Computer Science

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Chapter-20: Programming Language

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Programing language

Programing language is a notation for writing programs and set of rules for instructing a computer or computing device to perform specific tasks.

programming language usually refers to-

➥ Low-Level Programming Language

➥ High-Level Programing Language

Program is a set of instructions that a **computer** is instructed to perform an operation

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Low-Level Programing language: A low-level language is a type of programming language that contains basic instructions recognized by a computer.

For the CPU each instruction is given a binary code and the code make some programs. The binary codes representing program are called **machine code or machine language.**

This is the examples of machine language:
01001010101001010000001010010101001010010101001

Assembly language is the example of Low-level programming language. There is simplest translator is called assembler that converts assembly language to machine code or machine language.

Examples of Assembly language:

- LDR R3, [R1] (Load register R3 with the value of R1)
  MQV R2, #0 (Move the value 0 to the register R2)
  CMP R3, R0 (compare the value of register R3 with R0)

Mnemonic: Instruction is written as a short, memorable keywords in assembly language and that is called mnemonic. E.g. LDR (load register), STR (Store value to the memory), CMP (Compare the value in the memory).

Advantages of assembly language:
1. Same as a machine code instructions.
2. Easier to work with machine code.
3. Instructions is written as a short, memorable keyword.

Disadvantages of Assembly language:
1. Very limited range of instructions are available.

2. There are no string, integers or real numbers just binary so manually need to manage all the data and also has to manage where the data will be stored in the memory.

3. Debugging is very difficult, when the assembled program runs, any bugs usually just make the machine crash.

High-Level programming language: It is much more common to write software in high-level programming language such as python, C, Java or Visual Basic.

Source code can be translated in two ways-
  1. Compiler (A translator that translate the whole program in one)
  2. Interpreter (A translator that translates and run program one line at a time.)

Compiler:

➡ **Advantaged of compiler:**

It can be easier to protect the code from being altered or

➡ **Disadvantage of Compiler:**

A compiler cannot produce any object code unless the whole program is correct, it report a lot of errors initially it is harder to debug the program

Interpreter:

➡ **Advantages of Interpreter:**

Interpreters find errors when they happen and can often tell you what has gone wrong.

➡ **Disadvantage of Interpreter:**

Every computer that will run the program needs the interpreter software installed.

It run slower using an interpreter because the interpreter has to translate the source code while the program is running.

H.W

- ➡ Tuhin is writing a program by using assembly language, state the advantages and disadvantages of writing a program by assembly language.

- ➡ High-level languages require either an interpreter or a compiler to translate the program, discuss why?

- ➡ Distinguish between interpreter and compiler.

Thank You