment," or "diabetes prevention."

  4. Use quotation marks: If you're searching for a specific phrase or term, enclose it in quotation marks to ensure that the search engine looks for that exact phrase. This can help narrow down your results and find more relevant information.

  5. Exclude irrelevant terms: Use the minus sign (-) before a word or phrase to exclude it from your search results. This can help you filter out irrelevant information and focus on what's most important to you.

- **Boolean operators:** Boolean operators are powerful tools for refining web searches by allowing users to combine or exclude keywords to find more precise results. Here are the three main Boolean operators and how they can be used:

  1. AND: The AND operator is used to narrow down search results by including multiple keywords. When you use "AND" between two keywords, the search engine will only return results that include both of those keywords. For example, searching for "cats AND dogs" will only show results that mention both cats and dogs.

  2. OR: The OR operator is used to broaden search results by including either of two keywords. When you use "OR" between two keywords, the search engine will return results that include either of those keywords. For example, searching for "cats OR dogs" will show results that mention either cats or dogs, or both.

  3. NOT: The NOT operator is used to exclude specific keywords from search results. When you use "NOT" followed by a keyword, the search engine will exclude results that include that keyword. For example, searching for "cats NOT dogs" will show results that mention cats but exclude any results that also mention dogs.

In addition, the following techniques, you can enhance the precision and relevance of your web searches, making it easier to find the information you need quickly and efficiently.

Filter search results: Take advantage of search filters provided by search engines to narrow down results based on criteria such as date, location, or content type.

Use specialized search engines: Consider using specialized search engines or databases that are tailored to specific topics or industries. These can often provide more relevant and targeted results compared to general-purpose search engines.

2.2.6 Field queries, advanced search

Field queries and advanced search options are features available in many search engines that allow users to further refine their search queries and find more specific information.

This is how they work:

1. Field Queries: Field queries allow users to specify which part of a document or webpage they want to search within. Common fields include title, URL, author, and date. By using field queries, users can narrow down their search to specific types of content or metadata. For example, to search for articles written by a specific author, you could use the query "author:John Smith" or "inurl:article."

2. Advanced Search: Advanced search options provide users with a set of filters and parameters to customize their search queries. These options vary depending on the search engine but often include filters for date range, file type, language, location, and more. Advanced search can help users find exactly what they're looking for by refining their search criteria. For example, you might use advanced search to filter search results to only show pages published within the last year or to exclude certain websites from the results.

Field queries and advanced search options enhance the search experience by allowing users to specify their search criteria more precisely. Whether you're conducting research, looking for specific types of content, or filtering search results by specific attributes, these tools can help you find the information you need quickly and effectively.

2.2.7   Other search tools

In addition to field queries, advanced search options, and boolean operators, there are several other search tools and techniques that can be used to refine and improve search results on the web. Some of these include:

1. Filters: Many search engines offer filters that allow users to refine their search results based on specific criteria such as date, location, file type, or usage rights. By applying filters, users can narrow down their results to find the most relevant information more quickly.

2. Related Searches: Search engines often provide a list of related searches at the bottom of the search results page. These suggestions can help users discover additional topics or keywords related to their original search query, allowing for deeper exploration of the subject matter.

3. Search Suggestions: As users type their search queries into the search bar, search engines may offer autocomplete suggestions based on popular or relevant search terms. This feature can help users refine their queries and discover new keywords or phrases to improve their search results.

4. Search Operators: In addition to boolean operators, there are other specialized search operators that can be used to perform more specific types of searches. For example, the "filetype:" operator can be used to search for specific file types (e.g., PDF, DOCX), while the "define:" operator can be used to find definitions of terms or phrases.

5. Search Alerts: Some search engines offer the ability to set up search alerts or notifications for specific keywords or topics.

6. Voice Search: Users can simply speak their search queries aloud using their device's microphone, and the search engine will return relevant results based on the spoken query.

Chapter 3

The contributions of NICTs to external communication

NICTs (New Information and Communication Technologies) have revolutionized external communication in numerous ways, contributing significantly to the efficiency, reach, and effectiveness of communication channels. The contributions of NICTs to external communication have been transformative, enabling faster, more efficient, and more targeted communication while expanding the reach and impact of messages on a global scale.

