AMIRAJ
COLLEGE OF ENGINEERING & TECHNOLOGY

CHAPTER -1
INTRODUCTION TO COMPUTER AND PROGRAMMING

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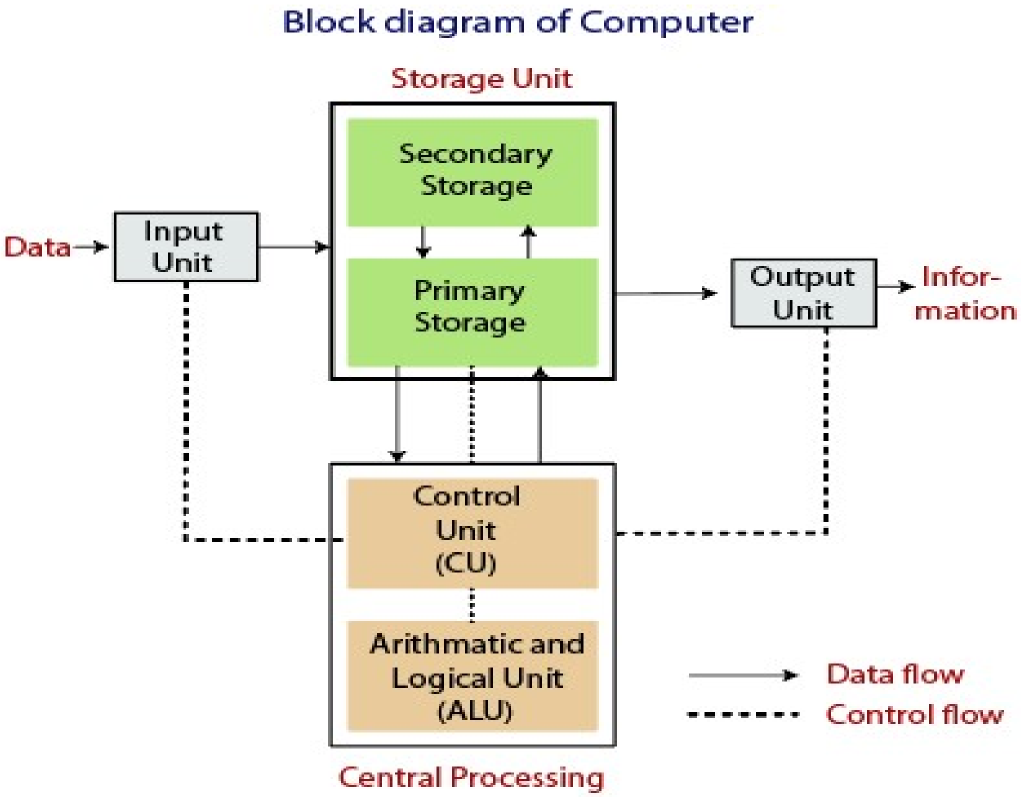
Block Diagram of Computer

Mainly computer system consists of three parts, that are central processing unit (CPU), Input Devices, and Output Devices. The Central Processing Unit (CPU) is divided into two parts again: arithmetic logic unit (ALU) and the control unit (CU).

The data is entered through input devices such as the keyboard, mouse, etc. This set of instruction is processed by the CPU after getting the input by the user, and then the computer system produces the output. The computer can show the output with the help of output devices to the user, such as monitor, printer, etc.

Block Diagram of Computer



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Central Processing Unit (CPU)

The computer system is nothing without the Central processing Unit so, it is also known as the brain or heat of computer. The CPU is an electronic hardware device which can perform different types of operations such as arithmetic and logical operation.

Control Unit

The control unit (CU) controls all the activities or operations which are performed inside the computer system. It receives instructions or information directly from the main memory of the computer.

