1ST GENERATION LANGUAGE (MACHINE LEVEL LANGUAGE)

MACHINE LEVEL LANGUAGE:

- Machine Level language can be understood directly by a computer's central processing unit (CPU).
- Machine code consists of sequences of binary numbers, or bits.
- These are usually represented by 1s and 0s.
- Used to form the basic instructions that guide the operation of a computer.
- Examples: Machine code for the Motorola 68000 microprocessor, Intel Pentium microprocessor.

Advantages of MLL :

- Programs written in MLL execute faster.
- No Requirement of Language Processor.
- Machine directly understand the instructions.
- Instructions can be written in binary form as 0^s &1^s.

Disadvantages of MLL :

- Machine dependent.
- Difficult to code.
- Difficult to Modify.
- Detail knowledge of hardware is required.
- Requires high level of programming skill.
- Difficult to handle errors.

2ND GENERATION LANGUAGE (ASSEMBLY LANGUAGE)

ASSEMBLY LANGUAGE

- It is developed to overcome problems of Machine level language.
- American mathematician Grace Murray Hopper developed assembly language in 1952.
- Assembly Language instructions are mnemonic codes used for computers, microprocessors, microcontrollers and others integrated circuits.
- It implements a symbolic representations of the binary machine codes and other constants needed to program a given by the CPU architecture.
- In Assembly Language each statement corresponds directly to a single machine instruction.
- Programs written in assembly language usually run faster than those generated.

Advantages of AL:

- Easier to understand and use.
- Easier to handle the errors.
- Easier to Modify.
- No worry about the storage addresses.

Disadvantages of AL:

- Machine dependent.
- Detail knowledge of hardware is required.
- Requires to translate the program.
- It takes time to code the instructions.
- Takes more time to execute than MLL.

3RD GENERATION LANGUAGE (PROCEDURAL LANGUAGE)

Third Generation Language (3GL):

- A third-generation programming language (3GL) is a refinement of a second-generation programming language.
- Third Generation languages are High Level languages that are human oriented.
- Third generational languages are procedural programming languages that uses procedures to operate on data structures.
- The term “Procedure “ means a series of actions conducted in a certain order or manner.
- Procedural language fallows top Down approach , that means flow starts from main and goes through functions /Function calls.
- **Procedural programming** can sometimes be used as a synonym for imperative programming (specifying the steps the program must take to reach the desired state).
- Examples: BSAIC, QBASIC, QWBASIC, FORTRAN, PASCAL, COBOL, C, C+ etc.

Features of Third Generation(3GL) Languages:

- Invented for use by professional programmers.
- Languages are file oriented.
- Languages are Procedure oriented languages.
- Programming Languages are machine independent.
- Require less time to write.
- Easy to understand/ learn.

Disadvantages:

- Takes more time to execute the program.
- Program takes more memory.
- Programmer should have depth knowledge of the programming language.

4TH GENERATION LANGUAGE

(OOP)

4GL:

- Fourth Generation Languages are advanced high level languages.
- 4GLs are Database Query Languages.
- 4GLs are Problem-Oriented Languages or Object Oriented Programs (OOPs).
- These languages do not consist detailed description and procedure.
- These languages are easier to write, modify and debug.
- 4GLs are also required translator programs (Compiler /Interpreter) to convert them into equivalent machine codes.
- Languages developed for the online users also.

Features of 4TH Generation Languages:

- Interactive Coding
- Increased productivity
- Increased Memory requirements
- Limited training required
- Faster to program
- Non-procedural language etc.

5TH GENERATION LANGUAGE

(NPL)

NATURAL PROGRAMMING LANGUAGES (NPL):

- ✓ Natural Programming languages also available for the special programming purpose.
- ✓ Natural Programming Language specially used in the Artificial Intelligence and Expert systems (Robotic system.)
- ✓ Natural Programming Languages are still in development.
- ✓ In the 1990s information scientists developed an AI computer program that allows non-experts to use their own natural language to retrieve information from databases.
- ✓ Natural programming languages are using for programming the devices now a days.

- ✓ Natural programming languages also known as a “Theorem-providing system”.
- ✓ Natural programming language is also called “constraint-based program”.
- ✓ Natural language is an interpreted language in which every expression is a list of calls to functions.

Features:

- ✓ Natural Programming languages also available for the special programming purpose like: LISP , PROLOG.
- ✓ Natural language specially used in the Artificial Intelligence and Expert systems (Robotic system.).
- ✓ Natural languages are still in development.

Good Bye !!!

Prof. N. P. BHUSAL
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