- Internet advertising

- Online site promotion

- The security of an online payment system

3.1 Internet advertising

Internet advertising, also known as online advertising or digital advertising, refers to the promotion of products, services, or brands using the internet as a medium. It encompasses various strategies and techniques aimed at reaching and engaging target audiences across the web.

Internet advertising offers businesses a wide range of opportunities to reach and engage their target audience effectively. By leveraging the various strategies and channels available, advertisers can create targeted campaigns, measure performance metrics, and optimize their advertising efforts to achieve their marketing objectives.

3.1.1 Banners

Banners are a common form of display advertising in internet advertising. They are graphical advertisements that appear on websites, typically in the form of rectangular images or multimedia content.

Banners can vary in size, design, and placement, but they generally aim to attract users' attention and encourage them to click through to the advertiser's website or landing page. The features of banners in internet advertising include:

1. Visual Appeal: Banners often feature eye-catching visuals, including images, graphics, animations, and videos, to capture users' attention and generate interest in the advertised product or service.

2. Call-to-Action (CTA): Banners typically include a clear and compelling call-to-action, such as "Shop Now," "Learn More," or "Sign Up Today," prompting users to take a desired action after viewing the ad.

3. Placement: Banners can be placed strategically on websites to maximize visibility and reach. They may appear at the top, bottom, or sides of web pages, within content sections, or in between paragraphs.

4. Targeting: Advertisers can target their banner ads based on various criteria, such as demographics, interests, browsing behavior, and geographic location, to ensure they reach their desired audience effectively.

5. Tracking and Measurement: Internet advertising platforms provide tools for tracking and measuring the performance of banner ads, including metrics such as impressions, clicks, click-through rate (CTR), conversions, and return on investment (ROI).

3.1.2 Interstitials

Interstitials are a type of online advertising format that appears between two content pages, typically before the user reaches their desired destination. These ads often cover the entire screen or a significant portion of it, providing ample space for multimedia content, such as images, videos, or interactive elements.

User chooses an action | Next Page loaded | Interstitial ad pop up shortly after next page loaded | Next Page

The main features of interstitials in internet advertising include:

1. Full-Screen Experience: Interstitial ads take over the entire screen or a large portion of it, creating a highly immersive and attention-grabbing experience for users.

2. Engaging Multimedia Content: Interstitials often feature rich multimedia content, including high-quality images, videos, animations, and interactive elements.

3. Placement: Interstitial ads typically appear between two content pages, such as when a user navigates from one webpage to another or between different sections of a mobile app. They can also be triggered based on user interactions, such as scrolling or clicking on a specific link.

4. Frequency Capping: interstitials may be subject to frequency capping, which limits the number of times a user sees the same ad within a certain time period. This helps maintain a positive user experience and prevents ad fatigue.

5. Cross-Device Compatibility: Interstitial ads are designed to be responsive and compatible with different devices and screen sizes, including desktops, smartphones, and tablets. This ensures a consistent and seamless user experience across various platforms.

3.1.3 The Windows

Windows in internet advertising typically refer to pop-up windows or pop-under windows that appear over or underneath the main browser window when a user visits a website. These windows contain advertisements and are designed to capture the user's attention and promote products or services.

The main key aspects of windows in internet advertising:

1. Pop-Up Windows: Pop-up windows appear suddenly in front of the main browser window, often overlaying the content of the website being visited. These windows can contain various types of advertisements, including banner ads, rich media ads, or promotional messages. Pop-up windows are typically triggered when a user performs a specific action, such as clicking on a link or button.

2. Pop-Under Windows: Pop-under windows are similar to pop-up windows but appear behind the main browser window. This means that they are only visible to the user once they close or minimize the main browser window. Pop-under windows are less intrusive than pop-ups but can still capture the user's attention when they return to their desktop or browser.

3. Effectiveness: While pop-up and pop-under windows can be effective at grabbing the user's attention, they are often considered intrusive and disruptive to the browsing experience. As a result, many users employ ad blockers or browser settings to prevent these windows from appearing.

