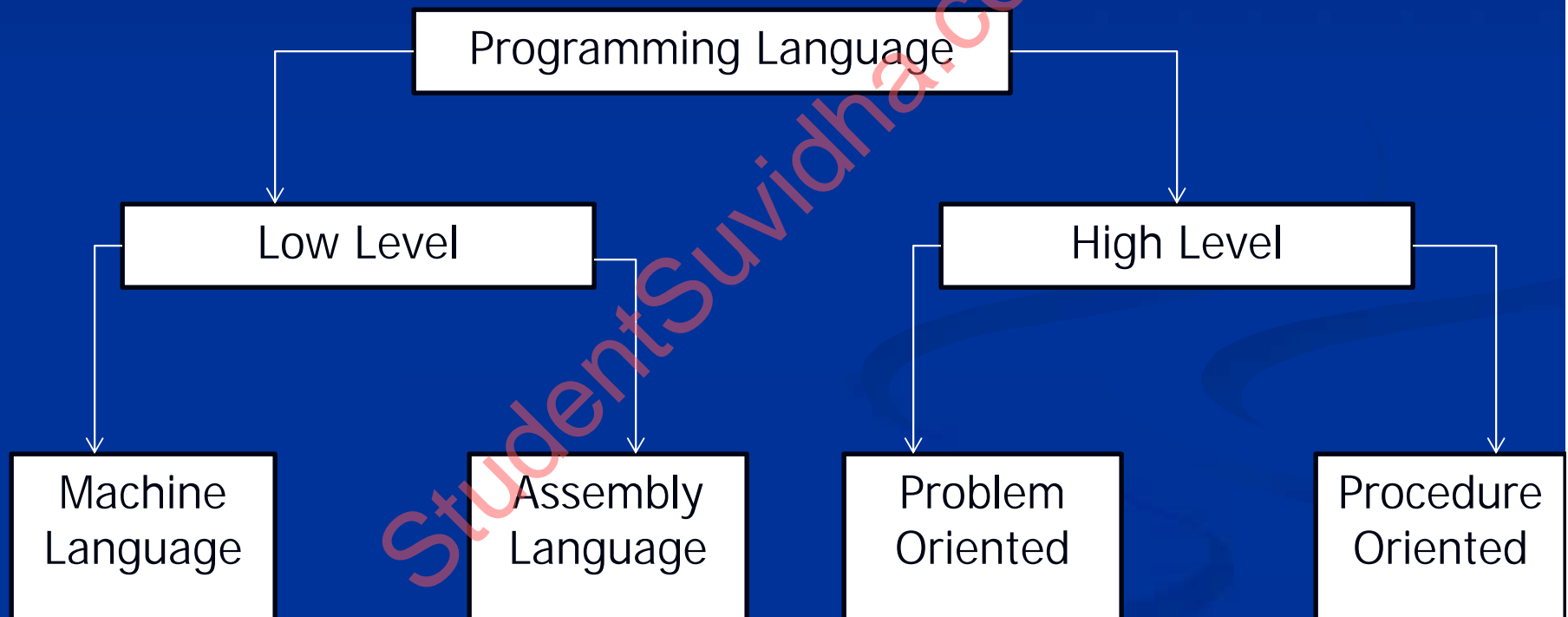


BASIC INTRODUCTION TO SYSTEM SOFTWARE AND PROGRAMS

What is a Programming language?

- A language used for expressing a set of computer instructions(program).
- Example: BASIC, FORTRAN, C/C++, PASCAL



Characteristics of Programming Language

- **Simplicity:** A good programming language must be simple & easy to learn & use.
- **Naturalness:** A good language should be natural for application area for which it is designed i.e. it should provide appropriate operators, data structures, control structures & a natural syntax to facilitate programmers to code their problems easily & efficiently.
- **Efficiency:** Good programming language should support a good language translator(a compiler or an interpreter) that gives due consideration to space & time efficiency.
- **Compactness:** In good programming language, programmer should be able to express the intended operations concisely without losing readability.
- **Extensibility:** A good programming language should also allow extension through simple, natural & elegant mechanism.
- **Suitability to its environment:** Depending upon the type of application for which a programming language has been designed, the language must also be made suitable to its environment.

LOW LEVEL LANGUAGE

- **Machine Language:** Every computer understands only one language without using a translating program. This language is called machine language of the computer, normally written as strings of binary 1s & 0s.

Advantages:

- ❖ Programs written in machine language can be executed very fast by a computer because instructions are understood by the computer without the need for any translation.

Disadvantages:

- ❖ Machine Dependent
- ❖ Difficult to program
- ❖ Error prone
- ❖ Difficult to modify

LOW LEVEL LANGUAGE(Cont.)

- **Assembly Language:** Assembly language programming introduced in 1952, helped in overcoming the limitations of machine language by providing alphanumeric codes instead of numeric codes for the instructions.

Advantages:

- ❖ Easier to understand and use
- ❖ Easier to locate and correct errors
- ❖ Easier to modify

Disadvantages:

- ❖ Machine dependent
- ❖ Knowledge of hardware required

HIGH LEVEL LANGUAGE

- The program development in low level language is very slow, they are machine dependent also.
- Programming in machine language is error prone & time consuming.
- Therefore, to overcome the limitations of low level languages, the need to develop programming languages that could make use of familiar words became necessary.

Advantages:

Machine Independence
Easier to learn & use
Less Error Prone
Low programming cost

Disadvantages

Lower Efficiency
Less flexibility

DIFFERENCE BETWEEN MACHINE LEVEL LANGUAGE & HIGH LEVEL LANGUAGE

Machine level language	High level language
Uses only 2 symbols 0 & 1	Uses alphabets, digits
Each instruction is a sequence of 0's and 1's	Each instruction is english like statement
Can be directly executed	Cannot be directly executed, need a translation device.
Machine dependent	Machine Independent
Difficult to understand, modify, write and debug	Easy to understand, write & debug
Very efficient(fast)	Less efficient(slow)
Not standardized, called as first generation programming language	Standardized, called as third generation programming language

DIFFERENCE BETWEEN ASSEMBLY LANGUAGE & HIGH LANGUAGE

ASSEMBLY LANGUAGE	HIGH LEVEL LANGUAGE
Mnemonic or symbolic instructions	English like statements.
Machine Dependent	Machine Independent
Very efficient language	Less efficient
It is not directly executed, firstly it should be translated into machine language by a process called assembly.	It is also not directly executed, it should be translated into machine language by the process called compilation.
Assembler is used in translation process	Interpreter or compiler is used in translation process
This is converted to machine readable form in 1 step.	It is first converted into machine's assembly language & then into machine language. Hence it requires 2 steps.

ASSIGNMENT

- Differentiate between high level language and low level language.