

python programming

Assignment NO:-1

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1) Who developed python and why was it created ? Explain one major difference between python and c language in terms of program execution.

→ • The python programming created by Guido van Rossum

• To address issues found in ABC language and make programming easy.

• Difference in python vs c.

i) Python is the interpreted language while c is the compiled language.

ii) While which means python code is execute line by line and c language code is execute at a time.

iii) Python code is platform independent because of PVM (Python virtual machine) while c language is platform dependent.

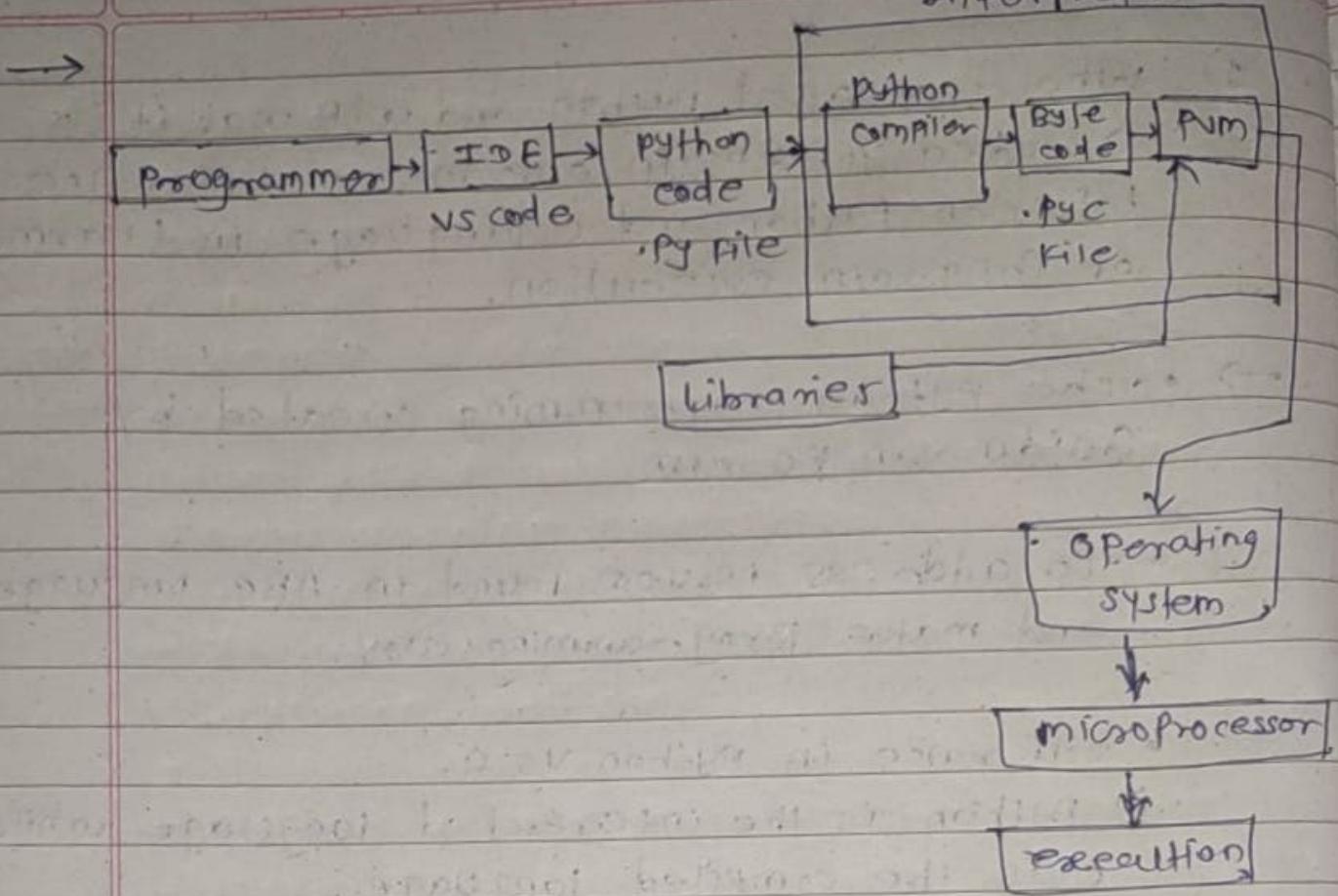
2) Explain the python build process starting from .py file to execution.