3.2   Online site promotion

Online site promotion refers to the process of using various digital marketing strategies and techniques to increase the visibility and awareness of a website on the internet. The goal of site promotion is to attract more visitors to the website, improve its search engine rankings, and ultimately drive conversions, such as purchases, sign-ups, or inquiries. The strategies for promoting a website online:

3.2.1   Sponsorship

Sponsorship in online site promotion involves partnering with other businesses, influencers, or organizations to promote a website, brand, product, or service to a specific audience. This collaboration typically involves financial support or the provision of resources in exchange for visibility, exposure, and promotional opportunities. Sponsorship can take various forms, including:

1. Financial Support: Sponsors may provide financial backing to support online advertising campaigns, content creation, events, or other promotional activities.

2. In-Kind Support: Instead of monetary contributions, sponsors may offer in-kind support in the form of goods or services that are relevant to the website's audience or promotional goals. This could include product giveaways, free samples, or access to exclusive resources.

3. Branded Content: Sponsors may collaborate with website owners to create branded content, such as sponsored articles, videos, or social media posts.

4. Event Sponsorship: Websites may partner with sponsors to host virtual events, webinars, or online conferences related to their niche or industry. Sponsors may contribute funding, speakers, or promotional materials to enhance the event's success and reach a broader audience.

5. Affiliate Partnerships: Websites can form affiliate partnerships with sponsors, where they earn a commission or referral fee for driving traffic or sales to the sponsor's website through affiliate links or promotional codes.

6. Co-Branding Opportunities: Sponsors and websites may collaborate on co-branded marketing campaigns or initiatives that leverage the strengths and resources of both parties.

3.2.2 The electronic community

The electronic community refers to a virtual or digital community formed through online platforms, forums, social media, and other digital channels. It is a network of individuals who interact, share information, and engage in discussions on various topics of common interest, regardless of geographical boundaries. The characteristics of the electronic community include:

1. Global Reach: Unlike traditional communities limited by physical proximity, the electronic community transcends geographical barriers, allowing individuals from around the world to connect and communicate with each other in real-time.

2. Diverse Membership: Electronic communities comprise members from diverse backgrounds, cultures, and demographics, bringing together individuals with different perspectives, experiences, and expertise.

3.   Interactivity: Members of electronic communities actively engage in discussions, debates, and exchanges of information through various online platforms, fostering dynamic interactions and collaborations.

4. Shared Interests: Electronic communities are formed around shared interests, hobbies, professions, or causes, enabling like-minded individuals to come together, share knowledge, and support each other's endeavors.

5. Information Exchange: Members of electronic communities share valuable information, resources, and insights on topics ranging from hobbies and interests to professional expertise and industry trends, contributing to continuous learning and growth within the community.

6. Virtual Events and Activities: Electronic communities organize virtual events, webinars, workshops, and other activities to facilitate networking, learning, and socializing among members, enhancing community engagement and participation.

7. Moderation and Governance: Some electronic communities have moderators or administrators who oversee community activities, enforce guidelines, and ensure that discussions remain respectful, inclusive, and constructive.

3.2.3   Emailing

Emailing is a crucial component of online site promotion, serving as a direct and effective communication channel to reach potential customers, engage with existing ones, and drive traffic to a website.The marketing contributes to online site promotion as follows:

1. Building Relationships: By sending personalized and relevant content, businesses can connect with subscribers on a more personal level, fostering trust and loyalty over time.

2. Driving Traffic: By enticing recipients with compelling subject lines and valuable content, businesses can encourage clicks and visits to their website, increasing overall site traffic.

3. Sharing Valuable Content: By providing useful and informative content, businesses can position themselves as industry experts and drive traffic to their website for further engagement.

4. Segmentation and Personalization: Email marketing platforms offer robust segmentation and personalization features, allowing businesses to tailor their messages based on subscriber demographics, interests, purchase history, and behavior.

5. Lead Generation: Email marketing campaigns can be used to capture leads and prospects, encouraging recipients to sign up for newsletters, download resources, or participate in webinars or events hosted on the website.

6. Measurable Results: Email marketing provides valuable insights and analytics that help businesses measure the effectiveness of their campaigns. Metrics such as open rates, click-through rates, conversion rates, and website traffic can be tracked to assess the impact of email promotions on site performance and overall marketing objectives.

