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software programming:-

Set of instruction given to perform specific task using some programming language.

1) Low level programming language (binary programming)
2) Mid level programming (assembly programming)
3) High level programming.

* Advantages of python:-

-> Easy to learn and read
-> Interpreted and dynamically typed.
-> Extensive libraries and frameworks.
-> cross-platform compatibility.
-> community support.
-> versability.
-> maintainable and scalable.

* Disadvantages of python:-

-> slow execution speed
-> High memory usage
-> weak in mobile computing.
-> Runtime Errors
-> Limited multi-threading.

* comments :-

comments in python are lines in the code that are ignored by the interpreter and are used to explain or annotate the code for better readability and understanding.

* Types of comments:

1. single line comment:
   • starts with #

   Ex:- #This is a single-line comment.

2. multi-line comment (or block comment):
   • Enclosed with triple quotes ''' ''' or """ """

Ex:-

```
"""This is a multi-line comment
explaining the following code block
"""
```

* keywords :-

keywords in python are reserved words that have predefined meaning and purposes in the language. They cannot be used as identifiers (variable names, function names, etc) because they define the structure and syntax of python code.

Ex:- if, else, while, for, break, continue, def, class, return, try, except, import, True, False, None, etc...

*variables:-

A variable is a symbolic name that is used to store data in Memory. It acts as a reference to a value, allowing programmers to manipulate and uses the data efficiently with in a program. unlike many other programming languages, python does not require explict declaration of variable types. The type is determined automatically at runtime based on the value assigned. Making Python a dynamically typed language.

Key characterstics of variables in python

1. Dynamic Typing - No need to declare data types explicity.

```
x = 10      # Integer.
x = "Hello" # Now it becomes a string.
```

2. No explick Declaration: A variable is created as soon as a value is assigned.

3. case-sensitive :- age, Age, and AGE are treated as different variables.

4. Flexible Assignment : Multiple variables can be assigned in a single statement.

```
a, b, c = 5, 10, 15.
```

5- Naming Rules :-

- Must begin with a letter or underscore (_).
- cannot start with a digit.
- can only contain letters, digits, and underscores.
- cannot use Python reserved keywords (e.g., if, while, class)

*Invalid variables:-

In Python, Variable names (identifiers) must follow specific rules. If these rules are not followed, the variable name becomes invalid, and python will raise a syntax error.

Ex of Invalid variables :-

1name = "John"	→ name1 = "John"
foo = 100	→ foo-value = 100
student-name = 85	→ student_name = 85
My var = "Hello"	→ My_var = "Hello"
@score = 95	→ score = 95.