Calculator: performs single-purpose of mathematic computation

Computer: performs general purpose of programmable computation, allowing users to run applications much more complex than simple calculation. (Programmable for executing algorithm)

Turing Test: is a test for human to assess whether a computer exhibit intelligent behaviour equivalent to that of a human.

Reverse Turing Test is a test for a computer to determine whether it is interacting with a human or another computer.

Von Neumann architecture is a stored-programme concept such that programme instructions and data are stored in a memory instead of hard-wired non-programmable early computers. A central processing unit (CPU) fetches the programme and data from the memory to decode and execute. The significance for the architecture is that it allows the programme and data to be easily changed, hence enabling general purpose programming.

The server machine is a dedicated hardware hosting websites on its storage.

The web server programme is a software on such machine helping to deliver the web pages upon requests from clients' browser.

Separating HTML and CSS: It allows the same style sheet to be reusable across different pages.
It is easier to design and maintain, and making the sources more readable as content and presentation are separated.
It also allows caching of pages, as such making delivery of content more efficient.

Overclocking CPU:
benefit: faster computation;
need: to fully utilize the processing power without hardware upgrade;
risk: overheating and easy breakdown.

Functions of Web Browser:
interprets and display HTML webpages with styles and scripts
responds to client-end scripts;
retrieve data from server;
navigate.

Hierarchy in data storage: by storing more frequently used data or instructions on higher-speed caches or memories, it speeds up the system. However such practice is limited by the expensiveness of the faster memories, therefore, the faster they are, the smaller they tend to be. It balances the performance with cost.

LCD is made of a few layers acting like shutters, parsing light through specific pixels. It uses fluorescent light and has low contrast.

LED is LED backlit LCD, uses LED backlighting. It produces clearer and better image quality, more energy-efficient, thinner, but costs more.

Database system:
users;
database application;

database management system;
database

Structured Query Language (SQL) is an international standard of query language, used for accessing and modifying information in the database. It is used by most of the relational database management system.

Advantage of using database:
reduce data redundancy;
data integrity;
easier in sharing and better security.

Wireless network:
a computer's wireless adapter translates data in to a radio signal and transmits it using an antenna. A wireless router requires the signal and decodes it. The router sends the information to the Internet using a physical wired Ethernet connection. The process also works in reverse with the router receiving information from the Internet translating it into a radio signal and sending it to the computer's wireless adapter.

Client-server model is centralised and server-based. Nodes connect to server and server is in charge.

Peer-to-peer (P2P) system is a system of nodes without central infrastructure. Peers in the P2P model are equally privileged, equipotent participants, while the client-server has clear distinction for the client to request form the server.

Wireless networks:
advantage: convenience, easy to install without cables, more expandable;
disadvantage: security risk, lower data rate, lower reliability.

Programming language:
notation for specifying programmes and computations;
consists of words, symbols and rules for writing a program.

Programming paradigm:
a style or way of programming.

Object: active program unit containing both data and procedures.

Class: a template from which objects are constructed.

An object is called an instance of the class.

Embedded operating systems:
designed to operate on small machines like smartphones;
able to operate with limited resources;
very compact and extremely efficient by design.

Basic features of Operating System:
performs basic functions:
start-up, file manager, device drivers, memory manager, CPU scheduler and dispatcher;
make sure each application gets the necessary resources;
providing a consistent interface;
user-friendly shell.

Electromechanical relays enabled the implementation of the digital calculating machines. However, the relays are still mechanical components, their mechanical movements limit the machines to rather slow operating speeds.

Vacuum tubes are electronics components which are hence much faster. It was rather expensive at the beginning for large scale used in computer, but the main disadvantages were its reliability and high power consumption due to its heating filament.

Discrete transistors are much faster smaller cheaper and more reliable and energy efficient than Vacuum Tubes. This enables the production of more powerful yet inexpensive computers. But with more sophisticated computer design, the complexity with the wiring and its associated signal delay were the primary barriers to enable even faster machines.

Integrated-Circuit based logic circuit removes these barriers, and enables the progress to the next generation of computer where the CPU can be constructed using high density packaged logic circuits, and the material made from an abundant source – silicon. These factors enable the mass production of computers at much lower cost and lead to the wider use of computers in non-scientific purpose.

Scientific computers are usually concerned with very fast computing speed to do complex calculation that involves massive amount of data and advanced mathematical analysis. The machine is often designed to work well for specific tasks.

Commercial computers deal with comparatively simpler calculations, but need to meet high input/output throughput, multitasking and multiuser scenarios. They are designed to handle wider variety of tasks, but may not perform the best for individual tasks.

IBM system/360 computer introduced the concept of a standard computer architecture: instruction set architecture (ISA) such that computers of different physical implementations but based on the same logical architecture can run the same software, that is software compatibility across different models. In present day computer system, the concept allows different computer manufacturers to design different computers but can run the same software. This architecture concept lowers the barriers for companies to adopt the computer system for their business.

Datapath width: the size of data that can be manipulated at the same time

Memory cache: cache is a small high speed memory situated close to the CPU and can operate faster than the larger main memory. It acts as a buffer to store instructions (I-Cache) and data (D-Cache) that are most likely to be used soon by the CPU, based on the spatial and/or temporal locality. It reduces the number of accesses to the slower external main memory.

Pipeline: the technique to split the FDE cycle into multiple individual stages such that each stage can continue to operate on the next instruction after it completes its portion of the task.

Superscalar: A superscalar CPU can execute more than one instruction per clock cycle. Because processing speeds are measured in clock cycles per second, a superscalar processor will be faster than a scalar processor rated at the same frequency. It includes parallel execution units which can execute instructions simultaneously.

Multi-core: to duplicate the CPU cores in a processor such that instructions can be executed completely independent of each other. In practice, this may not always be feasible since instructions in a program typically need results from each other in order to proceed. Multi-core is more useful for system that need to support multiple independent programs where each program can be assigned to individual core and run separately.