3.3 The security of an online payment system

The security of an online payment system is paramount in ensuring the safety of sensitive financial information and preventing fraudulent activities. By implementing robust security measures and staying vigilant against emerging threats, online payment systems can provide users with a secure and seamless transaction experience, fostering trust and confidence in the digital payment ecosystem.

3.3.1 Encryption

Encryption plays a crucial role in securing online transactions by protecting sensitive data from unauthorized access during transmission over the internet. One of the primary encryption techniques used in this context is Secure Socket Layer (SSL) or its successor, Transport Layer Security (TLS). These protocols establish a secure communication channel between the user's browser and the payment gateway, ensuring that data exchanged between them is encrypted and remains confidential.

When a user initiates an online transaction, SSL/TLS encrypts the data before it is transmitted over the internet. This encryption process involves encoding the information using complex algorithms, making it unreadable to anyone intercepting the communication. As a result, sensitive information such as credit card details, personal identification numbers (PINs), and authentication credentials are safeguarded from eavesdroppers and cybercriminals.

SSL/TLS encryption operates based on a combination of asymmetric and symmetric encryption algorithms. Initially, the user's browser and the server establish a secure connection by exchanging cryptographic keys. These keys are used to encrypt and decrypt data during the transmission process. Asymmetric encryption is employed to securely exchange symmetric encryption keys, which are then used for bulk data encryption using symmetric algorithms, such as Advanced Encryption Standard (AES).

By encrypting data in transit, SSL/TLS protects against various security threats, including man-in-the-middle attacks, data interception, and tampering. It provides assurance to users that their sensitive information is secure while being transmitted over potentially insecure networks, such as the internet. Additionally, SSL/TLS encryption is indicated by visual cues in web browsers, such as a padlock icon or a green address bar, providing users with confidence in the security of the connection.

3.3.2   Website data protection

Website data protection refers to the measures and practices implemented to safeguard sensitive information collected, processed, and stored by websites from unauthorized access, misuse, or theft. It encompasses various security measures, policies, and technologies aimed at protecting user data and ensuring compliance with relevant privacy regulations. Here are some key aspects of website data protection:

1. Encryption: Employing encryption technologies, such as SSL/TLS, to encrypt data transmitted between users' browsers and web servers ensures that sensitive information remains confidential during transit. Additionally, encrypting data stored in databases or on servers protects it from unauthorized access in case of a security breach.

2. Access Control: Implementing access control mechanisms helps restrict access to sensitive data based on user roles, permissions, and authentication levels. By enforcing strong password policies, multi-factor authentication, and role-based access controls, websites can prevent unauthorized users from accessing confidential information.

3. Data Minimization: Adopting a data minimization approach involves collecting and storing only the minimum amount of data necessary for the intended purpose. By limiting the collection of personal information and retaining data for the shortest duration required, websites can reduce the risk of data breaches and mitigate the impact of potential security incidents.

4. Regular Audits and Assessments: Conducting regular security audits, vulnerability assessments, and penetration testing helps identify and address security vulnerabilities or weaknesses in website infrastructure, code, or configurations. By proactively addressing security gaps, websites can enhance their resilience against cyber threats and data breaches.

5. Privacy Policies and Consent Management: Maintaining transparent privacy policies that clearly communicate how user data is collected, processed, and shared helps establish trust with website visitors. Implementing robust consent management mechanisms ensures that users provide informed consent before their data is collected or used for specific purposes, thereby complying with privacy regulations such as the General Data Protection Regulation (GDPR).

6. Secure Development Practices: Following secure coding practices, such as input validation, output encoding, and parameterized queries, helps mitigate common web application vulnerabilities, including cross-site scripting (XSS), SQL injection, and insecure direct object references. By prioritizing security throughout the software development lifecycle, websites can reduce the likelihood of security incidents and data breaches.

7. Incident Response and Contingency Planning: Developing and implementing an incident response plan enables websites to respond effectively to security incidents or data breaches. This includes procedures for detecting, containing, and mitigating security breaches, as well as communication protocols for notifying affected parties and regulatory authorities promptly.