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| Experiment No. 12 |
| Demonstrate the concept of Multi-threading |
| Date of Performance:08/04/2024 |
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Experiment No. 12

Title: Demonstrate the concept of Multi-threading

Aim: To study and implement the concept of Multi-threading

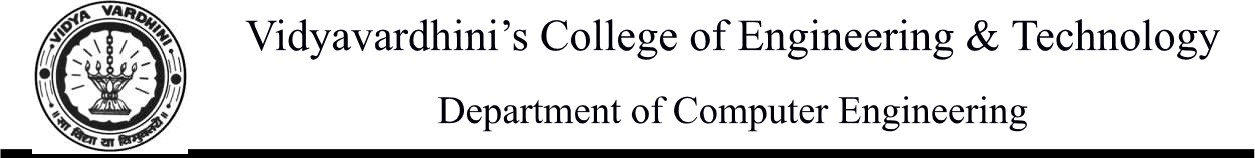
Objective: To introduce the concept of Multi-threading in python

Theory:

# Thread

In computing, a process is an instance of a computer program that is being executed. Any process has 3 basic components:

* An executable program.
* The associated data needed by the program (variables, work space, buffers, etc.)
* The execution context of the program (State of process)

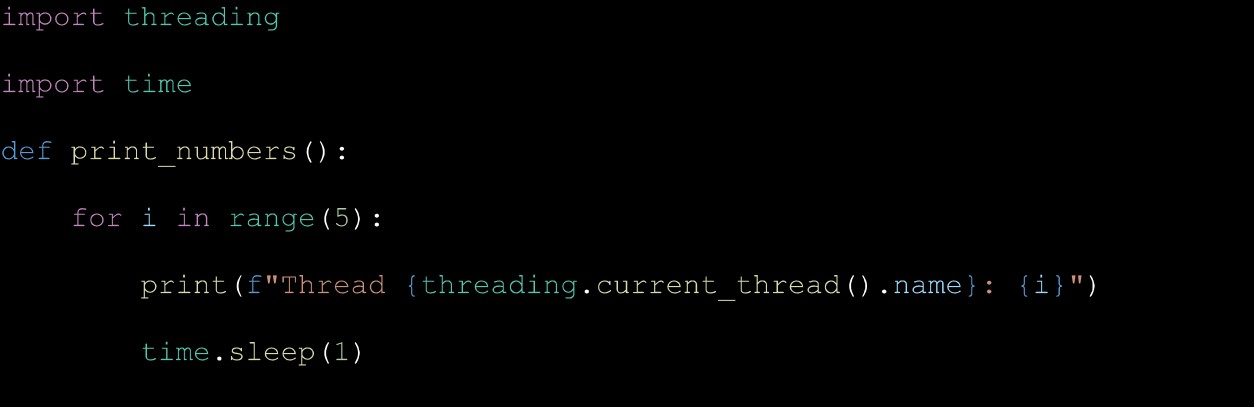
A thread is an entity within a process that can be scheduled for execution. Also, it is the smallest unit of processing that can be performed in an OS (Operating System).

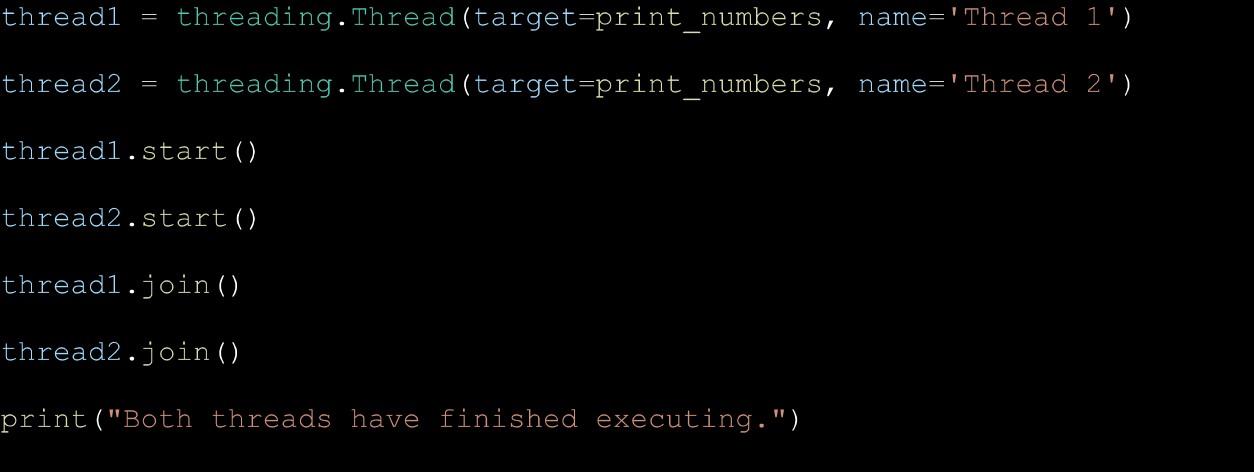
In simple words, a thread is a sequence of such instructions within a program that can be executed independently of other code. For simplicity, you can assume that a thread is simply a subset of a process!

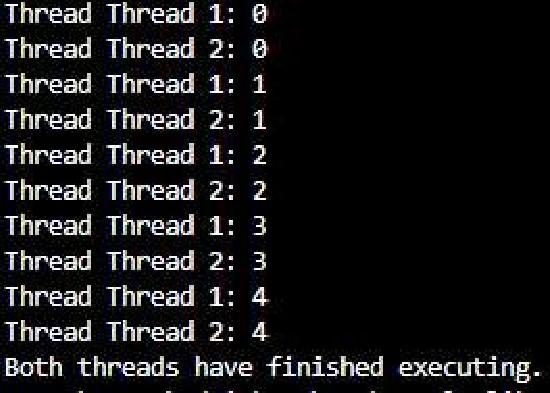
A thread contains all this information in a Thread Control Block (TCB):

* Thread Identifier: Unique id (TID) is assigned to every new thread
* Stack pointer: Points to thread's stack in the process. Stack contains the local variables under thread's scope.
* Program counter: a register which stores the address of the instruction currently being executed by thread.
* Thread state: can be running, ready, waiting, start or done.
* Thread's register set: registers assigned to thread for computations.
* Parent process Pointer: A pointer to the Process control block (PCB) of the process that the thread lives on.

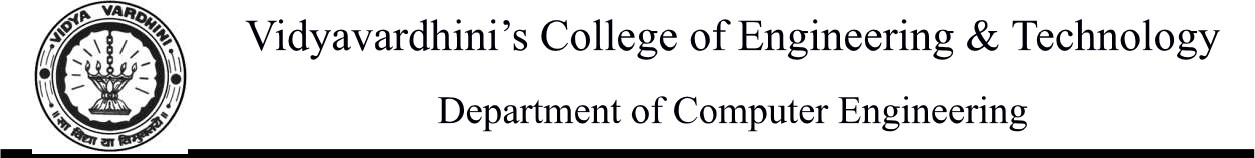
Code:







Output:

**Conclusion:** multi-threading is a powerful concept in Python (and in programming in general) that allows multiple threads of execution to run concurrently within the same process. This enables programs to perform multiple tasks simultaneously, improving performance and responsiveness.