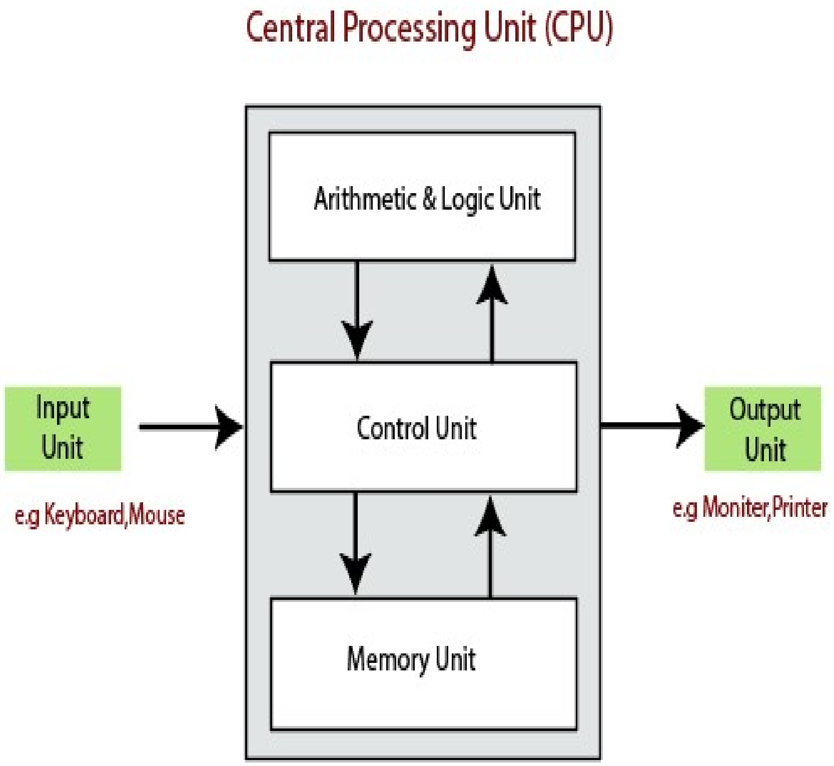
Arithmetic and Logical Unit

The arithmetic and logical unit is the combinational digital electronic circuit that can perform arithmetic operations on integer binary numbers.It presents the arithmetic and logical operation.

Central Processing Unit (CPU)

Storage Unit

The information or set of guidelines are stored in the storage unit of the computer system. The storage unit provides the space to store the data or instruction of processed data. The information or data is saved or hold in computer memory or storage device.



Components of Computer System

The hardware and software exist on the computer**.** The information which is stored through the device is known as computer software. The hardware components of the computer system are related to electronic and mechanical parts, and the software component is related to data and computer programs. Many elements are connected to the main circuit board of the computer system called a “motherboard.”

- Processor.
- Main Memory.
- Secondary Memory.
- Input Devices.
- Output Devices.

These are mainly five components of the computer system. The computer hardware, computer software, and liveware exist in the element of the computer system.

Difference between Hardware & software

Software	Hardware
It is a collection of programs to bring computer hardware system into operation.	It includes physical components of computer system.
It includes numbers, alphabets, alphanumeric symbols, identifiers, keywords, etc.	It consists of electronic components like ICs, diodes, registers, crystals, boards, insulators, etc.
Software products evolve by adding new features to existing programs to support hardware.	Hardware design is based on architectural decisions to make it work over a range of environmental conditions and time.
It will vary as per computer and its built-in functions and programming language.	It is mostly constructed for all types of computer systems.
It is designed and developed by experienced programmers in high-level language.	The hardware can understand only low-level language or machine language.
It is represented in any high-level language such as BASIC, COBOL, C, C++, JAVA, etc.	The hardware works only on binary codes 1’s and 0’s.
The software is categorized as operating system, utilities, language processor, application software, etc.	The hardware consists of input devices, output devices, memory, etc.

Difference between Compiler & Interpreter

Interpreter	Compiler
Translates program one statement at a time	Scans the entire program and translates it as a whole into machine code.
It takes less amount of time to analyze the source code but the overall execution time is slower.	It takes a large amount of time to analyze the source code but the overall execution time is comparatively faster.
No intermediate object code is generated, hence are memory efficient.	Generates intermediate object code which further requires linking, hence requires more memory..
Continues translating the program until the first error is met, in which case it stops. Hence debugging is easy.	It generates the error message only after scanning the whole program. Hence debugging is comparatively hard.
Programming languages like Python, Ruby use interpreters.	Programming languages like C, C++, Java use compilers.

Languages

What is Machine Language?

A computer's native language is called Machine Language. Machine language is the most primitive or basic programming language that starts or takes instructions in the form of raw binary code. Ex.:1101101010011010

What is Assembly Language?

Assembly Language uses short descriptive words (mnemonic) to represent each of the Machine Language instructions. For example the mnemonic **add** means to add numbers together, and **sub** means to subtract the numbers

What is a High-Level Language?

High-Level languages are platform independent, meaning that you can write & run High-Level Languages on different types of machines. High-Level Languages are English like and therefore easier to learn and use. Note that instructions in a High-Level Language are called **statements**.

Algorithm

Algorithm refers to a set of rules/instructions that step-by-step define how a work is to be executed upon in order to get the expected results.

In-order to write an algorithm, following things are needed as a pre-requisite:

1. The **problem** that is to be solved by this algorithm.
2. The **constraints** of the problem that must be considered while solving the problem.
3. The **input** to be taken to solve the problem.
4. The **output** to be expected when the problem the is solved.
5. The **solution** to this problem, in the given constraints.

Then the algorithm is written with the help of above parameters such that it solves the problem.