Mention the role of: nos and AP.

• Python interpreter

• Bytecode

• PVM



The Above diagram shows complete python toolchain (program execution).

- i) Programmer write code in IDE (Integrated development environment) and then store the code in .Py file.
- ii) This .py file execute in interpreter block in this first it can be compiled with the help of python compiler.
- iii) It can convert the High-level instruction into low-level instruction with the help of python compiler and it known as Bytecode if can store in .Pyc file.
- pycache folder used to store this file.

- iv) This .pyc file execute on the PVM (Python Virtual Machine) and execute the possible instructions.
- If any external library support need then it can call libraries.
- v) PVM execute possible instruction and non-executable instruction send to operating system. Operating system also execute the possible instructions.
- vi) After this It can be execute the instruction on the microprocessor.
- vii) Execution completed.

Role of -

- i) Python Interpreter -
Python interpreter can read and execute python code line by line.
- ii) Bytecode -
low level instructions which can be understandable to machine. It is not readable and in 0 and 1 format.
- iii) PVM -
python virtual machine is mini operating system which can perform instructions which is in .pyc file which contains Bytecode.

3) What is bytecode in python? Where is it stored and why does python use it?

→ Bytecode is the intermediate or low-level, optimized instructions code generated from python source which the python virtual machine executes.

- It can be stored in .pyc file in -pycache_ folder.

- python virtual machine can execute instructions using this bytecode because it is low-level optimized code in machine understandable format of 0 and 1.

4) Is python a compiled language or an interpreted language?

→ Justify your answer with execution steps.

→ Python is an interpreted language because that the first compiles code into bytecode, which can be executed by the python virtual machine.

source code (.py)

↓ (compilation through python compiler)

Bytecode (.pyc)

↓ (Interpreted by)

Python virtual machine (PVM)

↓

output

5) What is the purpose of the __pycache__ folder?

→ The purpose of the __pycache__ folder is to store .Pyc bytecode file.

6) Python is called a dynamically typed language. Explain this with a short code example.

→

Python is the dynamically typed language because at the time of variable declaration there is no need to declare a type of variable. Python automatically detect it at runtime.

Ex.

~~def~~ x = 10

print(type(x)) # <class 'int'>

x = "Hello"

print(type(x)) # <class 'str'>

x = 3.14

print(type(x)) # <class 'float'>

7) Explain why python is considered:

- platform independent
- portable

→ i) platform independent-

python considered platform independent language because the same python code can run on different systems without changing the source code.

- python code can be compiled into bytecode in .pyc file.
- this bytecode is executed by the python virtual machine.
- Each operating system has its own pvm, but the bytecode remains same.

ii) portable-

python is considered portable because a python program can be moved from one system to another and executed with little or no change.

8) What do you understand by 'Indentation-specific language'?

Why is indentation mandatory in Python?

→ Indentation specific language:

A language where indentation (spaces / tabs) is used to define the code blocks instead of braces {}.

Python uses indentation to define the structure of the program such as :

- function bodies
- loops
- conditional blocks
- class definitions.

Why indentation mandatory -

Indentation is mandatory because it is used to define code blocks.

- According to the official python documentation leading whitespace determines the grouping of statements. without indentation, python cannot understand which statement belongs to loops, conditions, functions or classes.

9) What will happen if indentation is not maintained properly? Explain with a small code snippet.

→ If indentation is not maintained properly in python it raises an IndentationError or behave logically incorrect, because python uses indentation to define code blocks.

Ex.

```
if True:  
    print("Hello")
```

O/P → IndentationError: expected an indented block.

10) Python supports multiple programming paradigms. Name any three paradigms and explain one in brief.

→ Python supports multiple programming paradigms, meaning it allows different styles of programming.

- i) Procedural programming
- ii) object-oriented programming
- iii) functional programming

Object oriented programming -

Object oriented programming paradigm where programs are built using

classes and object. It helps in organizing code by combining data(variable) and behaviour (methods) into a single unit called class, which improves code reusability and maintainability.