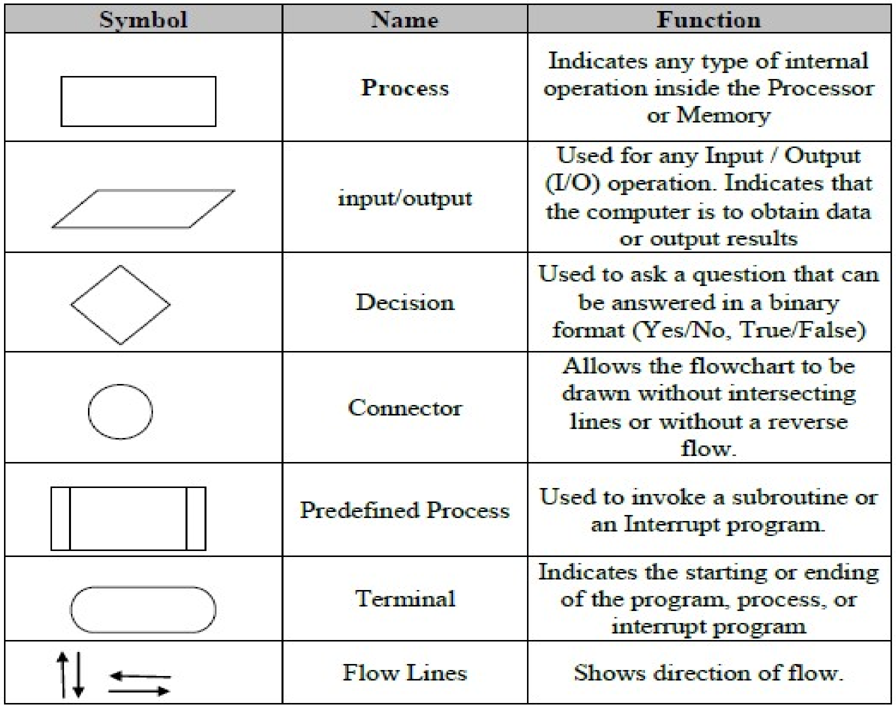
Algorithm

EXAMPLE : Write an algorithm to add two numbers entered by the user

```
Step 1: Start
Step 2: Declare variables num1, num2 and sum.
Step 3: Read values num1 and num2.
Step 4: Add num1 and num2 and assign the result to sum.
            sum←num1+num2
Step 5: Display sum
Step 6: Stop
```

Flow Charts

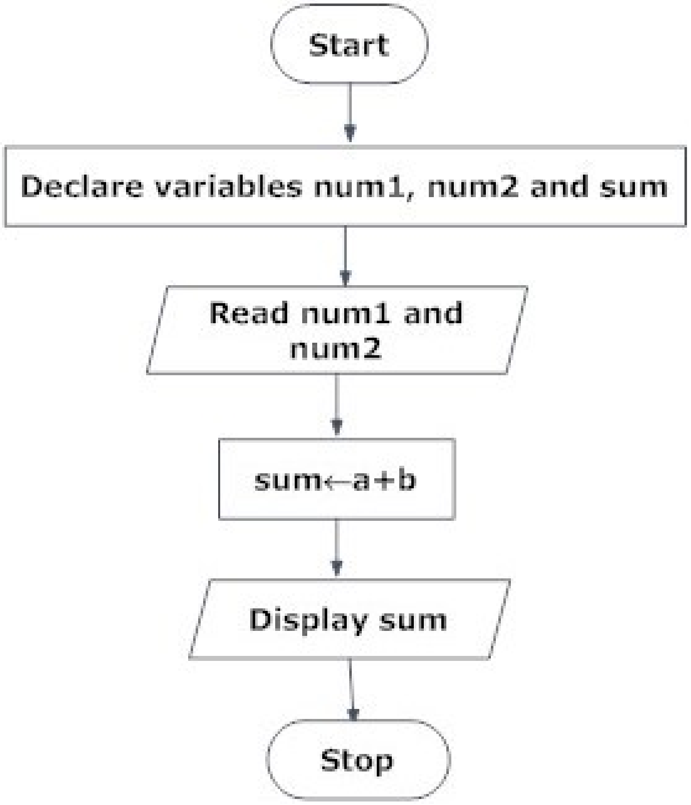
A flowchart is a blueprint that pictorially represents the algorithm and its steps. The steps of a flowchart do not have a specific size and shape rather it is designed in different shapes and sizes .



Symbol	Name	Function
▭	Process	Indicates any type of internal operation inside the Processor or Memory
▱	input/output	Used for any Input / Output (I/O) operation. Indicates that the computer is to obtain data or output results
◇	Decision	Used to ask a question that can be answered in a binary format (Yes/No, True/False)
○	Connector	Allows the flowchart to be drawn without intersecting lines or without a reverse flow.
◫	Predefined Process	Used to invoke a subroutine or an Interrupt program.
⬭	Terminal	Indicates the starting or ending of the program, process, or interrupt program
↑↓ ⇆	Flow Lines	Shows direction of flow.

Flow Charts

EXAMPLE : Add two numbers entered by the user.



Thank you